TEST REPORT

of

FCC Part 15 Subpart C

 \boxtimes New Application; \square Class I PC; \square Class II PC

Product :	Flo Home Water Monitoring and Control	
Brand:	Flo Technologies, Inc.	
Model:	900-001	
Model Difference:	N/A	
FCC ID:	PU5900-001	
FCC Rule Part:	§15.247, Cat: DTS	
Applicant:	Wistron Corporation	
Address:	21F., No. 88, Sec. 1, HsinTai 5th Rd., Hsichih Dist, New Taipei City 221	

Test Performed by: International Standards Laboratory

<Lung-Tan LAB> *Site Registration No. BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-4;

*Address: No. 120, Lane 180, San Ho Tsuen, Hsin Ho Rd. Lung-Tan Hsiang, Tao Yuan County 325, Taiwan *Tel: 886-3-407-1718; Fax: 886-3-407-1738

Report No.: ISL-17LR356FC Issue Date : 2018/01/15

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.

This test report shall not be reproduced except in full, without the written approval of International Standards Laboratory.



VERIFICATION OF COMPLIANCE

Applicant: Wistron Corporation	
Product Description:	Flo Home Water Monitoring and Control
Brand Name:	Flo Technologies, Inc.
Model No.:	900-001
Model Difference:	N/A
FCC ID:	PU5900-001
Date of test:	2017/12/28 ~ 2018/01/12
Date of EUT Received:	2017/12/28

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

Test By:	Lake Cheng	Date:	2018/01/15
	Lake Cheng / Engineer		
Prepared By:	Gigi yeh	Date:	2018/01/15
	Gigi Yeh / Engineer		
Approved By:	DinoChen	Date:	2018/01/15

Dino Chen / Sr. Engineer



Version

Version No.	Date	Description	
00	2018/01/15	Initial creation of document	



Description Of Test	Uncertainty
Conducted Emission (AC power line)	2.586 dB
Field Strength of Spurious Radiation	<=30MHz: 2.96dB 30-1GHz: 4.22 dB 1-40 GHz: 4.08 dB
Conducted Power	2.412 GHz: 1.30 dB 5.805 GHz: 1.55 dB
Power Density	2.412 GHz:1.30 dB 5.805 GHz: 1.67 dB
Frequency	0.0032%
Time	0.01%
DC Voltage	1%

Uncertainty of Measurement

-4 of 65-

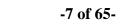


Table of Contents

1	GEN	ERAL INFORMATION	.7
	1.1	Related Submittal(s) / Grant (s)	
	1.2	Test Methodology	. 8
	1.3	Test Facility	. 8
	1.4	Special Accessories	
	1.5	Equipment Modifications	. 8
2	SYST	TEM TEST CONFIGURATION	. 9
	2.1	EUT Configuration	. 9
	2.2	EUT Exercise	. 9
	2.3	Test Procedure	
	2.4	Configuration of Tested System	10
3	SUM	MARY OF TEST RESULTS	11
4	DES	CRIPTION OF TEST MODES	11
5	CON	DUCTED EMISSION TEST	
	5.1	Standard Applicable:	
	5.2	Measurement Equipment Used:	
	5.3	EUT Setup:	
	5.4	Measurement Procedure:	
	5.5	Measurement Result:	
6	PEA	K OUTPUT POWER/ERIP MEASUREMENT	
	6.1	Standard Applicable:	
	6.2	Measurement Equipment Used:	
	6.3	Test Set-up:	
	6.4	Measurement Procedure:	
	6.5	Measurement Result:	
7		Bandwidth & 99% Bandwidth	
	7.1	Standard Applicable:	
	7.2	Measurement Equipment Used:	
	7.3	Test Set-up:	
	7.4	Measurement Procedure:	
	7.5	Measurement Result:	
8		Hz BANDWIDTH OF BAND EDGES MEASUREMENT	
	8.1	Standard Applicable:	
	8.2	Measurement Equipment Used:	
	8.3	Test SET-UP:	
	8.4	Measurement Procedure:	
	8.5 8.6	Field Strength Calculation:	
_		Measurement Result:	
9	SPUI 9.1	RIOUS RADIATED EMISSION TEST	
	9.1 9.2	Standard Applicable Measurement Equipment Used:	
	9.2 9.3	Test SET-UP:	
	9.3 9.4	Measurement Procedure:	
	9. 4	Field Strength Calculation	
	9.6	Measurement Result:	
	2.0		.0



10	Peak	Power Spectral Density	
		Standard Applicable:	
	10.2	Measurement Equipment Used:	
		Test Set-up:	
		Measurement Procedure:	
	10.5	Measurement Result:	
11	ANTI	ENNA REQUIREMENT	
	11.1	Standard Applicable:	
		Antenna Connected Construction:	





1 GENERAL INFORMATION

General:

Product Name	Flo Home Water Monitoring and Control
Brand Name Flo Technologies, Inc.	
Model Name	900-001
Model Difference	N/A
Downer Supply	100~240VAC form AC/DC Adapter
Power Supply	Adapter : Model:RH-120200US
Micro USB port	One provided
Operation Environment	Outdoor used

2.4GHz WLAN: 2TX/2RX

Wi-Fi	Frequency Range (MHz)	Channels	Peak / Average Power	Modulation Technology	
802.11b	2412 - 2462(DTS)	11	17.74 dBm (PK)	DSSS	
802.11g	2412 – 2462(DTS)	11	20.16 dBm (PK)		
802.11n	HT20 2412 – 2462(DTS)	11	23.15 dBm (PK)	OFDM	
802.11n	HT40 2422 – 2452(DTS)	9	19.45 dBm (PK)		
Modulation type		CCK, DQPSK, DBPSK for DSSS 64QAM. 16QAM, QPSK, BPSK for OFDM			
		PIFA Antenna WiFi 2.4G Antenna 1&2 : 5.18dBi			
Antenna Designation		Nss=2 for spatial multiplexing According to KDB662911 D01 SM-MIMO signals could be considered uncorrelated for purposes of direc- tional gain computation. Directional gain = G_{ANT}			
Tune up po	wer (Average)	+/- 0.5 dBm	1		

This report applies for 2.4GHz Wifi.

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: <u>PU5900-001</u> filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules.

1.2 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

KDB Document: 558074 D01 DTS Meas Guidance

1.3 Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of International Standards Laboratory <Lung-Tan LAB> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents . FCC Registration Number is: 872200; Designation Number is: TW1036, Canada Registration Number: 4067B-4.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.



2 SYSTEM TEST CONFIGURATION

2.1 EUT Configuration

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

2.2 EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 6 of ANSI C63.10: 2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR 16-1-1 Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m/1.5m (Frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maxi-mum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 6 and 11 of ANSI C63.10: 2013.



2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System (Fixed channel)



Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/ Type No.	Series No.	Data Cable	Power Cord
1	Notebook	HP	ProBook 440 G2	1588-3003	NA	Non-shielded
2	Test Kit	NA	NA	NA	NA	NA



3 SUMMARY OF TEST RESULTS

FCC Rules	Description Of Test	Result
§15.207(a)	AC Power Line Conducted Emission	Compliant
§15.247(b) (3),(4)	Peak Output Power	Compliant
§15.247(a)(2)	6dB Power Bandwidth	Compliant
§15.247(d)	100 KHz Bandwidth Of Frequency Band Edges	Compliant
§15.247(d)	Spurious Emission	Compliant
§15.247(e)	Peak Power Density	Compliant
§ 15.203	Antenna Requirement	Compliant

4 DESCRIPTION OF TEST MODES

The EUT has been tested under engineering operating condition.

Test program used to control the EUT for staying in continuous transmitting mode is programmed.

WLAN:

802.11 b mode: Channel low (2412MHz), mid (2437MHz), high (2462MHz) with 1Mbps lowest data rate are chosen for full testing.

802.11 g mode: Channel low (2412MHz), mid (2437MHz), high (2462MHz) with 6Mbps lowest data rate are chosen for full testing.

802.11 n _20MHz: Channel low (2412MHz), mid (2437MHz), high (2462MHz) with 6.5Mbps lowest data rate are chosen for full testing.

802.11 n _40MHz: Channel low (2422MHz), mid (2437MHz), high (2462MHz) with 13.5Mbps lowest data rate are chosen for full testing.

The worst case 802.11n _20MHz mode was reported for Radiated Emission.



5 CONDUCTED EMISSION TEST

5.1 Standard Applicable:

According to \$15.207, frequency range within 150KHz to 30MHz shall not exceed the Limit table as below.

Frequency range	Limits dB(uV)			
MHz	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46		
0.50 to 5	56	46		
5 to 30	60	50		
Note				
1. The lower limit shall apply at the transition frequencies				

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

5.2 Measurement Equipment Used:

	Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
TYPE		NUMBER	NUMBER	CAL.				
Conduction 04-3	WOKEN	CFD 300-NL	Conduction 04	09/11/2017	09/10/2018			
Cable			-3					
EMI Receiver 16	Rohde &	ESCI	101221	10/23/2017	10/22/2018			
	Schwarz							
LISN 18	ROHDE &	ENV216	101424	02/05/2017	02/04/2018			
	SCHWARZ							
LISN 19	ROHDE &	ENV216	101425	03/07/2017	03/06/2018			
	SCHWARZ							
Track Cafferran	E	EZEMC						
Test Software	Farad	Ver:ISL-03A2	N/A	N/A	N/A			

5.3 EUT Setup:

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4: 2014..
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.



5.4 Measurement Procedure:

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all frequency measured were complete.

5.5 Measurement Result:

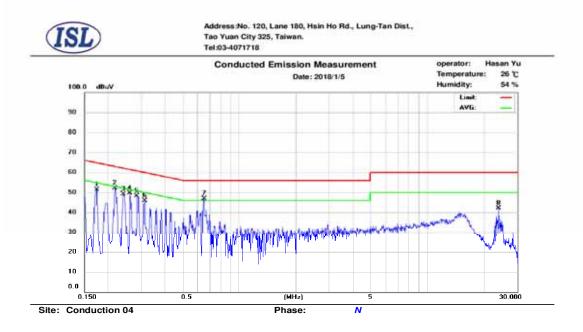
The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.



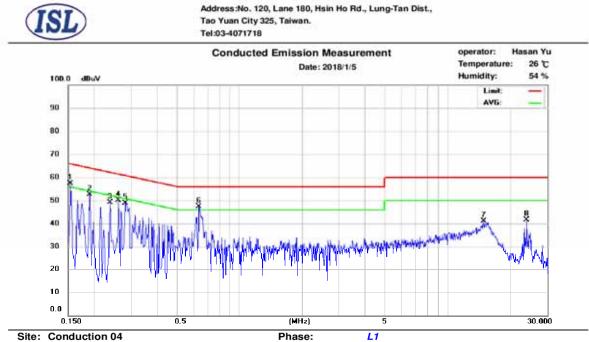
AC POWER LINE CONDUCTED EMISSION TEST DATA

Operation Mode:	Normal operation	Test Date:	2018/01/05
Test By:	Lake		



No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.174	43.46	22.48	9.30	52.76	64.77	-12.01	31.78	54.77	-22.99
2	0.218	40.89	21.13	9.30	50.19	62.89	-12.70	30.43	52.89	-22.46
3	0.242	39.13	20.95	9.30	48.43	62.03	-13.60	30.25	52.03	-21.78
4	0.262	37.66	20.30	9.30	46.96	61.37	-14.41	29.60	51.37	-21.77
5	0.286	35.92	18.95	9.30	45.22	60.64	-15.42	28.25	50.64	-22.39
6	0.314	34.14	17.20	9.31	43.45	59.86	-16.41	26.51	49.86	-23.35
7	0.650	35.32	25.42	9.35	44.67	56.00	-11.33	34.77	46.00	-11.23
8	24.002	34.22	30.47	9.90	44.12	60.00	-15.88	40.37	50.00	-9.63





-15 of 65-

No.	Frequency (MHz)	QP_R (dBuV)	AVG_R (dBuV)	Correct Factor (dB)	QP Emission (dBuV)	QP Limit (dBuV)	QP Margin (dB)	AVG Emission (dBuV)	AVG Limit (dBuV)	AVG Margin (dB)
1	0.154	47.52	26.32	9.94	57.46	65.78	-8.32	36.26	55.78	-19.52
2	0.190	43.36	22.10	9.93	53.29	64.04	-10.75	32.03	54.04	-22.01
3	0.238	41.05	20.92	9.93	50.98	62.17	-11.19	30.85	52.17	-21.32
4	0.262	38.72	20.56	9.93	48.65	61.37	-12.72	30.49	51.37	-20.88
5	0.282	37.15	19.57	9.93	47.08	60.76	-13.68	29.50	50.76	-21.26
6	0.638	36.22	27.62	9.95	46.17	56.00	-9.83	37.57	46.00	-8.43
7	14.882	25.82	17.21	10.24	36.06	60.00	-23.94	27.45	50.00	-22.55
8	24.002	34.20	30.61	10.32	44.52	60.00	-15.48	40.93	50.00	-9.07



6 PEAK OUTPUT POWER

6.1 Standard Applicable:

According to §15.247(b)(3),(4)(b)

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

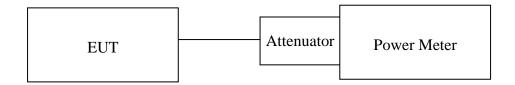
(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.



	Conducted Emission Test Site							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.			
ТҮРЕ		NUMBER	NUMBER	CAL.				
Power Meter 05	Anritsu	ML2495A	1116010	09/07/2017	09/06/2018			
Power Sensor 05	Anritsu	MA2411B	34NKF50	09/07/2017	09/06/2018			
Power Sensor 06	DARE	RPR3006W	13I00030SN O33	12/12/2017	12/11/2018			
Power Sensor 07	DARE	RPR3006W	13I00030SN O34	12/12/2017	12/11/2018			
Temperature Chamber	KSON	THS-B4H100	2287	12/02/2017	12/01/2018			
DC Power supply	ABM	8185D	N/A	11/06/2017	11/05/2018			
AC Power supply	EXTECH	CFC105W	NA	12/25/2017	12/24/2018			
Attenuator	Woken	Watt-65m3502	11051601	NA	NA			
Splitter	MCLI	PS4-199	12465	12/26/2017	12/25/2019			
Spectrum analyzer	keysight	N9010A	MY56070257	07/07/2017	07/06/2018			
Spectrum analyzer	R&S	FSP40	100143	11/02/2017	11/01/2018			
Test Sofware	DARE	Radimation Ver:2013.1.23	NA	NA	NA			

6.2 Measurement Equipment Used:

6.3 Test Set-up:



6.4 Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
- 3. Record the max. reading.
- 4. Repeat above procedures until all frequency measured were complete.



6.5 Measurement Result:

Cable loss $= 0$	Output Power			
СН	Detector		Limit	Result
	РК	AV	(dBm)	Result
	(dBm)	(dBm)		
Low	17.69	15.70		
Mid	17.74	15.75	30.00	Pass
High	17.64	15.10		

802.11g

Cable loss $= 0$	Output Power			
СН	Detector		Limit	Result
	РК	AV	(dBm)	Result
	(dBm)	(dBm)		
Low	19.73	10.85		
Mid	20.16	14.55	30.00	Pass
High	19.25	10.44		

802.11HT20: 2TX*2RX

Channel		Output Ch	ain (dBm)	Combined		
		Chain 1	chain 2	Output Power (dBm)	Limit(dBm)	Result
000 11 11700	Low	19.13	20.52	22.89	30.00	
802.11n HT20 (Peak)	Mid	19.16	20.94	23.15	30.00	
(i cuit)	High	19.05	20.63	22.92	30.00	Pass
000 11 11700	Low	10.76	11.13	13.96	30.00	rass
802.11n HT20 (Average)	Mid	10.94	11.93	14.47	30.00	
(Trioluge)	High	10.57	11.37	14.00	30.00	

802.11HT40

Cable loss $= 0$	Output Power			
СН	Detector		Limit	Degult
	РК	AV	(dBm)	Result
	(dBm)	(dBm)		
Low	18.93	8.42		
Mid	19.45	9.33	30.00	Pass
High	19.29	9.08		



7 6dB Bandwidth

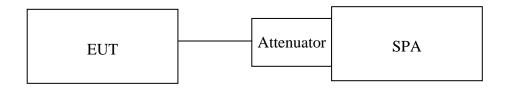
7.1 Standard Applicable:

According to §15.247(a)(2), Systems using digital modulation techniques may operate in the 902 - 928 MHz,2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500kHz.

7.2 Measurement Equipment Used:

Refer to section 6.2 for details.

7.3 Test Set-up:



7.4 Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW=100KHz, VBW = 3*RBW, Span= cover the complete power envelope of the signal of the UUT Sweep=auto
- 4. Mark the peak frequency and –6dB (upper and lower) frequency.
- 5. Repeat above procedures until all frequency measured were complete.



7.5 Measurement Result:

802.11b

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	10.09	> 500	PASS
Mid	10.09	> 500	PASS
High	10.09	> 500	PASS

802.11g

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	15.11	> 500	PASS
Mid	15.12	> 500	PASS
High	15.12	> 500	PASS

802.11n HT20

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
Low	15.13	> 500	PASS
Mid	15.12	> 500	PASS
High	15.11	> 500	PASS

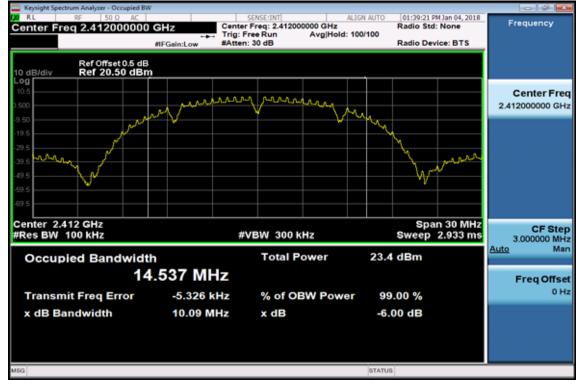
802.11n HT40

Frequency (MHz)	6dB Bandwidth (MHz)	Limit (KHz)	Result
(IVIIIZ)	(191112)	(KIIZ)	
Low	35.06	> 500	PASS
Mid	33.86	> 500	PASS
High	35.08	> 500	PASS

Note: Refer to next page for plots.



802.11b 6dB Band Width Test Data CH-Low



6dB Band Width Test Data CH-Mid

Keysight Spectrum Analyzer - Occupied BW	1				
RL RF 50 Ω AC Center Freq 2.437000000	Trig: F	SENSE:INT] A r Freq: 2.437000000 GHz Free Run Avg Hold: h: 30 dB	Radio Std		Frequency
10 dB/div Ref Offset 0.5 dB	1				
10.6 0.500	www.	Junio	m.		Center Freq 2.437000000 GHz
-19.5 -29.5 -39.5 -49.5				v	
Center 2.437 GHz #Res BW 100 kHz	#	VBW 300 kHz		n 30 MHz 2.933 ms	CF Step 3.00000 MHz
Occupied Bandwidt	^h .513 MHz	Total Power	23.2 dBm		Auto Man
Transmit Freq Error x dB Bandwidth	-9.299 kHz 10.09 MHz	% of OBW Powe x dB	r 99.00 % -6.00 dB		0 Hz
MSG			STATUS		



Keysight Spect GH2 SENSE:INT ALIGN AUTO Center Freq: 2.45200000 GHz Trig: Free Run Avg|Hold: 100/100 #IFGain:Low #Atten: 30 dB 01:42:36 PM Jan 04, 2018 Radio Std: None Frequency Center Freq 2.462000000 GHz Radio Device: BTS Ref Offset 0.5 dB Ref 20.50 dBm 0 dB/di **Center Freq** row man . . A 0 -2.462000000 GHz Center 2.462 GHz #Res BW 100 kHz Span 30 MHz Sweep 2.933 ms CF Step 3.000000 MHz #VBW 300 kHz Auto Man **Occupied Bandwidth Total Power** 23.0 dBm 14.526 MHz Freq Offset 0 Hz -4.064 kHz Transmit Freq Error % of OBW Power 99.00 % x dB Bandwidth 10.09 MHz x dB -6.00 dB STATUS

6dB Band Width Test Data CH-High

802.11g 6dB Band Width Test Data CH-Low

Keysight Spectrum Analyzer - Occupied BV RL RF 50 Ω AC Center Freq 2.412000000	GHz Center	ENSE:INT		2 PM Jan 04, 2018 itd: None	Frequency
	#IFGain:Low #Atten:			evice: BTS	
10 dB/div Ref Offset 0.5 dB	n				
د میں اور	where have been and a second sec	Juntonan	mar		Center Freq 2.412000000 GHz
-19.5 -29.5 -39.5			- Andrewsky	mmunia	
-49.5					
-69.5 Center 2.412 GHz				oan 30 MHz	CF Step
#Res BW 100 kHz	#V	/BW 300 kHz		p 2.933 ms	3.000000 MHz Auto Man
Occupied Bandwidt	հ 6.258 MHz	Total Power	17.8 dBm		Freq Offset
Transmit Freq Error	-4.790 kHz	% of OBW Pow	er 99.00 %		0 Hz
x dB Bandwidth	15.11 MHz	x dB	-6.00 dB		
MSG			STATUS		

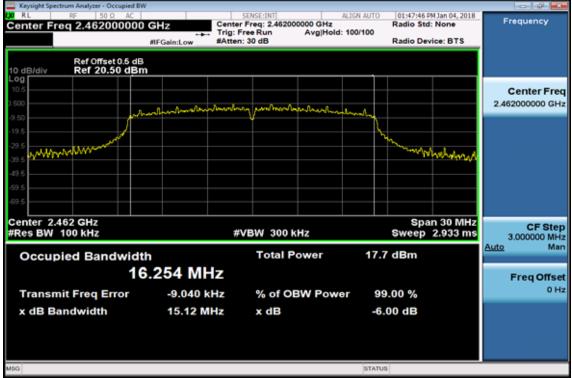




-23 of 65-

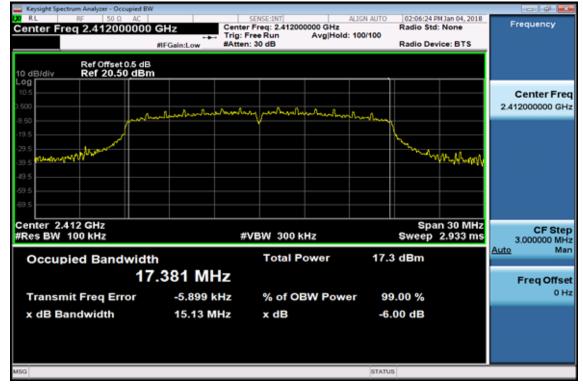
6dB Band Width Test Data CH-Mid

6dB Band Width Test Data CH-High





802.11n_20M 6dB Band Width Test Data CH-Low

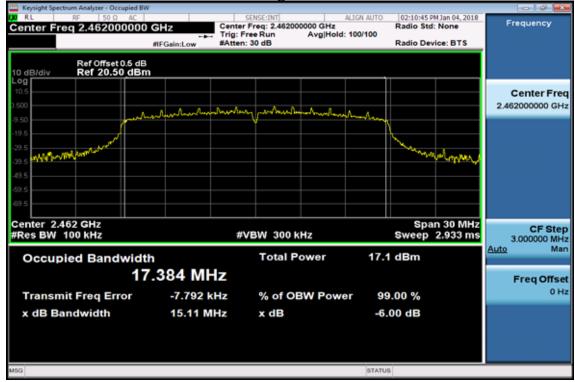


6dB Band Width Test Data CH-Mid

Keysight Spectrum Analyzer - Occupied										
RL RF 50 Ω AC Center Freq 2.4370000 Δ <th th="" δ<=""><th></th><th>SENSE:INT Center Freq: 2.43700 Trig: Free Run #Atten: 30 dB</th><th></th><th>Radio St 0/100</th><th>PM Jan 04, 2018 d: None wice: BTS</th><th>Frequency</th></th>	<th></th> <th>SENSE:INT Center Freq: 2.43700 Trig: Free Run #Atten: 30 dB</th> <th></th> <th>Radio St 0/100</th> <th>PM Jan 04, 2018 d: None wice: BTS</th> <th>Frequency</th>		SENSE:INT Center Freq: 2.43700 Trig: Free Run #Atten: 30 dB		Radio St 0/100	PM Jan 04, 2018 d: None wice: BTS	Frequency			
	Ref Offset 0.5 dB /div Ref 20.50 dBm									
0.5	handler	Auron	····h····h····	mhan.		Center Freq 2.437000000 GHz				
-9.50 -19.5 -29.5 WWWWWWWWWW				A. additioned	whater a					
-49.5										
-69.5										
Center 2.437 GHz #Res BW 100 kHz		#VBW 300 H	Hz		an 30 MHz 2.933 ms	CF Step 3.000000 MHz				
Occupied Bandwi	^{dth} 17.618 MH	Total P	ower	20.6 dBm		Auto Man Freq Offset				
Transmit Freq Error x dB Bandwidth	-14.306 ki 15.12 Mi		BW Power	99.00 % -6.00 dB		0 Hz				
MSG				STATUS						



6dB Band Width Test Data CH-High

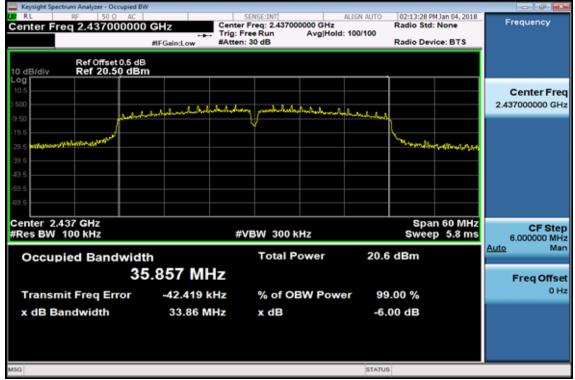


802.11n_40M 6dB Band Width Test Data CH-Low

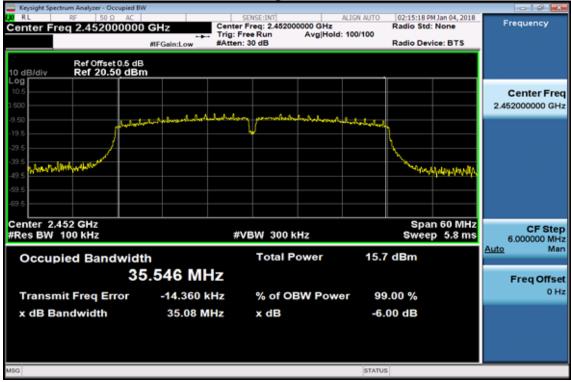
Keysight Spectrum Analyzer - Occupied B	w				
Center Freq 2.42200000		SENSE:INT r Freq: 2.422000000 GHz	Radio St	PM Jan 04, 2018 d: None	Frequency
		Free Run Avg Hold n: 30 dB		vice: BTS	
10 dB/div Ref 20.50 dB					
10.5 0.500		ang purchalada fair ala and			Center Freq 2.422000000 GHz
-19.5	pagalage (Agelgage and and an and a		-labelalad		
29.5 39.5 49.5			and the second	whether they	
-69.5					
Center 2.422 GHz #Res BW 100 kHz	#	*VBW 300 kHz	Sp Swe	an 60 MHz ep 5.8 ms	CF Step 6.000000 MHz
Occupied Bandwid		Total Power	16.0 dBm		<u>Auto</u> Man
3	5.528 MHz				Freq Offset
Transmit Freq Error	-13.994 kHz	% of OBW Pow	er 99.00 %		0 Hz
x dB Bandwidth	35.06 MHz	x dB	-6.00 dB		
MSG			STATUS		



6dB Band Width Test Data CH-Mid



6dB Band Width Test Data CH-High





8 100KHz BANDWIDTH OF BAND EDGES MEASUREMENT

8.1 Standard Applicable:

According to \$15.247(d), in any 100 KHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in \$15.205(a), must also comply with the radiated emission limits specified in15.209(a).

8.2 Measurement Equipment Used:

7.2.1. Conducted Emission at antenna port:

Refer to section 6.2 for details.



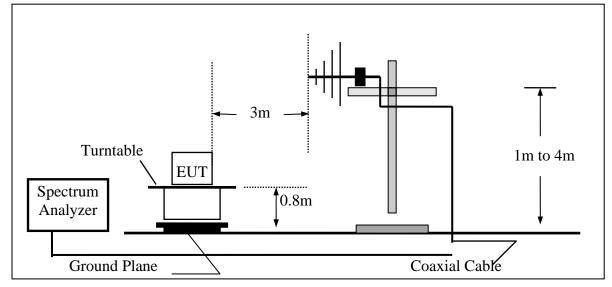
7.2.2. Radiated emission:

Chamber 14(966)										
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.					
ТҮРЕ		NUMBER	NUMBER	CAL.						
966 Chamber	Chance Most	Chamber 19	N/A	08/14/2017	08/13/2018					
Spectrum Analyzer 21(3Hz-44GHz)	Agilent	N9030A	MY51360021	11/20/2017	11/19/2018					
EMI Receiver	SCHWARZBECK	FCVU1534	1534149	12/07/2017	12/06/2018					
Loop Antenna(9K-30M)	EM	EM-6879	271	11/01/2016	10/31/2018					
Bilog Antenna (30M-1G)	SCHWARZBECK	VULB9168 w 5dB Att	736	11/16/2017	11/25/2018					
Horn antenna (1G-18G)	SCHWARZBECK	9120D	9120D-1627	11/27/2017	11/26/2019					
Horn antenna (18G-26G)	Com-power	AH-826	081001	11/21/2017	11/20/2019					
Horn antenna (26G-40G)	Com-power	AH-640	100A	02/22/2017	02/21/2019					
Preamplifier (9k-1000M)	HP	8447F 3113A04621		12/08/2017	12/07/2018					
Preamplifier(1G-26G)	Agilent	8449B	3008A02471	08/24/2017	08/23/2018					
Preamplifier (26G-40G)	MITEQ	JS4-26004000- 27-5A	818471	11/20/2017	07/21/2019					
RF Cable (9k-18G)	HUBER SUHNER	SUCOFLEX 104A	MY1397/4A	11/02/2017	11/01/2018					
RF cable (18G~40G)	HUBER SUHNER	Sucoflex 102	27963/2&37421/2	11/02/2017	11/01/2018					
Turn Table	MF	Turn Table-19	Turn Table-19	N/A	N/A					
Mast Tower	MF	JSDES-15A	1308283	N/A	N/A					
Controller	MF	MF-7802BS	MF780208460	N/A	N/A					
AC power source	T-Power	TFC-1005	40006471	N/A	N/A					
Signal Generator	R&S	SMU200A	102330	03/15/2017	03/14/2018					
Signal Generator	Anritsu	MG3692A	20311	12/07/2017	12/06/2018					
2.4G Filter	Micro-Tronics	Brm50702	76	12/25/2017	12/24/2018					
Test Software	Audix	E3 Ver:6.12023	N/A	N/A	N/A					

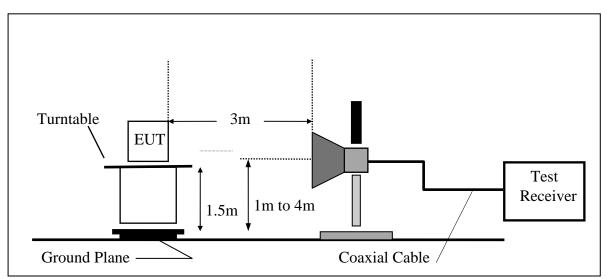


8.3 Test SET-UP:

The test item only performed radiated mode (A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



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





8.4 Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set center frequency of spectrum analyzer = operating frequency.
- 4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=25MHz, Sweep = auto
- 5. Mark Peak, 2.390GHz and 2.4835GHz and record the max. level.
- 6. Repeat above procedures until all frequency measured were complete.

8.5 Field Strength Calculation:

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

FS = RA + AF + CL - AG

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

8.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.



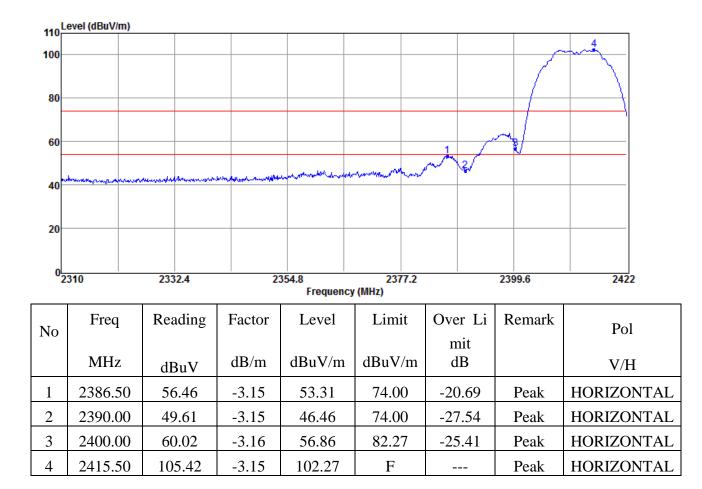
Radiated Emission: 802.11 b mode

Operati Fundan	diated Emission: 802.11 b modeeration ModeTX CH Lowndamental Frequency2412 MHzmperature25					Test Date Test By	2017/08 Lake	/29
Temper	rature	25				Humidity	60 %	
110	evel (dBuV/m)							
100								4
80								
60							~	
40	mbahanaand	Haranna Martaneto	unghlumm	anadan tara ara da a	un and a start	and and and and		
20								
0 ₂	310	2332.4	23	354.8 Frequency	2377.2 / (MHz)		2399.6	2422
No	Freq	Reading	Factor	Level	Limit	Over Li mit	Remark	Pol
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		V/H
1	2386.05	52.86	-3.14	49.72	74.00	-24.28	Peak	VERTICAL
2	2390.00	49.44	-3.15	46.29	74.00	-27.71	Peak	VERTICAL
3	2400.00	57.15	-3.16	53.99	81.41	-27.42	Peak	VERTICAL
4	2413.26	104.57	-3.16	101.41	F	-	Peak	VERTICAL

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.





-32 of 65-

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



-	ion Mode nental Freque rature		TX CH High 2462 MHz 25				Test Date Test By Humidity	/29	
440 ^{L6}	evel (dBuV/m)								
100		1							
80									
7	/								
60						~	2		
						man and a start	mannesser	non white make white	h Judinska
40									
20-									
20									
0	452	2461.6	2471.	-		2480.8	2490.4		2500
24	432	2401.0	24/1.	Z Frequen	cy (MHz		2490.4		2000
Ŋ	Freq	Reading	Factor	Lev	rel	Limit	Over Li	Remark	Pol
No	-						mit		POI
	MHz	dBuV	dB/m	dBu∖	//m	dBuV/m	dB		V/H
1	2463.57	104.91	-3.13	101.	78	F		Peak	VERTICAL
2	2483.50	51.54	-3.11	48.4	43	74.00	-25.57	Peak	VERTICAL

-33 of 65-

Remark:

3

2487.71

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

51.31

74.00

-22.69

Peak

VERTICAL

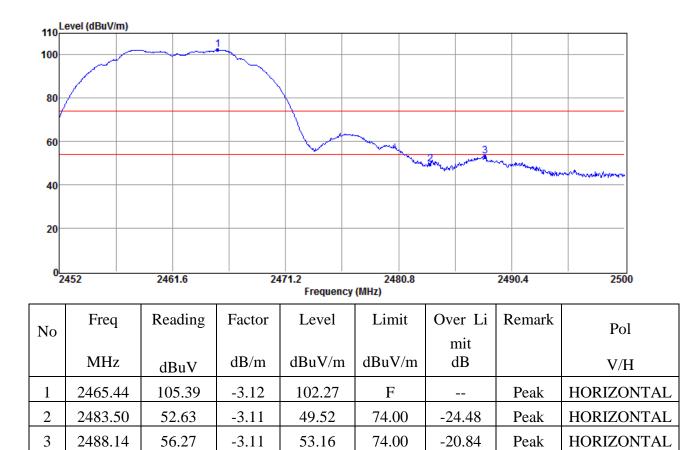
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Note: "F" denotes fundamental frequency

54.42

-3.11





-34 of 65-

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



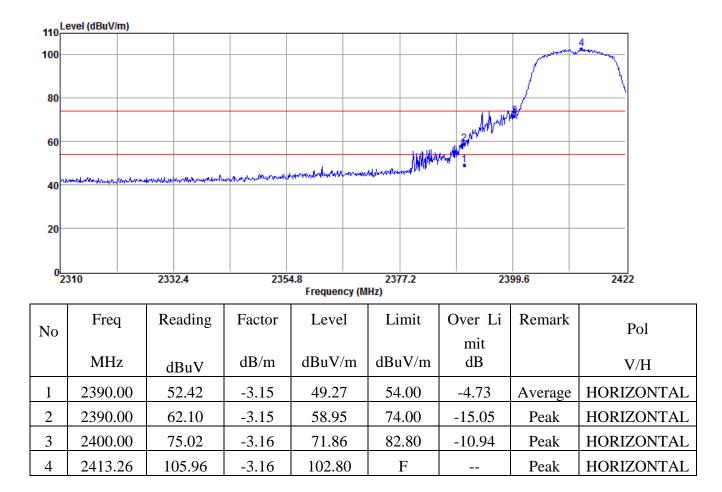
Radiated Emission: 802.11 g mode

Funda	Deperation ModeTX CH LowFundamental Frequency2412 MHzFemperature25							Test Da Test By Humidit		2017 Lake 60 %	e	/29		
110	Level (dBuV/m)													
100											and the second	4		
											<u></u>			
80														
	n. get Mereken an an all								2	7				
60								Mar	W 1					
40	world Workson and works	wandow	Mathedina	munichal	Manpanand	open white the	ANTHAN	W.J. M. WINN	· ·					
20														
0	2310	233	2.4	235	4.8 Frequen		2377.	2	23	99.6	i		2422	
				The second se			Γ	•	0 I		D	1		
No	Freq	R	eading	Factor	Lev	vel	L1	mit	Over L	.1	Rema	ark	Po	ol
	MHz			dB/m	dBu	V/m	dBu	ıV/m	mit dB	mit dB			V /]	и
1			dBuV		_						A			
1	2390.00		51.76	-3.15	48.			.00	-5.39		Avera	Ŭ	VERT	
2	2390.00) (61.35	-3.15	58.	20	74	.00	-15.80		Pea	.k	VERT	ICAL
3	2400.00	0 7	70.60	-3.16	67.	44	80).52	-13.08		Pea	k	VERT	ICAL
4	2414.83	3 1	03.68	-3.16	100	.52]	F			Pea	k	VERT	ICAL

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.





-36 of 65-

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

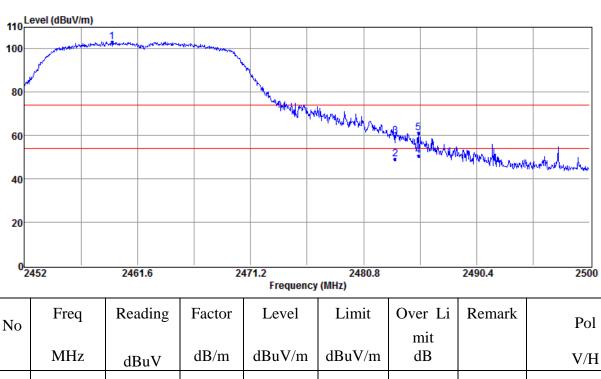


-	tion Mod mental F prature		TX CH 2462 N 25	-				Г	Fest Date Fest By Humidity	Lake	e	/29	
110	_evel (dBuV/	(m)											
100			and the second										
80#	And the second second			No.	M								
60-					""Wheel and	Million W	Nubi Winnung Maliy 2	5					
40-								•	and work of the state of the st	linnum	Norman	murre	
20													
02	2452		2461.6	2471	.2 Frequen	cy (MHz	2480.8 z)		2490).4		2500)
No	Fre	q	Reading	Factor	Lev	rel	Limit		Over Li mit	Rema	ark		Pol
	MH	[z	dBuV	dB/m	dBuV	//m	dBuV/m	ı	dB			,	V/H
1	2463	.76	105.04	-3.13	101.	.91	F			Pea	k	VER	RTICAL
2	2483.	.50	52.39	-3.11	49.2	28	54.00		-4.72	Avera	age	VER	RTICAL
3	2483.	.50	62.19	-3.11	59.0	08	74.00		-14.92	Pea	k	VER	TICAL
4	2484.	.30	53.87	-3.11	50.2	76	54.00		-3.24	Avera	age	VER	RTICAL
5	2484	.30	64.06	-3.11	60.	95	74.00		-13.05	Pea	k	VER	RTICAL

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.





-38 of 65-

		uDu v						
1	2459.44	106.37	-3.12	103.25	F		Peak	HORIZONTAL
2	2483.50	52.09	-3.11	48.98	54.00	-5.02	Average	HORIZONTAL
3	2483.50	62.83	-3.11	59.72	74.00	-14.28	Peak	HORIZONTAL
4	2485.46	53.66	-3.10	50.56	54.00	-3.44	Average	HORIZONTAL
5	2485.46	64.47	-3.10	61.37	74.00	-12.63	Peak	HORIZONTAL
-								

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



Radia	ted Emi	ssion:	802.11 n_2	0 mode							
Funda	tion Moc mental F erature		TX CH ncy 2412 M 25						Test Date Test By Humidity	2017/08, Lake 60 %	/29
110	Level (dBuV	/m)							1		
100										1 monthomas	Norman -
80										/	<u> </u>
60									2 Martin Martin		
	mmodMon	dates transformed	wanglawellawellyntynwyra	gulounout datteur	ng of the second second of the	within	NWAM	Mulano	1 1		
20											
0	2310		2332.4	2354	.8 Frequen	cy (MHi	2377 2)	.2	2399.	6	2422
No	Fre	q	Reading	Factor	Lev	vel	L	imit	Over Li mit	Remark	Pol
	MH	[z	dBuV	dB/m	dBuV	//m	dB	uV/m	dB		V/H
1	2390	.00	50.10	-3.15	46.9	95	54	4.00	-7.05	Average	VERTICAL
2	2390	.00	59.44	-3.15	56.2	29	74	4.00	-17.71	Peak	VERTICAL

Remark:

3

4

2400.00

2411.02

72.95

104.23

-3.16

-3.15

Field strength limits for frequency above 1000MHz are based on average limits. However, 1 Peak mode field strength shall not exceed the average limits specified plus 20dB.

69.79

101.08

81.08

F

-11.29

__

Peak

Peak

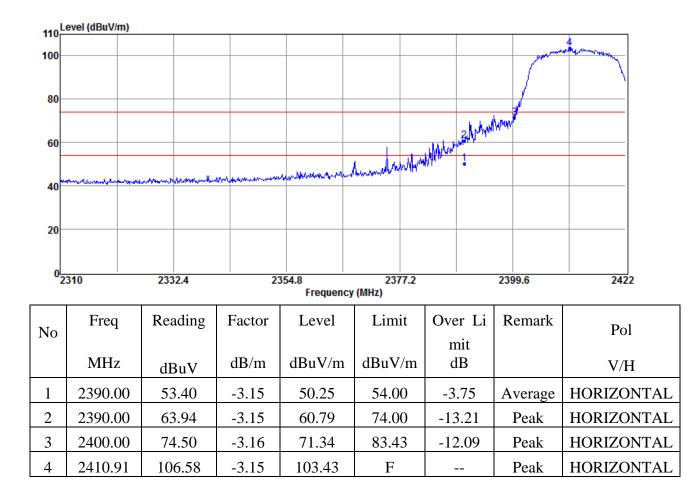
- $_2$ Measurement of data within this frequency range shown " " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Note: "F" denotes fundamental frequency

VERTICAL

VERTICAL



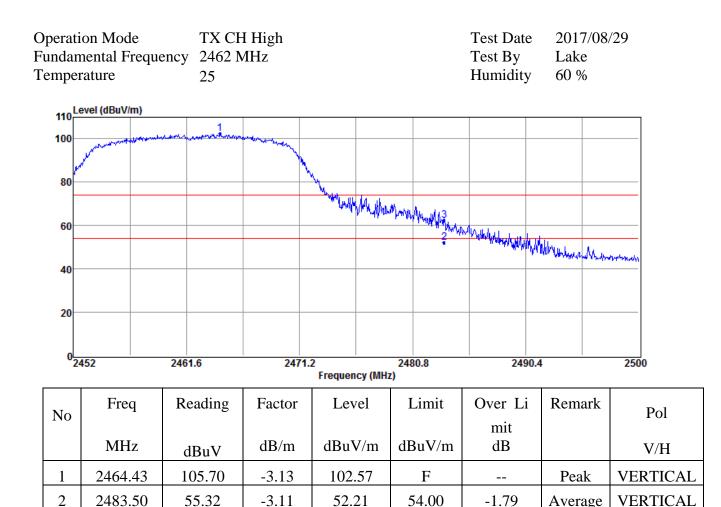


-40 of 65-

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.





Remark:

3

2483.50

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

62.33

74.00

-11.67

Peak

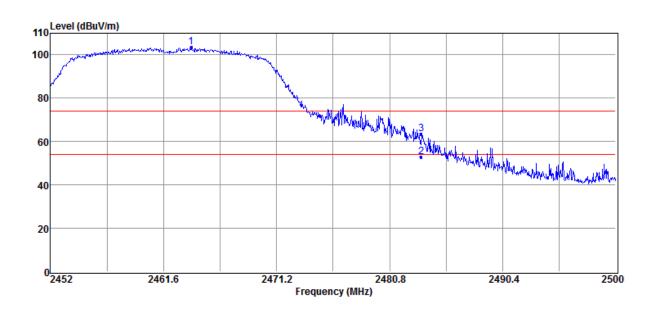
VERTICAL

-3.11

65.44

- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.





-42 of 65-

No	Freq	Reading	Factor	Level	Limit	Over Li	Remark	Pol
INO						mit		101
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		V/H
1	2463.95	106.54	-3.13	103.41	F		Peak	HORIZONTAL
2	2483.50	56.03	-3.11	52.92	54.00	-1.08	Average	HORIZONTAL
3	2483.50	66.51	-3.11	63.40	74.00	-10.60	Peak	HORIZONTAL

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



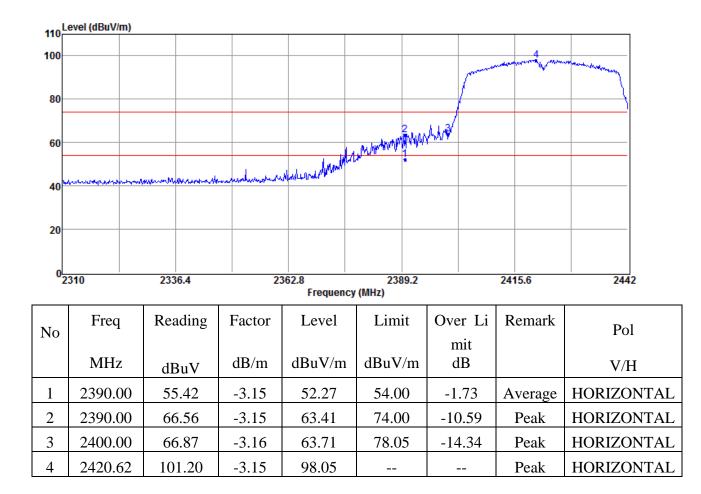
	on Mode nental Freque rature		H Low MHz		Test Date Test By Humidity	Lake	8/29	
110	evel (dBuV/m)							
100							4	
						-	man have	money
80								
						o/		
60				man allow Mappin	AN AND AN AND			
	and the second second second	www.hahamm	Met. Marchander and	man aller Margan				
40								
20-								
20								
0	310	2336.4	2362	0.0	2389.2	241	5.6	2442
2.	510	2550.4	2302	Frequency (M		241	5.0	2442
	Freq	Reading	Factor	Level	Limit	Over Li	Remark	Pol
No		-				mit		POI
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		V/H
1	2390.00	52.32	-3.15	49.17	54.00	-4.83	Average	VERTICAL
2	2390.00	62.16	-3.15	59.01	74.00	-14.99	Peak	VERTICAL
3	2400.00	64.97	-3.16	61.81	75.41	-13.60	Peak	VERTICAL
4	2419.03	98.56	-3.15	95.41	F		Peak	VERTICAL

-43 of 65-

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



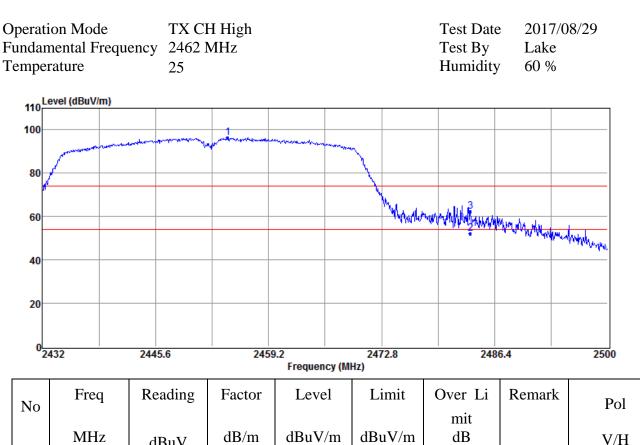


-44 of 65-

Remark:

- 1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.





-45 of 65-

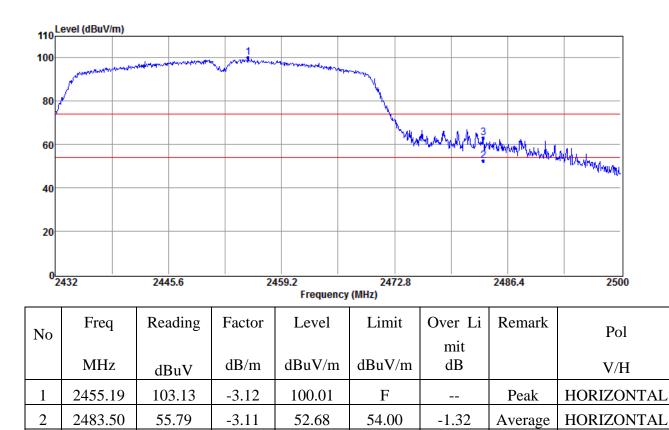
		uDu v						*/11
1	2454.30	99.65	-3.13	96.52	F		Peak	VERTICAL
2	2483.50	55.09	-3.11	51.98	54.00	-2.02	Average	VERTICAL
3	2483.50	65.49	-3.11	62.38	74.00	-11.62	Peak	VERTICAL

Remark:

- Field strength limits for frequency above 1000MHz are based on average limits. However, 1 Peak mode field strength shall not exceed the average limits specified plus 20dB.
- Measurement of data within this frequency range shown "-" in the table above means the 2 reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 3 ms., the VBW setting was 3 MHz.
- Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, 4 Sweep time= 200 ms.

HORIZONTAL





-46 of 65-

Remark:

3

2483.50

1 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.

74.00

-10.72

Peak

63.28

- 2 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 3 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 4 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Note: "F" denotes fundamental frequency

66.39

-3.11



9 SPURIOUS RADIATED EMISSION TEST

9.1 Standard Applicable

According to §15.247(d), all other emissions outside these bands shall not exceed the general radiated emission limits specified in §15.209(a). And according to §15.33(a)(1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

According to RSS-247 issue 2, §5.5

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digi-tally modulated device is operating, the RF power that is produced shall be at least 20 dB be-low that in the 100 kHz bandwidth within the band that contains the highest level of the de-sired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of root-mean-square averaging over a time interval, as permitted under Section 5.4(d), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general field strength limits specified in RSS-Gen is not required.

9.2 Measurement Equipment Used:

9.2.1 Conducted Emission at antenna port:

Refer to section 6.2 for details.

9.2.2 Radiated emission:

Refer to section 8.2 for details.

9.3 Test SET-UP:

The test item only performed radiated mode Refer to section 8.3 for details.



9.4 Measurement Procedure:

- 1 According 414788 section 2, Either OATS or chamber for radiated emission below 30MHz, the test was done at 966 chamber, the test site was evaluated with OATS and the Chamber has test signals level greater than OATS's .
- 2 The EUT was placed on a turn table which is 0.8m/1.5m above ground plane in 966 chamber.
- 3 The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4 EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5 When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 6 Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 7 And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 8 Repeat above procedures until all frequency measured were complete.

9.5 Field Strength Calculation

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

$$\mathbf{FS} = \mathbf{RA} + \mathbf{AF} + \mathbf{CL} - \mathbf{AG}$$

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

9.6 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.



indiance sparious i			
Operation Mode	TX mode	Test Date	2017/09/08
Channel number	CH Low	Test By	Lake
Temperature	25	Pol	Ver./Hor
Humidity	60 %		

Radiated Spurious Emission Measurement Result (below 1GE	Hz) (worst case: 802.11n_20 mode)

-49 of 65-

No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		V/H
1	47.46	43.56	-6.18	37.38	40.00	-2.62	Peak	VERTICAL
2	60.07	41.17	-6.74	34.43	40.00	-5.57	Peak	VERTICAL
3	71.71	41.73	-9.10	32.63	40.00	-7.37	Peak	VERTICAL
4	95.96	43.74	-11.79	31.95	43.50	-11.55	Peak	VERTICAL
5	173.56	36.08	-6.71	29.37	43.50	-14.13	Peak	VERTICAL
6	384.05	31.45	-3.34	28.11	46.00	-17.89	Peak	VERTICAL
1	216.24	46.45	-8.34	38.11	46.00	-7.89	Peak	HORIZONTAL
2	263.77	48.79	-6.16	42.63	46.00	-3.37	Peak	HORIZONTAL
3	288.02	44.88	-5.24	39.64	46.00	-6.36	Peak	HORIZONTAL
4	359.80	42.74	-3.86	38.88	46.00	-7.12	Peak	HORIZONTAL
5	384.05	42.90	-3.34	39.56	46.00	-6.44	Peak	HORIZONTAL
6	730.34	31.24	2.56	33.80	46.00	-12.20	Peak	HORIZONTAL

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



Radiated Spurious Em	ission Measurement Result (below 1GH	z) (worst case	e: 802.11n_20 mode)
Operation Mode	TX mode	Test Date	2017/09/08
Channel number	CH Mid	Test By	Lake
Temperature	25	Pol	Ver./Hor
Humidity	60 %		

-50 of 65-

No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		V/H
1	47.46	44.31	-6.18	38.13	40.00	-1.87	Peak	VERTICAL
2	95.96	46.07	-11.79	34.28	43.50	-9.22	Peak	VERTICAL
3	174.53	38.30	-6.84	31.46	43.50	-12.04	Peak	VERTICAL
4	359.80	33.87	-3.86	30.01	46.00	-15.99	Peak	VERTICAL
5	384.05	33.73	-3.34	30.39	46.00	-15.61	Peak	VERTICAL
6	455.83	32.45	-2.07	30.38	46.00	-15.62	Peak	VERTICAL
1	167.74	41.14	-6.17	34.97	43.50	-8.53	Peak	HORIZONTAL
2	216.24	46.88	-8.34	38.54	46.00	-7.46	Peak	HORIZONTAL
3	263.77	48.54	-6.16	42.38	46.00	-3.62	Peak	HORIZONTAL
4	288.02	45.48	-5.24	40.24	46.00	-5.76	Peak	HORIZONTAL
5	359.80	42.09	-3.86	38.23	46.00	-7.77	Peak	HORIZONTAL
6	384.05	43.35	-3.34	40.01	46.00	-5.99	Peak	HORIZONTAL

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Over



Radiated Spurious Em	ission Measurement Result (below 1GH	z) (worst cas	e: 802.11n_20 mode)
Operation Mode	TX mode	Test Date	2017/09/08
Channel number	CH High	Test By	Lake
Temperature	25	Pol	Ver./Hor
Humidity	60 %		

Temperature Humidity		25 60	%			Pol	5	/er./Hor	
	No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	1	MHz 47.46	dBuV 43.71	dB -6.18	dBuV/m 37.53	dBuV/m 40.00	dB -2.47	Peak	V/H VERTICAL

	IVITIZ	uDu v	uD	uDu v/m	uDu v/m	uD		V/11
1	47.46	43.71	-6.18	37.53	40.00	-2.47	Peak	VERTICAL
2	60.07	42.69	-6.74	35.95	40.00	-4.05	Peak	VERTICAL
3	71.71	44.10	-9.10	35.00	40.00	-5.00	Peak	VERTICAL
4	167.74	36.22	-6.17	30.05	43.50	-13.45	Peak	VERTICAL
5	359.80	33.33	-3.86	29.47	46.00	-16.53	Peak	VERTICAL
6	384.05	32.91	-3.34	29.57	46.00	-16.43	Peak	VERTICAL
1	167.74	40.97	-6.17	34.80	43.50	-8.70	Peak	HORIZONTAL
2	216.24	46.88	-8.34	38.54	46.00	-7.46	Peak	HORIZONTAL
3	263.77	49.60	-6.16	43.44	46.00	-2.56	Peak	HORIZONTAL
4	288.02	45.36	-5.24	40.12	46.00	-5.88	Peak	HORIZONTAL
5	359.80	42.25	-3.86	38.39	46.00	-7.61	Peak	HORIZONTAL
6	384.05	43.31	-3.34	39.97	46.00	-6.03	Peak	HORIZONTAL

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.



		c. 002.1111_20 mou
TX mode	Test Date	2017/09/08
CH Low	Test By	Lake
25	Pol	Ver./Hor
60 %		
	TX mode CH Low 25	CH LowTest By25Pol

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case: 802.11n_20 mode)

-52 of 65-

No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		V/H
1	4824.00	42.15	3.27	45.42	74.00	-28.58	Peak	VERTICAL
1	4824.00	42.59	3.27	45.86	74.00	-28.14	Peak	HORIZONTAL

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- ² Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



-		<i>,</i> , ,	_	
Operation Mode	TX mode	Test Date	2017/09/08	
Channel number	CH Mid	Test By	Lake	
Temperature	25	Pol	Ver./Hor	
Humidity	60 %			

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case: 802.11n_20 mode)

-53 of 65-

No	Freq MHz	Reading dBuV	Factor dB	Level dBuV/m	Limit dBuV/m	Over Limit dB	Remark	Pol V/H
1	4874.00	41.66	3.39	45.05	74.00	-28.95	Peak	VERTICAL
1	4874.00	42.88	3.39	46.27	74.00	-27.73	Peak	HORIZONTAL

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- ² Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



-		· · · · · · · · · · · · · · · · · · ·	•	_	
Operation Mode	TX mode		Test Date	2017/09/08	
Channel number	CH High		Test By	Lake	
Temperature	25		Pol	Ver./Hor	
Humidity	60 %				

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case: 802.11n_20 mode)

-54 of 65-

No	Freq	Reading	Factor	Level	Limit	Over Limit	Remark	Pol
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB		V/H
1	2001.00	56.04	-5.34	50.70	74.00	-23.30	Peak	VERTICAL
2	4924.00	41.06	3.51	44.57	74.00	-29.43	Peak	VERTICAL
1	4924.00	40.84	3.51	44.35	74.00	-29.65	Peak	HORIZONTAL

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- ² Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown "-" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 26GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.



10 Peak Power Spectral Density

10.1 Standard Applicable:

According to §15.247(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

According to RSS-247 issue 2, §5.2

(2)The transmitter power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of Section 5.4(d), (i.e. the power spectral density shall be determined using the same method as is used to determine the conducted output power).

10.2 Measurement Equipment Used:

Refer to section 6.2 for details.

10.3 Test Set-up:

Refer to section 7.3 for details.

10.4 Measurement Procedure:

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer as RBW =3KHz, VBW = 10KHz, Set the span to 1.5 DTS bandwidth., Sweep=Auto
- 4. Record the max. reading.
- 5. Repeat above procedures until all frequency measured were complete.



10.5 Measurement Result:

802.11b Mode

	Power Density	Maximum Limit	Result
СН	Level dBm/3KHz	(dBm)	Kesuit
Low	-8.17	8	
Mid	-8.72	8	Pass
High	-7.42	8	

802.11g Mode

	Power Density Maximum Limit		Result
СН	Level dBm/3KHz	(dBm)	Result
Low	-13.44	8	
Mid	-9.31	8	Pass
High	-14.26	8	

802.11n HT20 Mode

2TX*2RX

		Output Chain dbm		Combine		
	СН	Chain 1	chain 2	Power Density (dBm/3KHz)	Limit(dBm)	Result
	Low	-14.59	-13.52	-11.01	8.00	
802.11n HT20	Mid	-9.65	-10.17	-6.89	8.00	Pass
	High	-15.19	-13.17	-11.05	8.00	

802.11n HT40 Mode

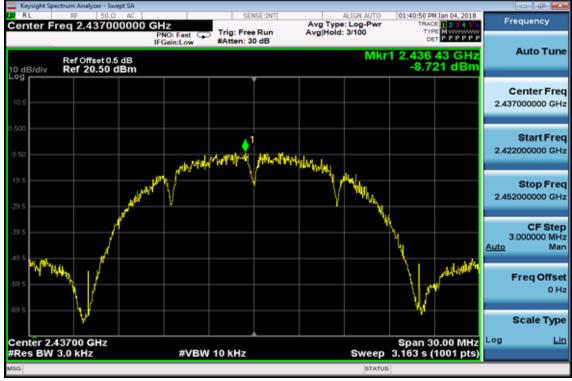
	Power Density	Maximum Limit	Result	
СН	Level dBm/3KHz	(dBm)	Kesun	
Low	-19.09	8		
Mid	-14.51	8	Pass	
High	-18.90	8		



802.11b Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)







-58 of 65-

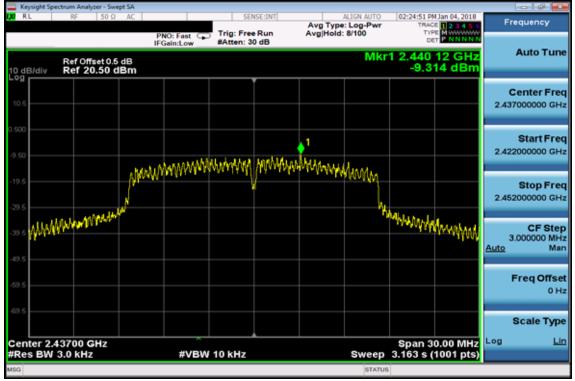
Power Spectral Density Test Plot (CH-High)

802.11g

Power Spectral Density Test Plot (CH-Low)

	01:44:20 PM Jan 04, 2018	ALIGN AUTO		SE:INT	50		AC AC	trum Analyzer - Swe RF 50 Ω	Keysight Sp
Frequency	TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P P P P P	: Log-Pwr			Trig: Free	Z IO: Fast	0000 GH	eq 2.41200	
Auto Tune	2.413 86 GHz -13.435 dBm	Mkr1		0 dB	#Atten: 3	Sain:Low	dB	Ref Offset 0.5 Ref 20.50 d	10 dB/div
Center Freq 2.412000000 GHz									10.5
Start Freq 2.397000000 GHz				• • ¹					-9.50
Stop Freq 2.427000000 GHz		Awapan	tt Marine	i in the second s	WWWW W	WWWWW	NAMA		-19.5
CF Step 3.000000 MH2 Auto Mar	Man	h.					4	a brille	-39.5
Freq Offset 0 Hz	malappapapapapapapapapapapapapapapapapap							UN ALA	-59.5 MM
Scale Type									-69.5
Log <u>Lin</u>	Span 30.00 MHz 3.163 s (1001 pts)	Sweep 3			10 kHz	#VBW		1200 GHz 3.0 kHz	Center 2. #Res BW
		STATUS							MSG

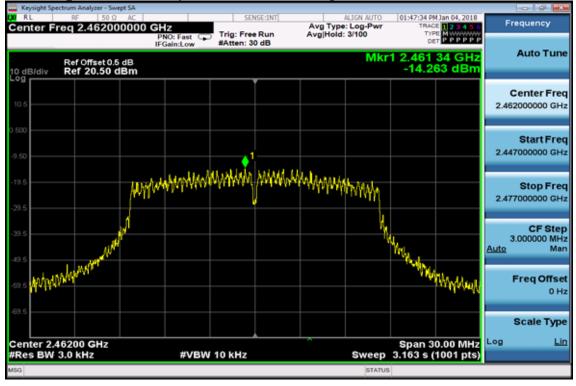




-59 of 65-

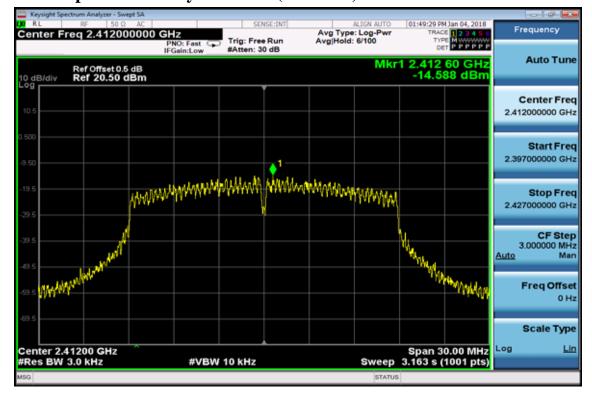
Power Spectral Density Test Plot (CH-Mid)

Power Spectral Density Test Plot (CH-High)





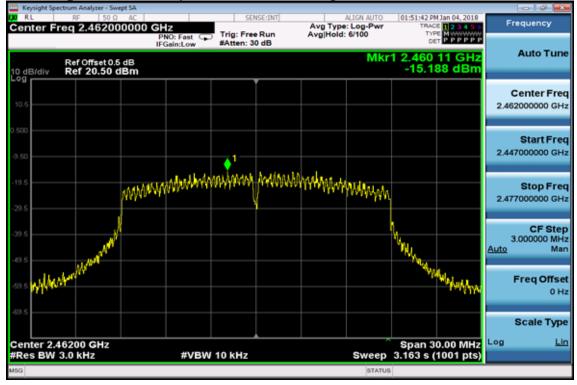
802.11n_20M, chain 1 Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

									um Analyzer - Swe	
Frequency		TRAC	LIGN AUTO	Avg Type	ISE:INT		Hz	AC	q 2.43700	Center Fr
Auto Tune	87 GHz 9 dBm	1 2.437		Avg Hold		Trig: Free #Atten: 3	RO: Fast Gain:Low	dB	Ref Offset 0.5 Ref 20.50 d	10 dB/div
Center Free 2.437000000 GH										10.5
Start Fre 2.422000000 GH					1 Atlanta I ki	يا يو ال				9.50
Stop Fre 2.452000000 GH			white	n www.my.wy	IANANAMA I	מאטראט	AMMM/M	HANNYAN		29.5
CF Ste 3.000000 MH Auto Ma	MAMMAN	What want							WARANA	39.5 NHM
Freq Offse 0 H										59.5
Scale Typ										69.5
Log <u>Li</u>	0.00 MHz 1001 pts)	Span 3 3.163 s (Sweep			10 kHz	#VBW			Center 2.4 #Res BW 3
		1	STATUS							ISG

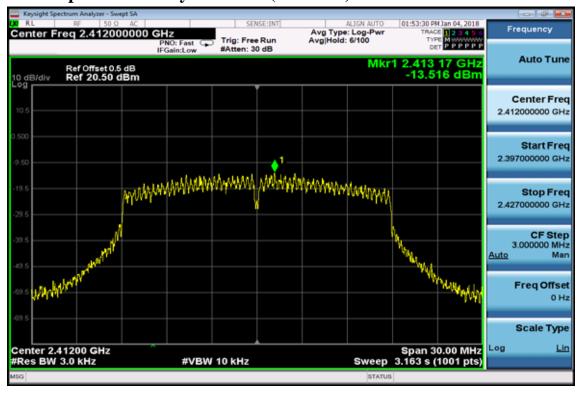




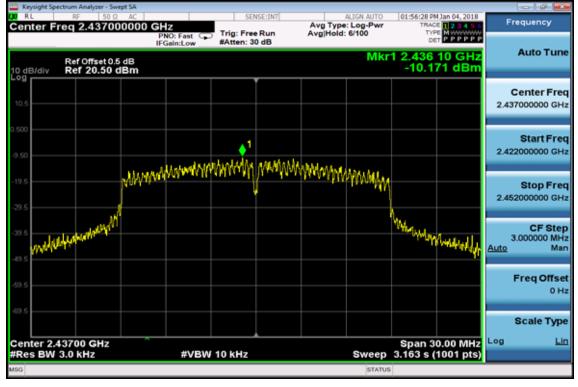
-61 of 65-

Power Spectral Density Test Plot (CH-High)

802.11n_20M, chain 2 Power Spectral Density Test Plot (CH-Low)



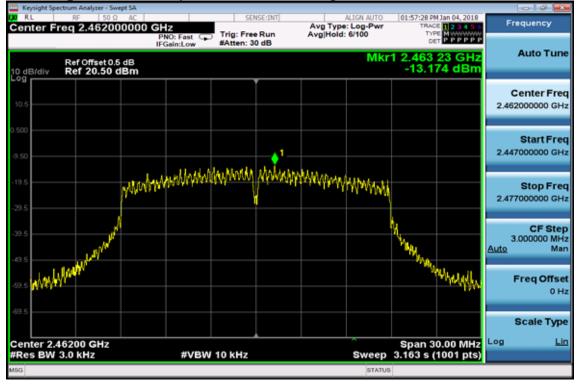




-62 of 65-

Power Spectral Density Test Plot (CH-Mid)

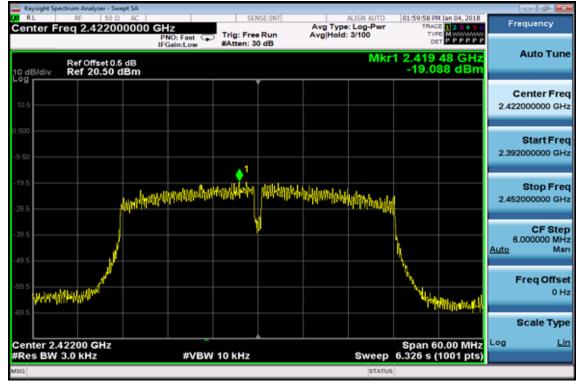
Power Spectral Density Test Plot (CH-High)





802.11n_40M

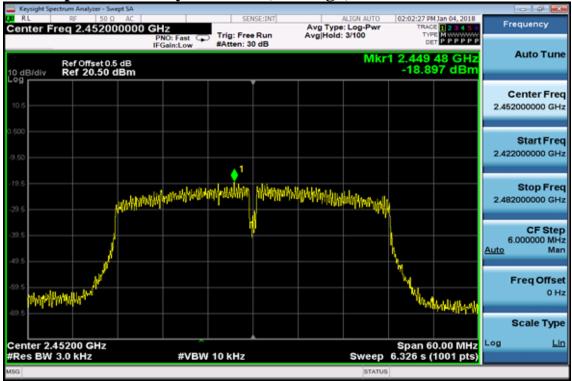
Power Spectral Density Test Plot (CH-Low)



Power Spectral Density Test Plot (CH-Mid)

Keysight Sp	ectrum Analyzer - Swept SA						
Center F	req 2.43700000	0 GHz	SENSE:INT	ALIGN Avg Type: Log	-Pwr TRAC	4 Jan 04, 2018	Frequency
10 dB/div	Ref Offset 0.5 dB Ref 20.50 dBm	PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold: 3/10	Mkr1 2.441	38 GHz 05 dBm	Auto Tune
10.5							Center Fre 2.437000000 GH
9.50							Start Fre 2.407000000 GH
-19.5	What I	hohairaidh an tarthair an t	hilddodalma) arhildifn M	htteitlentennen	Nardaja		Stop Fre 2.467000000 GH
39.5 49.5 MM	they apply and the				wheel week	Minimum	CF Ste 6.000000 MH Auto Ma
69.5							FreqOffse 0 ⊦
							Scale Typ
Center 2. #Res BW	43700 GHz 3.0 kHz	#VBW	10 kHz	Sv	Span 6 veep 6.326 s (Log <u>Li</u>
ISG					STATUS		





-64 of 65-

Power Spectral Density Test Plot (CH-High)



11 ANTENNA REQUIREMENT

11.1 Standard Applicable:

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

According to RSS-GEN 7.1.2, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to RSS-210 Annex 8 (Frequency Hopping and Digital Modulation Systems Operating in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz Bands) or RSS-210 Annex 9 (Local Area Network Devices), the total antenna gain shall be ad

ded to the measured RF output power before using the specified power limits. For devices subject to RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

11.2 Antenna Connected Construction:

The directional gins of antenna used for transmitting is 5.18 dBi for PIFA Antenna, and no consideration of replacement. Please see EUT photo and antenna spec. for details.