

FCC Radio Test Report

FCC ID: VACPDWX08

Original Grant

Report No. : TB-FCC1741378
Applicant : SUN HEI (WORLDWIDE) ELECTRONIC CO.,LTD.
Equipment Under Test (EUT)
EUT Name : 8 Inch Wi-Fi Digital Picture Frame
Model No. : PDWX-800CD
Series Model No. : PDWX-800BB, PDWX-800NT
Brand Name : Polaroid
Receipt Date : 2020-07-20
Test Date : 2020-07-20 to 2020-07-29
Issue Date : 2020-07-30
Standards : FCC Part 15, Subpart C (15.247)
Test Method : ANSI C63.10: 2013
Conclusions : **PASS**

In the configuration tested, the EUT complied with the standards specified above,
The EUT technically complies with the FCC and IC requirements

Test/Witness Engineer : *Garen*
Engineer Supervisor : *IVAN SU*
Engineer Manager : *Ray Lai*



This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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Revision History

Report No.	Version	Description	Issued Date
TB-FCC174378 Rev	.01	Initial issue of report	2020-07-30

1. General Information about EUT

1.1 Client Information

Applicant	:	SUN HEI (WORLDWIDE) ELECTRONIC CO.,LTD.
Address	:	UNIT B, 15/F, WING CHEUNG IND.BLDG 58-70, KWAI CHEONG RD.,KWAI CHUNG, N.T. HONGKONG
Manufacturer	:	Xiang Shun Electronic Products Co., Ltd
Address	:	No.5, Xixing Street, Changan Town, Dongguan City, Guangdong Province, China

1.2 General Description of EUT (Equipment Under Test)

EUT Name	:	8 Inch Wi-Fi Digital Picture Frame	
Models No.	:	PDWX-800CD, PDWX-800BB, PDWX-800NT	
Model Difference	:	All these models are identical in the same PCB, layout and electrical circuit, the only difference is Appearance color.	
Sample ID	:	20200708-17-01#	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz
		Number of Channel:	802.11b/g/n(HT20):11 channels see note(3)
		RF Output Power:	802.11b: 18.84dBm 802.11g: 15.77dBm 802.11n (HT20): 15.80dBm
		Modulation Type:	802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n: OFDM(BPSK,QPSK,16QAM, 64QAM)
		Antenna Gain:	1.22dBi Internal Antenna
Power Rating	:	DC 5V from AC/DC Adapter(SR-C60502000U2): Input: AC 100-240V, 50/60Hz. 0.35A Output: DC 5V, 2000mA.	
Software Version	:	NCH_V1.0.0_.d3.a3_a.u_s_v0.202007131519	
Hardware Version	:	TZXM790	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	The antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.	

Note:

- (1) This Test Report is F CC Part 15.247 for 802. 11b/g/n, the test procedure follows the F CC KDB 558074 D01 DTS Meas Guidance v05.
- (2) For a more detailed features description, please refer to the manufacturer's specifications or

the User's Manual.

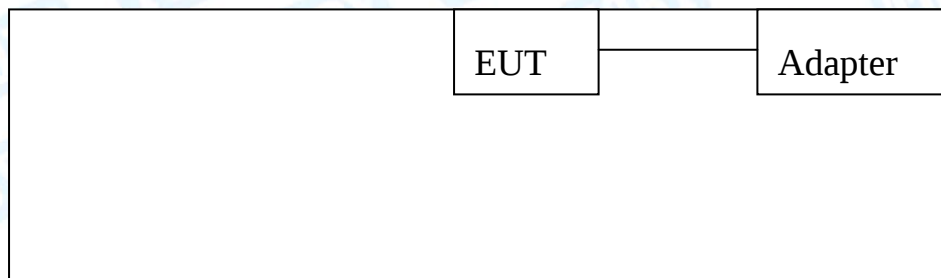
(3) Channel List:

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		
Note: CH 01~CH 11 for 802.11b/g/n(HT20)					

(4) The Antenna information about the equipment is provided by the applicant.

1.3 Block Diagram Showing the Configuration of System Tested

TX Mode



1.4 Description of Support Units

Equipment Information				
Name	Model	FCC ID/VOC	Manufacturer	Note
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1.5 Description of Test Mode

To investigate the maximum EMI emission characteristics generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned follows was evaluated respectively.

For Conducted Test	
Final Test Mode	Description
Mode 1	Adapter with TX B Mode

For Radiated Test	
Final Test Mode	Description
Mode 2	Adapter +TX Mode B Mode Channel 01/06/11
Mode 3	Adapter +TX Mode G Mode Channel 01/06/11
Mode 4	Adapter +TX Mode N(HT20) Mode Channel 01/06/11
Note : (1)The antenna gain provided by the applicant, the verified for the RF conduction test provided by TOBY test lab. (2) For the Conducted Emission and Radi ated test used the 20200708-17-01#. For the RF Conduction test used the 20200708-17-01#.	

Note:

- (1) For all test, we have verified the construction and function in typical operation. And all the test modes were carried out with the EUT in transmitting operation in maximum power with all kinds of data rate.
According to ANSI C63.10 standards, the measurements are performed at the highest, Middle, lowest available channels, and the worst case data rate as follows:
802.11b Mode: CCK (1 Mbps)
802.11g Mode: OFDM (6 Mbps)
802.11n (HT20) Mode: MCS 0 (6.5 Mbps)
- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is mobile unit; in normal use it was positioned on X-plane. The worst case was found positioned on X-plane. Therefore only the test data of this X-plane was used for radiated emission measurement test.

1.6 Description of Test Software Setting

During testing channel I&Power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN.

Test Software Version	RFtester-android10-default-Signed.apk		
Channel	CH 01	CH 06	CH 11
IEEE 802.11b DSSS	17	17	17
IEEE 802.11g OFDM	17	17	17
IEEE 802.11n (HT20)	17	17	17
Test Software Version	n/a		

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

Test Item	Parameters	Expanded Uncertainty (U_{Lab})
Conducted Emission	Level Accuracy: 9kHz~150kHz 150kHz to 30MHz	± 3.42 dB ± 3.42 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	± 4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	± 4.40 dB
Radiated Emission	Level Accuracy: Above 1000MHz	± 4.20 dB

1.8 Test Facility

The testing report were performed by the Shenzhen Toby Technology Co., Ltd., in their facilities located at 1A/F., Bldg.6, Yusheng Industrial Zone, The National Road No.107 Xixiang Section 467, Xixiang, Bao'an, Shenzhen, Guangdong, China. At the time of testing, the following bodies accredited the Laboratory:

CNAS (L5813)

The Laboratory has been accredited by CNAS to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the competence in the field of testing. And the Registration No.: CNAS L5813.

A2LA Certificate No.: 4750.01

The laboratory has been accredited by American Association for Laboratory Accreditation(A2LA) to ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories for the technical competence in the field of Electrical Testing. And the A2LA Certificate No.: 4750.01. FCC Accredited Test Site Number: 854351.

IC Registration No.: (11950A-1)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A-1.

2. Test Summary

FCC Part 15 Subpart C(15.247)/ RSS 247 Issue 2				
Standard Section FCC	Test Item	Test Sample(s)	Judgment	Remark
15.203	Antenna Requirement	20200708-17-01#	PASS	N/A
15.207	Conducted Emission	20200708-17-01#	PASS	N/A
15.205	Restricted Bands	20200708-17-01#	PASS	N/A
15.247(a)(2)	6dB Bandwidth	20200708-17-01#	PASS	N/A
15.247(b)	Peak Output Power	20200708-17-01#	PASS	N/A
15.247(e)	Power Spectral Density	20200708-17-01#	PASS	N/A
15.247(d)	Band Edge	20200708-17-01#	PASS	N/A
15.247(d)& 15.209	Transmitter Radiated Spurious Emission	20200708-17-01#	PASS	N/A
Note: “/” for no requirement for this test item. N/A is an abbreviation for Not Applicable.				

Test Software

Test Item	Test Software	Manufacturer	Version No.
Conducted Emission	EZ-EMC	EZ	CDI-03A2
Radiation Emission	EZ-EMC	EZ	FA-03A2RE
RF Conducted Measurement	MTS-8310 MWR	RFtest	V2.0.0.0

3. Test Equipment

Conducted Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 12, 2020	Jul. 11, 2021
RF Switching Unit	Compliance Direction Systems Inc	RSU-A4	34403	Jul. 12, 2020	Jul. 11, 2021
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 12, 2020	Jul. 11, 2021
LISN	Rohde & Schwarz	ENV216	101131	Jul. 12, 2020	Jul. 11, 2021
Radiation Emission Test					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 12, 2020	Jul. 11, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 12, 2020	Jul. 11, 2021
Spectrum Analyzer	Rohde & Schwarz	FSVR	1311.006K40-10094 5-DH	Feb. 09, 2020	Feb. 08, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar. 07, 2020	Mar. 06, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117542	Mar.03, 2020	Mar. 02, 2021
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar. 07, 2020	Mar. 06, 2021
Horn Antenna	ETS-LINDGREN	3117	00143209	Mar.03, 2020	Mar. 02, 2021
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar. 07, 2020	Mar. 06, 2021
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Mar.02, 2020	Mar. 01, 2021
Pre-amplifier	Sonoma	310N	185903	Jul. 26, 2020	Jul. 25, 2021
Pre-amplifier	HP	8449B	3008A00849	Mar.02, 2020	Mar. 01, 2021
Pre-amplifier	EMCI	EMC02325	980217	Feb. 09, 2020	Feb. 08, 2021
Cable	HUBER+SUHNER	100	SUCOFLEX	Mar. 07, 2020	Mar. 06, 2021
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
Antenna Conducted Emission					
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 12, 2020	Jul. 11, 2021
Spectrum Analyzer	Rohde & Schwarz	ESCI	100010/007	Jul. 12, 2020	Jul. 11, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 16, 2019	Sep. 15, 2020
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 16, 2019	Sep. 15, 2020
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 16, 2019	Sep. 15, 2020
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO26	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO29	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO31	Sep. 16, 2019	Sep. 15, 2020
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO33	Sep. 16, 2019	Sep. 15, 2020

4. Conducted Emission Test

4.1 Test Standard and Limit

4.1.1 Test Standard
FCC Part 15.207

4.1.2 Test Limit

Conducted Emission Test Limit

Frequency	Maximum RF Line Voltage (dB μ V)	
	Quasi-peak Level	Average Level
150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
500kHz~5MHz 56		46
5MHz~30MHz 60		50

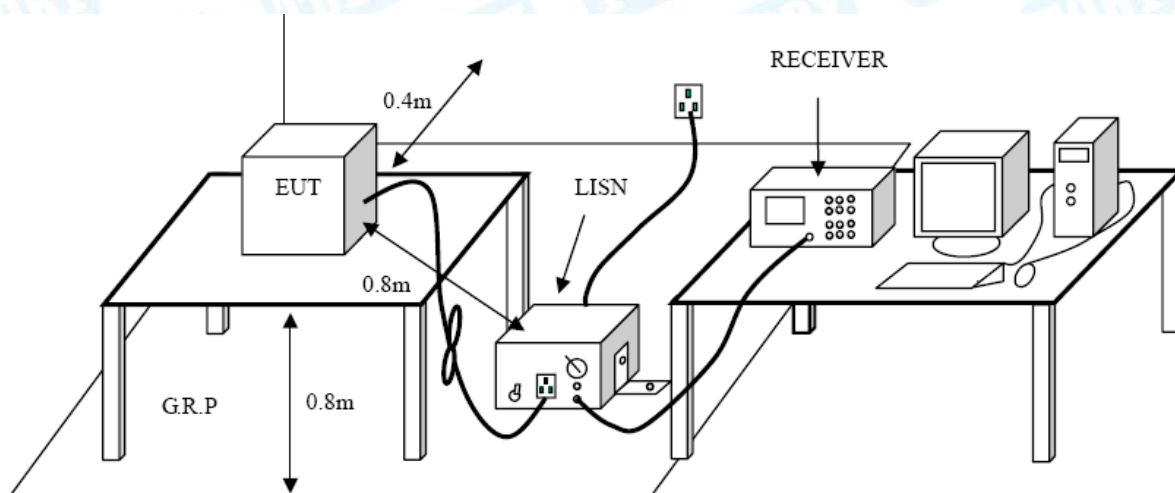
Notes:

(1) *Decreasing linearly with logarithm of the frequency.

(2) The lower limit shall apply at the transition frequencies.

(3) The limit decrease in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

4.2 Test Setup



4.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

LISN at least 80 cm from nearest part of EUT chassis.

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

4.4 EUT Operating Mode

Please refer to the description of test mode.

4.5 Test Data

Please refer to the Attachment A.

5. Radiated Emission Test

5.1 Test Standard and Limit

5.1.1 Test Standard
FCC Part 15.209

5.1.2 Test Limit

Radiated Emission Limits (9 kHz~1000 MHz)

Frequency (MHz)	Field Strength (microvolt/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
Above 960	500	3

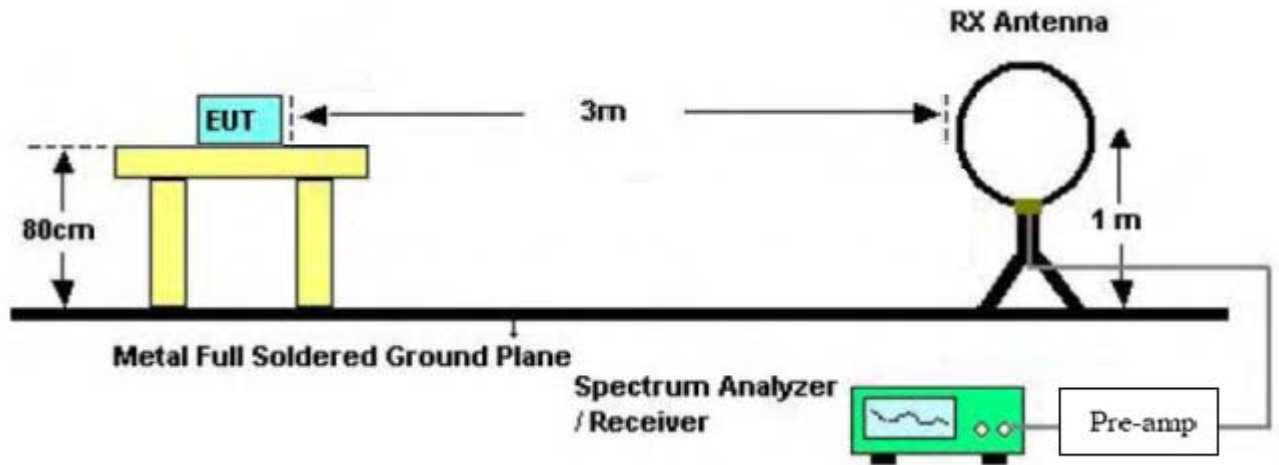
Radiated Emission Limit (Above 1000MHz)

Frequency (MHz)	Distance of 3m (dBuV/m)	
	Peak	Average
Above 1000	74	54

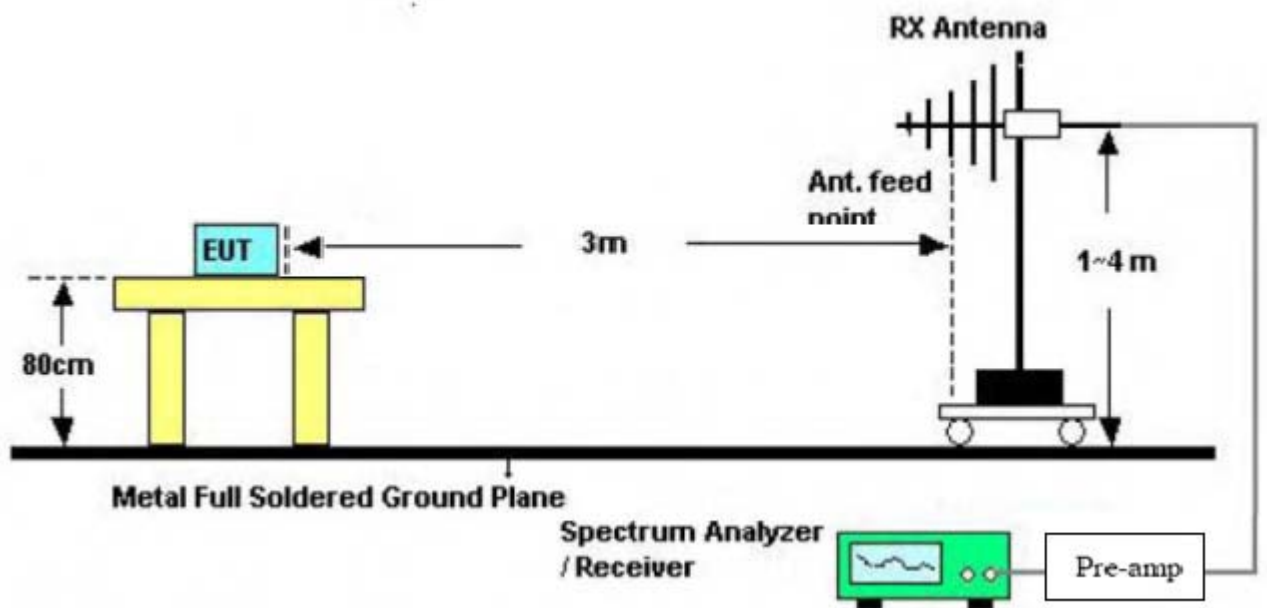
Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission Level(dBuV/m)=20log Emission Level(uV/m)

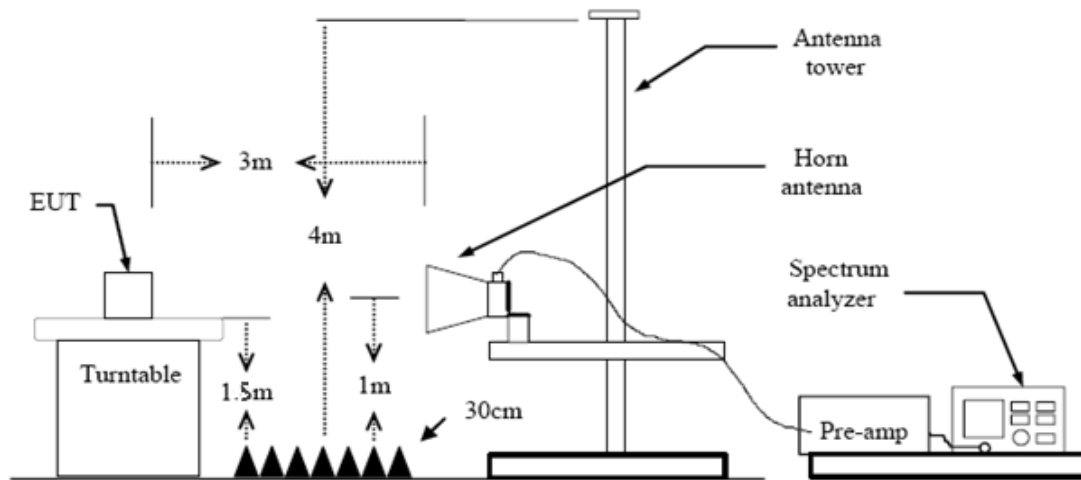
5.2 Test Setup



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

5.3 Test Procedure

- (1) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency Below 1GHz. The EUT was placed on a rotating 0.8m high above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The Test antenna shall vary between 1m and 4m , Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit Below 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak Value and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the measuring instrument use VBW=120 kHz with Quasi-peak detection.
- (7) Testing frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW= 1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

5.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

5.5 Test Data

Remark: During testing above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak V values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

Please refer to the Attachment B.

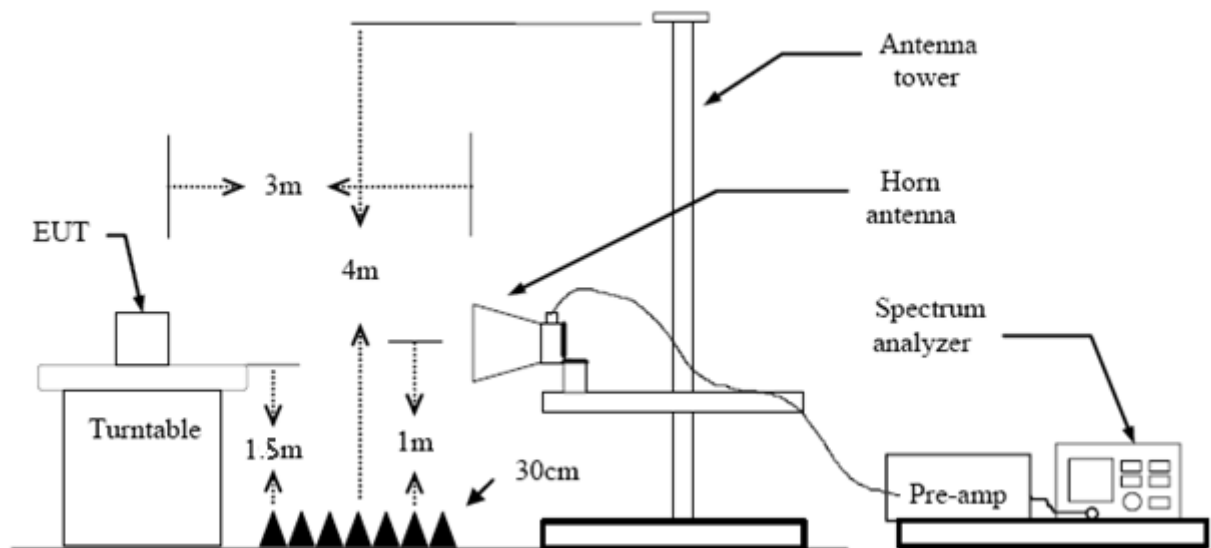
6. Restricted Bands Requirement

6.1 Test Standard and Limit

- 6.1.1 Test Standard
FCC Part 15.247(d)
FCC Part 15.209
FCC Part 15.205
- 6.1.2 Test Limit

Restricted Frequency Band (MHz)	Distance of 3m (dBuV/m)	
	Peak	Average
2310 ~2390	74	54
2483.5 ~2500	74	54

6.2 Test Setup



6.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency below 1GHz and above 1 GHz. The EUT was placed on a rotating 0.8m high above ground, the table was rotated 360 degrees to determine the position of the highest radiation.
- (2) Measurements at frequency above 1GHz. The EUT was placed on a rotating 1.5m high above the ground. RF absorbers covered the ground plane with a minimum area of 3.0m by 3.0m between the EUT and measurement receiver antenna. The RF absorber shall not exceed 30cm in high above the conducting floor. The table was rotated 360 degrees to determine the position of the highest radiation.

- (3) The Test antenna shall vary between 1m and 4m , Both Horizontal and Vertical antenna are set to make measurement.
- (4) The initial step in collect ing conducted emission da ta is a spectrum analyzer peak detector mode pre-scanning the measur ement frequency range. Signi ficant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value com pliance with and lower than Quasi Peak Mode Limit Bellow 1 GHz, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed. But the Peak V alue and average value both need to comply with applicable limit above 1 GHz.
- (6) Testing frequency range below 1GHz the m easuring instrument use VBW=120 k Hz wit h Quasi-peak detection.
- (7) Testing frequency range above 1GHz the m easuring instr ument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW= 1 MHz and VBW=10 Hz with Peak Detector for Average Values.
- (8) For the actual test configuration, please see the test setup photo.

6.4 EUT Operating Condition

The Equipment Under Test was set to Continual Transmitting in maximum power.

6.5 Test Data

Please refer to the Attachment C.

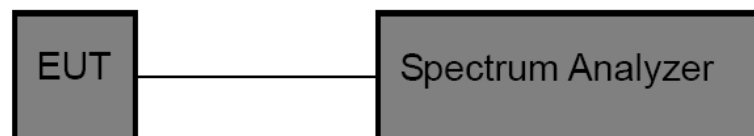
7. Bandwidth Test

7.1 Test Standard and Limit

- 7.1.1 Test Standard
FCC Part 15.247 (a)(2)
- 7.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210		
Test Item	Limit	Frequency Range(MHz)
Bandwidth	≥ 500 KHz (6dB bandwidth)	2400~2483.5

7.2 Test Setup



7.3 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) The bandwidth is measured at an amplitude level reduced 6dB from the reference level. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency . Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst –case (i.e the widest) bandwidth.
- (3)Measure the channel separation the spectrum analyzer was set to Resolution Bandwidth:100 kHz, and Video Bandwidth:300 kHz, Detector: Peak, Sweep Time set auto.

7.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low , Digital photo framesdle and high channel for the test.

7.5 Test Data

Please refer to the Attachment D.

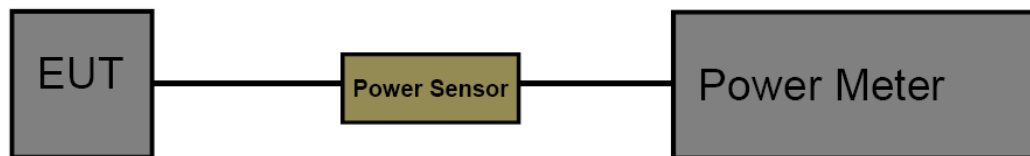
8. Peak Output Power Test

8.1 Test Standard and Limit

- 8.1.1 Test Standard
FCC Part 15.247 (b)
- 8.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-210		
Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	2400~2483.5

8.2 Test Setup



8.3 Test Procedure

The measurement is according to section 9.1.2 of KDB 558074 D01 DTS Meas Guidance v05. The EUT was connected to RF power meter via a broadband power sensor as show the block above. The power sensor video bandwidth is greater than or equal to the DTS bandwidth of the equipment.

8.4 EUT Operating Condition

The EUT was set to continuously transmitting in the max power during the test.

8.5 Test Data

Please refer to the Attachment E.

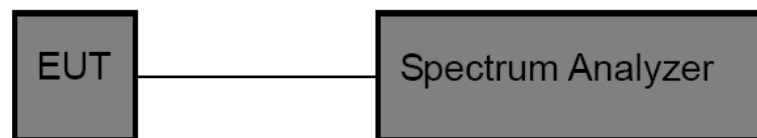
9. Power Spectral Density Test

9.1 Test Standard and Limit

- 9.1.1 Test Standard
FCC Part 15.247 (e)
- 9.1.2 Test Limit

FCC Part 15 Subpart C(15.247)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	8dBm(in any 3 kHz)	2400~2483.5

9.2 Test Setup



9.3 Test Procedure

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser center frequency to DTS channel center frequency.
- (3) Set the span to 1.5 times the DTS bandwidth.
- (4) Set the RBW to: 3 kHz
- (5) Set the VBW to: 10 kHz
- (6) Detector: peak
- (7) Sweep time: auto
- (8) Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

9.4 EUT Operating Condition

The EUT was set to continuously transmitting in each mode and low, Digital photo framesdle and high channel for the test.

9.5 Test Data

Please refer to the Attachment F.

10. Antenna Requirement

10.1 Standard Requirement

10.1.1 Standard

FCC Part 15.203

10.1.2 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.

10.2 Antenna Connected Construction

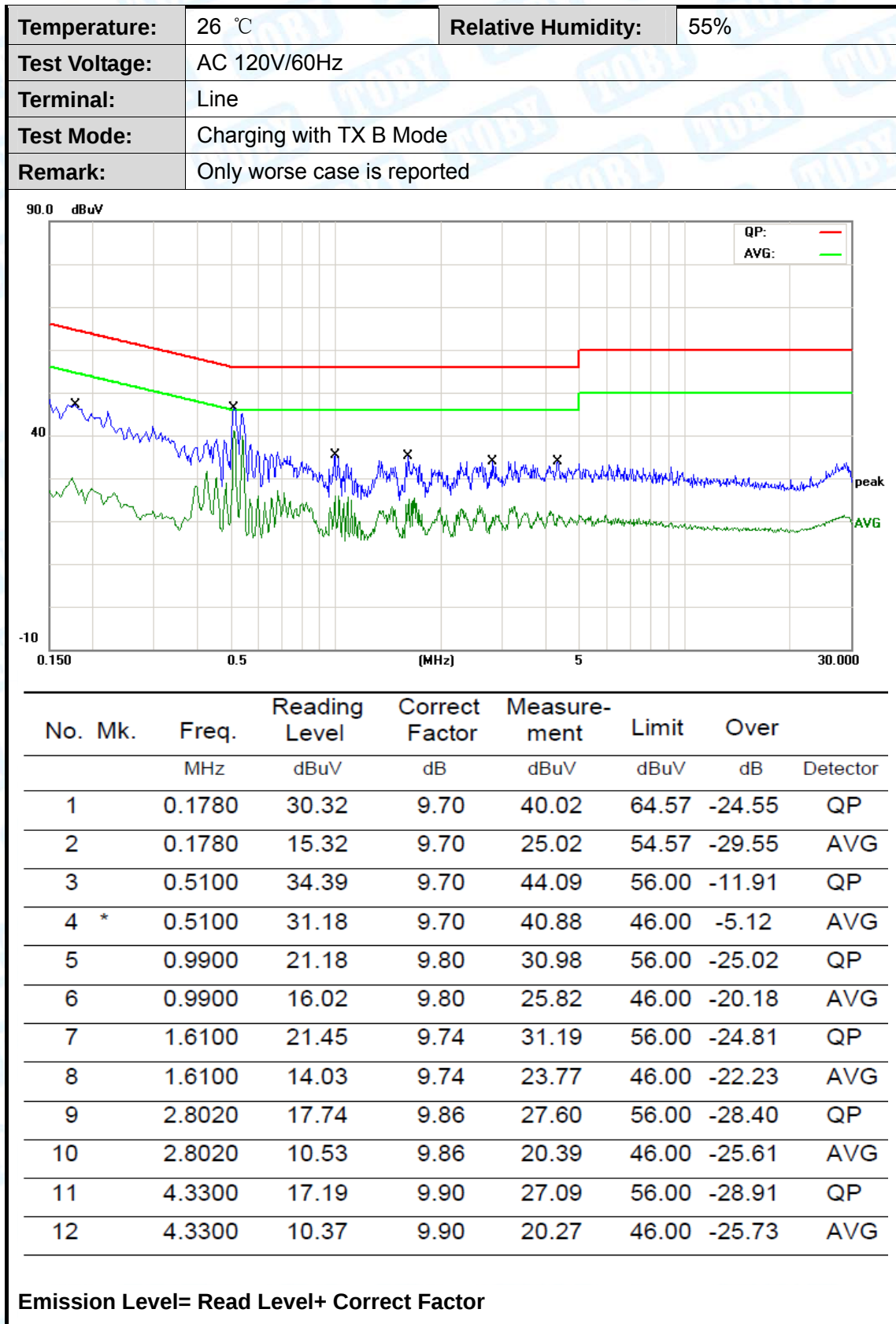
The gains of the antenna used for transmitting is 1.22dBi, and the antenna designed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

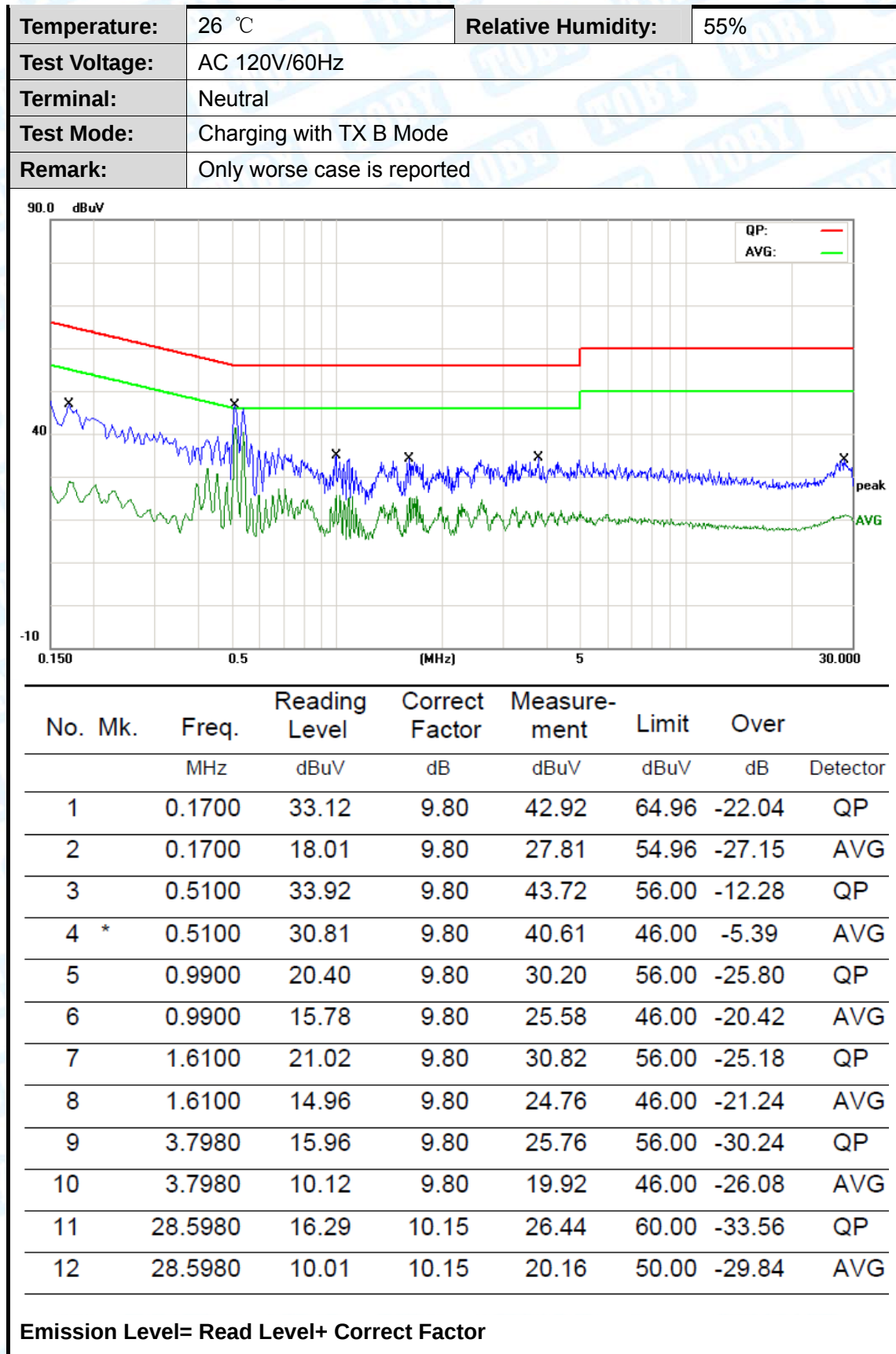
Result

The EUT antenna is a Internal Antenna. It complies with the standard requirement.

Antenna Type
☒ Permanent attached antenna
☐ Unique connector antenna
☐ Professional installation antenna

Attachment A-- Conducted Emission Test Data





Attachment B-- Radiated Emission Test Data

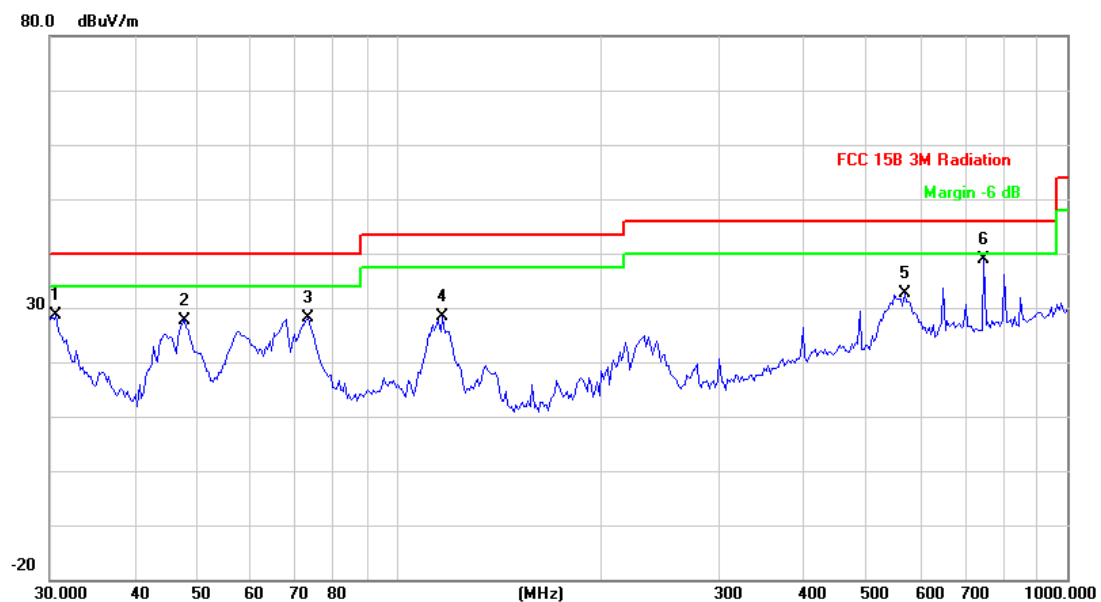
9KHz~30MHz

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz~1GHz

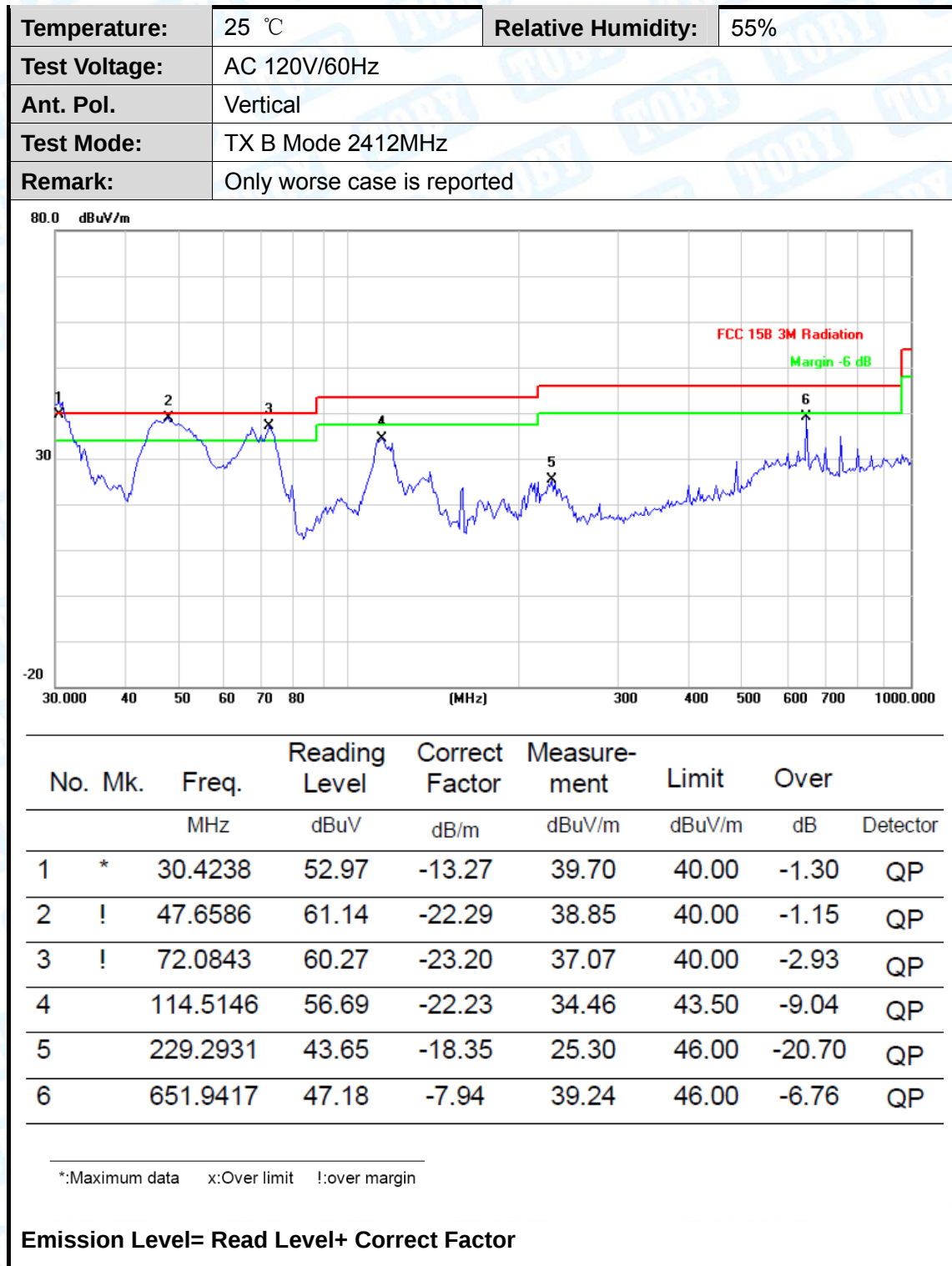
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX B Mode 2412MHz		
Remark:	Only worse case is reported		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		30.6379	42.08	-13.42	28.66	40.00	-11.34	QP
2		47.6586	50.04	-22.29	27.75	40.00	-12.25	QP
3		73.1025	51.25	-23.11	28.14	40.00	-11.86	QP
4		116.1321	50.59	-22.22	28.37	43.50	-15.13	QP
5		570.6100	41.33	-8.67	32.66	46.00	-13.34	QP
6	*	750.1083	45.39	-6.60	38.79	46.00	-7.21	QP

*:Maximum data x:Over limit !:over margin

Emission Level= Read Level+ Correct Factor



Above 1GHz

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	AC 120V/60Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX B Mode 2412MHz						
Remark:	No report for the emission which more than 20 dB below the prescribed limit.						
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4824.162	49.19	13.16	62.35	74.00	-11.65 peak
2	*	4824.260	38.97	13.16	52.13	54.00	-1.87 AVG
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX B Mode 2412MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

Temperature:	25 °C	Relative Humidity:	55%				
Test Voltage:	AC 120V/60Hz						
Ant. Pol.	Horizontal						
Test Mode:	TX B Mode 2437MHz						
Remark:	No report for the emission which more than 20 dB below the prescribed limit.						
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4874.232	48.60	13.53	62.13	74.00	-11.87 peak
2	*	4874.543	39.13	13.53	52.66	54.00	-1.34 AVG
Emission Level= Read Level+ Correct Factor							

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX B Mode 2437MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4874.232	38.11	13.53	51.64	54.00	-2.36	AVG
2		4874.546	48.03	13.53	61.56	74.00	-12.44	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX B Mode 2462MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4924.563	48.44	13.89	62.33	74.00	-11.67 peak
2	*	4924.563	38.72	13.89	52.61	54.00	-1.39 AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%					
Test Voltage:	AC 120V/60Hz							
Ant. Pol.	Vertical							
Test Mode:	TX B Mode 2462MHz							
Remark:	No report for the emission which more than 20 dB below the prescribed limit.							
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4924.362	38.50	13.89	52.39	54.00	-1.61	AVG
2		4924.433	48.46	13.89	62.35	74.00	-11.65	peak
Emission Level= Read Level+ Correct Factor								

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX G Mode 2412MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4824.105	41.79	14.55	56.34	74.00	-17.66 peak
2	*	4824.200	27.48	14.55	42.03	54.00	-11.97 AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX G Mode 2412MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4824.145	41.96	14.55	56.51	74.00	-17.49 peak
2	*	4824.251	28.29	14.55	42.84	54.00	-11.16 AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX G Mode 2437MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
1		4874.254	42.09	14.86	56.95	74.00	-17.05
2	*	4874.255	29.16	14.86	44.02	54.00	-9.98

Detector	peak	AVG
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Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX G Mode 2437MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4874.254	28.65	14.86	43.51	54.00	-10.49	AVG
2		4874.455	42.73	14.86	57.59	74.00	-16.41	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX G Mode 2462MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4925.112	28.29	15.19	43.48	54.00	-10.52	AVG
2		4925.145	41.52	15.19	56.71	74.00	-17.29	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX G Mode 2462MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4925.141	41.92	15.19	57.11	74.00	-16.89	peak
2	*	4925.617	28.26	15.19	43.45	54.00	-10.55	AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX N(HT20) Mode 2412MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4824.236	33.07	13.16	46.23	54.00	-7.77	AVG
2		4824.626	43.25	13.16	56.41	74.00	-17.59	peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX N(HT20) Mode 2412MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB
							Detector
1		4823.532	49.30	13.16	62.46	74.00	-11.54
2	*	4824.365	39.00	13.16	52.16	54.00	-1.84

Emission Level=	Read Level+	Correct Factor
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Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX N(HT20) Mode 2437MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4874.262	32.60	13.53	46.13	54.00	-7.87 AVG
2	*	4874.569	52.79	13.53	66.32	74.00	-7.68 peak

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX N(HT20) Mode 2437MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4873.256	47.71	13.52	61.23	74.00	-12.77 peak
2	*	4873.642	38.09	13.53	51.62	54.00	-2.38 AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX N(HT20) Mode 2462MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4923.422	29.24	13.89	43.13	74.00	-30.87 peak
2	*	4924.264	39.30	13.89	53.19	54.00	-0.81 AVG

Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX N(HT20) Mode 2462MHz		
Remark:	No report for the emission which more than 20 dB below the prescribed limit.		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		4924.621	43.34	13.89	57.23	74.00	-16.77 peak
2	*	4924.632	33.47	13.89	47.36	54.00	-6.64 AVG

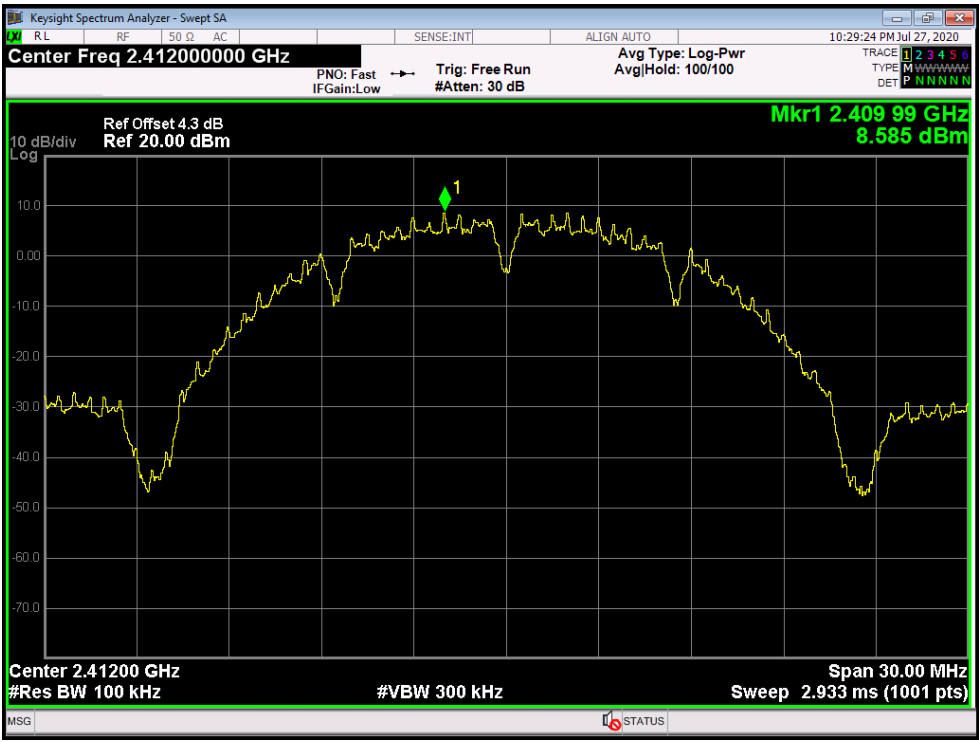
Emission Level= Read Level+ Correct Factor

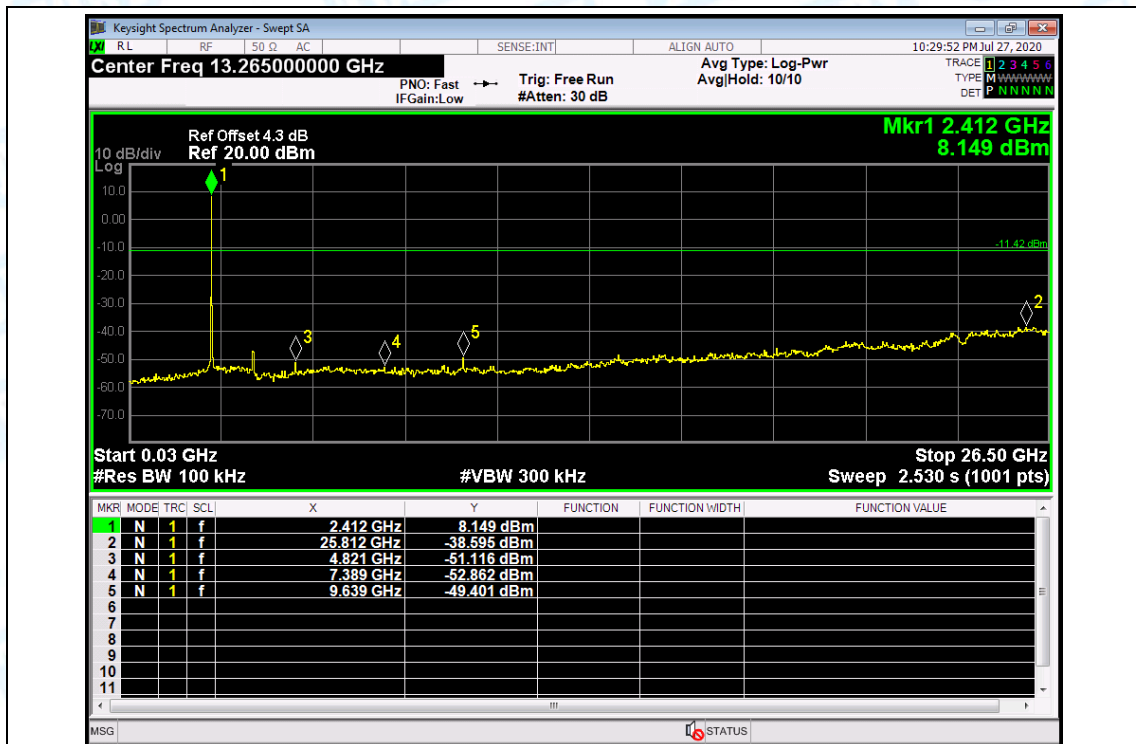
Conducted RF Spurious Emission Test Data

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX B Mode		
Remark:	This report only shall the worst case mode for TX IEEE 802.11b.		

2412 MHz

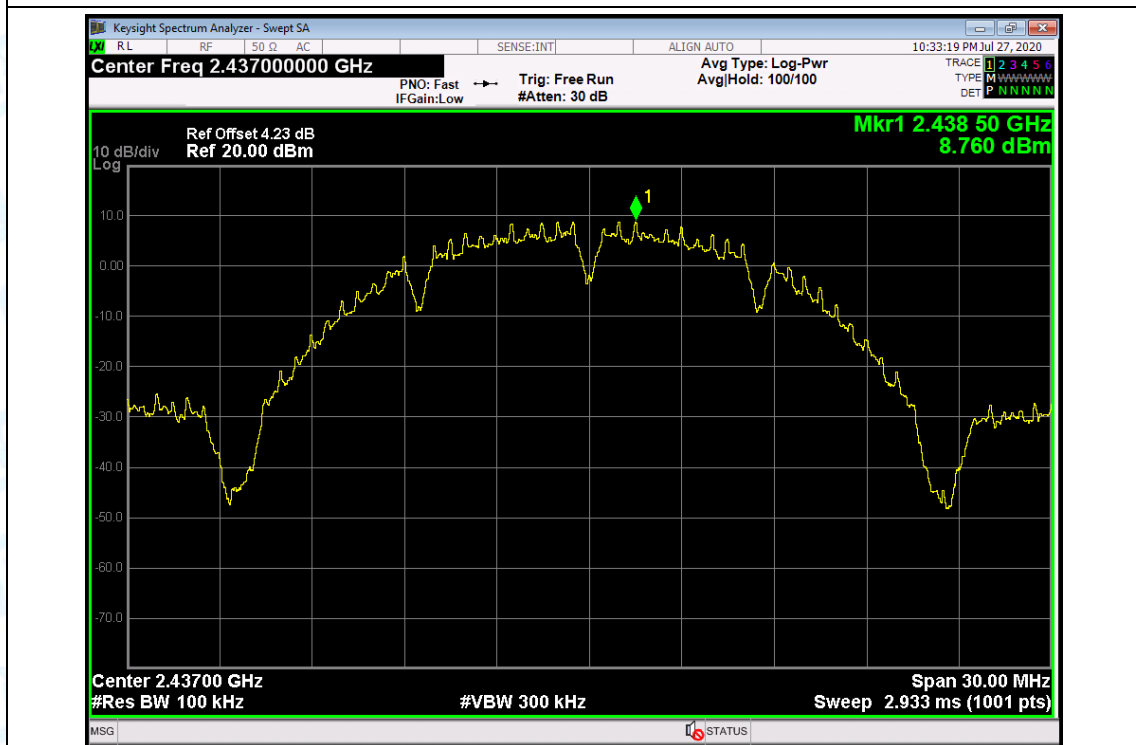
0.03GHz-25GHz

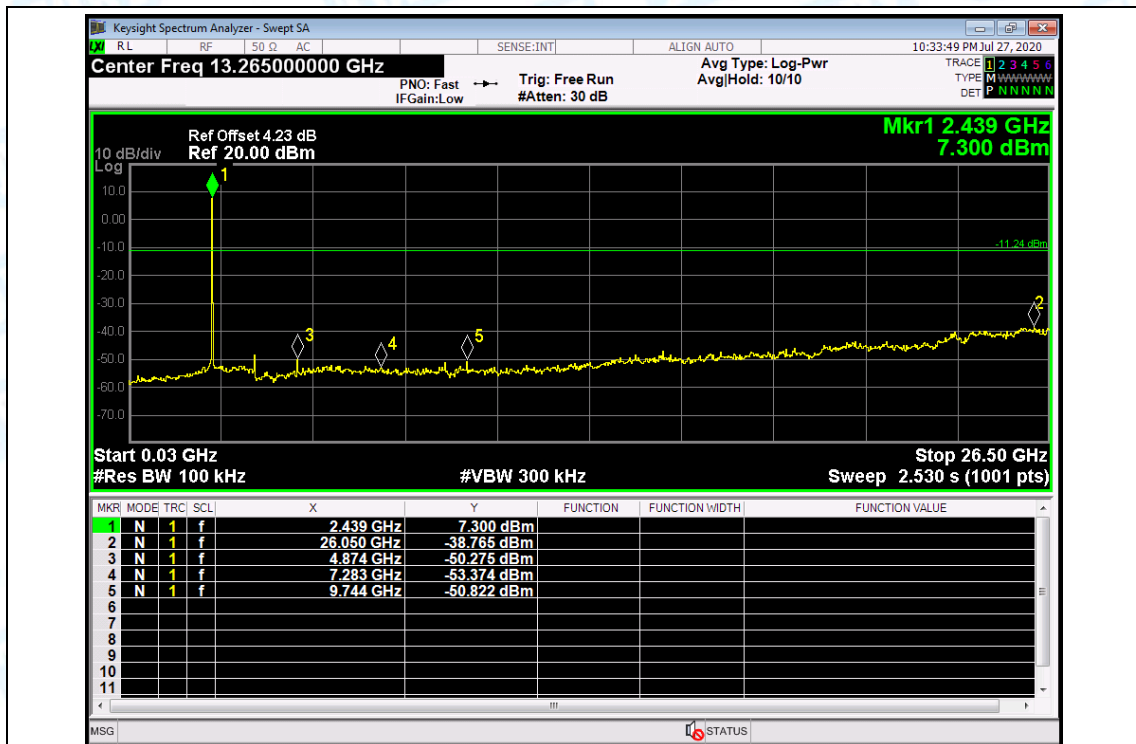




2437 MHz

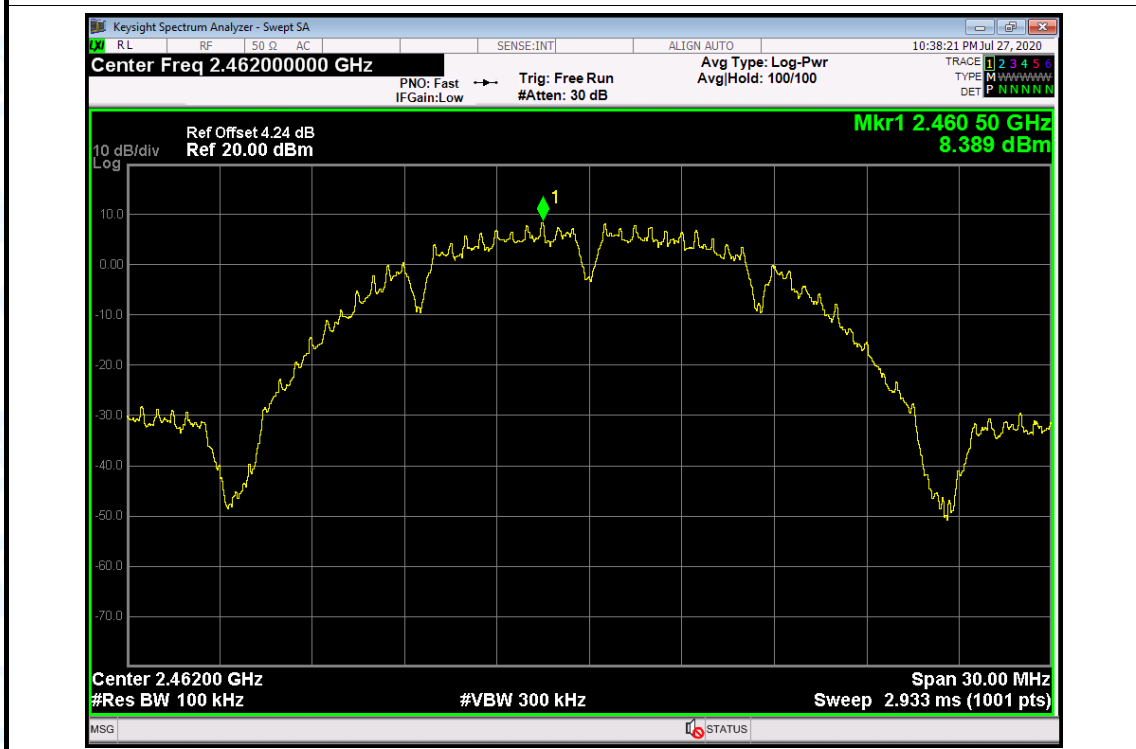
0.03GHz-25GHz

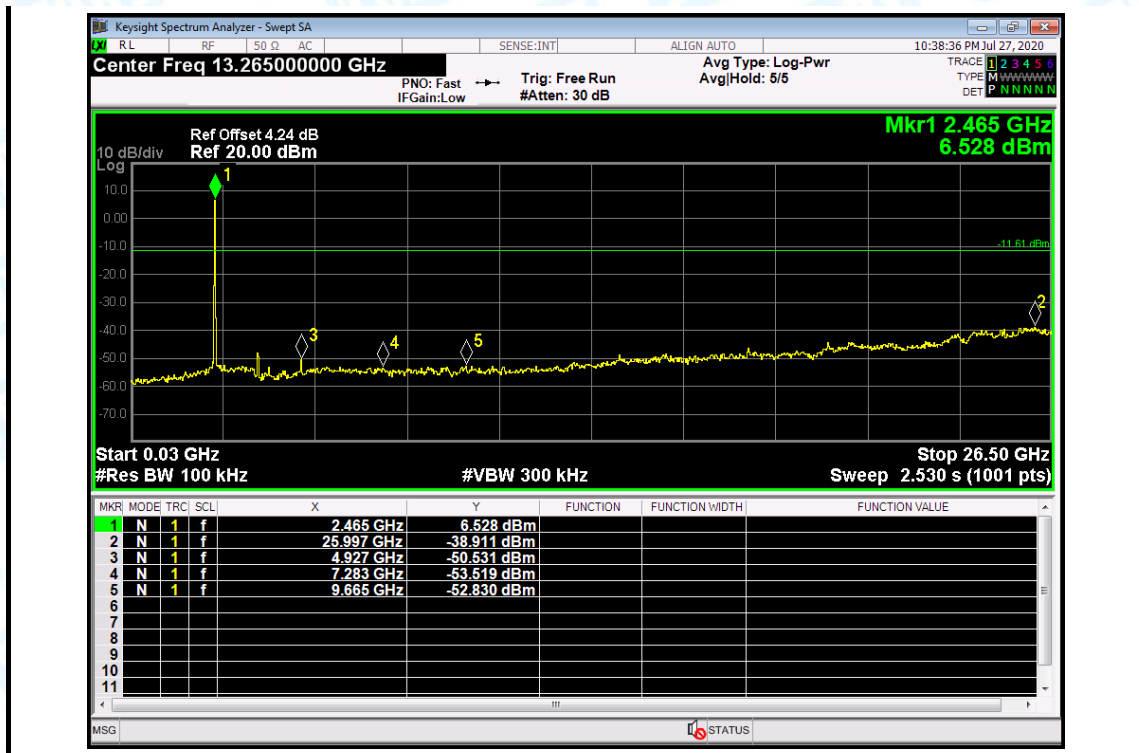




2462 MHz

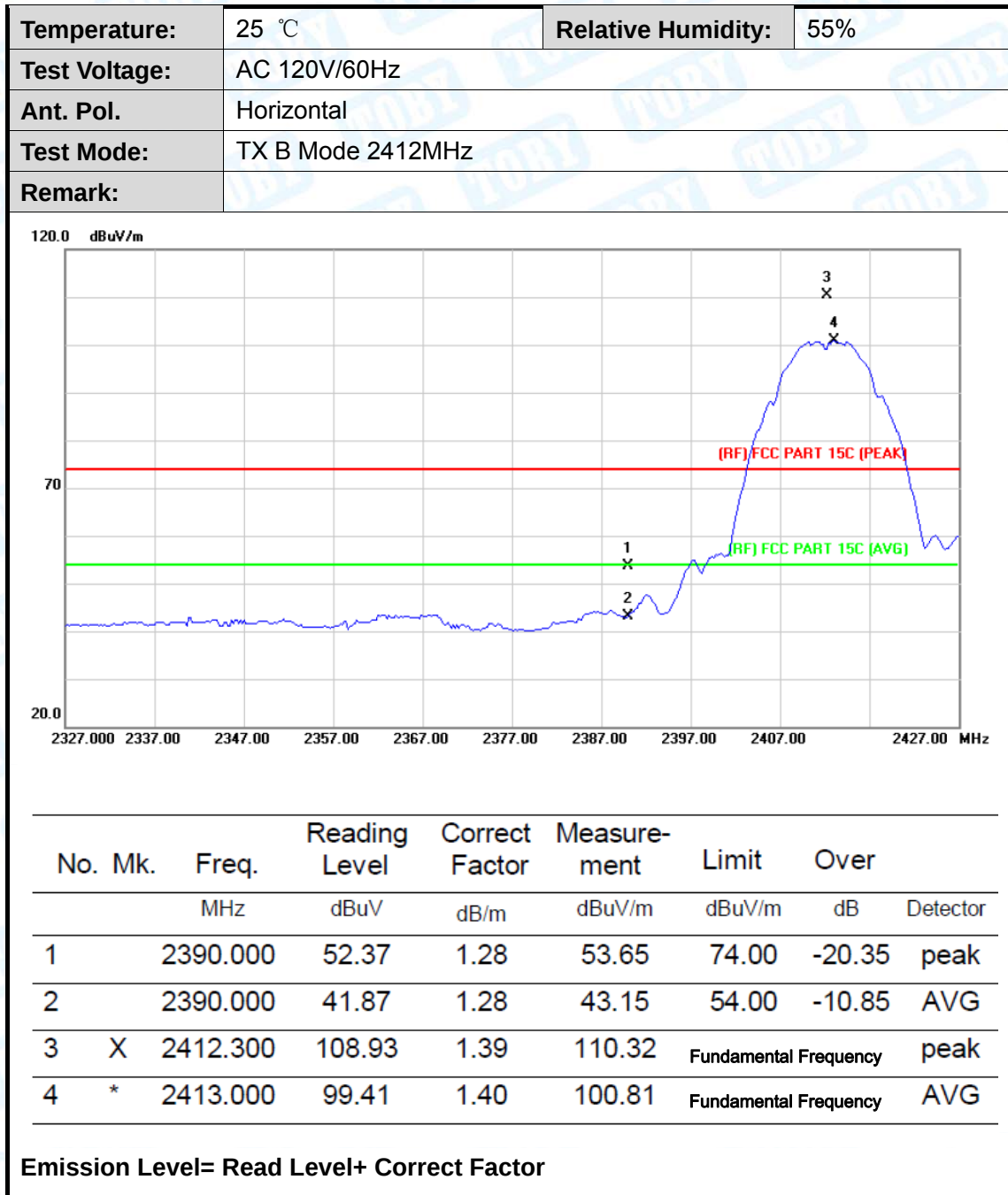
0.03GHz-25GHz



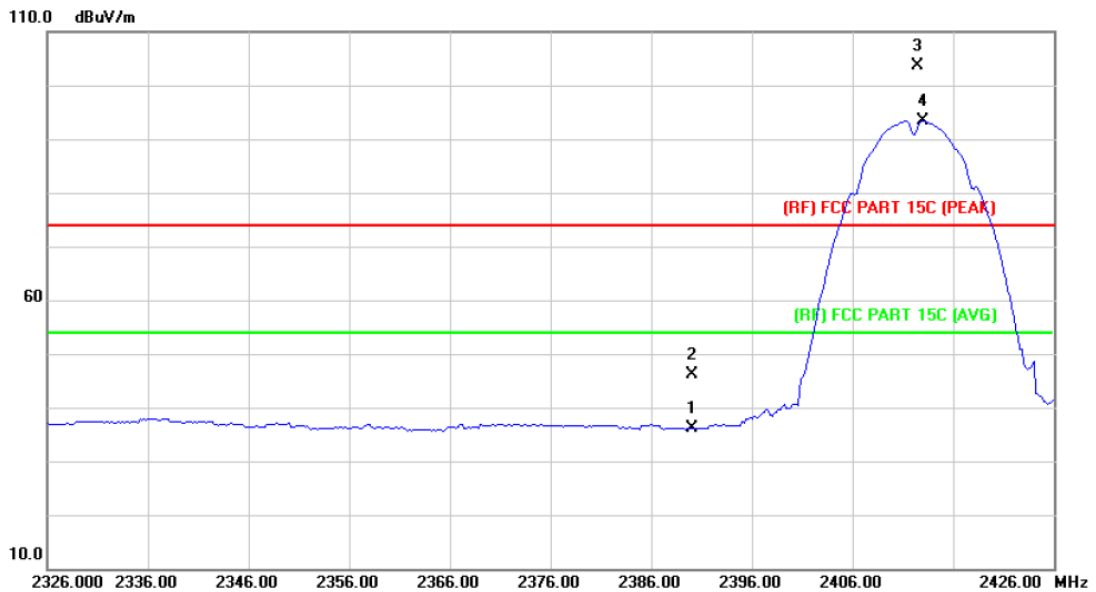


Attachment C-- Restricted Bands Requirement and Band-edge Test Data

(1) Radiation Test

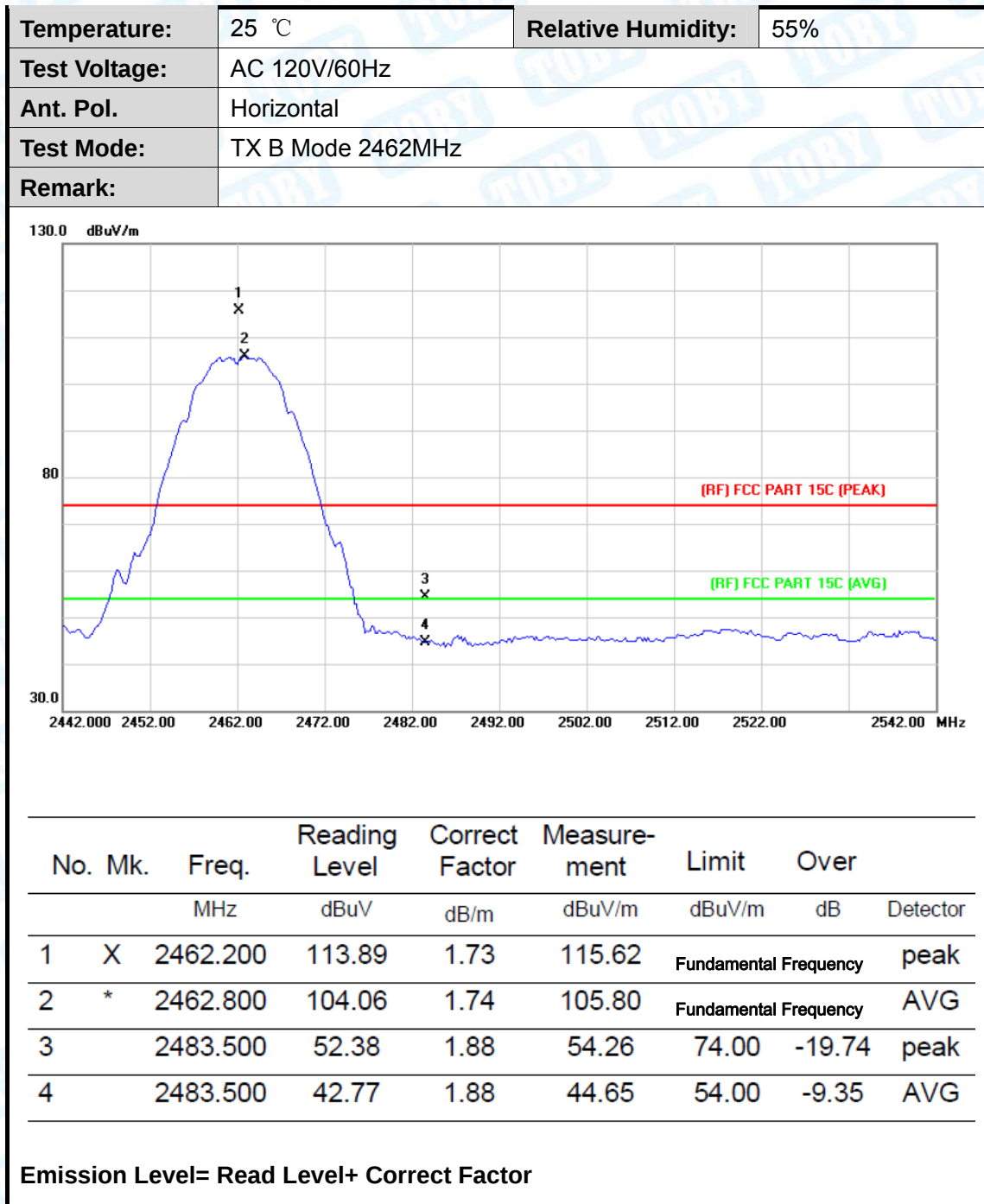


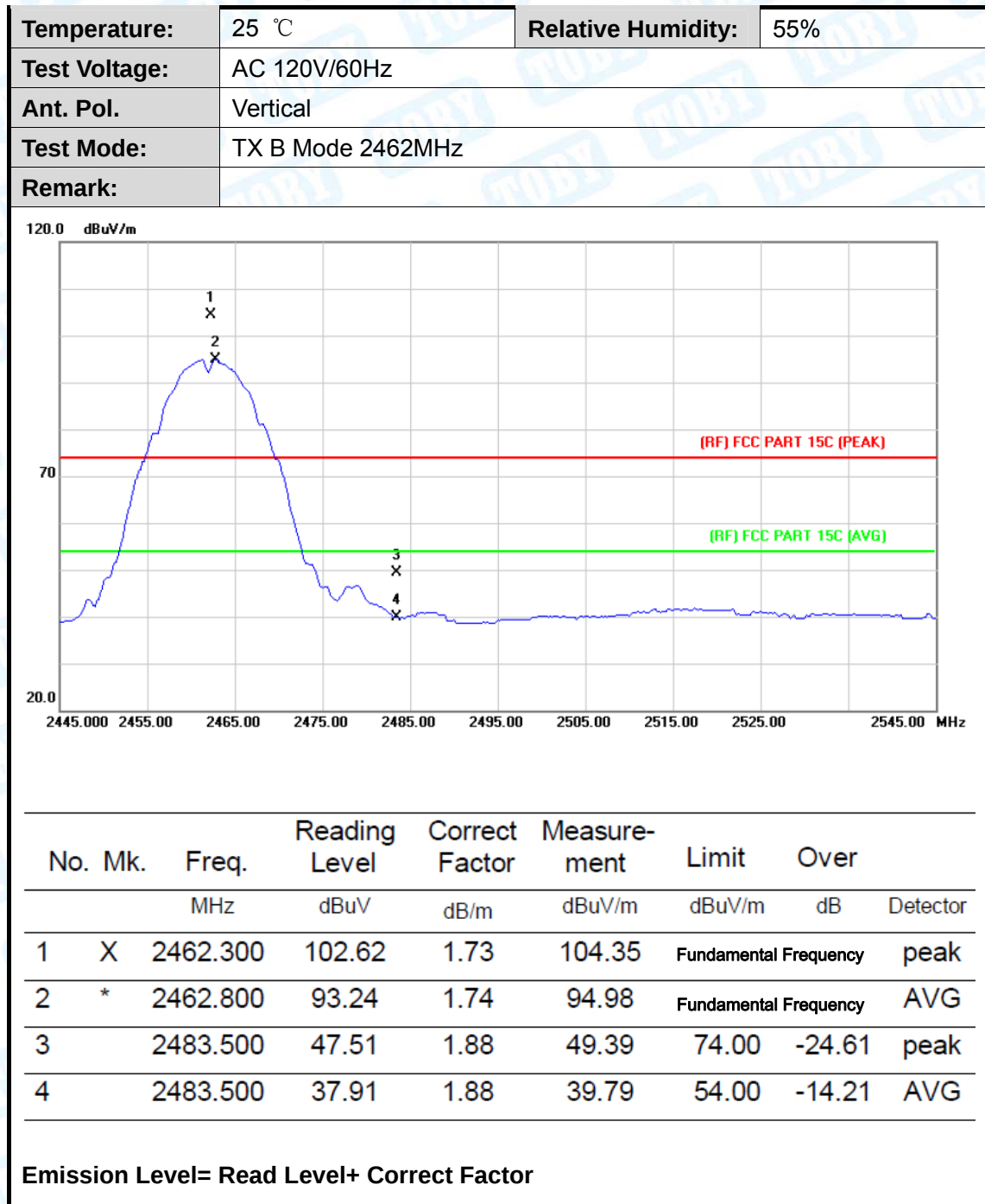
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX B Mode 2412MHz		
Remark:			



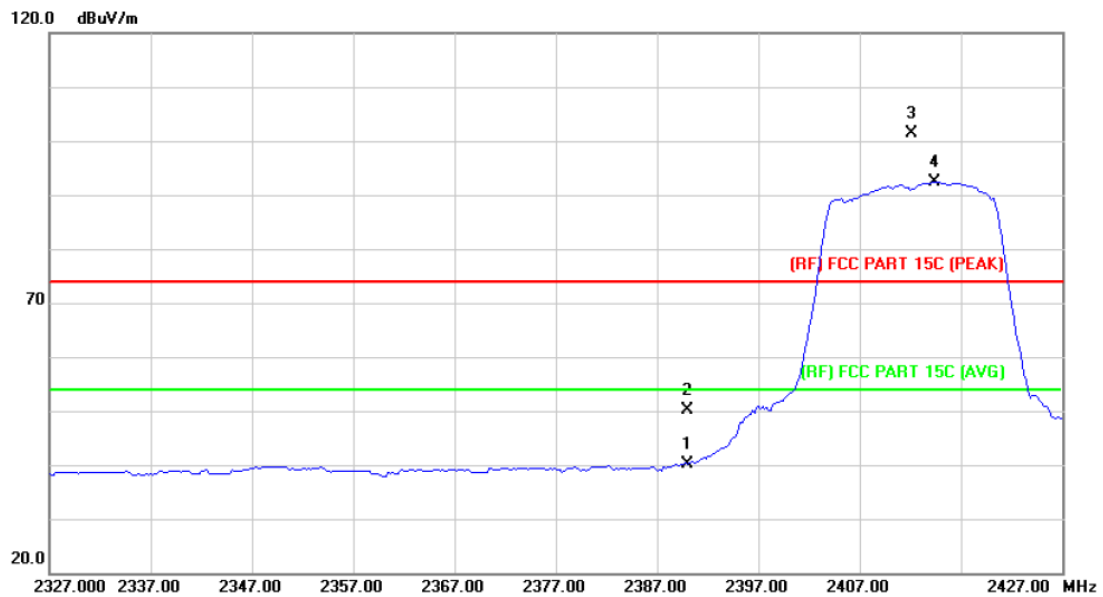
No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB Detector
1		2390.000	34.85	1.28	36.13	74.00	-37.87 peak
2		2390.000	44.95	1.28	46.23	54.00	-7.77 AVG
3	X	2412.500	102.22	1.40	103.62	Fundamental Frequency peak	
4	*	2413.000	91.97	1.40	93.37	Fundamental Frequency AVG	

Emission Level= Read Level+ Correct Factor



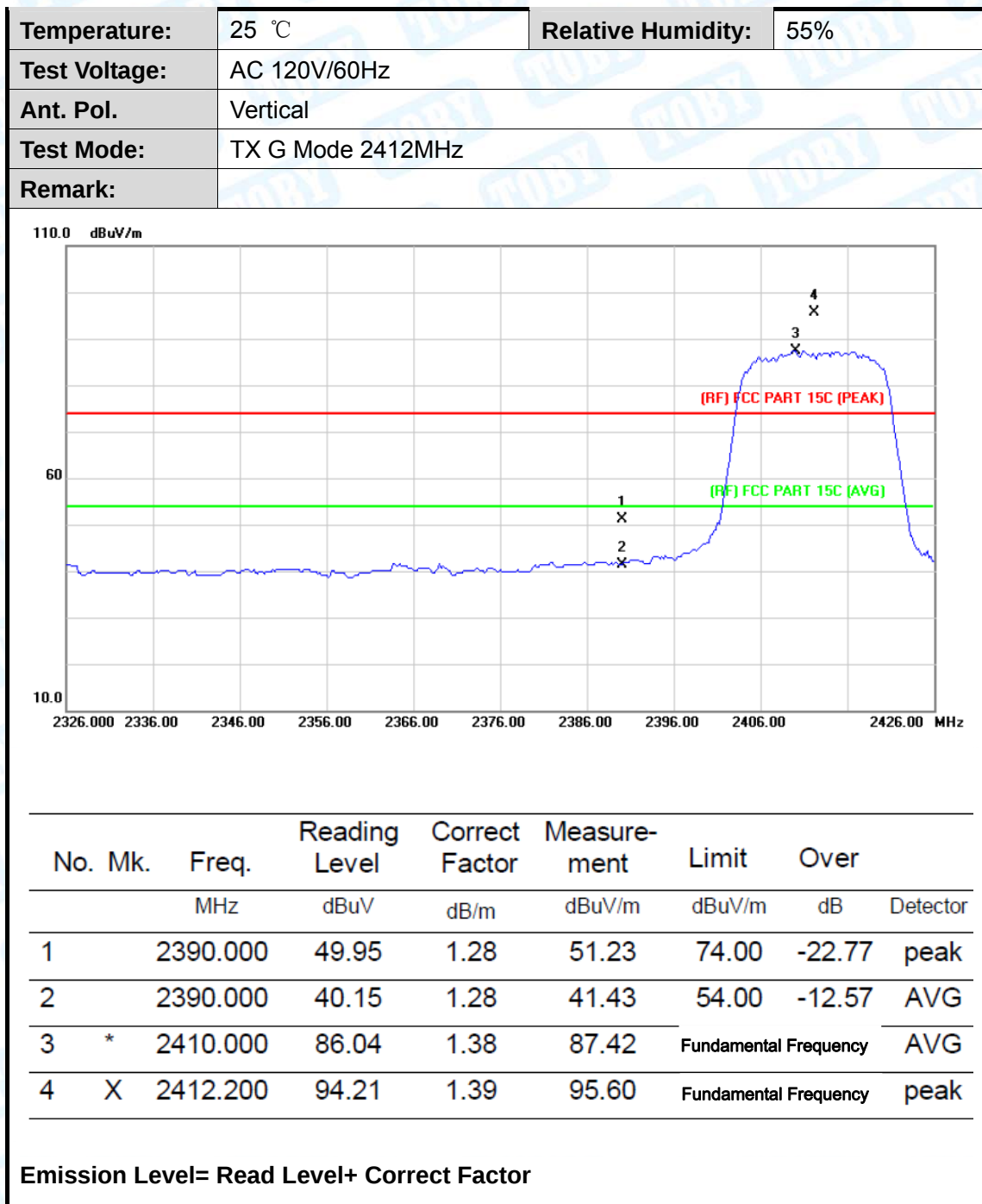


Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX G Mode 2412MHz		
Remark:			

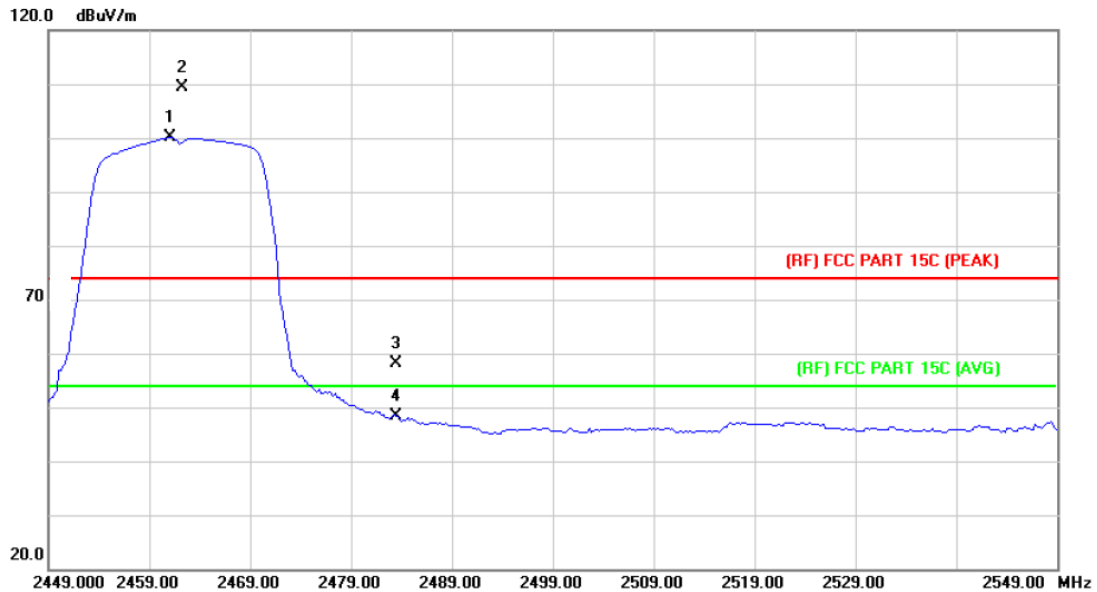


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	38.94	1.28	40.22	74.00	-33.78	peak
2		2390.000	48.95	1.28	50.23	54.00	-3.77	AVG
3	X	2412.200	99.91	1.39	101.30	Fundamental Frequency		peak
4	*	2414.400	91.01	1.41	92.42	Fundamental Frequency		AVG

Emission Level= Read Level+ Correct Factor



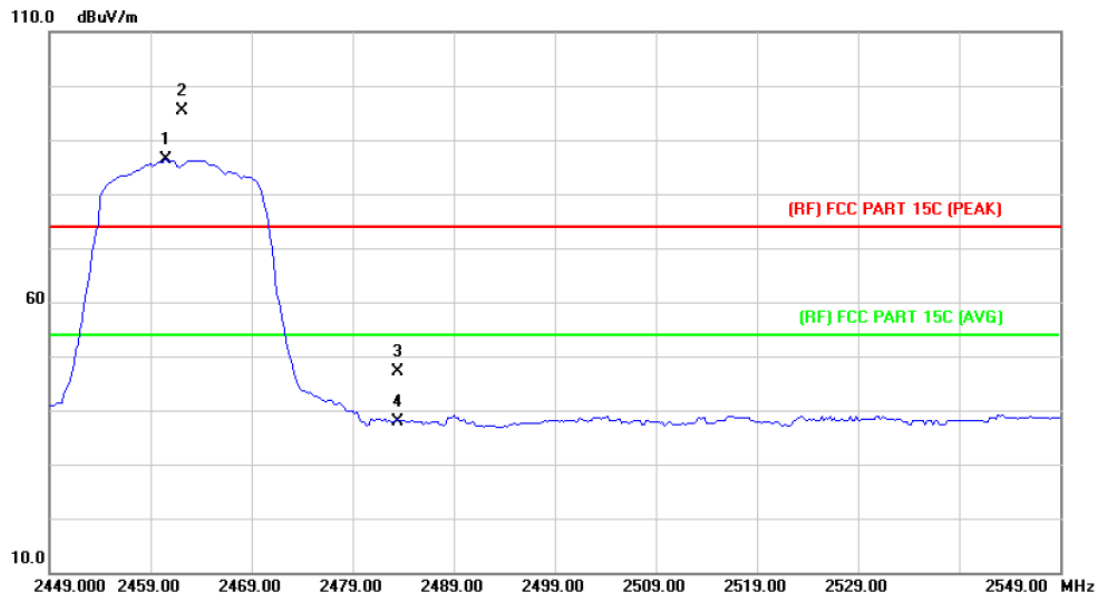
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Horizontal		
Test Mode:	TX G Mode 2462MHz		
Remark:			



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	2461.000	98.39	1.72	100.11	Fundamental Frequency		AVG
2	X	2462.300	107.59	1.73	109.32	Fundamental Frequency		peak
3		2483.500	56.35	1.88	58.23	74.00	-15.77	peak
4		2483.500	46.44	1.88	48.32	54.00	-5.68	AVG

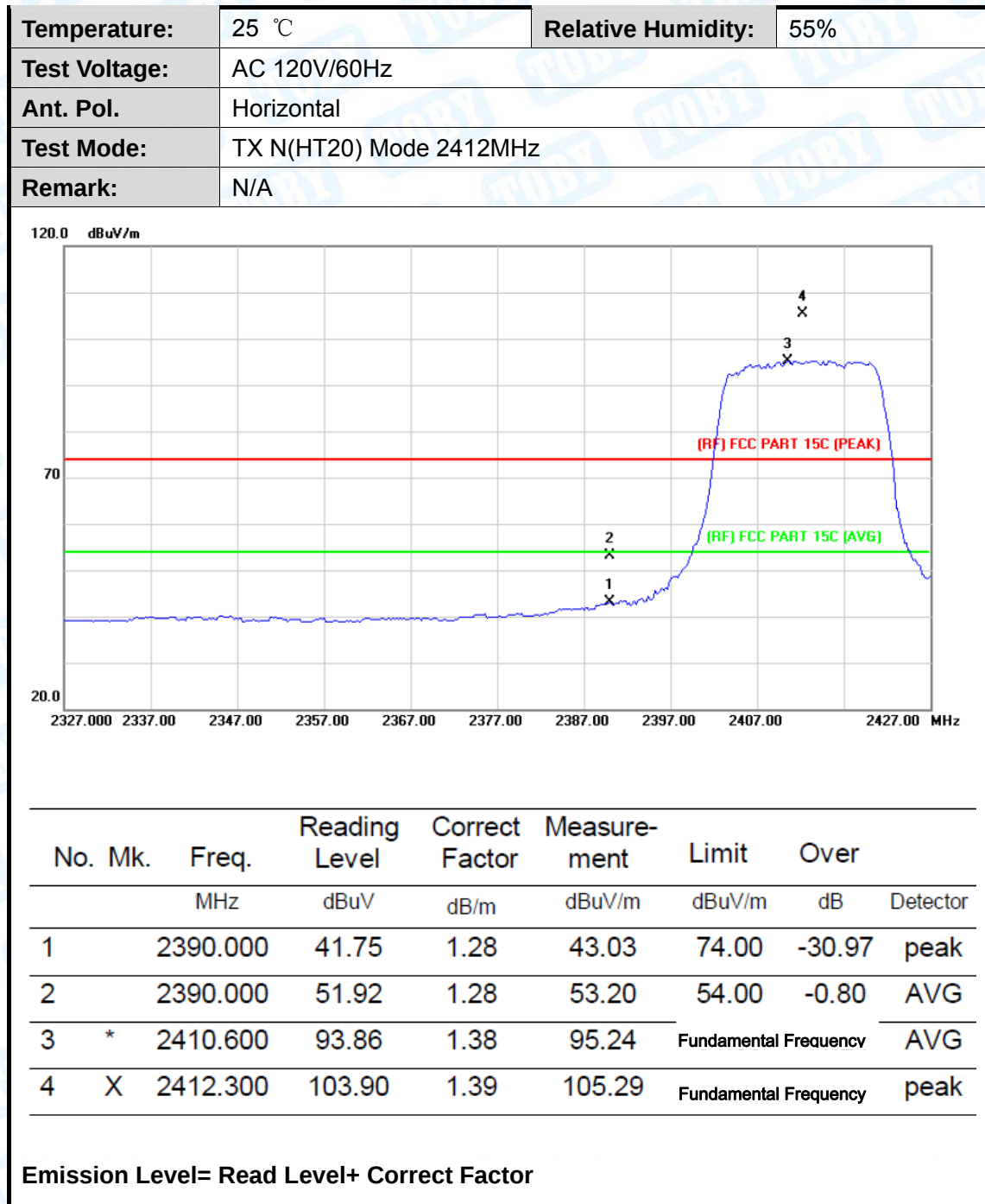
Emission Level= Read Level+ Correct Factor

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX G Mode 2462MHz		
Remark:			

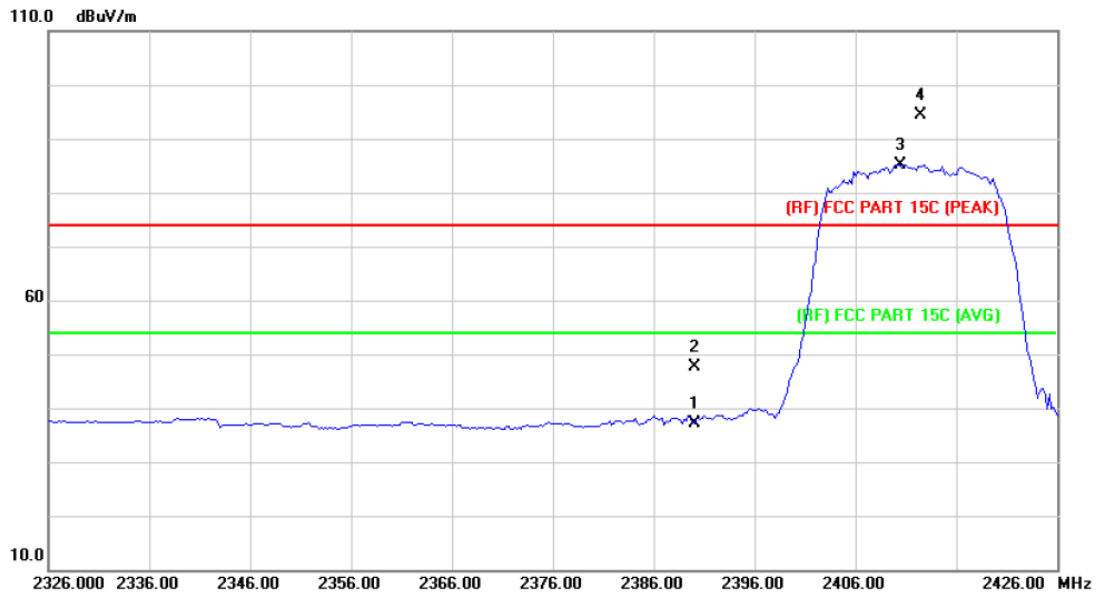


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1	*	2460.600	84.64	1.72	86.36	Fundamental Frequency		AVG
2	X	2462.100	93.53	1.73	95.26	Fundamental Frequency		peak
3		2483.500	45.28	1.88	47.16	74.00	-26.84	peak
4		2483.500	36.07	1.88	37.95	54.00	-16.05	AVG

Emission Level= Read Level+ Correct Factor

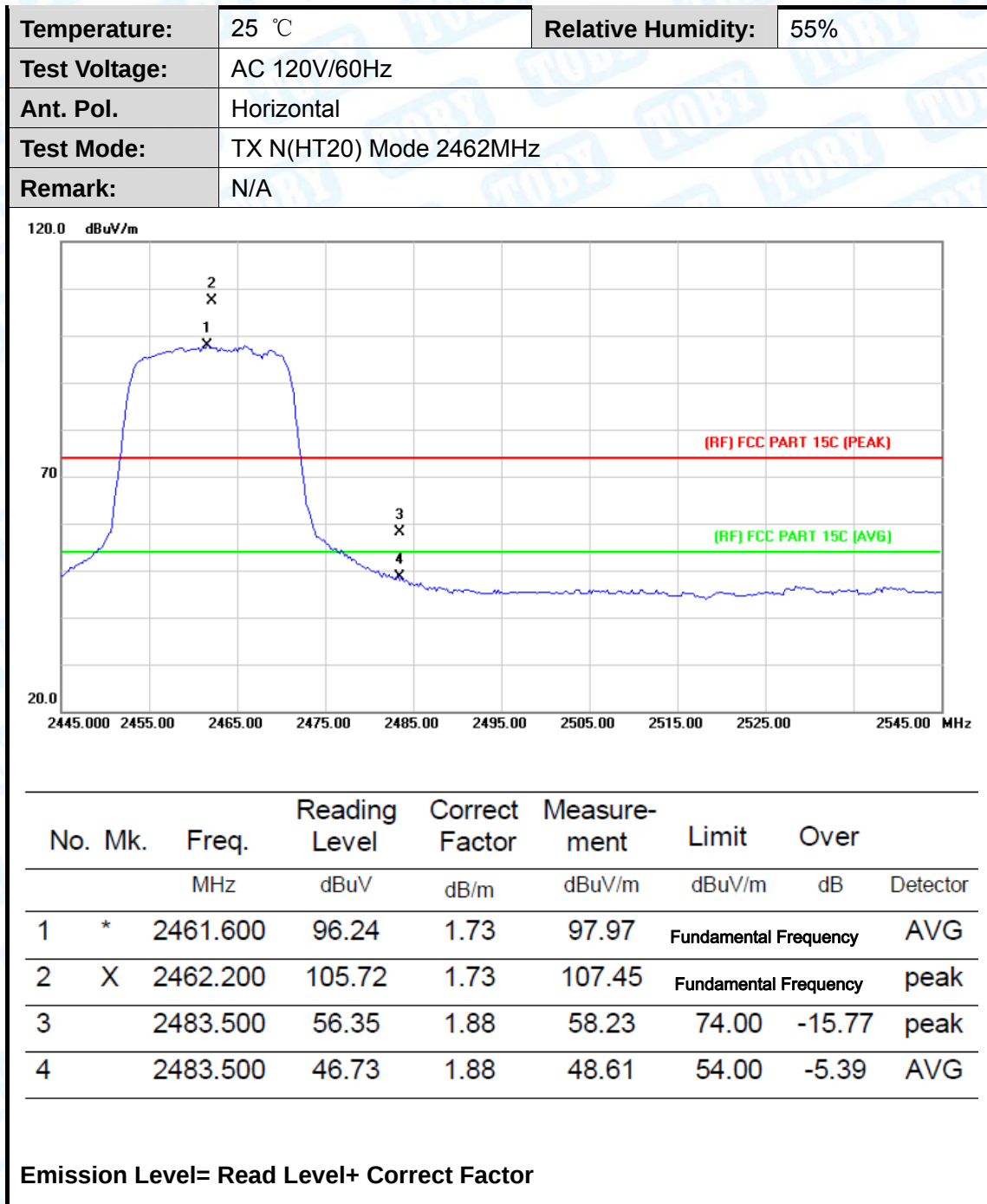


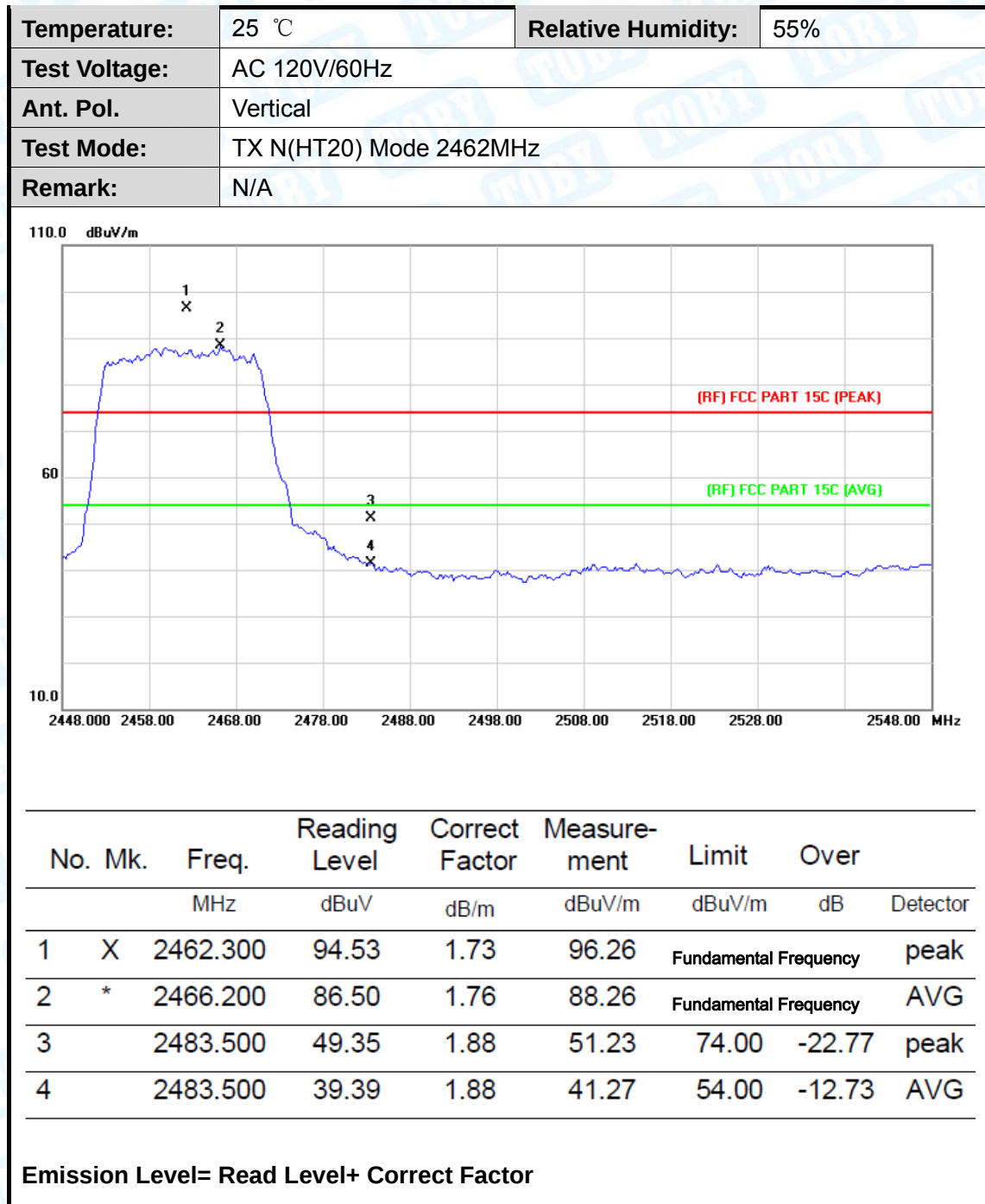
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Ant. Pol.	Vertical		
Test Mode:	TX N(HT20) Mode 2412MHz		
Remark:	N/A		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector
1		2390.000	35.77	1.28	37.05	74.00	-36.95	peak
2		2390.000	46.28	1.28	47.56	54.00	-6.44	AVG
3	*	2410.400	83.83	1.38	85.21	Fundamental Frequency		AVG
4	X	2412.400	93.07	1.39	94.46	Fundamental Frequency		peak

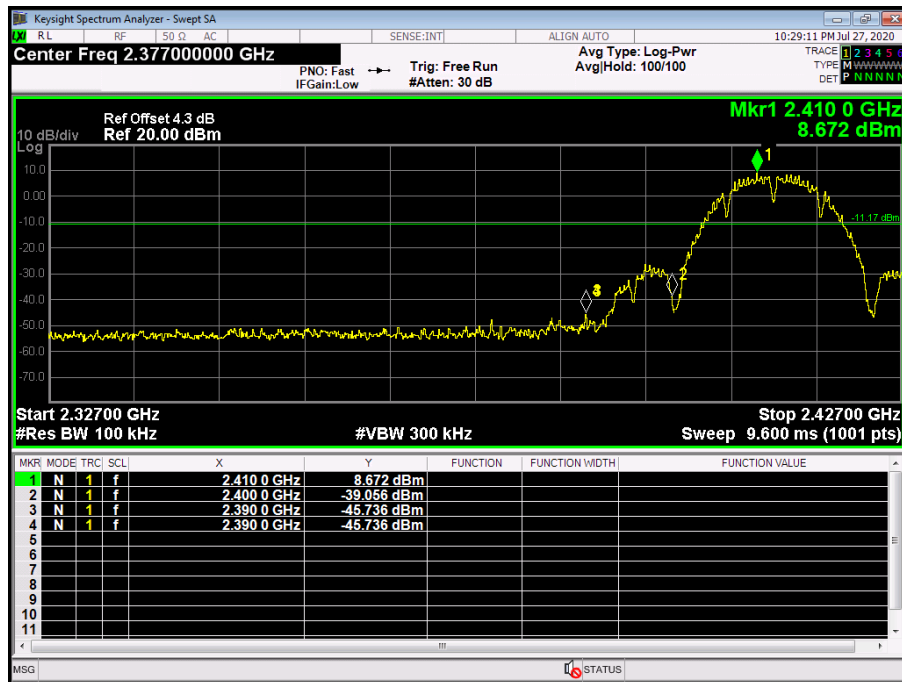
Emission Level= Read Level+ Correct Factor



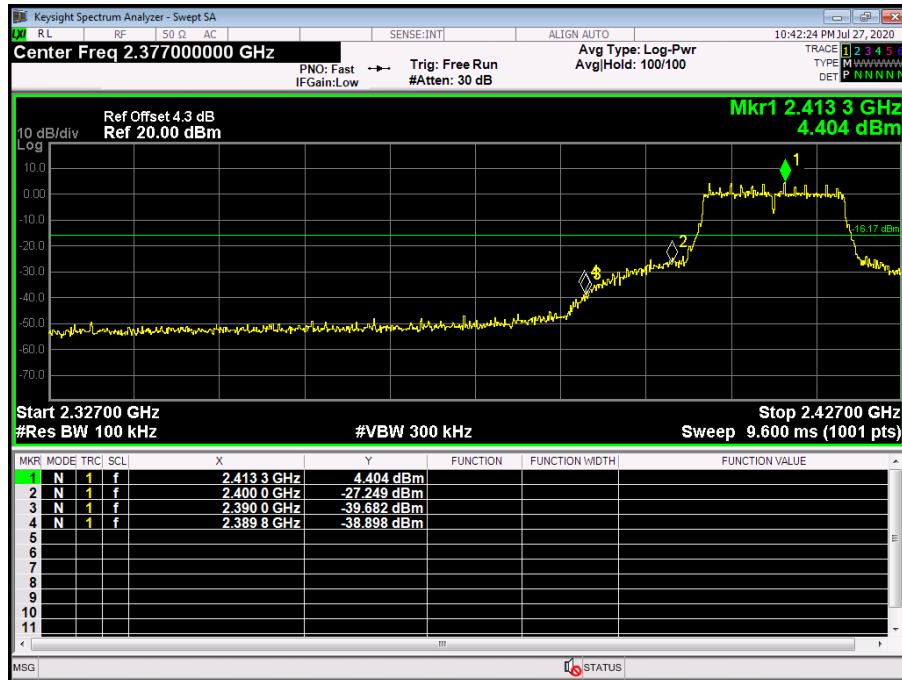


(2) Conducted Test

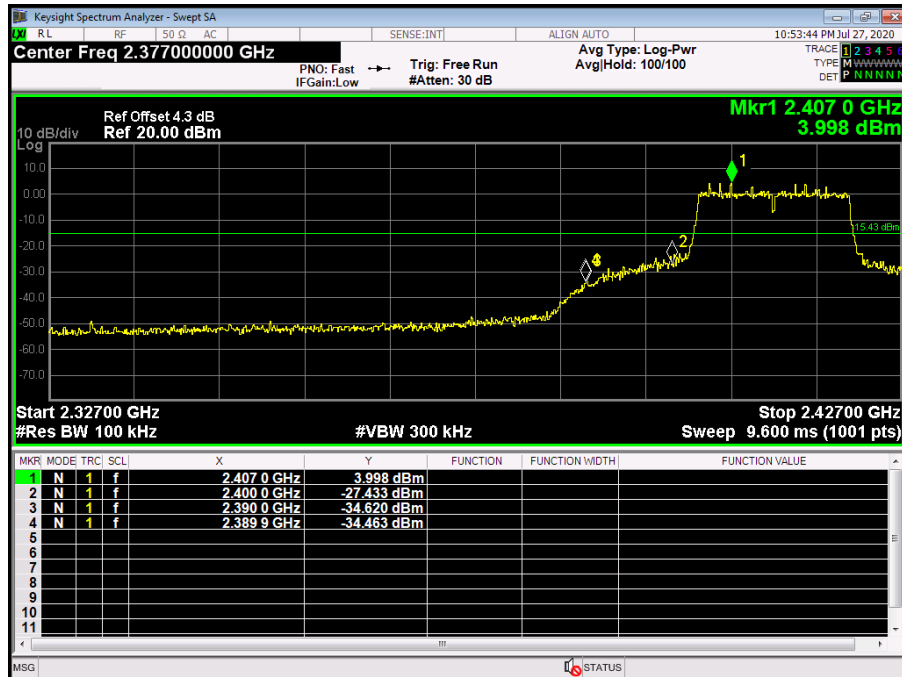
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX B Mode 2412MHz / TX B Mode 2462MHz		
Remark:	The EUT is programed in continuously transmitting mode		



Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX G Mode 2412MHz / TX G Mode 2462MHz		
Remark:	The EUT is programed in continuously transmitting mode		



Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX N(HT20) Mode 2412MHz / TX N(HT20) Mode 2462MHz		
Remark:	The EUT is programed in continuously transmitting mode		



Attachment D-- Bandwidth Test Data

Temperature:	25℃	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX 802.11B Mode		
Channel frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	
2412	9.579	≥0.5	
2437	10.030		
2462	9.588		
802.11B Mode			
2412 MHz			

Keysight Spectrum Analyzer - Occupied BW

RL

RF

50 Ω

AC

SENSE:INT

ALIGN AUTO

10:34:38 PM Jul 27, 2020

Center Freq 2.412000000 GHz

Center Freq: 2.412000000 GHz

Trig: Free Run

Avg/Hold: 100/100

Radio Std: None

#IFGain:Low

#Atten: 30 dB

Radio Device: BTS

Ref Offset 4.3 dB

Ref 24.30 dBm

10 dB/div

Log

-14.3

-5.70

-15.7

-25.7

-35.7

-45.7

-55.7

-65.7

14.3

4.30

-5.70

-15.7

-25.7

-35.7

-45.7

-55.7

-65.7

Center 2.412 GHz

#Res BW 100 kHz

#VBW 300 kHz

Span 40 MHz

Sweep 4 ms

Occupied Bandwidth

14.884 MHz

Total Power

25.3 dBm

Transmit Freq Error

-34.275 kHz

% of OBW Power

99.00 %

x dB Bandwidth

9.579 MHz

x dB

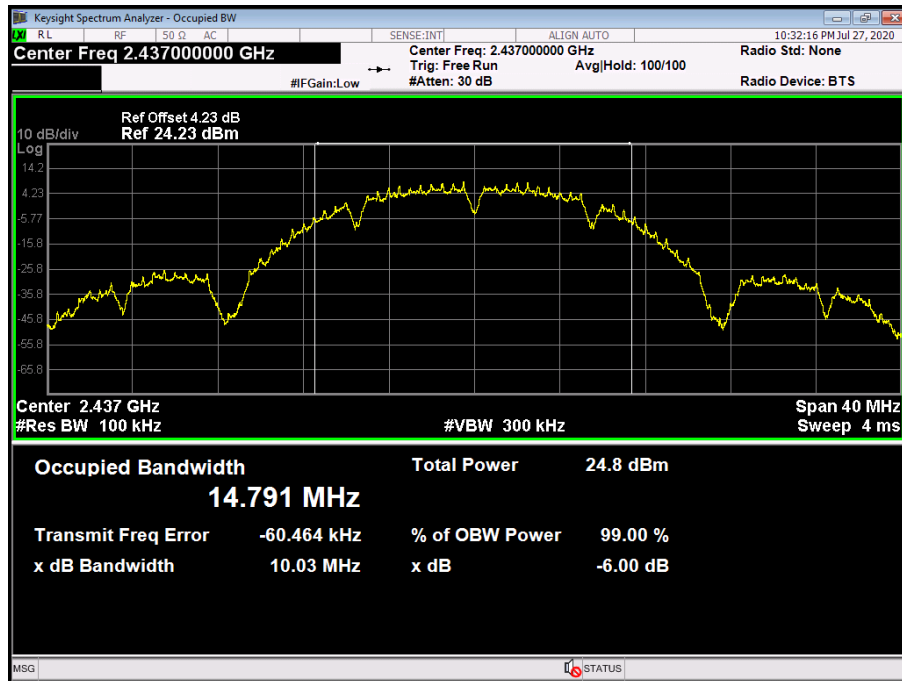
-6.00 dB

MSG

STATUS

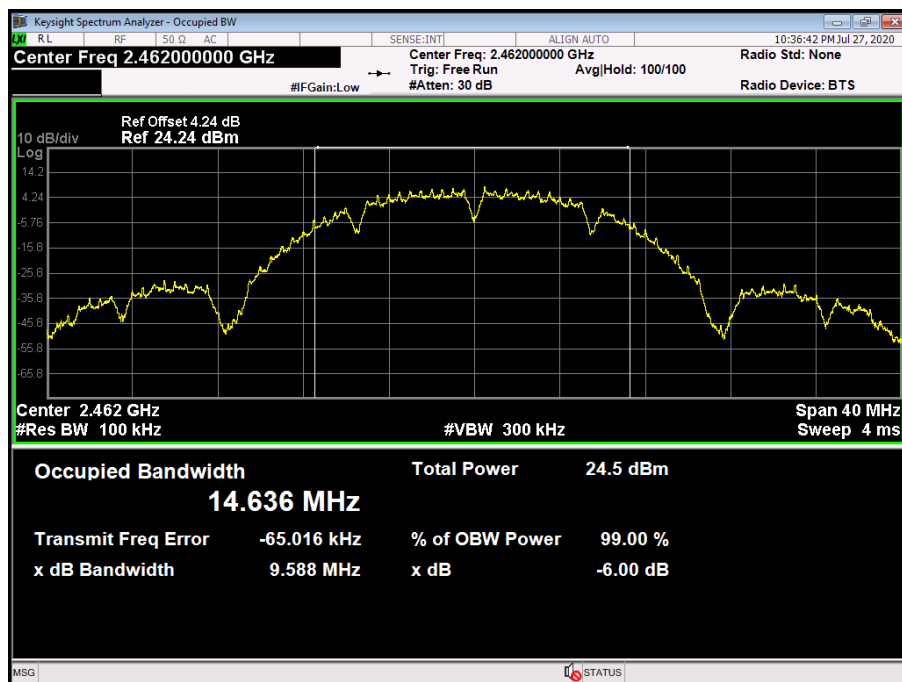
802.11B Mode

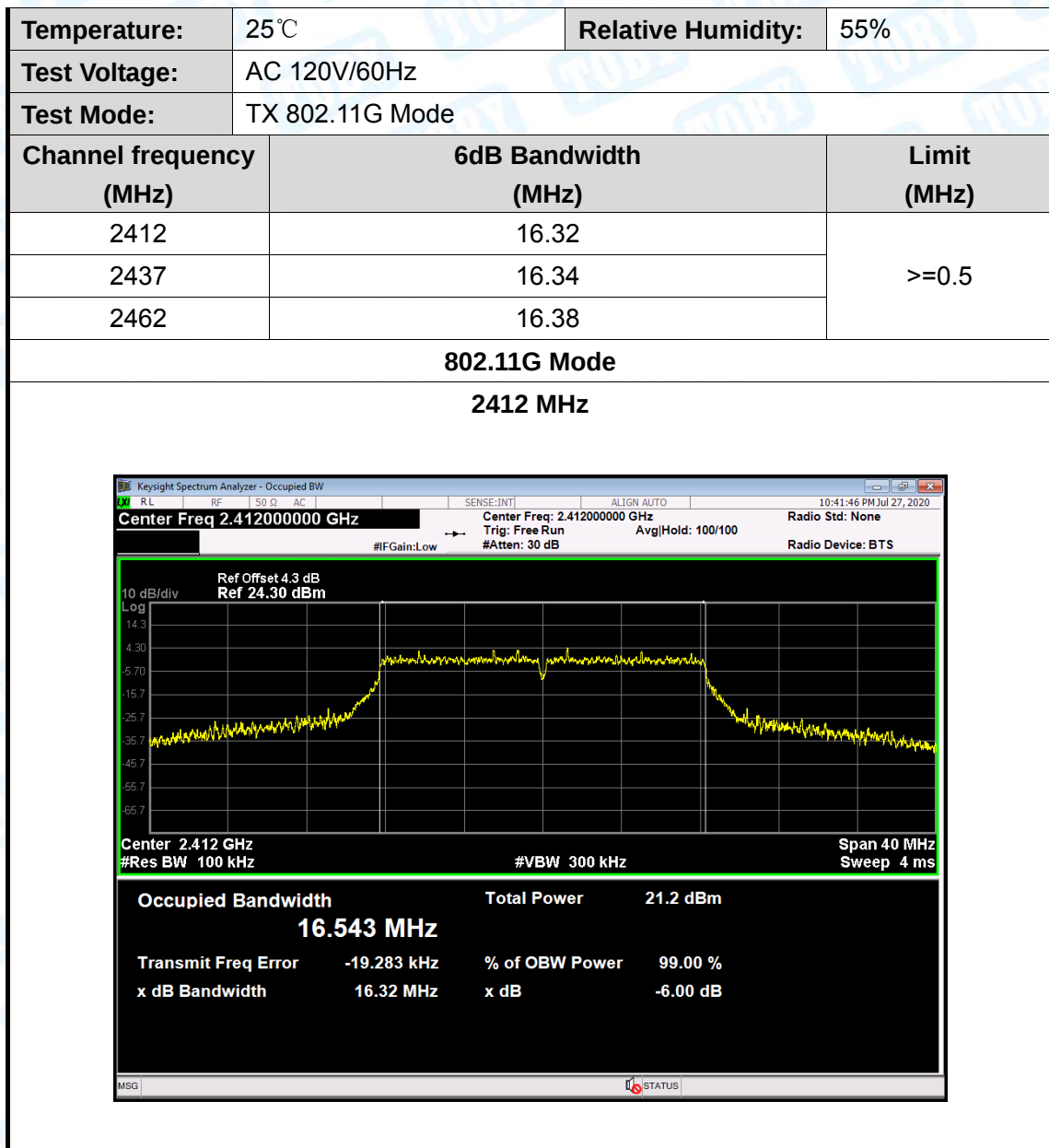
2437 MHz



802.11B Mode

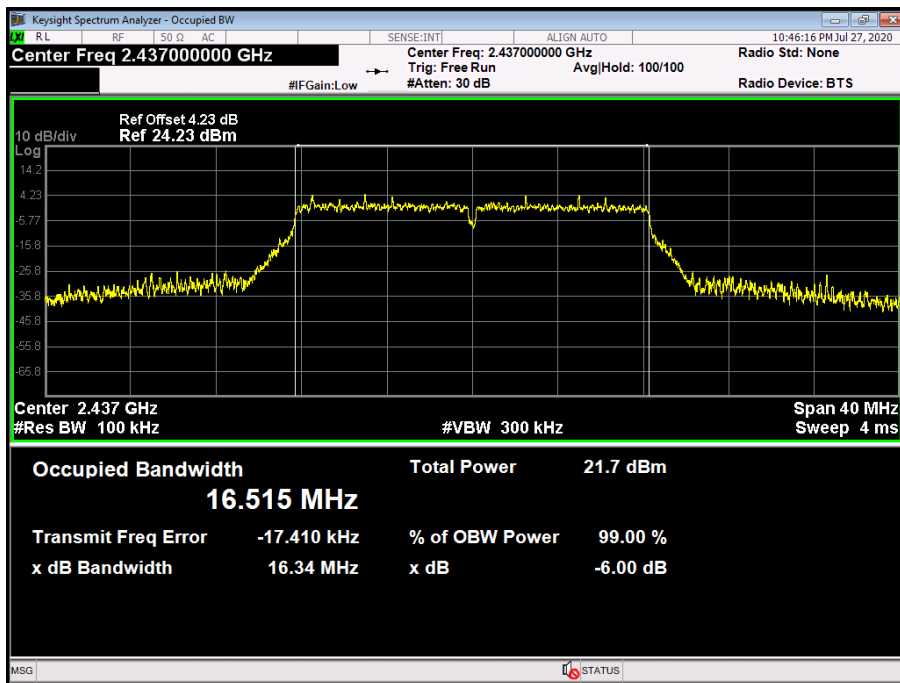
2462 MHz





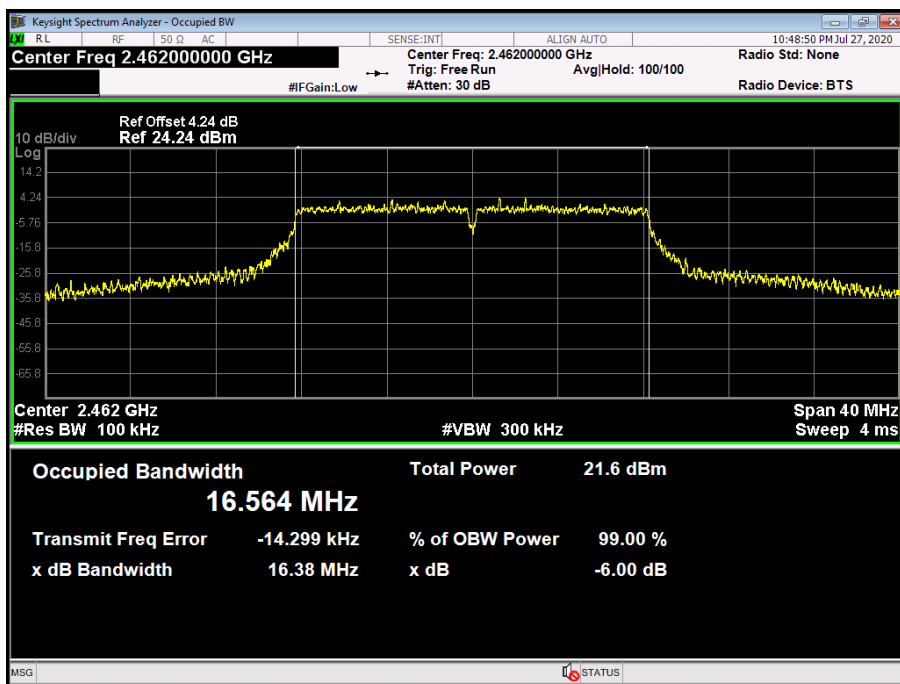
802.11G Mode

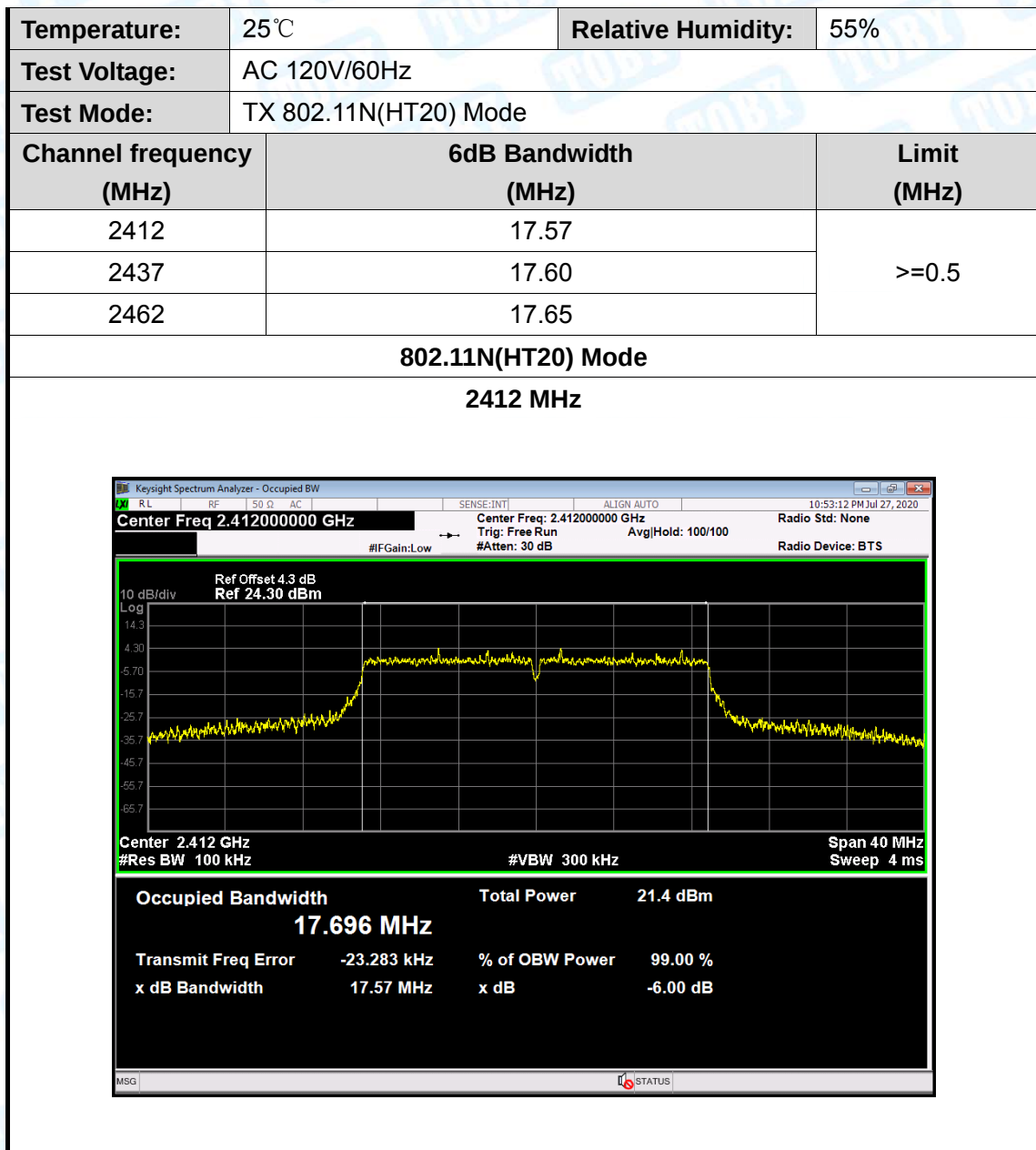
2437 MHz



802.11G Mode

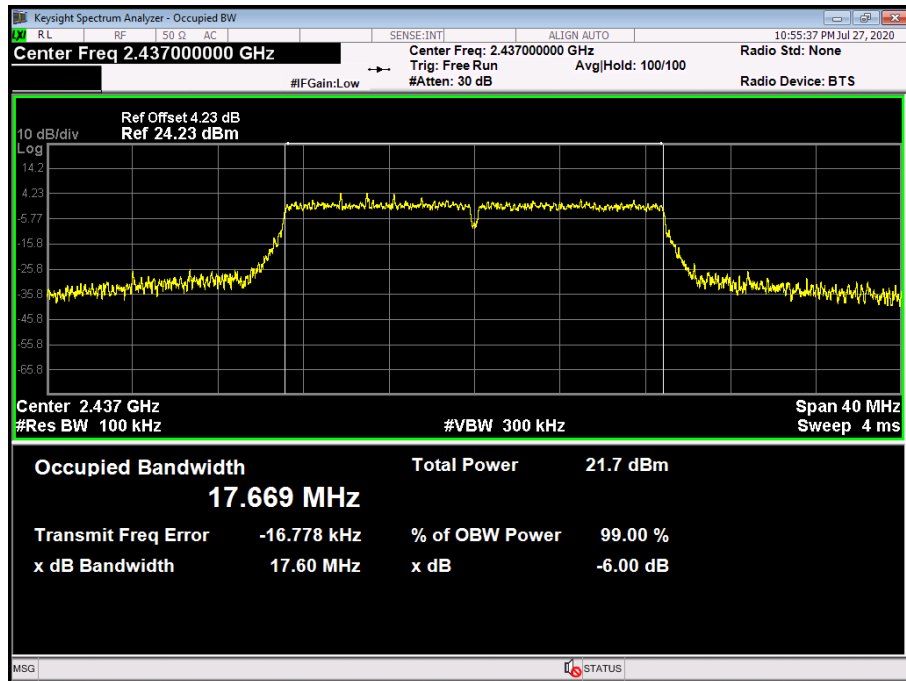
2462 MHz





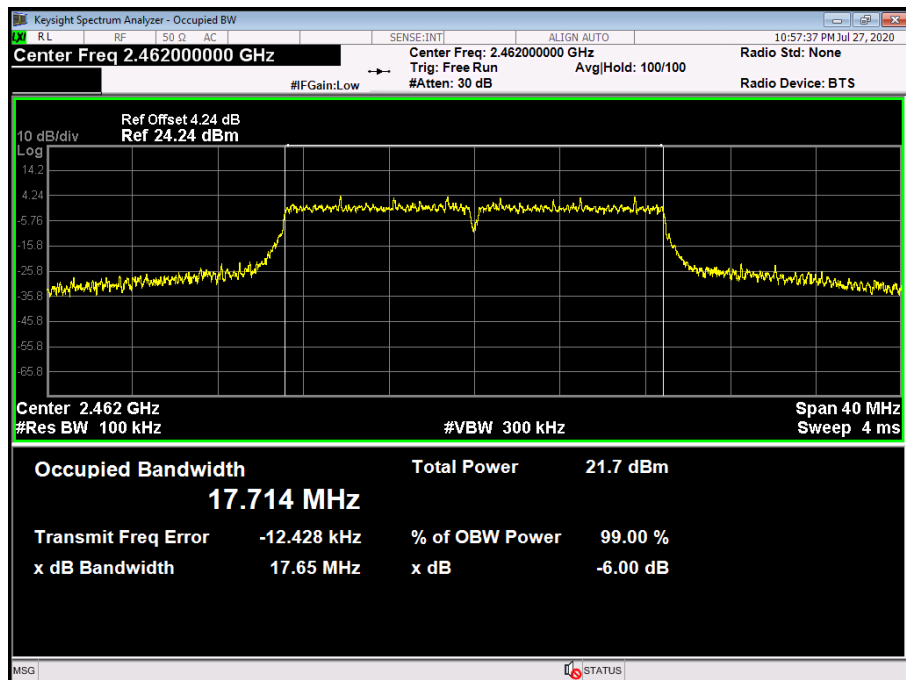
802.11N(HT20) Mode

2437 MHz



802.11N(HT20) Mode

2462 MHz

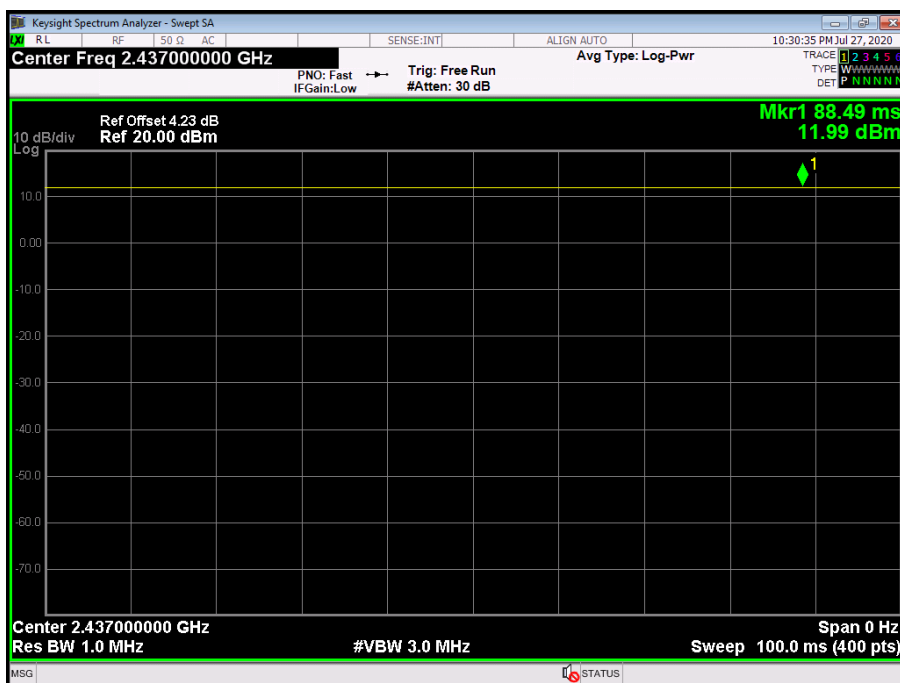


Attachment E-- Peak Output Power Test Data

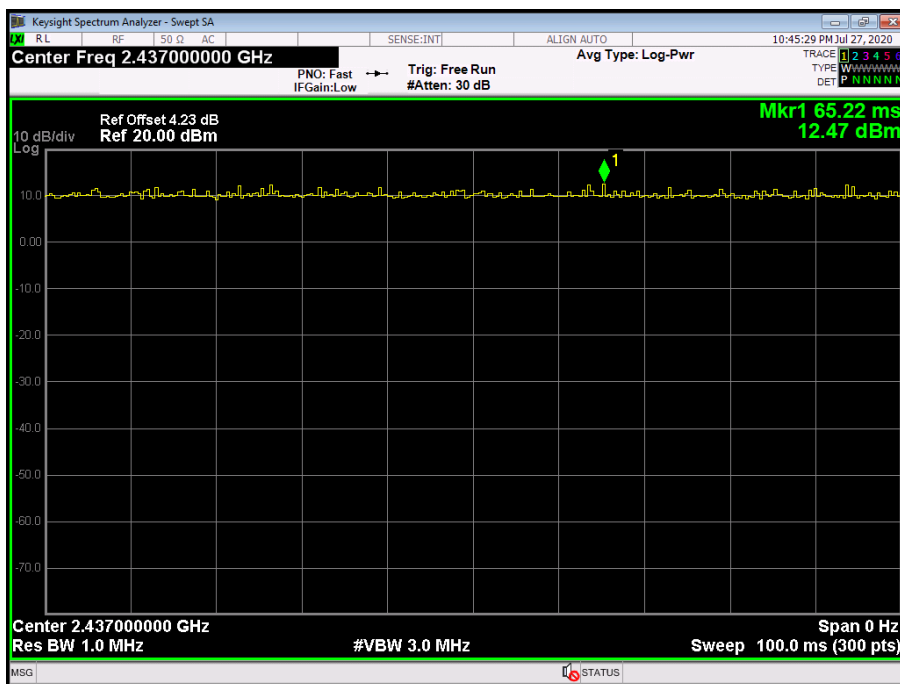
Test Conditions:		Continuous Transmitting Mode	
Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Mode	Channel frequency (MHz)	Test Result (dBm)	Limit (dBm)
802.11b	2412	18.84	30
	2437	18.37	
	2462	17.97	
802.11g	2412	15.28	
	2437	15.77	
	2462	15.75	
802.11n (HT20)	2412	15.33	
	2437	15.80	
	2462	15.71	
Result: PASS			

Duty Cycle		
Mode	Channel frequency (MHz)	Test Result
802.11b	2412	>98%
	2437	
	2462	
802.11g	2412	
	2437	
	2462	
802.11n (HT20)	2412	
	2437	
	2462	
Please see below plots		

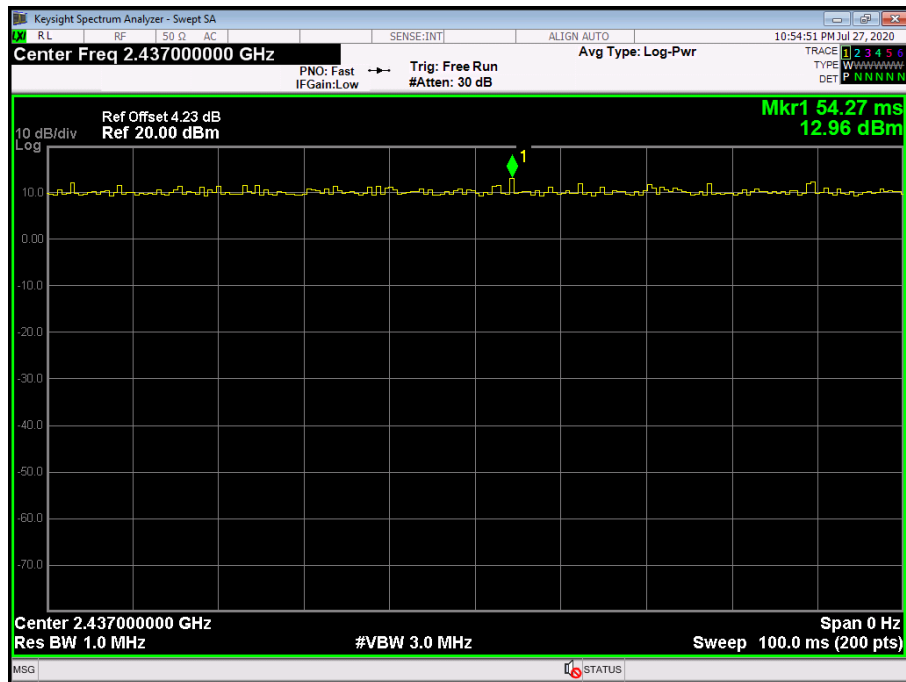
802.11 B Mode 2437 MHz



802.11 G Mode 2437 MHz



802.11 N20 Mode 2437 MHz



Attachment F-- Power Spectral Density Test Data

Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX 802.11B Mode		
Channel Frequency (MHz)	Power Density (dBm/3 kHz)	Limit (dBm/3 kHz)	
2412	-5.206	8	
2437	-4.704		
2462	-5.786		
802.11B Mode			
2412 MHz			

Keysight Spectrum Analyzer - Swept SA

RL

RF

150 Ω

AC

SENSE:INT

ALIGN AUTO

10:35:08 PM Jul 27, 2020

Center Freq 2.41200000 GHz

PN0: Fast

IF Gain: Low

Trig: Free Run

#Atten: 30 dB

Avg Type: Log-Pwr

Avg/Hold: 2/2

TRACE 1 2 3 4 5 6

TYPE M W W W W W W W

DET P N N N N N

Ref Offset 4.3 dB

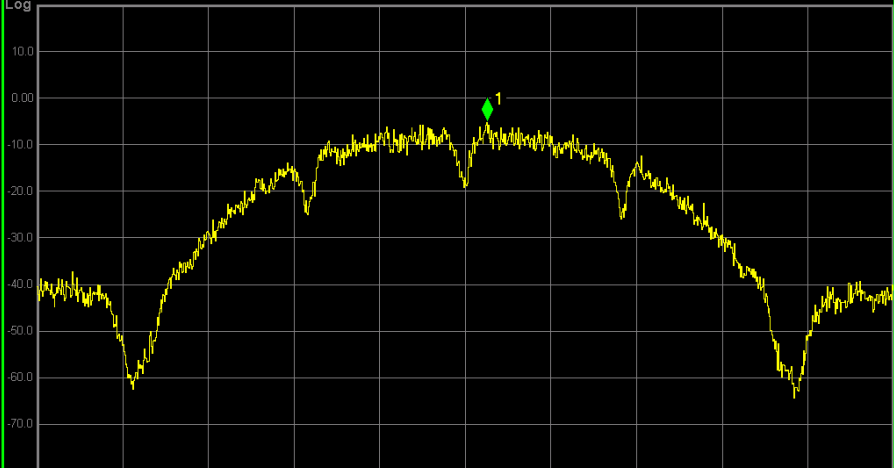
Ref 20.00 dBm

Mkr1 2.412 78 GHz

-5.206 dBm

10 dB/div

Log



Center 2.41200 GHz

#Res BW 3.0 kHz

#VBW 10 kHz

Span 30.00 MHz

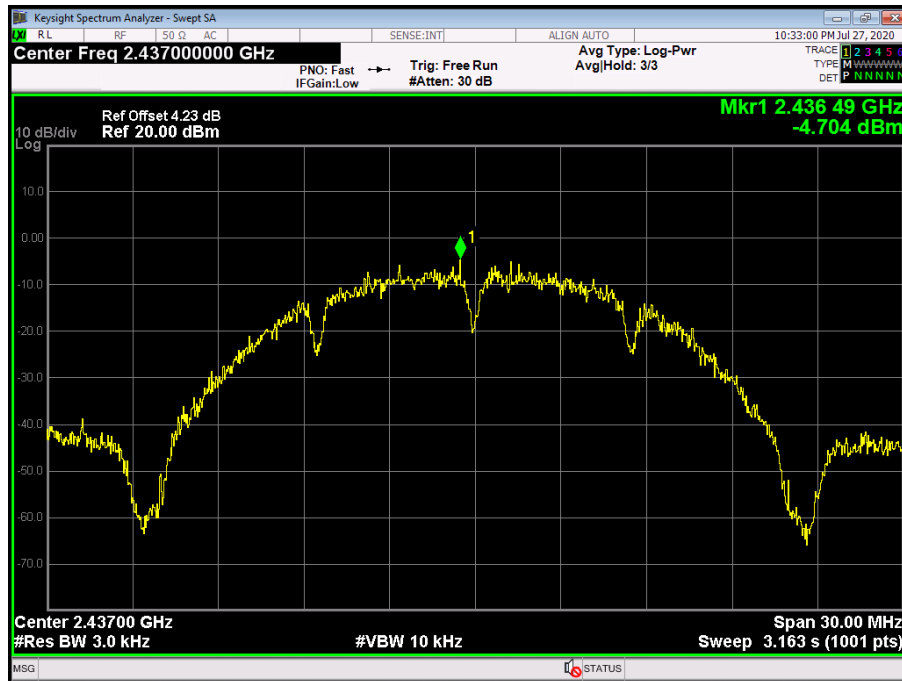
Sweep 3.163 s (1001 pts)

MSG

STATUS

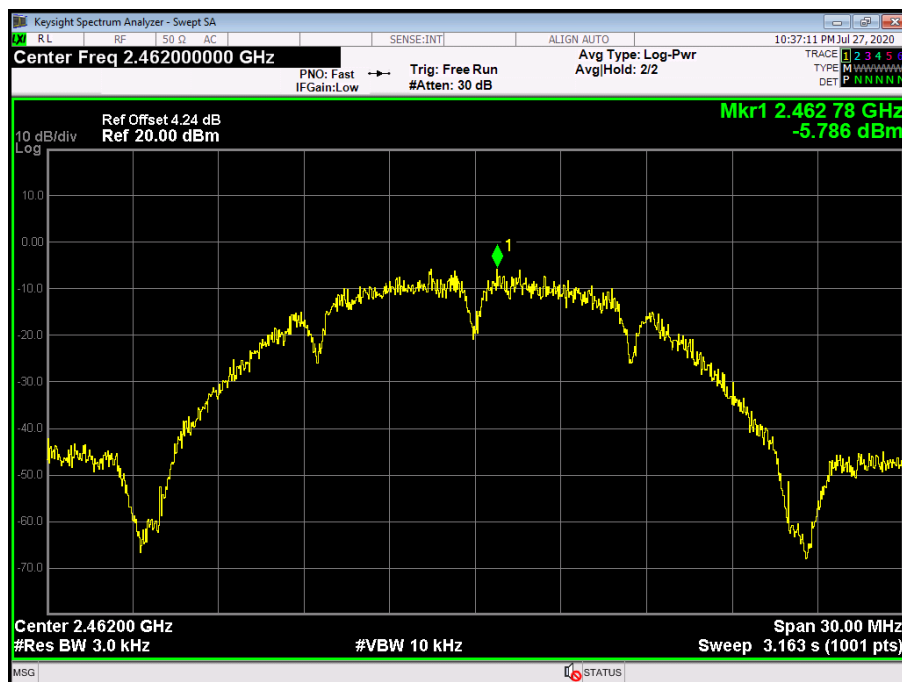
802.11B Mode

2437 MHz

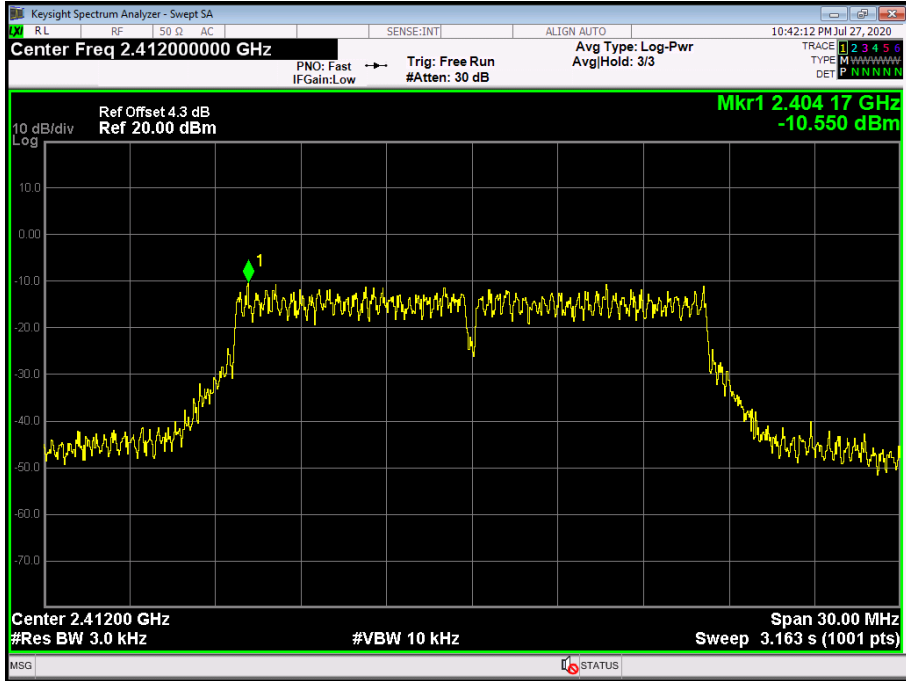


802.11B Mode

2462 MHz



Temperature:	25 °C	Relative Humidity:	55%
Test Voltage:	AC 120V/60Hz		
Test Mode:	TX 802.11G Mode		
Channel Frequency (MHz)	Power Density (dBm/3 kHz)	Limit (dBm/3 kHz)	
2412	-10.550	8	
2437	-9.324		
2462	-9.492		
802.11G Mode			
2412 MHz			



Keysight Spectrum Analyzer - Swept SA

Center Freq 2.412000000 GHz

Ref Offset 4.3 dB
Ref 20.00 dBm

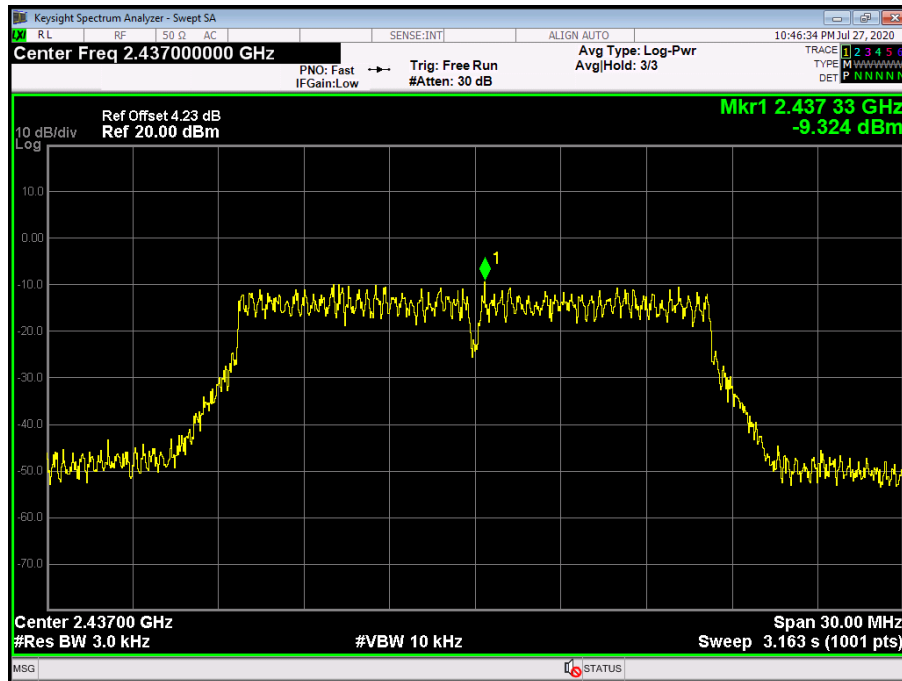
Mkr1 2.404 17 GHz
-10.550 dBm

Center 2.41200 GHz
#Res BW 3.0 kHz
#VBW 10 kHz

Span 30.00 MHz
Sweep 3.163 s (1001 pts)

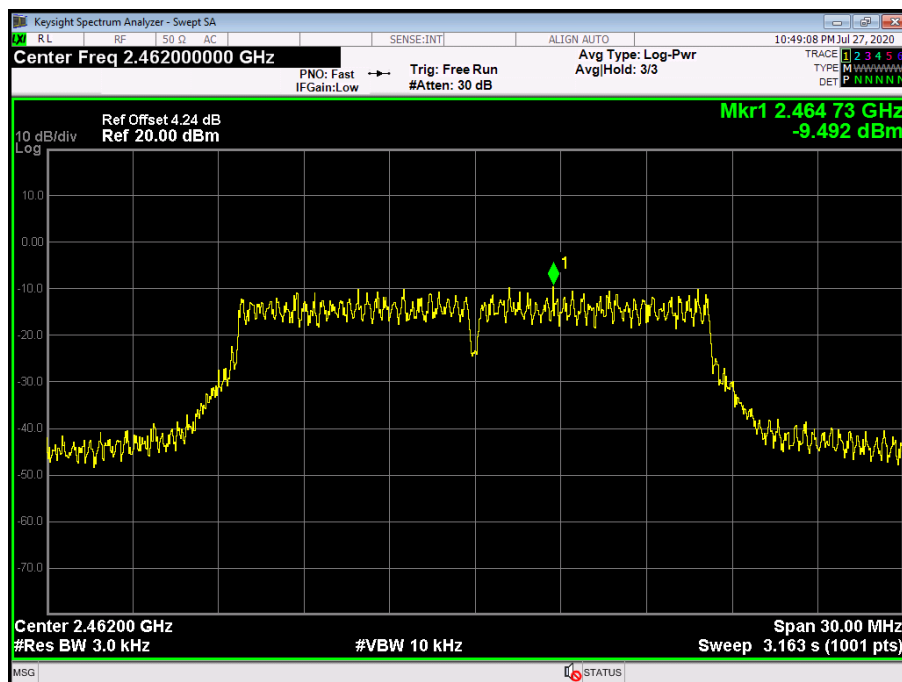
802.11G Mode

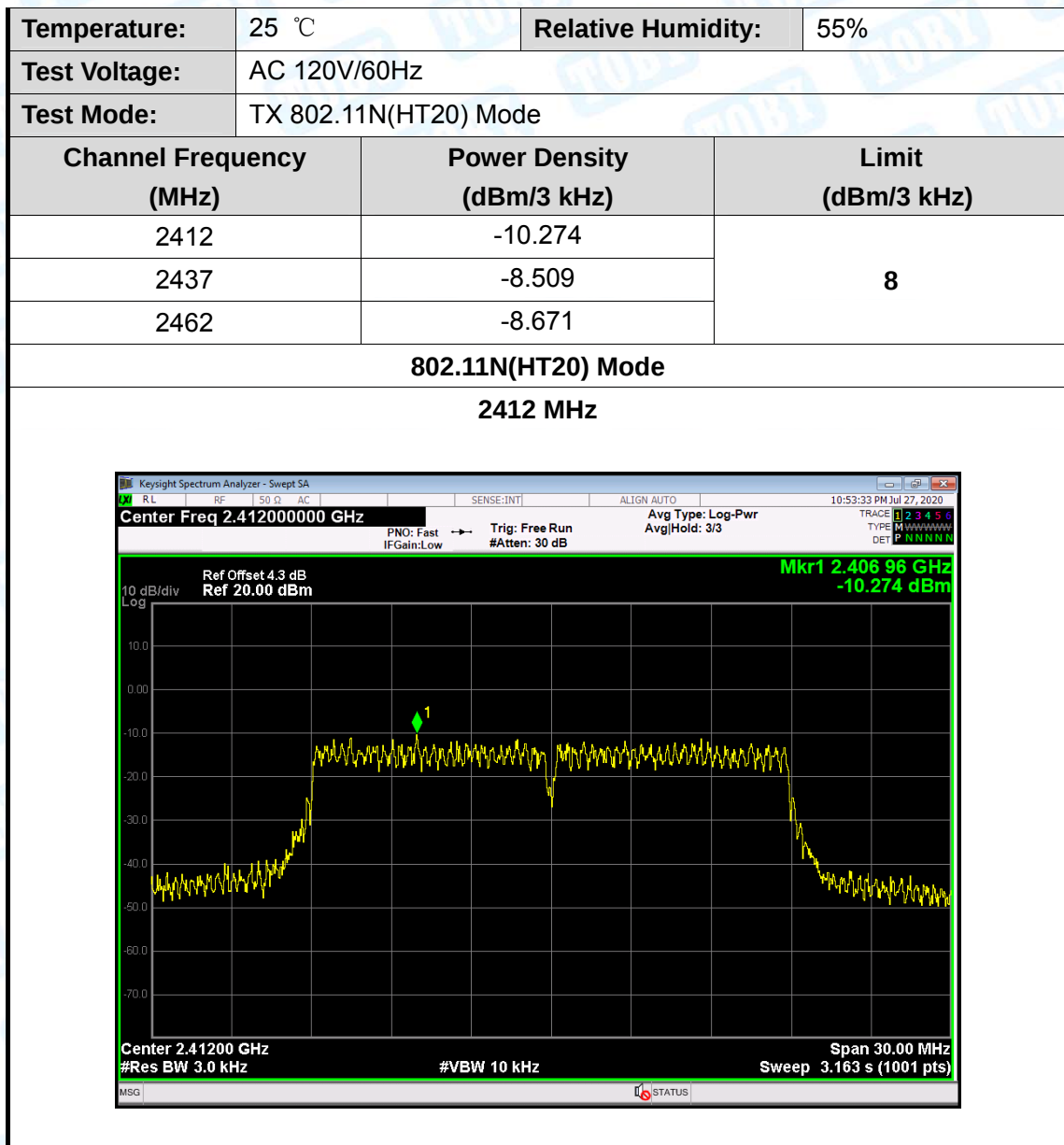
2437 MHz



802.11G Mode

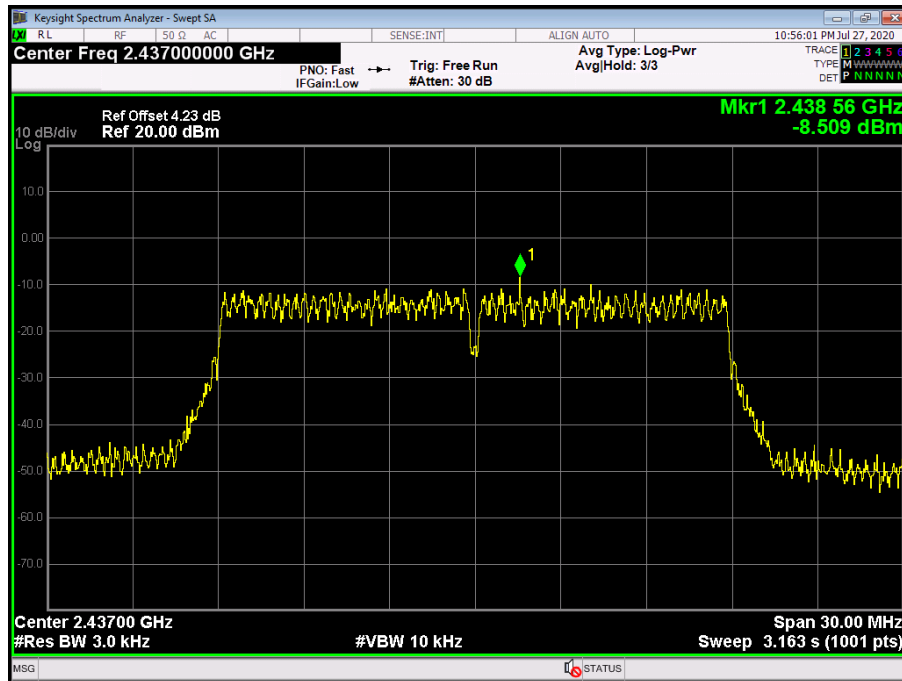
2462 MHz





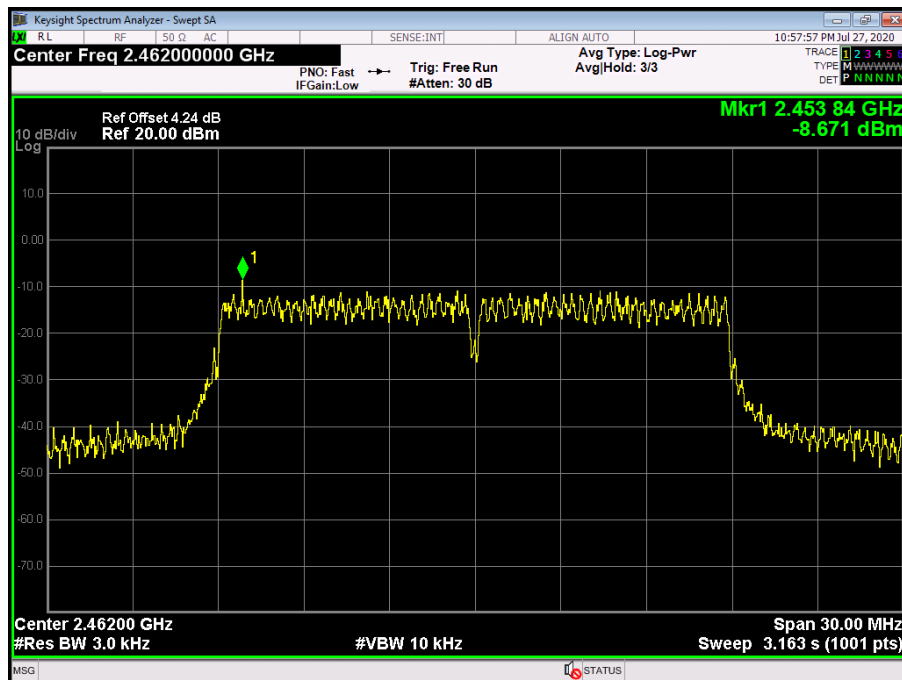
802.11N(HT20) Mode

2437 MHz



802.11N(HT20) Mode

2462 MHz



-----END OF REPORT-----