

Shenzhen Toby Technology Co., Ltd.

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FCC Radio Test Report FCC ID: 2AZ2P-X5M

Original Grant

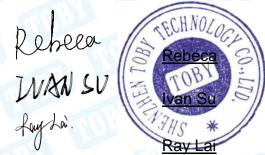
Report No.	14	TB-FCC180315
Applicant	:	Shenzhen Zijing Optoelectronics Technology Co., Ltd.
Equipment Under T	est (l	EUT)
EUT Name	:	Projector
Model No.		X5M
Series Model No.	:	X5A, X5P, X2A, X2M, X2P, X3A, X3M, X3P
Brand Name	1:1	Aisy.od, waygoal
Sample ID	:	20210510-22-01#& 20210510-22-04#
Receipt Date	18	2021-05-10
Test Date	-	2021-05-11 to 2021-05-24
Issue Date	1	2021-05-25
Standards	-	FCC Part 15, Subpart C 15.247
Test Method	÷	ANSI C63.10: 2013 KDB 558074 D01 15.247 Meas Guidance v05r02
Conclusions	:	PASS
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In the configuration tested, the EUT complied with the standards specified above,

Test/Witness Engineer

Engineer Supervisor

Engineer Manager



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.

TB-RF-074-1.0



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Revision History

Report No.	Version	Description	Issued Date
TB-FCC180315	Rev.01	Initial issue of report	2021-05-25
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1. General Information about EUT

1.1 Client Information

Applicant	2	Shenzhen Zijing Optoelectronics Technology Co., Ltd.	
Address:4 / F, No.66, Baotian Industrial Park, Xixiang Street, Shenzhen City, China		4 / F, No.66, Baotian Industrial Park, Xixiang Street, Baoan District, Shenzhen City, China	
Manufacturer	:	Shenzhen Zijing Optoelectronics Technology Co., Ltd.	
Address	4 / F, No.66, Baotian Industrial Park, Xixiang Street, Baoa Shenzhen City, China		

1.2 General Description of EUT (Equipment Under Test)

EUT Name	-	Projector		
Model(s) No.	-	X5M, X5A, X5P, X2A, X2M, X2P, X3A, X3M, X3P		
Model Different		All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name.		
Product Description		Operation Frequency:	Bluetooth 5.0(BLE): 2402MHz~2480MHz	
		Number of Channel:	Bluetooth 5.0(BLE): 40 channels see note(3)	
		Antenna Gain:	-0.58dBi PCB Antenna	
		Modulation Type:	GFSK	
		Bit Rate of Transmitter:	1Mbps	
Power Rating		Adapter 1#(PS65B190Y3420S) Input: 100-240V~, 50/60Hz,1.5A MAX Output: DC 19.0V 3.42A 64.98W Adapter 2#(CW1903420) Input: 100-240V~, 50/60Hz,1.2A MAX Output: DC 19.0V 3.42A 64.98W		
Software Version	-	N/A		
Hardware Version	:	N/A		
Remark	÷	The antenna gain and adapter provided by the applicant, the verified for the RF conduction test provided by TOBY test lab.		

Note:

This Test Report is FCC Part 15.247 for Bluetooth, the test procedure follows the FCC KDB 558074 D01 15.247 Meas Guidance v05r02.

- (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- (2) Antenna information provided by the applicant.



(3) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

1.3 Block Diagram Showing the Configuration of System Tested

EUT ADAPTER

1.4 Description of Support Units

	Equipment Information					
Name	Model	FCC ID/VOC	Manufacturer	Used "√"		
	a Ora					
		Cable Information				
Number	Shielded Type	Ferrite Core	Length	Note		
Cable 1	Yes	NO	1.0M	Accessory		



1.5 Description of Test Mode

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

For Conducted Test				
Final Test Mode Description				
Mode 1 Charging+TX Mode with Adapter 1#				
Mode 2 Charging+TX Mode with Adapter 2#				
For Radiated Test				
Final Test Mode Description				
Mode 3 TX Mode with Adapter 1#				
Mode 4 TX Mode with Adapter 2#				
Mode 5	TX 1Mbps Mode (Channel 00/20/39)			

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:

BLE Mode: GFSK Modulation Transmitting mode.

- (2) During the testing procedure, the continuously transmitting with the maximum power mode was programmed by the customer.
- (3) The EUT is considered a 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& 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 RF setting.

Test Software Version	AUP	FCC_assist.ex	e
Frequency	2402 MHz	2442MHz	2480 MHz
BLE GFSK	DEF	DEF	DEF

1.7 Measurement Uncertainty

The reported uncertainty of measurement $y \pm U_{3}$ where expended 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	±3.50 dB ±3.10 dB
Radiated Emission	Level Accuracy: 9kHz to 30 MHz	±4.60 dB
Radiated Emission	Level Accuracy: 30MHz to 1000 MHz	±4.50 dB
Radiated Emission	Level Accuracy: Above 1000MHz	±4.20 dB



1.8 Test Facility

The testing was 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: 2017 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: 2017 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. Designation Number: CN1223.

IC Registration No.: (11950A)

The Laboratory has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing. The site registration: Site# 11950A. CAB identifier: CN0056

2. Test Summary

	FCC Part 15 Subpar	t C(15.247)		
Standard Section	Test Item	Test Sample(s)	Judgment	Remark
15.203	Antenna Requirement	20210510-22-01#	PASS	N/A
15.207(a)	Conducted Emission	20210510-22-04#	PASS	N/A
15.205&15.247(d)	Band-Edge & Unwanted Emissions into Restricted Frequency	20210510-22-01#	PASS	N/A
15.247(a)(2)	6dB Bandwidth	20210510-22-01#	PASS	N/A
15.247(b)(3)	Conducted Max Output Power	20210510-22-01#	PASS	N/A
15.247(e)	Power Spectral Density	20210510-22-01#	PASS	N/A
15.205, 15.209&15.247(d)	Transmitter Radiated Spurious &Unwanted Emissions into Restricted Frequency	20210510-22-01# 20210510-22-04#	PASS	N/A

3. 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	MWRFtest	V2.0.0.0

4. Test Equipment

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
EMI Test Receiver	Rohde & Schwarz	ESCI	100321	Jul. 06, 2020	Jul. 05, 2021
	Compliance				
RF Switching Unit	Direction Systems	RSU-A4	34403	Jul. 06, 2020	Jul. 05, 2021
	Inc	6000	1 NO		TOR
AMN	SCHWARZBECK	NNBL 8226-2	8226-2/164	Jul. 06, 2020	Jul. 05, 2021
LISN	Rohde & Schwarz	ENV216	101131	Jul. 06, 2020	Jul. 05, 2021
Radiation Emission T	est			<u>.</u>	
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
EMI Test Receiver	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	FSV40-N	102197	Jul. 06, 2020	Jul. 05, 2021
Bilog Antenna	ETS-LINDGREN	3142E	00117537	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	3117	00143207	Mar.01, 2020	Feb. 28, 2022
Horn Antenna	ETS-LINDGREN	BBHA 9170	BBHA9170582	Mar.01, 2020	Feb. 28, 2022
Loop Antenna	SCHWARZBECK	FMZB 1519 B	1519B-059	Jul. 07, 2020	Jul. 06, 2021
Pre-amplifier	Sonoma	310N	185903	Feb. 25, 2021	Feb. 24, 2022
Pre-amplifier	HP	8449B	3008A00849	Feb. 25, 2021	Feb. 24, 2022
Pre-amplifier	SKET	LNPA_1840G-50	SK201904032	Feb. 25, 2021	Feb. 24, 2022
Cable	HUBER+SUHNER	100	SUCOFLEX	Feb. 25, 2021	Feb. 24, 2022
Positioning Controller	ETS-LINDGREN	2090	N/A	N/A	N/A
	Ļ	Antenna Conducted E	mission		
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Due Date
Spectrum Analyzer	Agilent	E4407B	MY45106456	Jul. 06, 2020	Jul. 05, 2021
Spectrum Analyzer	Rohde & Schwarz	ESPI	100010/007	Jul. 06, 2020	Jul. 05, 2021
MXA Signal Analyzer	Agilent	N9020A	MY49100060	Sep. 11, 2020	Sep. 10, 2021
Vector Signal Generator	Agilent	N5182A	MY50141294	Sep. 11, 2020	Sep. 10, 2021
Analog Signal Generator	Agilent	N5181A	MY50141953	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO26	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO29	Sep. 11, 2020	Sep. 10, 2021
RF Power Sensor	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO31	Sep. 11, 2020	Sep. 10, 2021
	DARE!! Instruments	RadiPowerRPR3006W	17100015SNO33	Sep. 11, 2020	Sep. 10, 2021



5. Conducted Emission Test

- 5.1 Test Standard and Limit
 - 5.1.1Test Standard FCC Part 15.207
 - 5.1.2 Test Limit

Conducted	Emission	Test	Limit

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

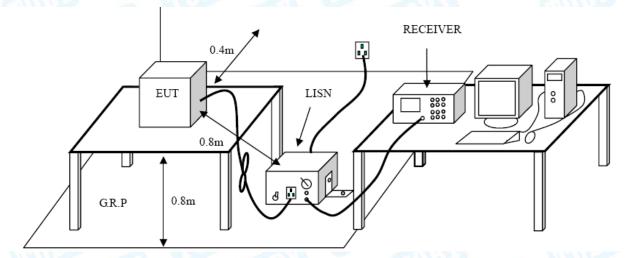
Notes:

(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.

5.2 Test Setup





5.3 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 9 kHz, and the test frequency band is from 0.15MHz to 30MHz.

5.4 Deviation From Test Standard

No deviation

5.5 EUT Operating Mode

Please refer to the description of test mode.

5.6 Test Data

Please refer to the Attachment A.



6. Radiated and Conducted Unwanted Emissions

- 6.1 Test Standard and Limit
 - 6.1.1 Test Standard
 - FCC Part 15.247(d)
 - 6.1.2 Test Limit

Radiated Emission Limits (9kHz~1000MHz)

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	Distance Meters(at 3m)		
(MHz)	Peak (dBuV/m)	Average (dBuV/m)	
Above 1000	74	54	

Note:

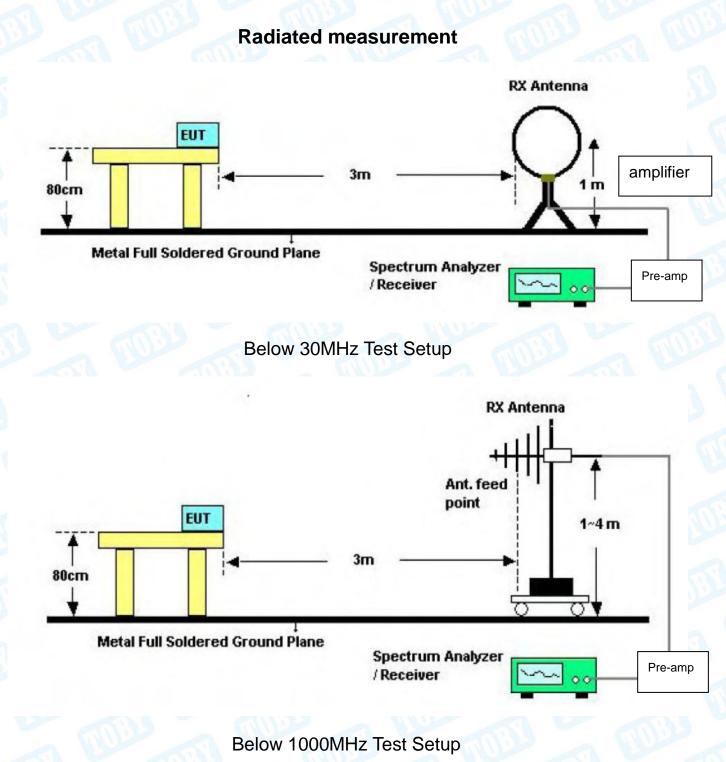
(1) The tighter limit applies at the band edges.

(2) Emission Level (dBuV/m)=20log Emission Level (uV/m)

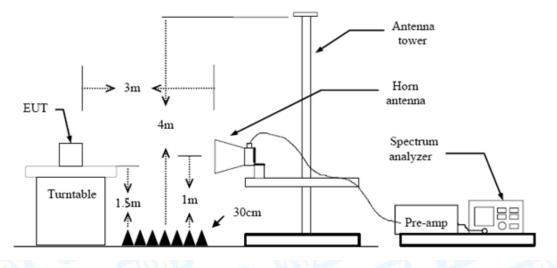
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the RF power that is produced shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided that the transmitter demonstrates compliance with the peak conducted power limits. 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.



6.2 Test Setup

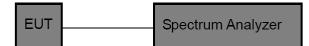






Above 1GHz Test Setup

Conducted measurement



6.3 Test Procedure

Radiated measurement

- (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. 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 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 Bellow 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.

Conducted measurement

Testing shall be done on a laboratory bench in a shielded room or in another suitable location. The active antenna port of the unlicensed wireless device shall be connected to the spectrum analyzer after applying appropriate precautions to protect the instrumentation. If a second antenna port is available, then it shall be tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port. (See also 7.8.8, 11.12.2, and 12.1.2.)

For the actual test configuration, please see the test setup photo.

6.4 Deviation From Test Standard

No deviation

6.5 EUT Operating Condition

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

6.6 Test Data

Remark: During testing 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.

Please refer to the Attachment B.

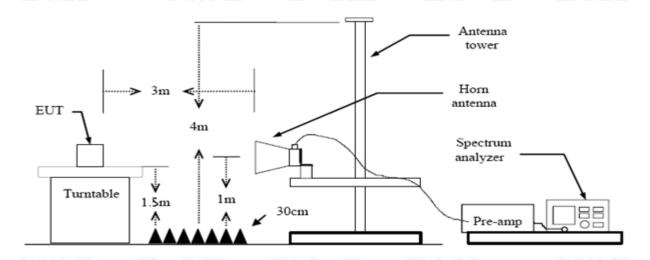


7. Restricted Bands Requirement

- 7.1 Test Standard and Limit
 - 7.1.1 Test Standard FCC Part 15.247(d) FCC Part 15.205
 - 7.1.2 Test Limit

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

7.2 Test Setup



7.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency up to 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 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 Bellow 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.

7.4 Deviation From Test Standard

No deviation

7.5 EUT Operating Condition

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

7.6 Test Data

Remark: During testing 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.

Please refer to the Attachment C.

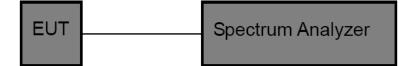


8. Bandwidth Test

- 8.1 Test Standard and Limit
 - 8.1.1 Test Standard
 - FCC Part 15.247 (a)(2)
 - 8.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-247		
Test Item	Limit	Frequency Range(MHz)
Bandwidth	>=500 KHz (6dB bandwidth)	2400~2483.5

8.2 Test Setup



8.3 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.

8.4 Deviation From Test Standard

No deviation

8.5 EUT Operating Condition

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

8.6 Test Data

Please refer to the Attachment D.



9. Peak Output Power Test

- 9.1 Test Standard and Limit
 - 9.1.1 Test Standard
 - FCC Part 15.247 (b)(3)
 - 9.1.2 Test Limit

FCC Part 15 Subpart C(15.247)/RSS-247		
Test Item	Limit	Frequency Range(MHz)
Peak Output Power	1 Watt or 30 dBm	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 is according to section 9.1.1 of KDB 558074 D01 Meas Guidance v05r02.

- (1) Set the RBW ≥DTS Bandwidth
- (2) Set VBW≥3*RBW
- (3) Set Span≥3*RBW
- (4) Sweep time=auto
- (5) Detector= peak
- (6) Trace mode= maxhold.
- (7) Allow trace to fully stabilize, and then use peak marker function to determine the peak amplitude level.

9.4 Deviation From Test Standard

No deviation

9.5 EUT Operating Condition

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

9.6 Test Data

Please refer to the Attachment E.

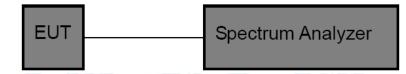


10. Power Spectral Density Test

- 10.1 Test Standard and Limit
 - 10.1.1 Test Standard
 - FCC Part 15.247 (e)
 - 10.1.2 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

10.2 Test Setup



10.3 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 Meas Guidance v05r02.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser centre frequency to DTS channel centre 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.

10.4 Deviation From Test Standard

No deviation

10.5 EUT Operating Condition

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

10.6 Test Data

Please refer to the Attachment F.



11. Antenna Requirement

- 11.1 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.

11.2 Deviation From Test Standard

No deviation

11.3 Antenna Connected Construction

The gains of the antenna used for transmitting is -0.58dBi, and the antenna de-signed with permanent attachment and no consideration of replacement. Please see the EUT photo for details.

11.4 Result

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

	Antenna Type	
A U	Permanent attached antenna	
	Unique connector antenna	a
2 10	Professional installation antenna	

Attachment A-- Conducted Emission Test Data

Temperature:	24.8 ℃		Rela	ative Humidit	y: 47	%	
Test Voltage:	AC 120	V 60Hz	53.0		1632		C.F.
Terminal:	Line			SI V		A B	
Test Mode:	Mode 1	(Adapter 1#)		100	a	Contraction of the second	-
Remark:	Only wo	orse case is	reported.		20		an
80.0 dBuV							
						QP: AVG:	
much *		X	X X X	×			
	month	whater many have been a server as the server of the server		and the second			
30 M M	erder "Bank	Manual waranter	the most water of the	LI M MM			
		P. L. M. W. Wallson Manus and the set of	144		i D'Maria		A CARANA A C
v V	YVV			IN NAL	UMA NUMBER		peak
	·				ΥΨ.	houd has a d	pcak
	, 					headhar, a d	AVG
	,				~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	hwaller, a I	d Nhaddill.
						hwalling a I	d Nhaddill.
	0.5		(441-)			hwdhu, a fl	AVG
20	0.5		(MHz)	5		hwdhut, a d	d Nhaddill.
0.150		Reading	Correct	Measure-			AVG
	Freq.	Level	Correct Factor	Measure- ment	Limit	Over	AVG
0.150		-	Correct	Measure-	Limit	Over	AVG
0.150	Freq.	Level	Correct Factor	Measure- ment			AVG
0.150 No. Mk.	Freq. MHz	Level dBuV	Correct Factor dB	Measure- ment dBu∨	dBu∨	dB	30.000 Detector
0.150 No. Mk.	Freq. MHz 0.3140	Level dBu∨ 35.57	Correct Factor dB 9.70	Measure- ment dBu∨ 45.27	dBu∨ 59.86	dB -14.59	30.000 Detector
0.150 No. Mk. 1 2 3	Freq. MHz 0.3140 0.3140 0.9340	Level dBu∨ 35.57 34.91 38.61	Correct Factor dB 9.70 9.70 9.78	Measure- ment dBu∨ 45.27 44.61 48.39	dBu∨ 59.86 49.86 56.00	dB -14.59 -5.25 -7.61	Detector QP AVG
0.150 No. Mk. 1 2 3 4	Freq. MHz 0.3140 0.3140 0.9340 0.9340	Level dBu∨ 35.57 34.91 38.61 34.74	Correct Factor dB 9.70 9.70 9.78 9.78	Measure- ment dBu∨ 45.27 44.61 48.39 44.52	dBu∨ 59.86 49.86 56.00 46.00	dB -14.59 -5.25 -7.61 -1.48	Detector QP AVG QP AVG
No. Mk.	Freq. MHz 0.3140 0.3140 0.9340	Level dBu∨ 35.57 34.91 38.61	Correct Factor dB 9.70 9.70 9.78	Measure- ment dBu∨ 45.27 44.61 48.39	dBu∨ 59.86 49.86 56.00	dB -14.59 -5.25 -7.61	Detector QP AVG

9.74

9.74

9.86

9.86

9.90

9.90

49.15

43.87

47.74

44.78

45.25

43.60

56.00 -6.85

46.00 -2.13

56.00 -10.75

-8.26

-1.22

-2.40

56.00

46.00

46.00

12 3.4300 33.70 Remark: 1 Corr Easter (dB) = LISN Easter (dB)

2.1820

2.1820

2.8060

2.8060

3.4300

39.41

34.13

37.88

34.92

35.35

7

8

9

10

11

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

QP

AVG

QP

AVG

QP

AVG



Temperature:	24.8 ℃	Relative Humidity:	47%
Test Voltage:	AC 120V 60Hz		
Terminal:	Neutral	and	
Test Mode:	Mode 1(Adapter 1#)		
Remark:	Only worse case is reported	d.	
80.0 dBuV			
			QP: AVG:
30	man and a second and		
			peak AVG
-20 0.150	0.5 (MHz)	5	

No. M	k. Freq.	Level	Factor	ment	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0.3100	35.72	9.70	45.42	59.97	-14.55	QP
2	0.3100	35.12	9.70	44.82	49.97	-5.15	AVG
3	0.9380	38.00	9.78	47.78	56.00	-8.22	QP
4	0.9380	34.79	9.78	44.57	46.00	-1.43	AVG
5	1.5580	39.44	9.74	49.18	56.00	-6.82	QP
6	1.5580	32.91	9.74	42.65	46.00	-3.35	AVG
7	2.1820	39.94	9.74	49.68	56.00	-6.32	QP
8	2.1820	34.13	9.74	43.87	46.00	-2.13	AVG
9	2.8060	37.99	9.86	47.85	56.00	-8.15	QP
10 *	2.8060	34.94	9.86	44.80	46.00	-1.20	AVG
11	3.4300	35.43	9.90	45.33	56.00	-10.67	QP
12	3.4300	33.61	9.90	43.51	46.00	-2.49	AVG
Remark:							

Remark: 1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)

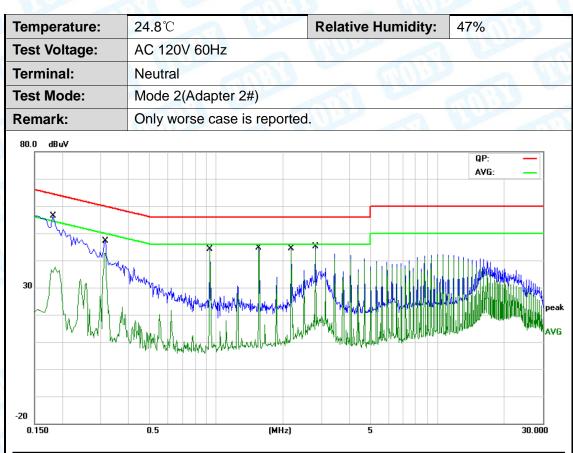
Temperature:	24.8℃	Relative Humidity:	47%
Test Voltage:	AC 120V 60Hz		
Terminal:	Line		
Test Mode:	Mode 2(Adapter 2#)	MUPP A	
Remark:	Only worse case is report	ed.	
80.0 dBu¥			
			QP: AVG:
30	M. M		pea AVE
-20	0.5 (MH	z] 5	30.000
No. Mk.	0	rect Measure- ctor ment Lir	nit Over

No.	Mk.	Freq.	Level	Factor	ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBu∨	dB	Detector
1		0.3100	33.97	9.70	43.67	59.97	-16.30	QP
2		0.3100	32.27	9.70	41.97	49.97	-8.00	AVG
3		0.9340	33.98	9.78	43.76	56.00	-12.24	QP
4		0.9340	34.15	9.78	43.93	46.00	-2.07	AVG
5		1.5580	34.23	9.74	43.97	56.00	-12.03	QP
6	*	1.5580	34.39	9.74	44.13	46.00	-1.87	AVG
7		2.1820	34.07	9.74	43.81	56.00	-12.19	QP
8		2.1820	34.15	9.74	43.89	46.00	-2.11	AVG
9		2.8060	34.23	9.86	44.09	56.00	-11.91	QP
10		2.8060	33.68	9.86	43.54	46.00	-2.46	AVG
11		3.4300	31.89	9.90	41.79	56.00	-14.21	QP
12		3.4300	30.81	9.90	40.71	46.00	-5.29	AVG

Remark: 1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)





No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1819	40.42	9.80	50.22	64.39	-14.17	QP
2		0.1819	23.95	9.80	33.75	54.39	-20.64	AVG
3		0.3140	33.80	9.80	43.60	59.86	-16.26	QP
4		0.3140	32.02	9.80	41.82	49.86	-8.04	AVG
5		0.9340	34.08	9.80	43.88	56.00	-12.12	QP
6		0.9340	34.27	9.80	44.07	46.00	-1.93	AVG
7		1.5580	34.28	9.80	44.08	56.00	-11.92	QP
8	*	1.5580	34.45	9.80	44.25	46.00	-1.75	AVG
9		2.1820	34.13	9.80	43.93	56.00	-12.07	QP
10		2.1820	34.20	9.80	44.00	46.00	-2.00	AVG
11		2.8060	34.31	9.80	44.11	56.00	-11.89	QP
12		2.8060	33.71	9.80	43.51	46.00	-2.49	AVG
-								

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)

2. Margin (dB) =QuasiPeak/Average (dBuV)-Limit (dBuV)



Attachment B--Unwanted Emissions Data

---Radiated Unwanted Emissions

9 KHz~30 MHz

From 9 KHz to 30 MHz: 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

emperature:	23.7 ℃	Re	elative Hur	nidity:	46%	
est Voltage:	AC 120V 60Hz	VV		19		anti
nt. Pol.	Horizontal		100		120	
est Mode:	Mode 3	CIUS.		au	in the second	-
emark:	Only worse case is	s reported.	199		5	167
80.0 dBuV/m						
				(RF)FCC 15C 3		
				(NF)FUU 15U .	Margin -6 dB	ſ
		ſ	4 ×		c	
30	1		Mun .	5	, ×	
Storm Mr.A	X 2	w when	" WOW	while	Man Mar Ma	
- my	Munimum Minimum	Mart				
-20	50 60 70 80	(MHz)	300	400 500	600 700	1000.000
	Reading		leasure-			
No. Mk. F	Freq. Level			1.1.1.1.	_	
	ICY. LEVEI	Factor	ment	Limit	Over	
	MHz dBuV	Hactor dB/m	ment dBuV/m	LIMIT dBuV/m	Over dB	Detector
	•					Detector peak
1 76.	MHz dBuV	dB/m	dBuV/m	dBuV/m	dB	peak
1 76. 2 102	MHz dBu∨ .2442 49.97	dB/m -22.82	dBuV/m 27.15	dBuV/m 40.00	dB -12.85	peak peak
1 76. 2 102 3 160	MHz dBu∨ .2442 49.97 2.3597 44.89	dB/m -22.82 -22.02	dBuV/m 27.15 22.87	dBuV/m 40.00 43.50	dB -12.85 -20.63	
1 76. 2 102 3 160 4 * 249	MHz dBu√ .2442 49.97 2.3597 44.89 0.3456 56.53	dB/m -22.82 -22.02 -20.79	dBuV/m 27.15 22.87 35.74	dBuV/m 40.00 43.50 43.50	dB -12.85 -20.63 -7.76	peak peak peak

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

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

- 2. QuasiPeak (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)
- 3. Margin (dB) = QuasiPeak (dBµV/m)-Limit QPK(dBµV/m)

Temperature:	23.7℃		R	elative Humi	dity:	46%	
Test Voltage:	AC 12	0V 60Hz		CUL:	1		
Ant. Pol.	Vertica	al	CAN)	6	TUP		1
Test Mode:	Mode	3		1100		cini)	
Remark:	Only w	orse case i	s reported.			1990	1
80.0 dBuV/m							
					(RF)FCC	15C 3M Radiatio	n
						Margin -E	a dB
			2	9	- (5	
		×	. Å.	Ă	×. 1		
30 month Mary	wh		MW W	W WMM	W CMV-M	m il	Mand
		MAN. M.		· 4		· mande	/w
-20							
-20	0 60 70	80	(MHz)	300	400 5	500 600 700	1000.00
	0 60 70		(MHz) Correct	300 Measure-	400 5	500 600 700	1000.00
30.000 40 5	0 60 70 Freq.	80 Reading Level			400 s	500 600 700 Over	1000.00
30.000 40 50 No. Mk. F		Reading	Correct	Measure-		Over	1000.00
30.000 40 50 No. Mk. F	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	Detecto
30.000 40 50 No. Mk. F 1 98	Freq. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detecto
30.000 40 50 No. Mk. F 1 98. 2 ! 160	⁼ req. MHz .8324	Reading Level dBu∨ 54.49	Correct Factor dB/m -21.94	Measure- ment dBuV/m 32.55	Limit dBuV/m 43.50	Over dB -10.95	Detecto peak
30.000 40 50 No. Mk. F 1 98. 2 ! 160 3 * 197	Freq. MHz .8324 0.3456	Reading Level dBuV 54.49 59.15	Correct Factor dB/m -21.94 -20.79	Measure- ment dBuV/m 32.55 38.36 39.66	Limit dBuV/m 43.50 43.50	Over dB -10.95 -5.14	Detecto peak peak
30.000 40 50 No. Mk. F 1 98. 2 ! 160 3 * 197 4 249	Freq. MHz .8324 0.3456 7.8926	Reading Level dBuV 54.49 59.15 59.58	Correct Factor dB/m -21.94 -20.79 -19.92	Measure- ment dBuV/m 32.55 38.36	Limit dBuV/m 43.50 43.50 43.50	Over dB -10.95 -5.14 -3.84	Detecto peak peak peak
30.000 40 50 No. Mk. F 1 98 2 ! 160 3 * 197 4 249 5 387	Freq. MHz .8324 0.3456 7.8926 0.4250	Reading Level dBu∨ 54.49 59.15 59.58 53.47	Correct Factor dB/m -21.94 -20.79 -19.92 -17.25	Measure- ment dBuV/m 32.55 38.36 39.66 36.22	Limit dBuV/m 43.50 43.50 43.50 46.00	Over dB -10.95 -5.14 -3.84 -9.78	Detecto peak peak peak

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

- Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = QuasiPeak (dBµV/m)-Limit QPK(dBµV/m)

Temperature:	23.7 ℃		1022	Relative Hu	midity:	46%	
Test Voltage:	AC 12	0V 60Hz		6 W	-		
Ant. Pol.	Horizo	ntal	169		2010		19
Test Mode:	Mode	4				-	
Remark:	Only w	orse case i	s reported.	NUPP		N.S.	-
80.0 dBuV/m							
					(RF)FCC	15C 3M Radiatio	on la
						Margin -	6 dB
			2	3		6	
30			Ā	Two way	. <u>*</u>	5 X	
		1	and why	waw "W	MW WY	Londomman	how
my my wing	Manna	- Mark	Munt				
	An NAMANA NA	why AM AOA					
-20	0 60 70		(111-)		400	E00 C00 700	
	0 60 70	80	(MHz)	300	400	500 600 700) 1000.00
30.000 40 5		Reading	Correct	Measure-) 1000.00
30.000 40 5	0 60 70 Freq.				400 Limit	500 600 700 Over) 1000.00
30.000 40 5		Reading	Correct	Measure-		Over	0 1000.00
30.000 40 5	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
30.000 40 5 No. Mk. F 1 102	⁻ req. MHz	Reading Level dBuV	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detecto
30.000 40 5 No. Mk. F 1 102 2 160	⁻ req. MHz 2.3597	Reading Level dBuV 44.89	Correct Factor dB/m -22.02	Measure- ment dBuV/m 22.87	Limit dBuV/m 43.50	Over dB -20.63	Detecto
30.000 40 5 No. Mk. F 1 102 2 160 3 * 249	Freq. MHz 2.3597 0.3456	Reading Level dBuV 44.89 56.53	Correct Factor dB/m -22.02 -20.79	Measure- ment dBuV/m 22.87 35.74	Limit dBuV/m 43.50 43.50	Over dB -20.63 -7.76	Detecto peak peak
30.000 40 5 No. Mk. F 1 102 2 160 3 * 249 4 379	Freq. MHz 2.3597 0.3456 0.4250	Reading Level dBu∨ 44.89 56.53 57.58	Correct Factor dB/m -22.02 -20.79 -17.25	Measure- ment dBuV/m 22.87 35.74 40.33	Limit dBuV/m 43.50 43.50 46.00	Over dB -20.63 -7.76 -5.67	Detecto peak peak peak

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

- Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = QuasiPeak (dBµV/m)-Limit QPK(dBµV/m)

Temperature:	23.7℃	2	R	elative Humi	dity:	46	%	
Test Voltage:	AC 12	0V 60Hz		GU	R	2	C.S.	
Ant. Pol.	Vertica	al	Com.	6	110			2 8
Test Mode:	Mode	4				Ø	all	5
Remark:	Only v	vorse case i	s reported.		-	N	200	-
80.0 dBuV/m								
					(RF)FC	C 15C 3	3M Radiat	
							Margin	-6 dB
			2		5	x		
30	M		, M	h An	MmM	1 m	~	1 phil
30 00 000 0000	w h	man has	MUN	No MAM	r ^f		min	100404
-20								
-20	0 60 70	80	(MHz)	300	400	500	600 70	0 1000.00
	0 60 70	80 Reading	(MHz) Correct	300 Measure-		500		
30.000 40 5	0 60 70 =req.				400 Limit	500	600 70 Over	
30.000 40 5		Reading	Correct	Measure-				
30.000 40 5	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	m	Over	Detect
30.000 40 5 No. Mk. F 1 98	⁻ req. MHz	Reading Level dBu∨	Correct Factor dB/m	Measure- ment dBuV/m	Limit dBuV/	m 0	Over dB	Detect 5 pea
30.000 40 5 No. Mk. F 1 98 2 ! 160	Freq. MHz .8326	Reading Level dBu∨ 53.99	Correct Factor dB/m -21.94	Measure- ment dBuV/m 32.05	Limit dBuV/ 43.5	m 0 0	Over dB -11.4	Detect 5 pea 4 pea
30.000 40 5 No. Mk. F 1 98 2 ! 160 3 * 197	Freq. MHz .8326).3456	Reading Level dBu∨ 53.99 58.65	Correct Factor dB/m -21.94 -20.79	Measure- ment dBuV/m 32.05 37.86	Limit dBuV/ 43.5 43.5	m 0 0	Over dB -11.4 -5.64	Detect 5 pea 4 pea 4 pea
30.000 40 5 No. Mk. F 1 98 2 ! 160 3 * 197 4 249	Freq. MHz .8326 0.3456 7.8928	Reading Level dBu∨ 53.99 58.65 59.58	Correct Factor dB/m -21.94 -20.79 -19.92	Measure- ment dBuV/m 32.05 37.86 39.66	Limit dBuV/ 43.5 43.5 43.5	m 0 0 0	Over dB -11.4 -5.64 -3.84	Detect 5 pea 4 pea 4 pea 8 pea

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

- Corr. = Antenna Factor (dB/m) + Cable Loss (dB)
 QuasiPeak (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = QuasiPeak (dBµV/m)-Limit QPK(dBµV/m)

Above 1GHz

Tomporatura	23.1℃	Relative Humidity:	44%
Temperature:	23.10	Relative Humaity.	44 /0
Test Voltage:	AC 120V 60Hz		
Ant. Pol.	Horizontal		
Test Mode:	BLE(1Mbps) Mode TX 2402	MHz	
Remark:	No report for the emission w	hich more than 10 dB	below the
	prescribed limit.		

No	o. Mk.	Freq.	•		Measure- ment	Limit	Over	
		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.684	44.77	13.01	57.78	74.00	-16.22	peak
2	*	4804.192	29.31	13.02	42.33	54.00	-11.67	AVG

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)

3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.

5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.1℃	Relative Humidity:	44%				
Test Voltage:	AC 120V 60Hz	AC 120V 60Hz					
Ant. Pol.	Vertical	Vertical					
Test Mode:	BLE(1Mbps) Mode TX 24	l02 MHz					
Remark: No report for the emission which more than 10 dB below the prescribed limit.							

Ν	lo. Mk.	Freq.		Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4803.844	46.82	13.01	59.83	74.00	-14.17	peak
2	*	4803.974	39.29	13.01	52.30	54.00	-1.70	AVG

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)
- 4. The tests evaluated1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.
- 5. No report for the emission which more than 20dB below the prescribed limit.



Temperature:	23.1 ℃	Relative Humidity:	44%			
Test Voltage:	AC 120V 60Hz		1 Contraction			
Ant. Pol.	Horizontal	Horizontal				
Test Mode:	BLE(1Mbps) Mode TX 2442 MHz					

	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	1	*	4883.832	34.11	13.59	47.70	54.00	-6.30	AVG
2	2		4884.134	44.29	13.60	57.89	74.00	-16.11	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)

3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.

5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.1℃	Relative Humidity:	44%			
Test Voltage:	AC 120V 60Hz					
Ant. Pol.	Vertical	Vertical				
Test Mode:	BLE(1Mbps) Mode T>	(2442 MHz				

N	lo. M	k. Freq.			Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	*	4884.062	36.04	13.60	49.64	54.00	-4.36	AVG
2		4884.406	44.77	13.61	58.38	74.00	-15.62	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)

3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz,The testing has been conformed to the 10th harmonic of the highest fundamental frequency.

5. No report for the emission which more than 20dB below the prescribed limit.



Temperature:	23.1 ℃	Relative Humidity:	44%				
Test Voltage:	AC 120V 60Hz						
Ant. Pol.	Horizontal	GIU					
Test Mode:	BLE(1Mbps) Mode TX 2480	BLE(1Mbps) Mode TX 2480 MHz					

No	. Mk	. Freq.	Reading Level		Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		4959.632	44.51	14.15	58.66	74.00	-15.34	peak
2	*	4959.954	34.55	14.15	48.70	54.00	-5.30	AVG

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB)

2. Peak/AVG (dBµV/m)= Corr. (dB/m)+ Read Level (dBµV)

3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)

4. The tests evaluated1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.

5. No report for the emission which more than 20dB below the prescribed limit.

Temperature:	23.1 ℃	Relative Humidity:	44%				
Test Voltage:	AC 120V 60Hz	AC 120V 60Hz					
Ant. Pol.	Vertical	Vertical					
Test Mode:	BLE(1Mbps) Mode TX 2480) MHz	i and				

	No.	Mk.	Freq.	Reading Level		Measure- ment	Limit	Over	
			MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		*	4959.938	31.69	14.15	45.84	54.00	-8.16	AVG
2	2		4960.078	43.27	14.15	57.42	74.00	-16.58	peak

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)

4. The tests evaluated1-26.5GHz, The testing has been conformed to the 10th harmonic of the highest fundamental frequency.

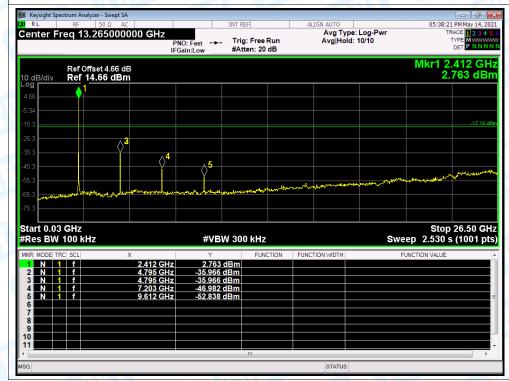
5. No report for the emission which more than 20dB below the prescribed limit.



---Conducted Unwanted Emissions



Tx. Spurious NVNT BLE 1Mbps 2402MHz Ant1 Emission

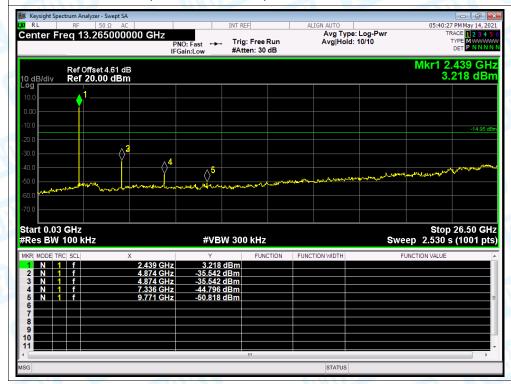




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Tx. Spurious NVNT BLE 1Mbps 2442MHz Ant1 Emission

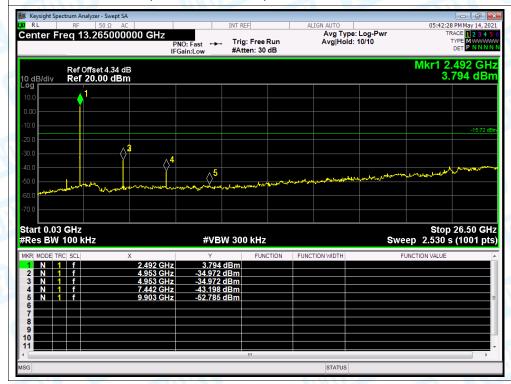




Report No.: TB-FCC180315 Page: 37 of 48



Tx. Spurious NVNT BLE 1Mbps 2480MHz Ant1 Emission



TOBY

Attachment C-- Restricted Bands Requirement and Band

Edge Test Data

(1) Radiation Test

ation rest			
emperature:	23.1 ℃	Relative Humidity:	44%
est Voltage:	AC 120V 60Hz		61
nt. Pol.	Horizontal		
est Mode:	BLE Mode TX 2402 M	Hz (1Mbps)	TUU
emark:	N/A		anb.
110.0 dBu∀/m			
			3
			*
		(RF) F	CC PART 15C (PEAK)
60		(BF)	FCC PART 15C (AVG)
			1 X
			2
1			
10.0			

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	43.06	1.28	44.34	74.00	-29.66	peak
2		2390.000	32.46	1.28	33.74	54.00	-20.26	AVG
3	Х	2402.000	90.67	1.33	92.00	- Fundamenta	I Frequency	peak
4	*	2402.000	87.49	1.33	88.82	Fundamental	Frequency	AVG

Remark:

- 1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)
- 3. Margin (dB) = Peak/AVG (dB μ V/m)-Limit PK/AVG(dB μ V/m)



Cemperature:	23.1 ℃	Relative Humidity:	44%			
Fest Voltage:	AC 120V 60Hz		3 4 1			
Ant. Pol.	Vertical					
Fest Mode: BLE Mode TX 2402 MHz(1Mbps)						
Remark:	N/A	A TUNE	1 de la			
110.0 dBuV/m						
60		(RF)	FCC PART 15C (PEAK)			
		(8)	F) FCC PART 15C (AVG)			
	~~~	(R)				

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1		2390.000	42.99	1.28	44.27	74.00	-29.73	peak
2		2390.000	32.46	1.28	33.74	54.00	-20.26	AVG
3	Х	2402.000	85.77	1.33	87.10	Fundamental	Frequency	peak
4	*	2402.200	82.12	1.33	83.45	Fundamenta	I Frequency	AVG

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)



Temperature:	<b>23.1</b> ℃	Relative Humidity:	44%
Test Voltage:	AC 120V 60Hz		
Ant. Pol.	Horizontal	BY MOUL	
Fest Mode:	BLE Mode TX 2480	MHz (1Mbps)	
Remark:	N/A	THUR A	
110.0 dBu∀/m			
1			
ž			
$\land$			
		(RF) FCC P	ART 15C (PEAK)
60 3 ×			
V ¥		(RF) FCC	PART 15C (AVG)
			mmmmm
	war war		
10.0			
2476.000		(MHz)	2576.00

No.	. Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.700	94.91	1.85	96.76	Fundamental	Frequency	peak
2	*	2480.000	90.08	1.85	91.93	Fundamental	Frequency	AVG
3		2483.500	57.47	1.88	59.35	74.00	-14.65	peak
4		2483.500	49.76	1.88	51.64	54.00	-2.36	AVG

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)



Temperature:	<b>23.1</b> ℃	Relative Humidity:	44%
Test Voltage:	AC 120V 60Hz		0 0
Ant. Pol.	Vertical		
Fest Mode:	BLE Mode TX 2480	) MHz (1Mbps)	6110
Remark:	N/A		
110.0 dBu∀/m			
60 3 X			FCC PART 15C (PEAK)
		www.commence.com	
10.0		(MHz)	2576.00
2476.000			

No	o. Mk	k. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector
1	Х	2479.800	87.10	1.85	88.95	- Fundamental	Frequency	peak
2	*	2480.000	83.84	1.85	85.69	Fundamental	Frequency	AVG
3		2483.500	50.19	1.88	52.07	74.00	-21.93	peak
4		2483.500	44.07	1.88	45.95	54.00	-8.05	AVG

Remark:

1. Corr. = Antenna Factor (dB/m) + Cable Loss (dB) 2. Peak/AVG (dBμV/m)= Corr. (dB/m)+ Read Level (dBμV)

- 3. Margin (dB) = Peak/AVG (dBµV/m)-Limit PK/AVG(dBµV/m)



# (2) Conducted Test

At Voltage:       AC 120V/60Hz         It Mode:       BLE Mode TX 2402MHz / BLE Mode TX 2480MHz(1Mbps)         Inark:       The EUT is programmed in continuously transmitting mode         Voltage:       Assessed         Inark:       The EUT is programmed in continuously transmitting mode         Voltage:       Assessed         Inark:       The EUT is programmed in continuously transmitting mode         Voltage:       Assessed         Inark:       The EUT is programmed in continuously transmitting mode         Voltage:       Assessed         Inark:       The EUT is programmed in continuously transmitting mode         Inark:       The EUT is programmed in continuously transmitting mode         Inark:       The EUT is programmed in continuously transmitting mode         Inark:       The EUT is programmed in continuously transmitting mode         Inark:       The EUT is programmed in continuously transmitting mode         Inark:       The EUT is programmed in continuously transmitting mode         Inark:       Stop 2,0500 CHz       Stop 2,0500 CHz         Inark:       Stop 2,0500 CHz       Stop 2,0500 CHz         Inark:       Stop 2,0500 CHz       Stop 2,0500 CHz         Inark:       Inark:       Stop 2,0500 CHz       Stop 2,0500 CHz       Stop 2,0500 CHz	nperature:	<b>25℃</b>		Relative Humidity	55%
nark: The EUT is programmed in continuously transmitting mode Center Freq 235600000 GHz Ref Offeet 45 GH 1 Genter Freq 235600000 GHz 1 Genter Freq 2356000000 GHz 1 Genter Freq 23560000000 GHz 1 Genter Freq 23560000000 GHz 1 Genter Freq 23560000000 GHz 1 Genter Freq 23560000000 GHz 1 Genter Freq 25560000000000 GHz 1 Genter Freq 255600000000000000000000000000000000000	t Voltage:	AC 120V/60	)Hz	- AN	
Marging Systems Analysis         Start Edit         Align and the system         Control Freq 2.3560000000 GHz         Title Freq 2.3560000000 GHz         Align and the system         Align and the system <th< td=""><td>t Mode:</td><td>BLE Mode</td><td>TX 2402MHz /</td><td>BLE Mode TX 2480N</td><td>/Hz(1Mbps)</td></th<>	t Mode:	BLE Mode	TX 2402MHz /	BLE Mode TX 2480N	/Hz(1Mbps)
Bit Note	nark:	The EUT is	programmed in	n continuously transm	nitting mode
Center Freq 2.356000000 GHz         Avg/pic/de/ True         Avg/pic/de/ Pic/and/ Avg/pic/de/ 10/100         True (Pic/and/ Pic/and/ Avg/pic/de/ 10/100         True (Pic/and/ Pic/and/ Avg/pic/de/ 10/100           Ref Offset 466 dB         Mkr1 2.402 0 GHz         Mkr1 2.402 0 GHz         4.559 dBm           10 dd/dd/ Cdg         General Addition         Mkr1 2.402 0 GHz         1           10 dd/dd/ Cdg         General Addition         General Addition         1         1           10 dd/dd/ Cdg         General Addition         General Addition         1         1         1           10 dd/dd/dd/dd/ Cdg         General Addition         General Addition         General Addition         1         1         1         1           10 dd/dd/dd/dd/dd/dd/dd/dd/dd/dd/dd/dd/dd/			INT REE		
Ref Offset 4.56 dB         Mkr1 2.402 0 GHz           100         4.559 dBm           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         100           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100         1           100		356000000 GHz	NO: Fast 🛶 Trig: Free F	Avg Type: Log-Pwr Run Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW
Interference       4.559 dBm         Interference       1         Interference	Ref Of	IF		dB	Mkr1 2.402 0 GHz
000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       0000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000       000	10 dB/div Ref 2	20.00 dBm			4.559 dBm
103       103       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       104       1					
300       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4       4	-10.0				-15.92 dBm
Image: Start 2.30600 GHz           Start 2.30600 GHz         #VEW 300 KHz         Start 2.30600 GHz         Start 2.30600 GHz         Start 2.30600 GHz           WF MODE THE SEL         2.402 GHz         4.599 GBm         FINCTION WOTH         FINCTION WOTH         FINCTION WOTH         FINCTION WALLE           Image: Start 2.30600 GHz         3.665 GBm         Gradue					
00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00       00 <td< td=""><td></td><td></td><td></td><td>A4</td><td></td></td<>				A4	
Start 2.30600 GHz #Res EW 100 KHz #Res EW 100 KHz *VEW 300 KHz *VEW	metruplemar	สไปสารายสารายสารายสาราช	warden and the second of the second	Lawrence and the second	when when the state of the stat
#Res BW 100 kHz         #VBW 300 kHz         Sweep 9.600 ms (1001 pts)           WR MORE TRC SCI         2.402 0 CHz         4.559 dBm         FUNCTION         FUNCTION         FUNCTION MAUE         FUNCTION MAUE           3         N         1         f         2.400 0 CHz         4.459 dBm         FUNCTION         FUNCTION MAUE         FUNCTION MAUE <td< td=""><td>-70.0</td><td></td><td></td><td></td><td></td></td<>	-70.0				
MRR MODE TRC SCL       X       Y       FUNCTION       FUNCTION WOLTH       FUNCTION WALLE         2       N       1       1       2.450.0 GHz       -4.550.6 GHz       -4.560.6 GHz <td></td> <td></td> <td>#VBW 300 kHz</td> <td>Swe</td> <td>Stop 2.40600 GHz ep 9.600 ms (1001 pts)</td>			#VBW 300 kHz	Swe	Stop 2.40600 GHz ep 9.600 ms (1001 pts)
2       N       1       f       2.400.0 GHz       34.566 dBm         4       N       1       f       2.300.0 GHz       550.030.0 dBm         5       1       2.344.7 GHz       550.030.0 dBm       1       1         6       1       2.344.7 GHz       550.030.0 dBm       1       1         10       1       1       2.344.7 GHz       550.030.0 dBm       1         11       1       2.344.7 GHz       550.030.0 dBm       1       1         10       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1		× 2 402 0 GHz	Y FUNC		
6       Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         MSG       Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA       Image: Section Analyzer Swept SA         Image: Section Analyzer	2 N 1 f 3 N 1 f	2.400 0 GHz 2.390 0 GHz	-34.556 dBm -56.056 dBm		
8       Image: Status         MSC       Image: Status         MSC       Image: Status         MSC       Image: Status         MSC       Image: Status         Center Freq 2.526000000 GHz       Image: Status         PNO: Fast       Trig: Free Run #Atten: 30 dB         MSC       MKr1 2.480 2 GHz         Conter Freq 2.526000000 GHz       Trig: Free Run #Atten: 30 dB         MSC       MKr1 2.480 2 GHz         Status       Status         Status       MKr1 2.480 2 GHz         Status       Mage: Status	5	2.364 / GHz	-52.030 dBm		Ξ
10       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m       m	8				
Image: Section Analyzer Swept SA         Image: Section Analyzer Swept SA           Off RL         Ref         SO 0. AC         Image: Section Analyzer Swept SA           Center Freq 2.526000000 GHz         Trig: Free Run Pho: Fast         Trig: Free Run Arg Hold: 100/100         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho: Fast         Avg Type: Log: Plwr Arg Hold: 100/100         Trig: Free Run Pho:	10				-
MR         RL         RF         50.0         AC         INT REF         ALIGN AUTO         05-41-54 PM May 14, 2021           Center Freq 2.526000000 GHz         PNO: Fast         Image: Processing and the state of the state	4				
Center Freq 2.526000000 GHz         Avg Type: Log-Pwr Avg Hold: 100/100         Trace Trace Avg Hold: 100/100         Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace Trace	MSG			STATUS	
Ref Offset 4.34 dB         Mkr1 2.480 2 GHz           10 dB/div         Ref 20.00 dBm         3.847 dBm           10 dB/div         1         1         1           10 dB/div         1         1         1         1           10 dB/div         1         1         1         1         1           10 dB/div         1         1         1         1         1         1           10 dB/div         1         1         1         1         1         1         1           10 dB/div         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1         1	Keysight Spectrum Anal				
10 dB/div       Ref 20.00 dBm       3.847 dBm         10 dB/div       Ref 20.00 dBm	Keysight Spectrum Anal	50 Ω AC 526000000 GHz		ALIGN AUTO Avg Type: Log-Pwr	05:41:54 PM May 14, 2021
100       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	Keysight Spectrum Anal	50 Ω AC 526000000 GHz P IF	NO: Fast 🛶 Trig: Free F	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET PNNNNN
100	Keysight Spectrum Anal	50 Ω AC 526000000 GHz P IF ffset 4.34 dB	NO: Fast 🛶 Trig: Free F	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN Mkr1 2.480 2 GHz
200 300 400 400 400 400 400 400 4	Center Freq 2.5	50 Ω AC 526000000 GHz P IF ffset 4.34 dB	NO: Fast 🛶 Trig: Free F	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN Mkr1 2.480 2 GHz
-0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0     -0.0	Center Freq 2.5	50 Ω AC 526000000 GHz P IF ffset 4.34 dB	NO: Fast 🛶 Trig: Free F	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100	05:41:54 PM May 14, 2021 TRACE 2 3 4 5 6 TYPE DET P NNNNN Mkr1 2.480 2 GHz 3.847 dBm
Start 2.47600 GHz     Start 2.47600 GHz     Stop 2.57600 GHz       #Res BW 100 kHz     #VBW 300 kHz     FUNCTION     FUNCTION WDTH       1     N     1     f     2.480 2 GHz     -3.847 dBm       2     N     1     f     2.483 5 GHz     -45.665 dBm       3     N     1     f     2.483 5 GHz     -45.665 dBm       6     -     -     -     -       7     -     -     -     -       8     -     -     -     -       9     -     -     -     -	Center Freq 2.5	50 Ω AC 526000000 GHz P IF ffset 4.34 dB	NO: Fast 🛶 Trig: Free F	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100	05:41:54 PM May 14, 2021 TRACE 2 3 4 5 6 TYPE DET P NNNNN Mkr1 2.480 2 GHz 3.847 dBm
Total         Total <th< td=""><td>Keysight Spectrum Anal XI RL RF Center Freq 2.5</td><td>50 2 AC 526000000 GHz P IF ffset 4.34 dB 20.00 dBm</td><td>NO: Fast 🛶 Trig: Free F</td><td>ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100</td><td>05:41:54 PM May 14, 2021 TRACE 2 3 4 5 6 TYPE DET P NNNNN Mkr1 2.480 2 GHz 3.847 dBm</td></th<>	Keysight Spectrum Anal XI RL RF Center Freq 2.5	50 2 AC 526000000 GHz P IF ffset 4.34 dB 20.00 dBm	NO: Fast 🛶 Trig: Free F	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100	05:41:54 PM May 14, 2021 TRACE 2 3 4 5 6 TYPE DET P NNNNN Mkr1 2.480 2 GHz 3.847 dBm
#Res BW 100 kHz         #VBW 300 kHz         Sweep         9.600 ms (1001 pts)           MKR MODE TRC SCL         X         Y         FUNCTION         FUNCTION WIDTH         FUNCTION VALUE           1         N         1         f         2.480 2 GHz         3.847 dBm         FUNCTION WIDTH         FUNCTION VALUE           1         N         1         f         2.480 3 GHz         -45.665 dBm         FUNCTION VALUE         FUNCTION VALUE           3         N         1         f         2.483 5 GHz         -45.665 dBm         FUNCTION VALUE         FUNCTION VALUE           5         -         -         -         -         -         -         -           6         -         -         -         -         -         -         -         -           9         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -	Reysight Spectrum Analog           Oracle         RF           Center Freq 2.3           10         B/div           10         B/div           10         B/div           100         1           100         1           100         1           100         1           200         1           200         2           300         2           400         2	50.0 AC 526000000 GHz P F frset 4.34 dB 20.00 dBm	PNO: Fast Trig: Free F Gain:Low #Atten: 30	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100 dB	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P NNNN Mkr1 2.480 2 GHz 3.847 dBm -15.00 dBm
MKR         MKR         MKR         MKR         MKR         MKR         MKR         MKR         FUNCTION         FUNCTION         FUNCTION WIDTH         FUNCTION VALUE         A           1         N         1         f         2.480.2 GHz         3.847 dBm         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -         -	Center Freq 2.5	50.0 AC 526000000 GHz P F frset 4.34 dB 20.00 dBm	PNO: Fast Trig: Free F Gain:Low #Atten: 30	ALIGN AUTO Avg Type: Log-Pwr Run Avg Hold: 100/100 dB	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE WWWWW DET P NNNN Mkr1 2.480 2 GHz 3.847 dBm -15.00 dBm
2       N       1       f       2.483 5 GHz       -45.665 dBm         3       N       1       f       2.500 0 GHz       -64.859 dBm         4       N       1       f       2.483 5 GHz       -45.665 dBm         5       -       -       -       -         6       -       -       -       -         7       -       -       -       -         8       -       -       -       -         9       -       -       -       -         10       -       -       -       -       -	Reysight Spectrum Analog           M RL         RF           Center Freq 2.5           Image: Spectrum Analog           Og B/div         Ref Of           10 dB/div         Ref Of           10 dB/div         Ref Of           200         1           -100         1           -200         2           -300         2           -400         2           Start 2.47600 GH	50 Q AC 526000000 GHz P F F F F F F F F F F F F F	PNO: Fast Trig: Free F Gain:Low #Atten: 30	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 dB	05:41:54 PMMay 14, 2021 TRACE 2 3 4 3 6 TYPE NNNNN Mkr1 2.480 2 GHz 3.847 dBm 
4       N       1       f       2.483 5 GHz       -45.665 dBm         5       -       -       -       -       -         6       -       -       -       -       -       -         7       -       -       -       -       -       -       -       -         8       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       -       - <t< td=""><td>Keysight Spectrum Analog           W         RL         RF           Center Freq 2.5         Ref Of           10         dB/div         Ref Of           10         dB/div         Ref Of           100        </td><td>50 2 AC 526000000 GHz P F F F F F F F F F F F F F</td><td>PNO: Fast Trig: Free F Gain:Low #Atten: 30 #Atten: 30 אמייייין אליגערייין אליגערייין אליגערייין אליגערייין אליגערייין אליגערייין אליגעריייין אליגעריייי #VBW 300 kHz</td><td>ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 dB</td><td>05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MAXIMUM DET P N N N N Mkr1 2.480 2 GHz 3.847 dBm </td></t<>	Keysight Spectrum Analog           W         RL         RF           Center Freq 2.5         Ref Of           10         dB/div         Ref Of           10         dB/div         Ref Of           100	50 2 AC 526000000 GHz P F F F F F F F F F F F F F	PNO: Fast Trig: Free F Gain:Low #Atten: 30 #Atten: 30 אמייייין אליגערייין אליגערייין אליגערייין אליגערייין אליגערייין אליגערייין אליגעריייין אליגעריייי #VBW 300 kHz	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 dB	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MAXIMUM DET P N N N N Mkr1 2.480 2 GHz 3.847 dBm 
7     6       8     6       9     6       10     6	Keysight Spectrum Analog           Keysight S	50 Q. AC 526000000 GHz P F F F F F F F F F F F F F	Trig: Free F Gain:Low #Atten: 30 #Atten: 30 #VBW 300 kHz #VBW 300 kHz 3.847 dBm 45.665 dBm	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 dB	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MAXIMUM DET P N N N N Mkr1 2.480 2 GHz 3.847 dBm 
9	Image: sector of the	50 9. AC         P           526000000 GHz         P           First 4.34 dB         P           ffset 4.34 dB         P           20.00 dBm         P           Hz         P           1z         2.480 2 GHz           2.480 2 GHz         2.483 5 GHz           2.500 0 GHz         2.500 0 GHz	Trig: Free F Gain:Low #Atten: 30 #Atten: 30 #VBW 300 kHz #VBW 300 kHz Y FUNC 3.847 dBm -54.656 dBm -54.69 dBm	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 dB	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MAXIMUM DET P N N N N Mkr1 2.480 2 GHz 3.847 dBm 
	Keysight Spectrum Analog           Ref Of           Od B/div         Ref Of           Od B/div         Ref Of           Out         Out           Out         Out           Out         Out           Out         Out           Start 2.47600 GH #Res BW 100 kt           Mkrit MODE Tricl Scl.         I           N         I         f           S         N         I         f           N         I         f           S         N         I         f	50 9. AC         P           526000000 GHz         P           First 4.34 dB         P           ffset 4.34 dB         P           20.00 dBm         P           Hz         P           1z         2.480 2 GHz           2.480 2 GHz         2.483 5 GHz           2.500 0 GHz         2.500 0 GHz	Trig: Free F Gain:Low #Atten: 30 #Atten: 30 #VBW 300 kHz #VBW 300 kHz Y FUNC 3.847 dBm -54.656 dBm -54.69 dBm	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 100/100 dB	05:41:54 PM May 14, 2021 TRACE 1 2 3 4 5 6 TYPE MAXIMUM DET P N N N N Mkr1 2.480 2 GHz 3.847 dBm 



### **Attachment D-- Bandwidth Test Data**

Temperature:	<b>25</b> ℃		Relative Humidity:	55%	
Test Voltage:	AC 1	20V/60Hz	603	9 ~ 5	
Test Mode:	BLE	TX Mode(1 Mbps)	20	(CT)	
Channel freque	ency	6dB Bandwidth	99% Bandwidth	Limit	
(MHz)		(kHz)	(kHz)		
2402		662.6	1035.2		
2442		684.3	1038.0	>=500	
2480		2480 656.1 1038.5			
		BLEN	lode	1	

#### 2402 MHz







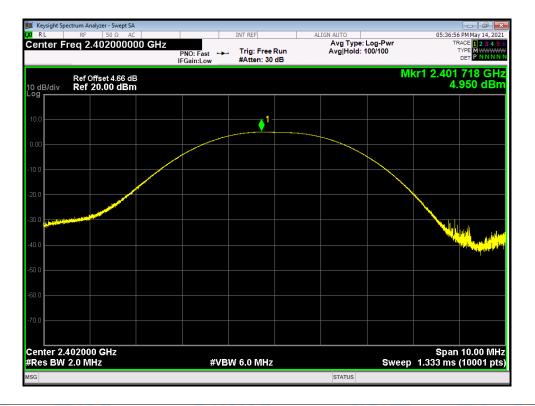
TB-RF-074-1.0



# **Attachment E-- Peak Output Power Test Data**

Temperature:	<b>25℃</b>	132	<b>Relative Humidity</b>	: 55%		
Test Voltage:	AC 120V/	60Hz				
Test Mode:	Test Mode: BLE TX Mode (1Mbps)					
Channel frequer	icy (MHz)	Test Result (dBm)		Limit (dBm)		
2402		4.950				
2442		5.392		30		
2480		4.653				
		BLE	Mode			
		0.400	NAL 1			

#### 2402 MHz



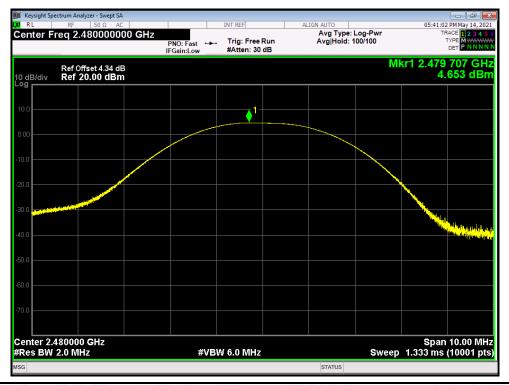


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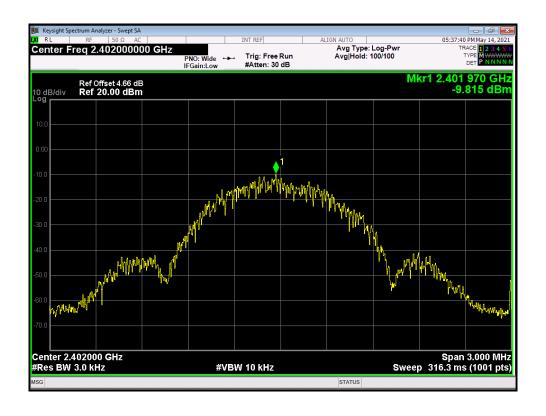
#### **BLE Mode**

2480 MHz

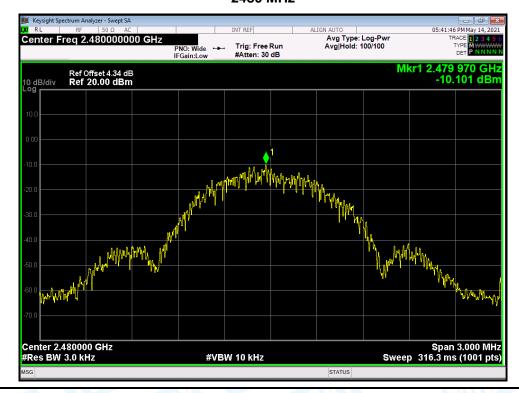


# **Attachment F-- Power Spectral Density Test Data**

Temperature:	<b>25℃</b>	25℃ Relative Humidity: 55%					
Test Voltage:	AC 120V	C 120V/60Hz					
Test Mode:	BLE TX N	_E TX Mode(1Mbps)					
Channel Free	quency	Power I	Density	Lim	it	Result	
(MHz)		(dBm/3kHz)		(dBm/3	(dBm/3kHz)		
2402		-9.8	315				
2442		-9.429 <b>8</b> -10.101		8		PASS	
2480							
		BLE	Mode	I	L		
		2402	MHz				



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



### 2480 MHz



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