FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

Top Victory Electronics(Taiwan) Co., Ltd.

WiFi +BT module

WCT5GM2511

FCC ID: ARS-WCT5GM2511

Prepared for : Top Victory Electronics(Taiwan) Co., Ltd.
10F No.230, Liancheng Rd., Zhonghe Dist., New Taipei City
23553 Taiwan (R.O.C)

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park,
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Report Number : ACS-F20030

Date of Test : Feb.11~Apr.05,2020

Date of Report : May.14,2020

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TEST REPORT CERTIFICATION

Applicant	:	Top Victory Electronics(Taiwan) Co., Ltd.
Manufacturer	:	Top Victory Electronics(Taiwan) Co., Ltd.
Product	:	WiFi +BT module
FCC ID	:	ARS-WCT5GM2511
		(A) Model No. : WCT5GM2511
		(B) Test Voltage : DC 5V From PC Input AC 120V/60Hz

Tested for comply with:

FCC CFR47 Part 15 Subpart C
Test procedure used: ANSI C63.10: 2013;
KDB 558074 D01v05r02

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to confirm comply with all the FCC Part 15 Subpart C requirements. The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements. This report contains data that are not covered by the NVLAP accreditation.

This Report is made under FCC Part 2.1074. No modifications were required during testing to bring this product into compliance.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Date of Test : Feb.11~Apr.05,2020 Report of date: May.14,2020

Prepared by : Brave Zhang / Assistant

Reviewed by : Sunny Lu/ Deputy Manager

AUDIX® 信華科技（深圳）有限公司
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature: David Jin

Approved & Authorized Signer : David Jin / Deputy General Manager

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT has been tested according to the applicable standards as referenced below.

EMISSION		
Description of Test Item	**Standard**	**Results**
Power Line Conducted Emission Test	FCC Part 15: 15.207 ANSI C63.10 :2013	PASS
Radiated Emission Test	FCC Part 15: 15.209 FCC Part 15: 15.205 FCC Part 15: 15.247(d) ANSI C63.10 : 2013	PASS
Conducted Spurious Emissions	FCC Part 15: 15.247(d) ANSI C63.10 : 2013	PASS
Carrier Frequency Separation Test	FCC Part 15: 15.247(a)(2) ANSI C63.10 : 2013	N/A
6dB Bandwidth Test	FCC Part 15: 15.247(b)(3) ANSI C63.10 : 2013	PASS
Maximum Peak Output Power Test	FCC Part 15: 15.247(d) ANSI C63.10 : 2013	PASS
Band Edge Compliance Test	FCC Part 15: 15.247(e) ANSI C63.10 : 2013	PASS
Power Spectral Density Test	FCC Part 15: 15.207 ANSI C63.10 :2013	PASS
Antenna requirement	FCC Part 15: 15.203	PASS
N/A is an abbreviation for Not Applicable.		

2. GENERAL INFORMATION

2.1.Description of Equipment Under Test

Applicant	Top Victory Electronics(Taiwan) Co., Ltd.
Applicant Address	10F No.230, Liancheng Rd., Zhonghe Dist., New Taipei City 23553 Taiwan (R.O.C)
Manufacturer	Top Victory Electronics(Taiwan) Co., Ltd.
Manufacturer Address	10F No.230, Liancheng Rd., Zhonghe Dist., New Taipei City 23553 Taiwan (R.O.C)
Factory	TPV Electronics (Fujian) Co., Ltd.
Factory Address	Rongqiao Economic and Technological Development Zone, Fuqing City, Fujian Province, P.R. China.
Product	WiFi +BT module
Model No.	WCT5GM2511
FCC ID	ARS-WCT5GM2511
Sample Type	Prototype production
Date of Receipt	Jan.17,2020
Date of Test	Feb.11~Apr.05,2020
Remark: This report only for BLE.	

2.2.Feature of Equipment Under Test

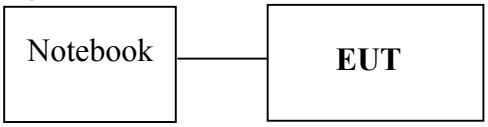
Product Feature & Specification		
Product	WiFi +BT module	
Model No.	WCT5GM2511	
Radio	IEEE802.11 a/b/g/n/ac; Bluetooth V3.0+EDR; Bluetooth V4.0; Bluetooth V5.0	
Power Source	☐ Commercial Power	AC 100~240 V
	☒ External Power Source	DC 5V
	☐ Li-ion Battery	DC V
	☐ UM battery	DC V
Bluetooth		
Bluetooth Version	V5.0 dual mode	
Frequency Range	2402-2480MHz	
Type of Modulation	GFSK, π/4DQPSK, 8DPSK	
Data Rate	1Mbps, 2Mbps, 3Mbps	
Quantity of Channels	79/40	
Channel Separation	1MHz/2MHz	
2.4GHz Wi-Fi		
Support Modes	802.11b/g/n20/n40	
Frequency Range	2412-2462MHz	
Type of Modulation	802.11b(DSSS): CCK, QPSK, BPSK; 802.11g/n(OFDM): 64QAM,16QAM, QPSK, BPSK	
Data Rate	802.11b: 1/2/5.5/11 Mbps; 802.11g: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps	
Channel Separation	5MHz	
5GHz Wi-Fi		
Support Modes	802.11a/n20/n40/ac20/ac40/ac80	
Frequency Range	5180-5240MHz, 5745-5825MHz	
Type of Modulation	802.11a/n (OFDM): QPSK, BPSK, 16QAM, 64QAM 802.11ac (OFDM): QPSK, BPSK, 16QAM, 64QAM,256QAM	
Data Rate	802.11a: 6/9/12/18/24/36/48/54 Mbps; 802.11n: up to 300Mbps; 802.11ac: up to 867Mbps	
Channel Separation	5MHz	

Antenna System	
Type of Antenna	PCB Antenna
Antenna Number	2 (ANT A and ANT B)
Operation Modes	Only MIMO mode supported
Antenna Peak Gain	Bluetooth Peak Gain: 1.72dBi DTS Band (2400-2483.5MHz) Peak Gain: ANTA: 2.08dBi; ANTB: 2.00dBi. U-NII-1 Band(5150-5250MHz) Peak Gain: ANTA: 3.06dBi; ANTB: 3.04dBi U-NII-3 Band (5725-5850MHz) Peak Gain: ANT A: 3.08dBi; ANT B: 3.10dBi.

2.3. Tested Supporting System Details

No.	Description	ACS No.	Manufacturer	Model	Serial Number
1.	Notebook	N/A	acer	ZOW	NVX7C
		USB Cable: Shielded, Detachable, 1.0m			

2.4. Block Diagram of connection between EUT and simulators



(EUT: WiFi +BT module)

2.5. Test information

A special software was used to control EUT work in Continuous TX mode (GFSK modulation), and select test channel.

Tested mode, channel, and data rate information			
Mode	data rate (Mbps)	Channel	Frequency (MHz)
Tx Mode GFSK modulation	1/2	Low :CH 0	2402
	1/2	Middle: CH19	2440
	1/2	High: CH39	2480

2.6. Test Facility

Site Description

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Kefeng Road, Science & Technology Park,
Nanshan District , Shenzhen, Guangdong, China

EMC Lab. : Certificated by Industry Canada
Registration Number: IC 5183A-1
Valid Date: May.07, 2020

: Certificated by DAkkS, Germany
Registration No: D-PL-12151-01-00
Valid Date: Dec.07, 2021

: Accredited by NVLAP, USA
NVLAP Code: 200372-0
Valid Date: Mar.31, 2021

: Certificated by FCC USA.
Designation No.: CN5022
Valid Date: Mar.31, 2021

2.7. Measurement Uncertainty (95% confidence levels, k=2)

Test Item	Uncertainty
Uncertainty for Conduction emission test in No. 1 Conduction	2.6dB(150KHz to 30MHz)
Uncertainty for Radiation Emission test in 3m chamber	3.6dB(30~200MHz, Polarization: H)
	4.0dB(30~200MHz, Polarization: V)
	3.6dB(200M~1GHz, Polarization: H)
	3.8dB(200M~1GHz, Polarization: V)
Uncertainty for Radiation Emission test in 3m chamber(1GHz-25GHz)	4.6dB(1~6GHz, Distance: 3m)
	4.6dB(6~25GHz, Distance: 3m)
Uncertainty for Radiated Spurious Emission test in RF chamber	3.7dB(30MHz~1000MHz)
	3.3dB(1~26.5GHz)
Uncertainty for Conduction Spurious emission test	2.0dB
Uncertainty for Output power test	0.8dB
Uncertainty for Bandwidth test	83kHz
Uncertainty for DC power test	0.1%
Uncertainty for test site temperature and humidity	0.6℃
	3%

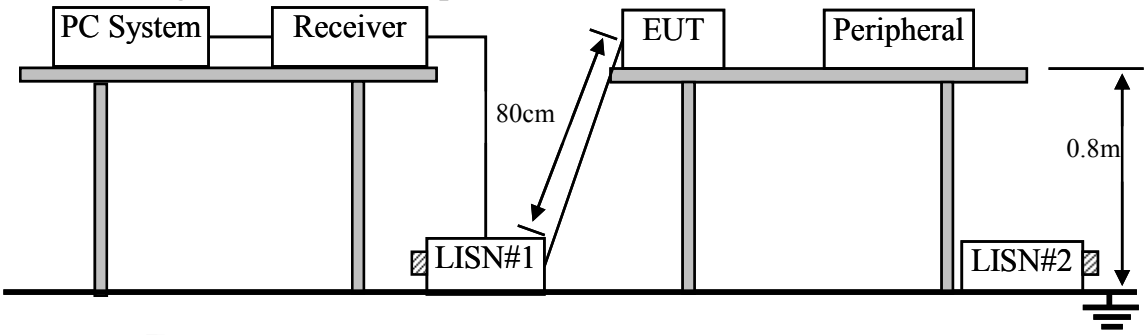
Note: EMI uncertainty is evaluated by CISPR16-4-2.
The value of measurement uncertainty of EMI is less than U_{CISPR}.
The value is not calculated in the test results.

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Test Equipments

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	1# Shielding Room	AUDIX	N/A	N/A	May.17,18	3 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100842	Apr.14,19	1 Year
3.	L.I.S.N.#1	Rohde & Schwarz	ENV216	102160	Oct.13,19	1 Year
4.	L.I.S.N.#2	Kyoritsu	KNW-407	8-1636-1	Apr.18,19	1 Year
5.	Terminator	Hubersuhner	50Ω	No.1	Apr.14,19	1 Year
6.	Terminator	Hubersuhner	50Ω	No.2	Apr.14,19	1 Year
7.	RF Cable	Fujikura	RG55/U	No.2	Apr.13,19	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397223	Apr.14,19	1 Year
9.	Test Software	AUDIX	e3	6.100913a	N/A	N/A
Note: N/A means Not applicable.						

3.2.Block Diagram of Test Setup



:50Ω Terminator

3.3.Power Line Conducted Emission Test Limits

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

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

3.4.Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.4.1. WiFi +BT module (EUT)

Model Number : WCT5GM2511
Serial Number : N/A

3.4.2. Support Equipment: As Tested Supporting System Details, in Section 2.2.

3.5.Operating Condition of EUT

3.5.1. Setup the EUT and simulator as shown as Section 3.2.

3.5.2. Turn on the power of all equipments.

3.5.3. PC run test software to control EUT work in Tx mode.

3.6.Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power Via AC unit connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs). The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.

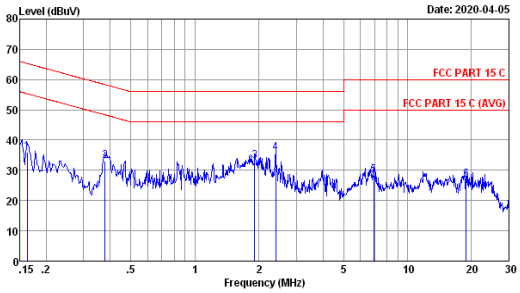
The bandwidth of test receiver (R & S ESCI) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

3.7.Power Line Conducted Emission Test Results

PASS. **(**All emissions not reported below are too low against the prescribed limits.)

Data: 3 File: E:\1#CE\2020 Report Data\T\TPV\A1Z2001008-rf.EM6 (24)

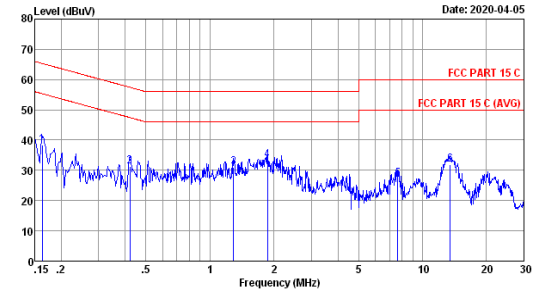


Site no :1# Conduction Data No :3
Dis./Lisn :2019 ENV216 L LISN phase:
Limit :FCC PART 15 C
Env./Ins. :21.7*C/46% Engineer :Evan
EUT :
Power Rating :DC 5V From PC Input AC 120V/60Hz
Test Mode :BT4.0 Tx

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.162	9.60	0.03	26.40	36.03	65.34	29.31	QP
2	0.377	9.60	0.02	23.45	33.07	58.34	25.27	QP
3	1.908	9.60	0.04	23.55	33.19	56.00	22.81	QP
4	2.396	9.60	0.04	26.18	35.82	56.00	20.18	QP
5	6.951	9.70	0.08	18.51	28.29	60.00	31.71	QP
6	18.920	9.70	0.14	17.06	26.90	60.00	33.10	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Data: 4 File: E:\1#CE\2020 Report Data\T\TPV\A1Z2001008-rf.EM6 (24)

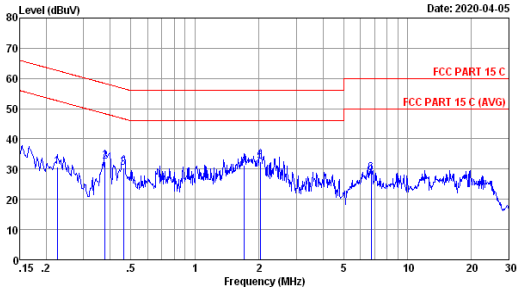


Site no :1# Conduction Data No :4
Dis./Lisn :2019 ENV216 N LISN phase:
Limit :FCC PART 15 C
Env./Ins. :21.7*C/46% Engineer :Evan
EUT :
Power Rating :DC 5V From PC Input AC 120V/60Hz
Test Mode :BT4.0 Tx

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.162	9.60	0.03	28.68	38.31	65.34	27.03	QP
2	0.421	9.60	0.02	21.81	31.43	57.42	25.99	QP
3	1.289	9.60	0.03	21.24	30.87	56.00	25.13	QP
4	1.868	9.60	0.04	23.86	33.50	56.00	22.50	QP
5	7.646	9.60	0.09	17.51	27.20	60.00	32.80	QP
6	13.479	9.60	0.12	22.15	31.87	60.00	28.13	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Data: 6 File: E:\1#CE\2020 Report Data\T\TPV\A1Z2001008-rf.EM6 (24)

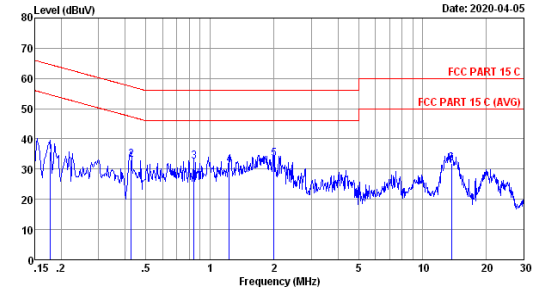


Site no :1# Conduction Data No :6
Dis./Lisn :2019 ENV216 L LISN phase:
Limit :FCC PART 15 C
Env./Ins. :21.7*C/46% Engineer :Evan
EUT :
Power Rating :DC 5V From PC Input AC 120V/60Hz
Test Mode :BT5.0 Tx

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.226	9.60	0.03	21.08	30.71	62.61	31.90	QP
2	0.377	9.60	0.02	22.81	32.43	58.34	25.91	QP
3	0.461	9.60	0.02	20.82	30.44	56.67	26.23	QP
4	1.707	9.60	0.04	21.55	31.19	56.00	24.81	QP
5	2.033	9.60	0.04	22.85	32.49	56.00	23.51	QP
6	6.733	9.69	0.08	18.80	28.57	60.00	31.43	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

Data: 5 File: E:\1#CE\2020 Report Data\T\TPV\A1Z2001008-rf.EM6 (24)



Site no :1# Conduction Data No :5
Dis./Lisn :2019 ENV216 N LISN phase:
Limit :FCC PART 15 C
Env./Ins. :21.7*C/46% Engineer :Evan
EUT :
Power Rating :DC 5V From PC Input AC 120V/60Hz
Test Mode :BT5.0 Tx

No	Freq (MHz)	LISN Factor (dB)	Cable loss (dB)	Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.178	9.60	0.03	25.97	35.60	64.59	28.99	QP
2	0.426	9.60	0.02	23.46	33.08	57.33	24.25	QP
3	0.844	9.60	0.03	22.98	32.61	56.00	23.39	QP
4	1.236	9.60	0.03	21.65	31.28	56.00	24.72	QP
5	2.001	9.60	0.04	23.77	33.41	56.00	22.59	QP
6	13.695	9.60	0.12	22.27	31.99	60.00	28.01	QP

Remarks: 1.Emission Level=LISN Factor+Cable Loss+Reading.
2.If the average limit is met when useing a quasi-peak detector. the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

4. RADIATED EMISSION MEASUREMENT

4.1. Test Equipment

Frequency range: 30~1000MHz

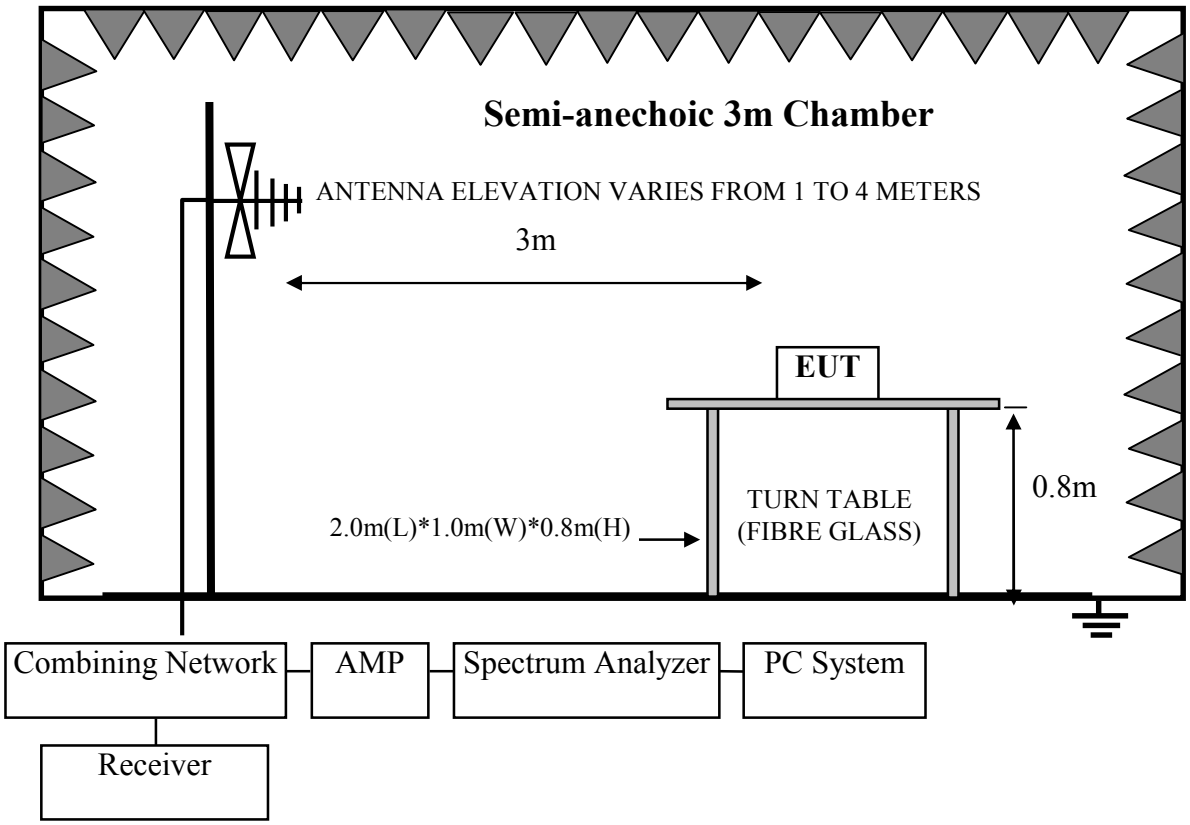
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(NSA)	AUDIX	N/A	N/A	May.10,19	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.14,19	1 Year
4.	EMI Test Receiver	Rohde & Schwarz	ESR7	101547	Apr.14,19	1 Year
5.	Amplifier	HP	8447D	2648A04738	Apr.14,19	1 Year
6.	Tri-log-Broadband Antenna	SCHWARZBECK	VULB 9168	493	Jul.24,19	1 Year
7.	NSA Cable	HUBER+SUHNER	CFD400NL-LW	No.3	Oct.13,19	1 Year
8.	Coaxial Switch	Anritsu	MP59B	6201397222	Apr.14,19	1 Year
9.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

Frequency range: above 1000MHz

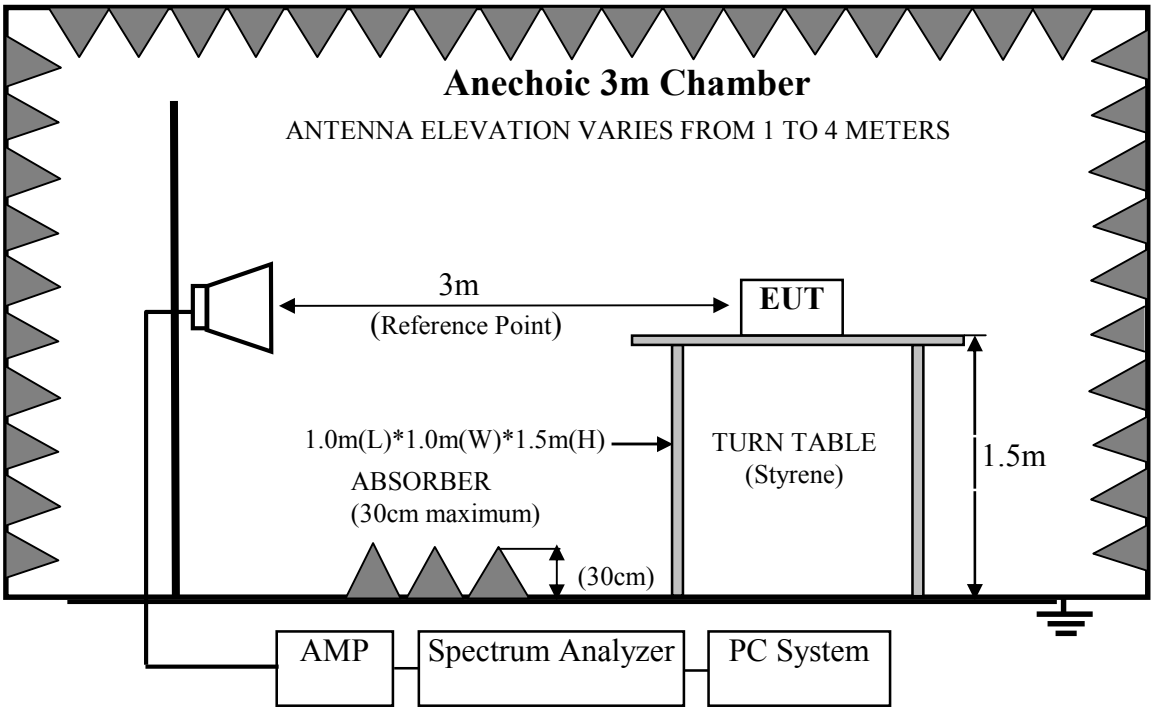
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	3#Chamber(Svswr)	AUDIX	N/A	N/A	Apr.18,19	1 Year
2.	3#Chamber(SE)	AUDIX	N/A	N/A	May.17,18	3 Year
3.	Signal Analyzer	Rohde & Schwarz	FSV30	104050	Apr.14,19	1 Year
4.	Horn Antenna	ETC	MCTD 1209	DRH15F03007	Jun.17,19	1 Year
5.	Horn Antenna	ETS	3116	00060089	Dec.02,19	1 Year
6.	Amplifier	Agilent	83017A	MY53270084	Oct.13,19	1 Year
7.	RF Cable	Hubersuhner	SUCOFLEX-106	505238/6	Apr.13,19	1 Year
8.	Test Software	AUDIX	e3	6.2009-5-21a(n)	N/A	N/A
Note: N/A means Not applicable.						

4.2. Block Diagram of Test Setup

For frequency range 30MHz-1000MHz



For frequency range 1GHz-25GHz



4.3. Radiated Emission Limit Standard:

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000MHz	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

Remark： (1) Emission level dBμV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

(4) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

4.4. EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

4.4.1. WiFi +BT module (EUT)

Model Number : WCT5GM2511
Serial Number : N/A

4.5. Operating Condition of EUT

4.5.1. Setup the EUT and simulator as shown as Section 4.2.

4.5.2. Turn on the power of all equipments.

4.5.3. Let EUT work in BLE Tx mode.

4.6. Test Procedure

Frequency below 30MHz:

The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground for frequency 30MHz~1000MHz, 1.5 meter high above ground for frequency above 1GHz and put the absorbing with 2.4m(L)*2.4m(W)*0.3m(H) on the ground . The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it.EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna for frequency 30MHz~1000MHz, and the Horm antenna is used as receiving antenna for frequency above 1GHz. Both horizontal and vertical polarization of the antenna is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.10-2013 on radiated emission Test.

This test was performed with EUT in X, Y, Z position, and the worse case was found when EUT in X position as the test photo indicated.

The bandwidth of the EMI test receiver (R&S ESR7) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's RBW is set at 1MHz and VBW is set at 3MHz for peak emissions measurement above 1GHz.

This device is pulse Modulated, a duty cycle factor was used to calculated average level based measured peak level.

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

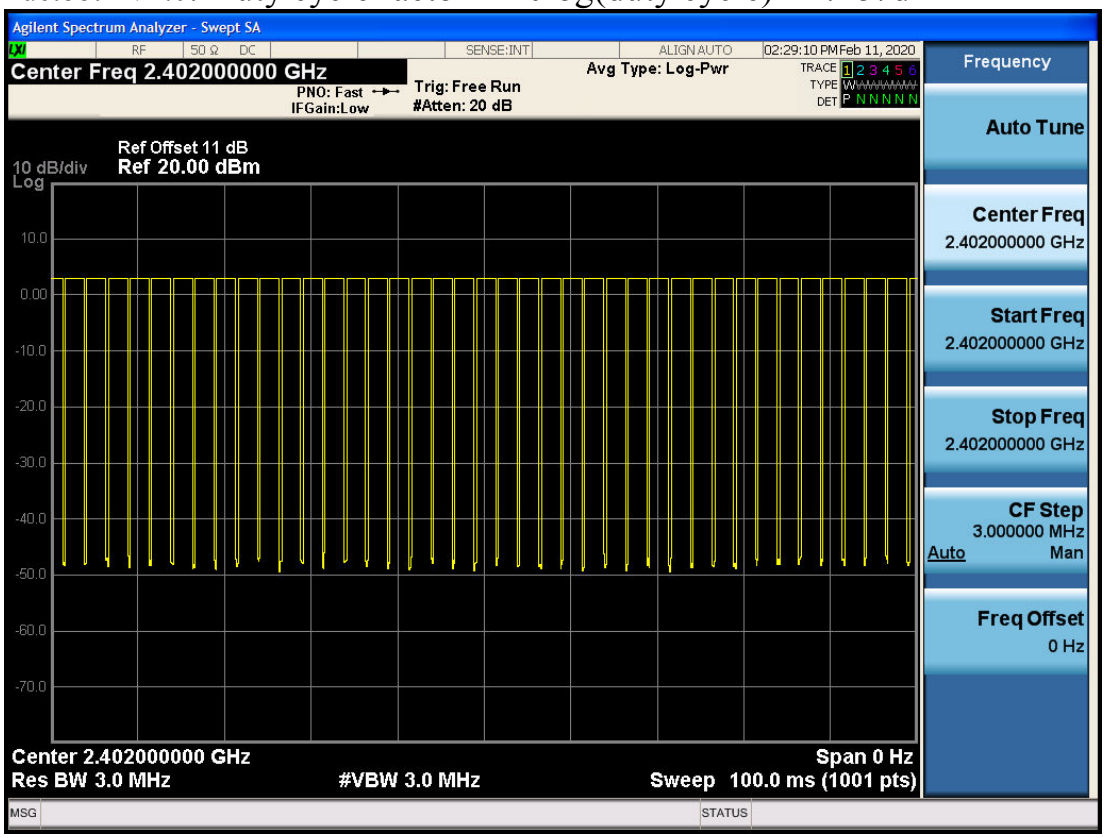
4.7. Radiated Emission Test Results

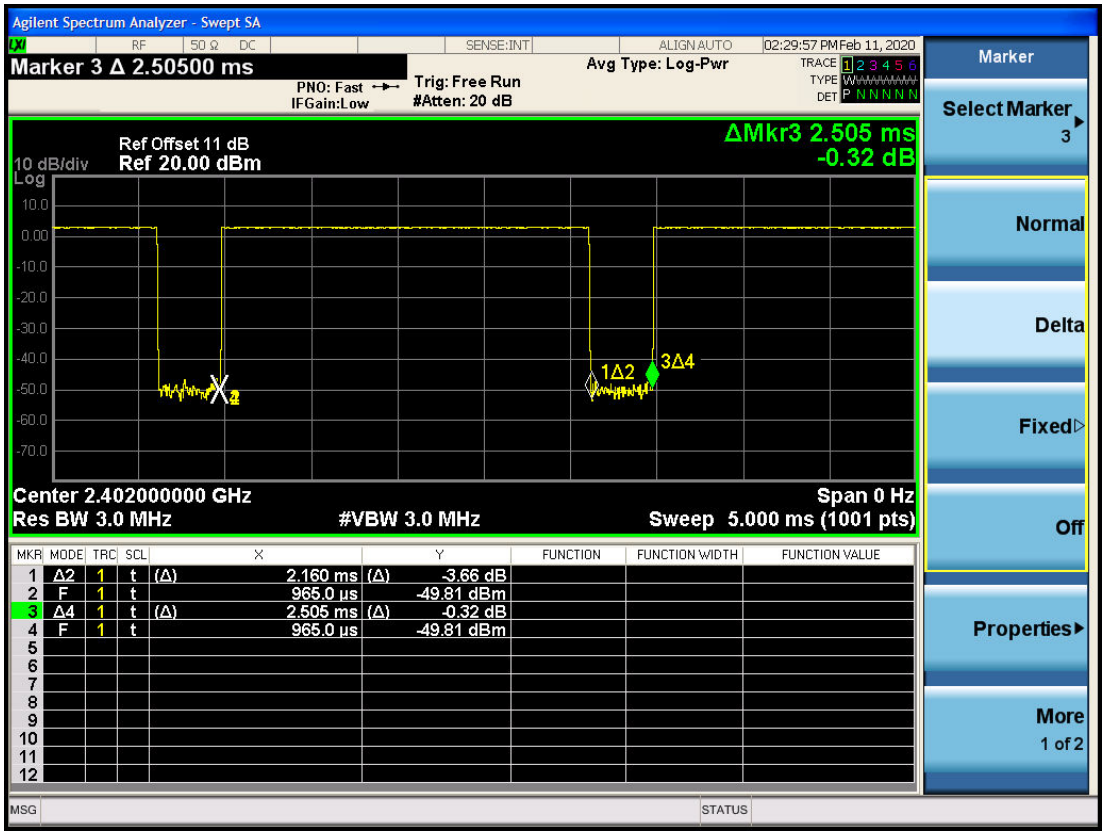
PASS.

All the emissions from 30MHz to 25GHz were comply with the 15.209 Limit.

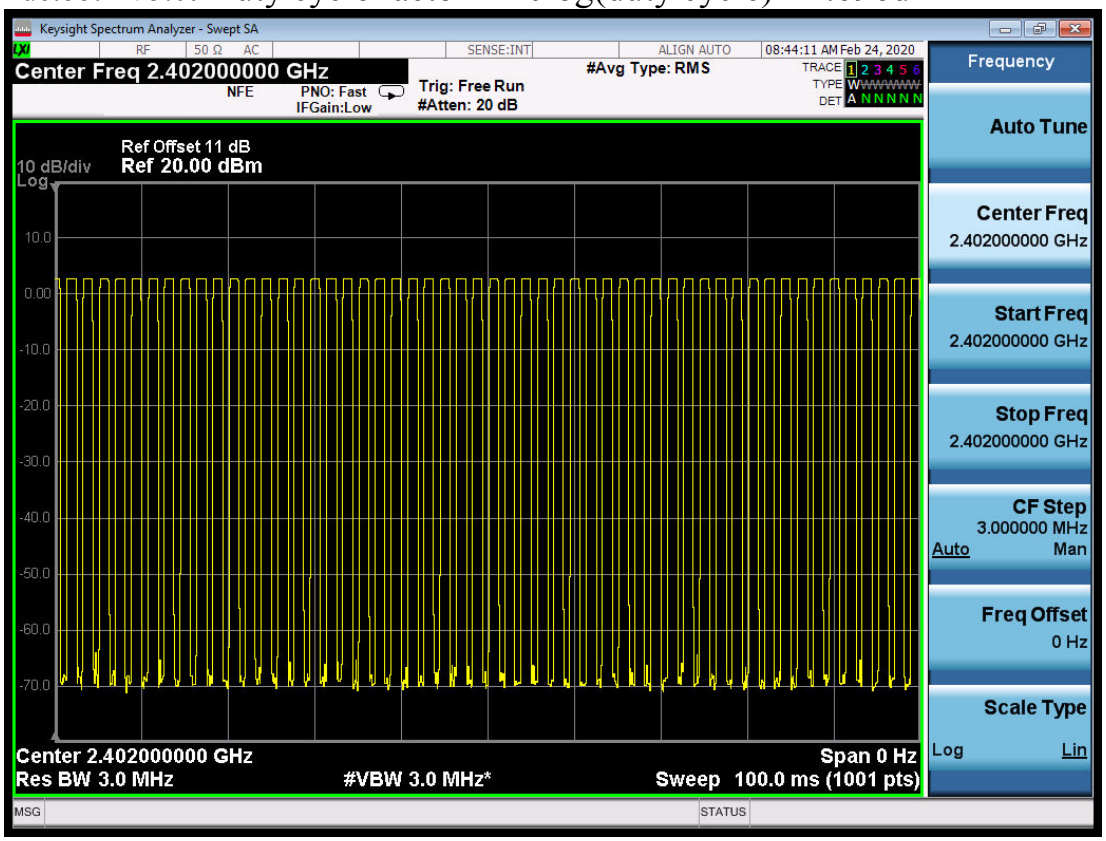
Note: The duty cycle factor for calculate average level is -1.287dB for Bluetooth V4.0, The duty cycle factor for calculate average level is -4.696dB for Bluetooth V5.0, and average limit is 20dB below peak limit, so if peak measured level comply with average limit, the average level was deemed to comply with average limit.

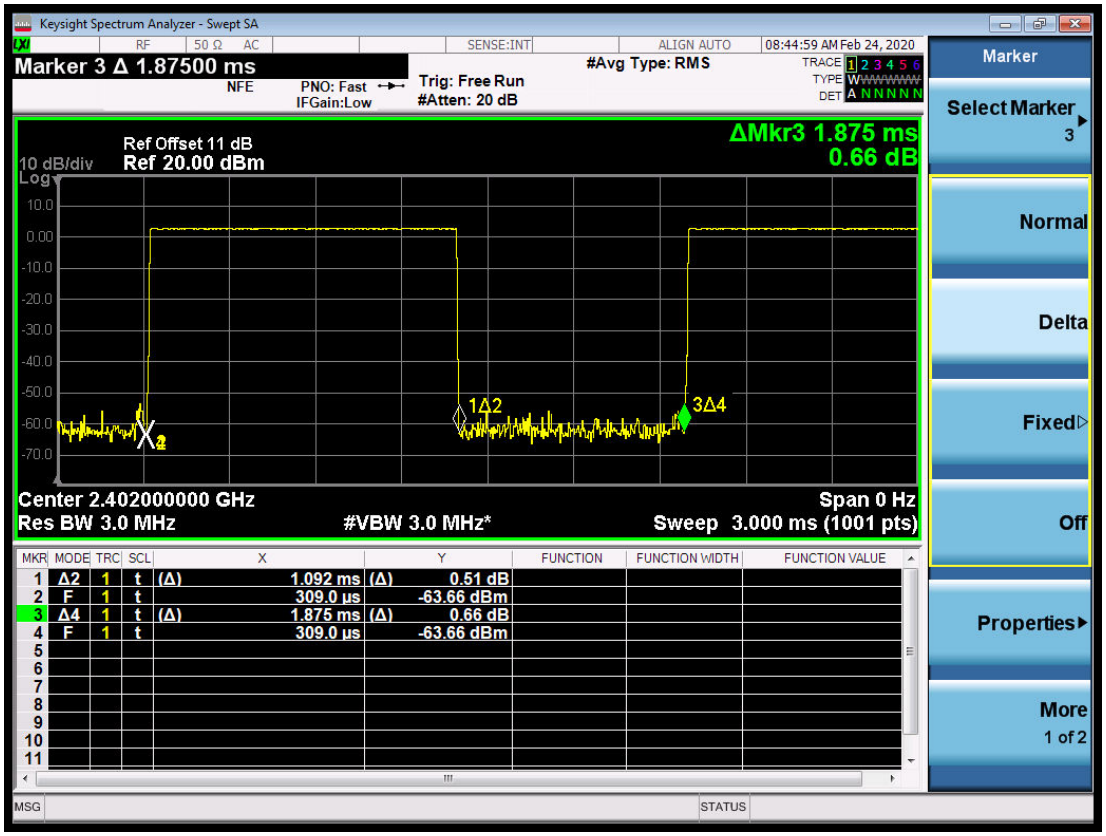
Bluetooth V4.0: Duty cycle factor = 20log(duty cycle)=-1.287dB



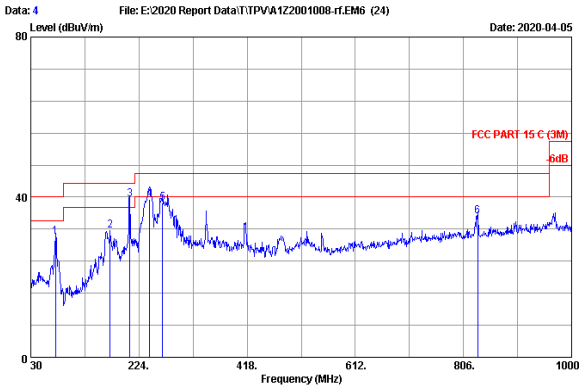


Bluetooth V5.0: Duty cycle factor = 20log(duty cycle)=-4.696dB





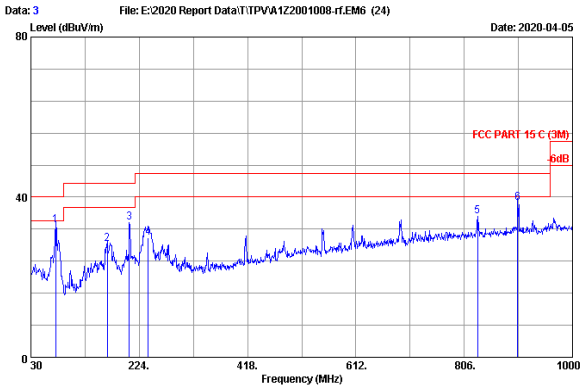
Frequency: 30MHz~1GHz



Site no. : 3m Chamber Data no. : 4
Dis. / Ant. : 3m 2019 VULB9168-493 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 22.4*C/59% Engineer : Hogen
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	74.620	16.60	0.82	12.62	30.04	40.00	9.96	QP
2	172.590	18.80	1.32	11.55	31.67	43.50	11.83	QP
3	207.510	17.00	1.47	20.87	39.34	43.50	4.16	QP
4	243.400	18.03	1.60	19.89	39.52	46.00	6.48	QP
5	266.680	18.82	1.69	17.98	38.49	46.00	7.51	QP
6	831.220	28.70	3.24	3.29	35.23	46.00	10.77	QP

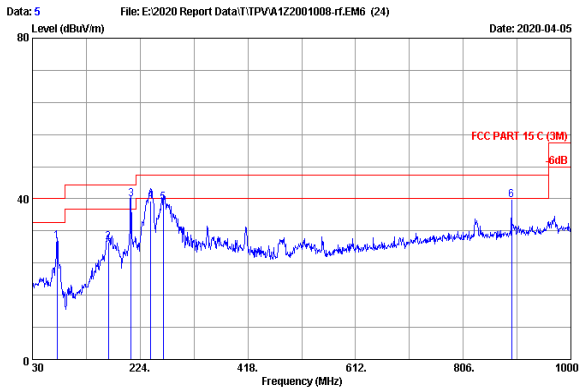
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 3
Dis. / Ant. : 3m 2019 VULB9168-493 Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 22.4*C/59% Engineer : Hogen
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	74.620	16.60	0.82	15.47	32.89	40.00	7.11	QP
2	166.770	19.30	1.30	7.67	28.27	43.50	15.23	QP
3	206.540	17.03	1.47	15.06	33.56	43.50	9.94	QP
4	240.490	17.93	1.59	10.30	29.82	46.00	16.18	QP
5	830.250	28.70	3.24	3.30	35.24	46.00	10.76	QP
6	902.030	29.36	3.34	5.87	38.57	46.00	7.43	QP

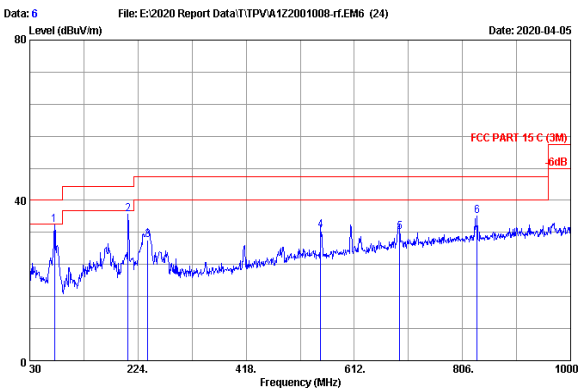
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 5
Dis. / Ant. : 3m 2019 VULB9168-493 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 22.4*C/59% Engineer : Hogen
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 Tx

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	74.620	16.60	0.82	11.92	29.34	40.00	10.66	QP
2	166.770	19.30	1.30	8.60	29.20	43.50	14.30	QP
3	207.510	17.00	1.47	21.38	39.85	43.50	3.65	QP
4	243.400	18.03	1.60	19.90	39.53	46.00	6.47	QP
5	265.710	18.76	1.68	18.58	39.02	46.00	6.98	QP
6	893.300	29.30	3.33	6.92	39.55	46.00	6.45	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

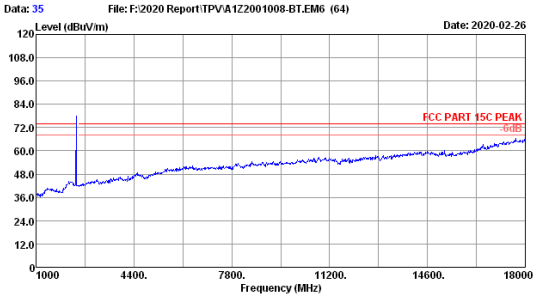


Site no. : 3m Chamber Data no. : 6
Dis. / Ant. : 3m 2019 VULB9168-493 Ant. pol. : VERTICAL
Limit : FCC PART 15 C (3M)
Env. / Ins. : 22.4*C/59% Engineer : Hogen
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 Tx

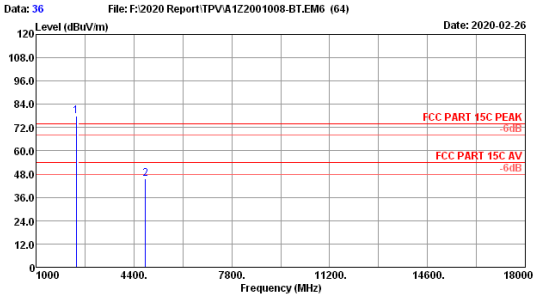
No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	74.620	16.60	0.82	16.43	33.85	40.00	6.15	QP
2	206.540	17.03	1.47	18.08	36.58	43.50	6.92	QP
3	241.460	17.97	1.59	10.48	30.04	46.00	15.96	QP
4	551.860	25.00	2.50	5.13	32.63	46.00	13.37	QP
5	693.480	27.00	2.86	2.30	32.16	46.00	13.84	QP
6	832.190	28.70	3.24	4.13	36.07	46.00	9.93	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.

Frequency: 1GHz~18GHz



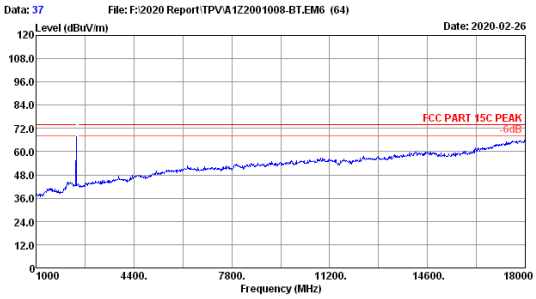
Site no. : 3m Chamber Data no. : 35
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4°C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2402MHz Tx Mode



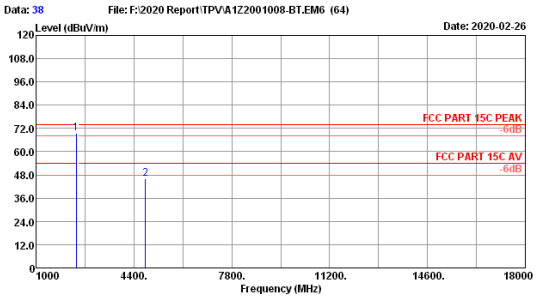
Site no. : 3m Chamber Data no. : 36
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4°C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	3.04	35.04	82.40	78.10	------	------	Peak
2	4804.00	31.70	4.27	34.36	44.20	45.81	74.00	28.19	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 37
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4°C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2402MHz Tx Mode

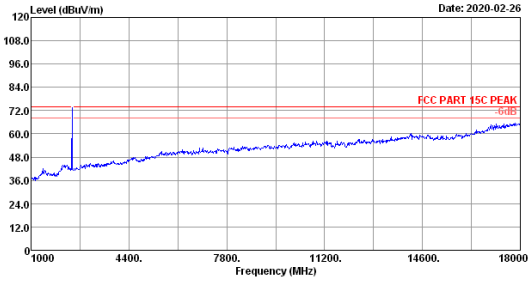


Site no. : 3m Chamber Data no. : 38
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4°C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	3.04	35.04	73.94	69.64	------	------	Peak
2	4804.00	31.70	4.27	34.36	44.65	46.26	74.00	27.74	Peak

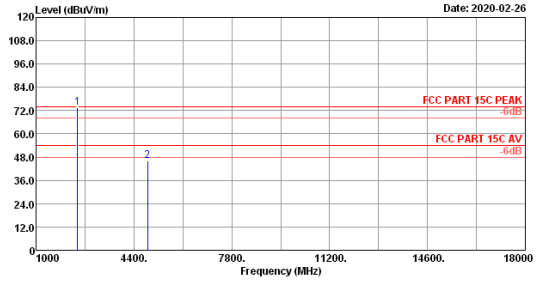
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 39 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 39
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2440MHz Tx Mode

Data: 40 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

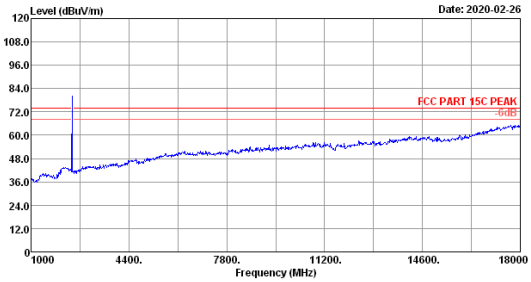


Site no. : 3m Chamber Data no. : 40
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.00	27.90	3.08	35.02	77.43	73.39	------	------	Peak
2	4880.00	32.02	4.30	34.38	44.30	46.24	74.00	27.76	Peak

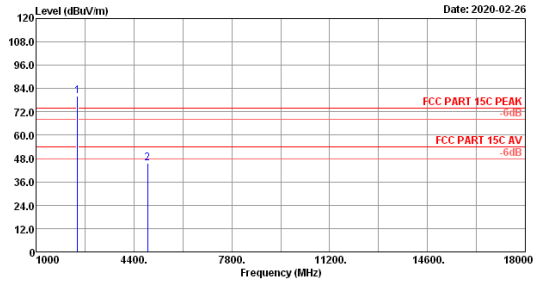
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 41 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 41
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2440MHz Tx Mode

Data: 42 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

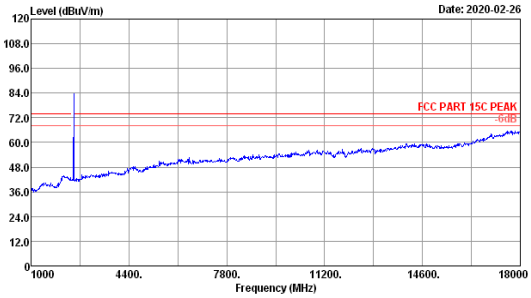


Site no. : 3m Chamber Data no. : 42
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.00	27.90	3.08	35.02	84.39	80.35	------	------	Peak
2	4880.00	32.02	4.30	34.38	43.57	45.51	74.00	28.49	Peak

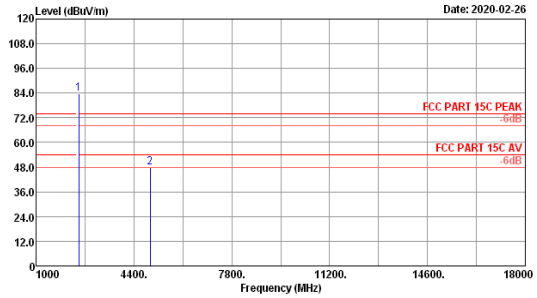
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 43 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 43
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2480MHz Tx Mode

Data: 44 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

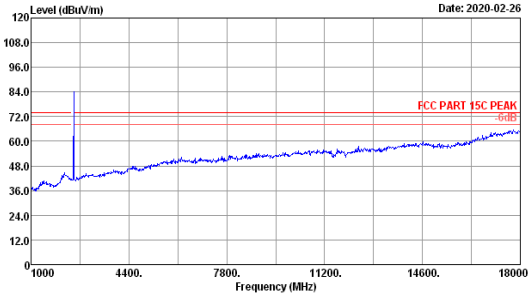


Site no. : 3m Chamber Data no. : 44
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.03	3.10	35.01	87.79	83.91	------	------	Peak
2	4960.00	32.70	4.33	34.39	45.15	47.79	74.00	26.21	Peak

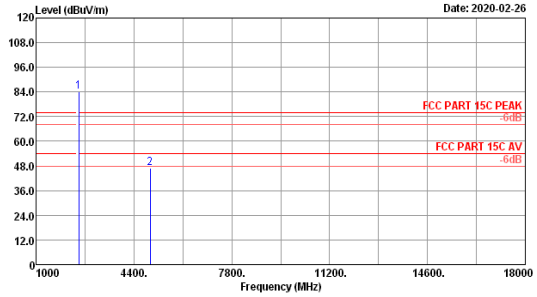
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 45 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 45
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2480MHz Tx Mode

Data: 46 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

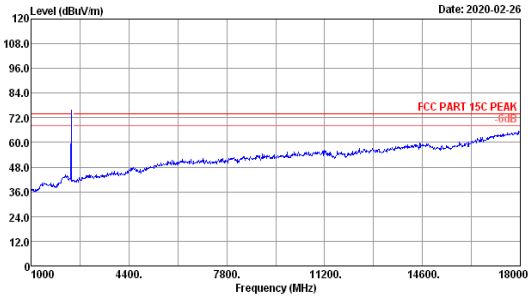


Site no. : 3m Chamber Data no. : 46
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT4.0 GFSK 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.03	3.10	35.01	88.01	84.13	------	------	Peak
2	4960.00	32.70	4.33	34.39	44.13	46.77	74.00	27.23	Peak

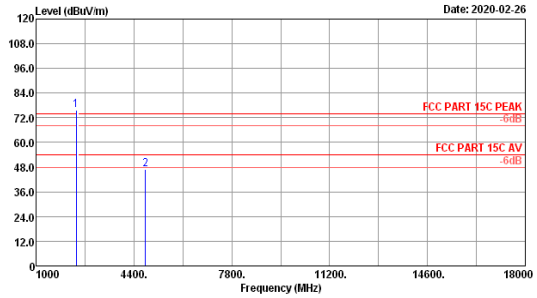
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 51 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 51
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2402MHz Tx Mode

Data: 52 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

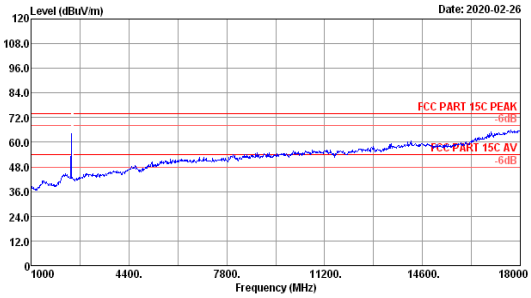


Site no. : 3m Chamber Data no. : 52
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	3.04	35.04	80.22	75.92	------	------	Peak
2	4804.00	31.70	4.27	34.36	45.30	46.91	74.00	27.09	Peak

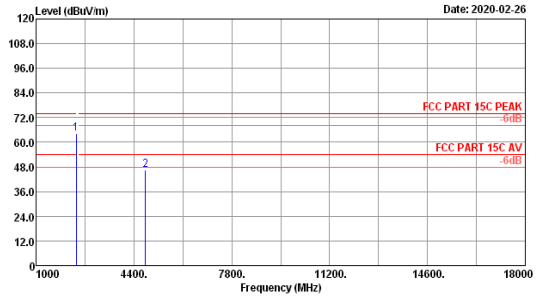
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 53 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 53
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2402MHz Tx Mode

Data: 54 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

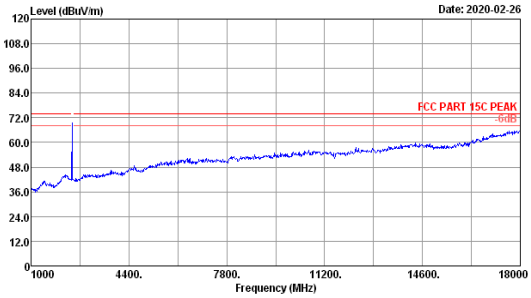


Site no. : 3m Chamber Data no. : 54
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2402MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.70	3.04	35.04	68.60	64.30	------	------	Peak
2	4804.00	31.70	4.27	34.36	44.96	46.57	74.00	27.43	Peak

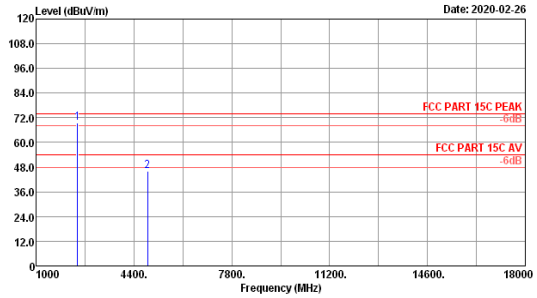
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 55 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 55
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2440MHz Tx Mode

Data: 56 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

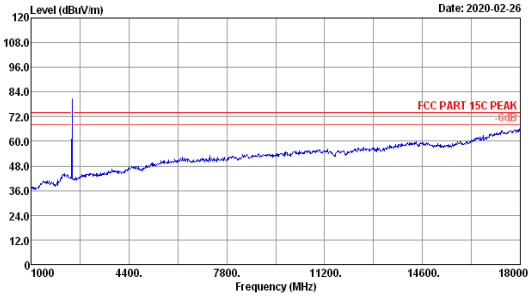


Site no. : 3m Chamber Data no. : 56
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.00	27.90	3.08	35.02	73.74	69.70	------	------	Peak
2	4880.00	32.02	4.30	34.38	44.20	46.14	74.00	27.86	Peak

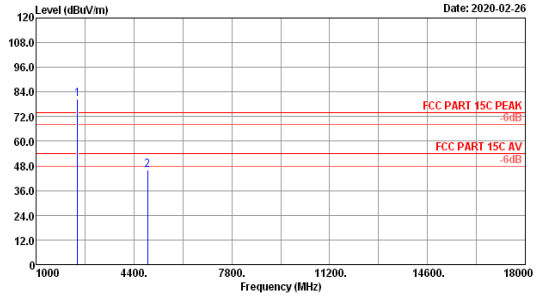
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 57 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 57
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2440MHz Tx Mode

Data: 58 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

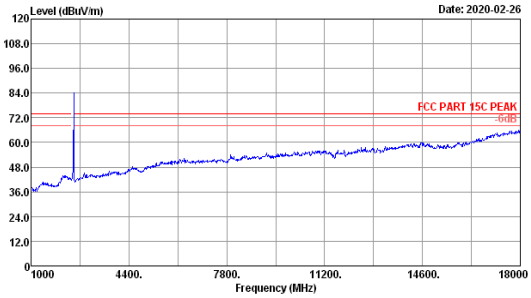


Site no. : 3m Chamber Data no. : 58
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2440MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2440.00	27.90	3.08	35.02	84.77	80.73	------	------	Peak
2	4880.00	32.02	4.30	34.38	44.13	46.07	74.00	27.93	Peak

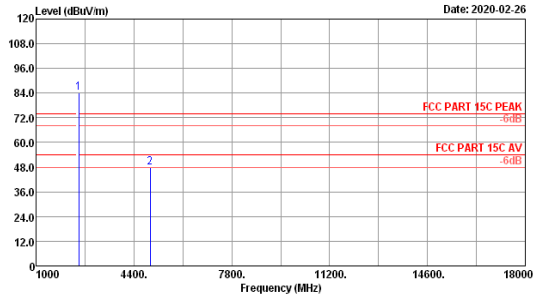
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 59 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 59
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2480MHz Tx Mode

Data: 60 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)

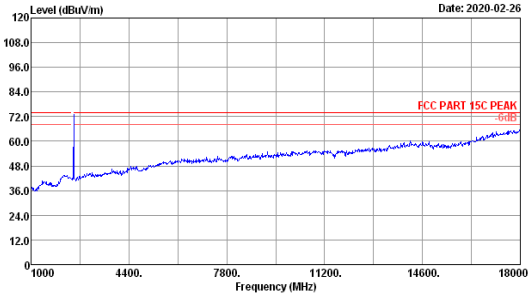


Site no. : 3m Chamber Data no. : 60
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.03	3.10	35.01	88.00	84.12	------	------	Peak
2	4960.00	32.70	4.33	34.39	44.98	47.62	74.00	26.38	Peak

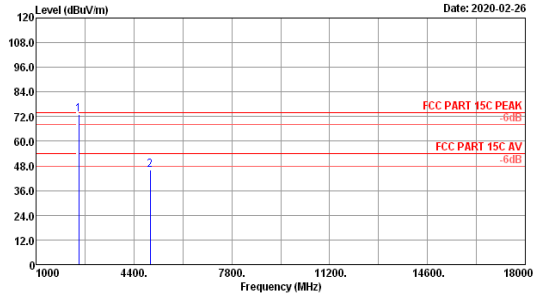
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

Data: 61 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 61
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2480MHz Tx Mode

Data: 62 File: F:\2020 Report\TPV\A1Z2001008-BT.EM6 (64)



Site no. : 3m Chamber Data no. : 62
Dis. / Ant. : 3m 2019 MCTD1209-3007 Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : 23.4*C/52.9% Engineer : Garry
EUT :
Power rating : DC 5V From PC Input AC 120V/60Hz
Test Mode : BT5.0 GFSK 2480MHz Tx Mode

No.	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	28.03	3.10	35.01	77.08	73.20	------	------	Peak
2	4960.00	32.70	4.33	34.39	43.59	46.23	74.00	27.77	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading -Amp factor.
2. The emission levels that are 20dB below the official limit are not reported.

5. CONDUCTED SPURIOUS EMISSIONS

5.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	PXA Signal Analyzer	Agilent	N9030A	MY51380221	Jun.30,19	1 Year
2.	Attenuator	Agilent	8491B	MY39269201	Oct.13,19	1 Year
3.	RF Cable	EMCI	EMC102-KM-KM 3500	170702	May.13,19	1 Year

5.2. Block Diagram of Test Setup

Please reference to section 2.4.

5.3. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

5.4. Test Procedure

Use the test method descried in ANSI C63.10:
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz and measure all the emissions With peak detector.

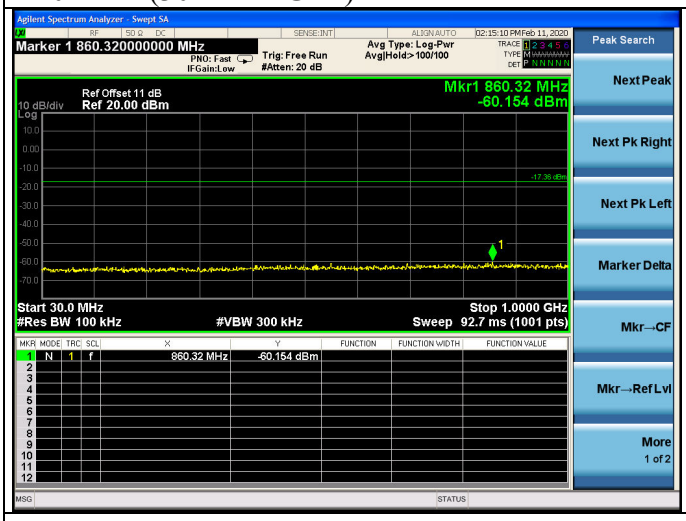
5.5. Test result

PASS (The testing data was attached in the next pages.)

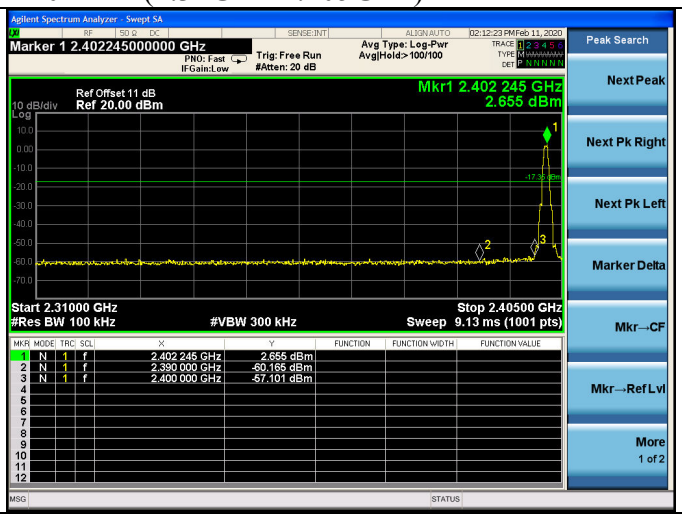
EUT: WiFi +BT module		
M/N: WCT5GM2511		
Test date: 2020-02-11~20	Pressure: 102.1±1.0 kpa	Humidity: 51.1±3.0%
Tested by: Lynn	Test site: RF site	Temperature:22.8±0.6 ℃

Bluetooth V4.0 (GFSK)

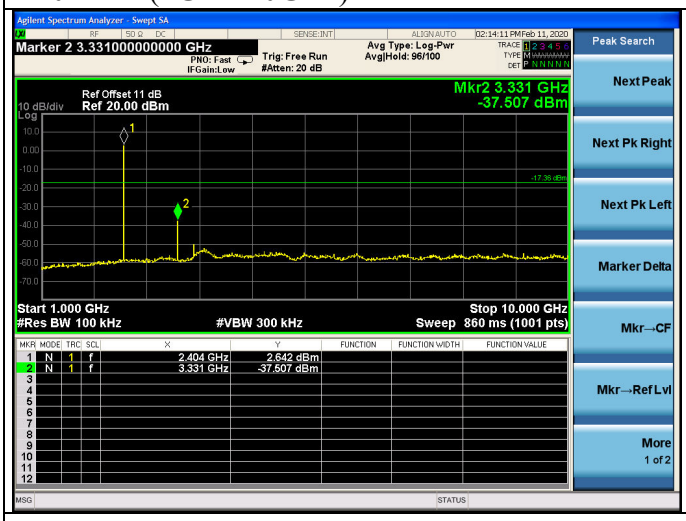
2402MHz(30MHz-1GHz)



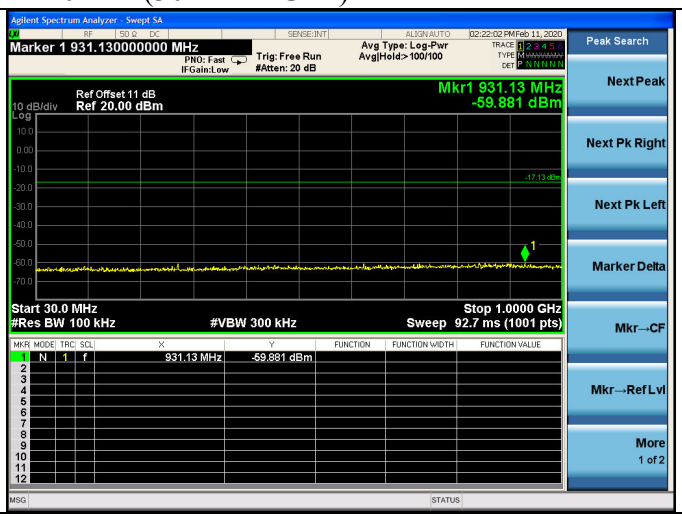
2402MHz(2.31GHz-2.405GHz)



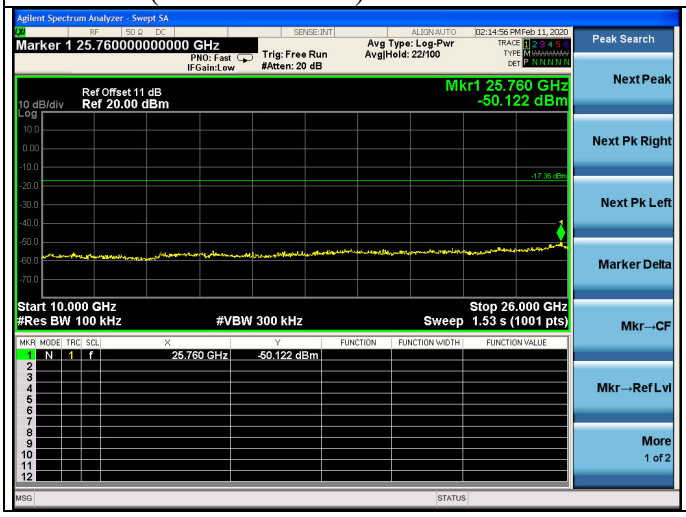
2402MHz(1GHz-10GHz)



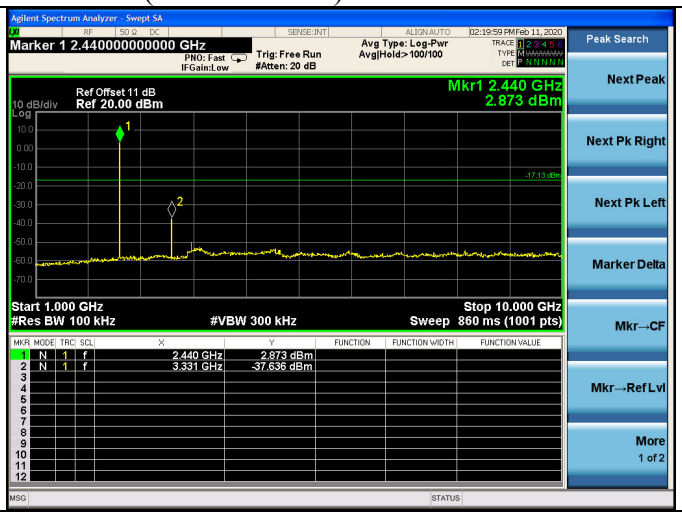
2440MHz(30MHz-1GHz)



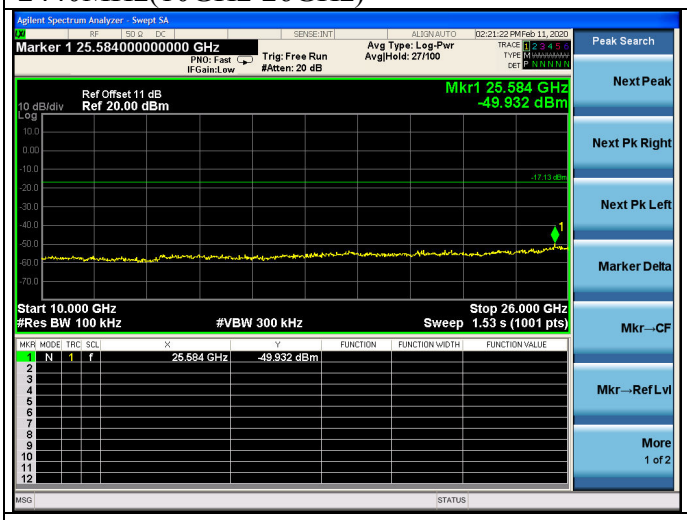
2402MHz(10GHz-26GHz)



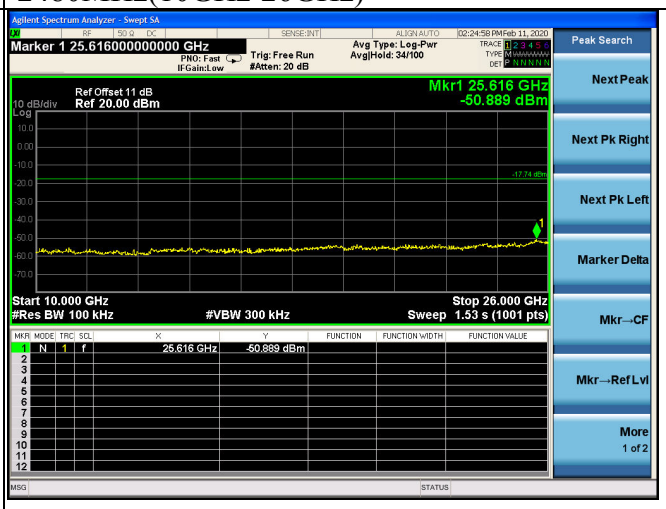
2440MHz(1GHz-10GHz)



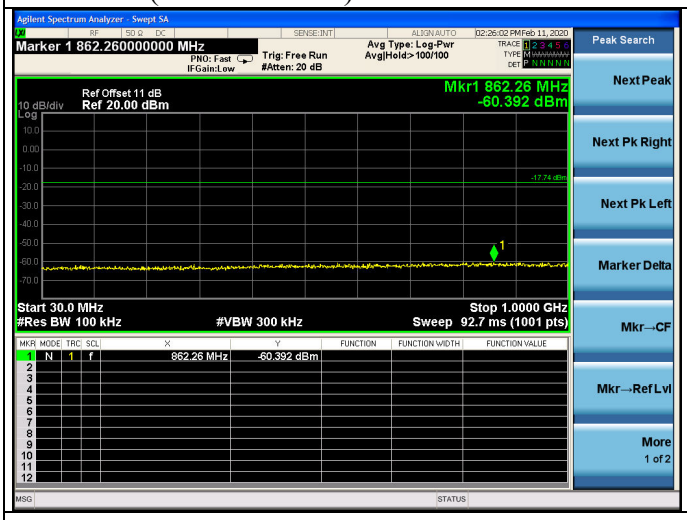
2440MHz(10GHz-26GHz)



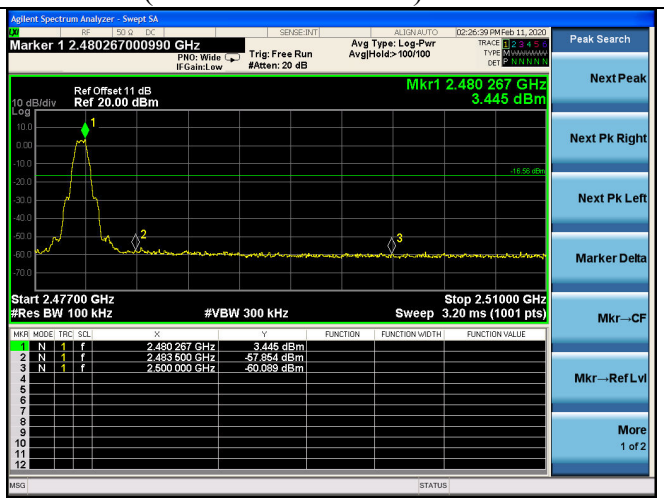
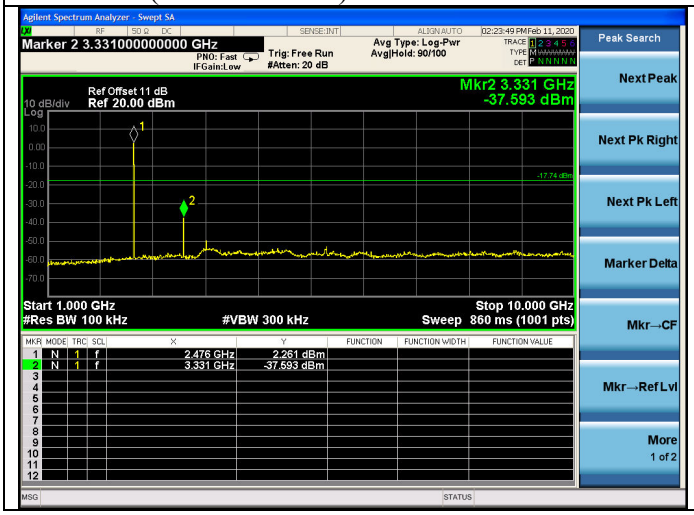
2480MHz(10GHz-26GHz)



2480MHz(30MHz-1GHz)



2480MHz(2.477GHz-2.51GHz)



2480MHz(1GHz-10GHz)