

# **FCC Radio Test Report**

# FCC ID: OL3AT10DONGLE

Report No. Equipment Model Name Brand Name Applicant Address Manufacturer Address		BTL-FCCP-2-2301G001 Dongle AT10DONGLE Alcatel-Lucent Enterprise ALE International 32, Avenue Kléber – 92700 Colombes – FRANCE ALE International 32, Avenue Kléber – 92700 Colombes – FRANCE
Radio Function	:	Bluetooth Low Energy
FCC Rule Part(s) Measurement Procedure(s)		FCC CFR Title 47, Part 15, Subpart C (15.247) ANSI C63.10-2013
Date of Receipt Date of Test Issued Date	-	2023/1/6 2023/6/9 ~ 2023/6/12 2023/8/9

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

Prepared by

: <u>Eddie Lee, Engineer</u>

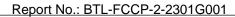
Jerry Chuang, Supervisor



Approved by

#### BTL Inc.

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#### Declaration

**BTL** represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

**BTL**'s reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

This report is the confidential property of the client. As a mutual protection to the clients, the public and ourselves, the test report shall not be reproduced, except in full, without our written approval.

BTL's laboratory quality assurance procedures are in compliance with the ISO/IEC 17025 requirements, and accredited by the conformity assessment authorities listed in this test report.

**BTL** is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

#### Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.



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### **REVISION HISTORY**

Report No.	Version	Description	Issued Date	Note
BTL-FCCP-2-2301G001	R00	Original Report.	2023/6/19	Invalid
BTL-FCCP-2-2301G001	R01	Revised report to address TCB's comments.	2023/8/1	Invalid
BTL-FCCP-2-2301G001	R02	Revised report to address TCB's comments.	2023/8/4	Invalid
BTL-FCCP-2-2301G001	R03	Revised report to address TCB's comments.	2023/8/9	Valid

### 1 SUMMARY OF TEST RESULTS

Test procedures according to the technical standards.

Standard(s) Section	Description	Test Result	Judgement	Remark
15.207	AC Power Line Conducted Emissions	APPENDIX A	Pass	
15.205 15.209 15.247(d)	Radiated Emissions	APPENDIX B APPENDIX C	Pass	
15.247(a)(2)	Bandwidth	APPENDIX D	Pass	
15.247(b)(3)	Output Power	APPENDIX E	Pass	
15.247(e)	Power Spectral Density	APPENDIX F	Pass	
15.247(d)	Antenna conducted Spurious Emission	APPENDIX G	Pass	
15.203	Antenna Requirement		Pass	NOTE (3)

#### NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) The report format version is TP.1.1.1.

(3) The EUT has internal antenna, which was permanently attached, fulfill the requirement of this section. Please refer to the EUT photos.

#### 1.1 REFERENCE TEST GUIDANCE

KDB 558074 D01 15.247 Meas Guidance v05r02



#### 1.2 TEST FACILITY

 The test locations stated below are under the TAF Accreditation Number 0659.

 The test location(s) used to collect the test data in this report are:

 No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

 (FCC DN: TW0659)

 ☑
 C05
 □
 CB11
 ⊠
 SR10

□ SR11

No. 72, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan (FCC DN: TW0659)

□ C06 <sup>′</sup> ⊠ CB21 □ CB22

#### 1.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $\mathbf{y} \pm \mathbf{U}$ , where expanded uncertainty  $\mathbf{U}$  is based on a standard uncertainty multiplied by a coverage factor of  $\mathbf{k} = 2$ , providing a level of confidence of approximately **95**%. The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2. The BTL measurement uncertainty is less than the CISPR 16-4-2 U<sub>cispr</sub> requirement.

A. AC power line conducted emissions test:

Test Site	Method	Measurement Frequency Range	U (dB)
C05	CISPR	150 kHz ~ 30MHz	3.44

B. Radiated emissions test :

Test Site	Measurement Frequency Range	U (dB)
	0.03 GHz ~ 0.2 GHz	4.17
	0.2 GHz ~ 1 GHz	4.72
CB21	1 GHz ~ 6 GHz	5.21
CB21	6 GHz ~ 18 GHz	5.51
	18 GHz ~ 26 GHz	3.69
	26 GHz ~ 40 GHz	4.23

#### C. Conducted test :

Test Item	U (dB)
Occupied Bandwidth	0.5334
Output power	0.3669
Power Spectral Density	0.6591
Conducted Spurious emissions	0.5416
Conducted Band edges	0.5348

NOTE:

Unless specifically mentioned, the uncertainty of measurement has not been taken into account to declare the compliance or non-compliance to the specification.

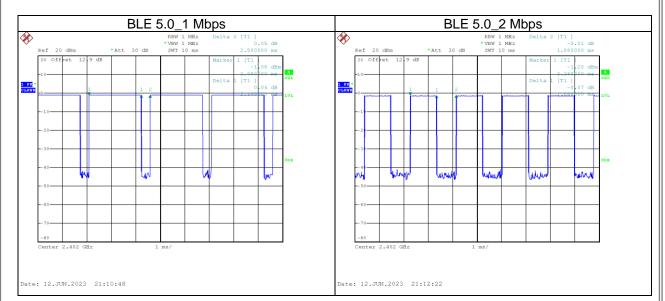
#### 1.4 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Test Voltage	Tested by
AC Power Line Conducted Emissions	20 °C, 53 %	DC 5V	Jay Tien
Radiated emissions below 1 GHz	Refer to data	DC 5V	Mark Wang
Radiated emissions above 1 GHz	Refer to data	DC 5V	Mark Wang
Bandwidth	23 °C, 46 %	DC 5V	Jay Tien
Output Power	23 °C, 46 %	DC 5V	Jay Tien
Power Spectral Density	23 °C, 46 %	DC 5V	Jay Tien
Antenna conducted Spurious Emission	23 °C, 46 %	DC 5V	Jay Tien

#### 1.5 DUTY CYCLE

If duty cycle is  $\geq$  98 %, duty factor is not required. If duty cycle is < 98 %, duty factor shall be considered.

	Remark	Delta 1			Delta 2	On Time/Period	10 log(1/Duty Cycle)
Γ	Mode	ON	Numbers	On Time (B)	Period (ON+OFF)	Duty Cycle	Duty Factor
	WOUE	(ms)	(ON)	(ms)	(ms)	(%)	(dB)
	BLE (1 Mbps)	2.140	1	2.140	2.500	85.60%	0.68
	BLE (2 Mbps)	1.080	1	1.080	1.880	57.45%	2.41



### 2 GENERAL INFORMATION

#### 2.1 DESCRIPTION OF EUT

EquipmentDongleModel NameAT10DONGLEBrand NameAlcatel-Lucent EnterpriseModel DifferenceN/APower SourceDC voltage supplied from USB port.Power RatingDC 5VProducts CoveredN/AHVINAT10DONGLEFVINN/AOperation Band2400 MHz ~ 2483.5 MHzOperation Frequency2402 MHz ~ 2480 MHzModulation TechnologyGFSKTransfer Rate1 Mbps, 2 MbpsOutput Power Max.1 Mbps: 1.30 dBm (0.0013 W) 2 Mbps: 1.29 dBm (0.0013 W)Operating SoftwareRTLBTAPP v5.2.2.50Test ModelAT10DONGLESample StatusEngineering SampleEUT Modification(s)N/A		
Brand NameAlcatel-Lucent EnterpriseModel DifferenceN/APower SourceDC voltage supplied from USB port.Power RatingDC 5VProducts CoveredN/AHVINAT10DONGLEFVINN/AOperation Band2400 MHz ~ 2483.5 MHzOperation Frequency2402 MHz ~ 2480 MHzModulation TechnologyGFSKTransfer Rate1 Mbps, 2 MbpsOutput Power Max.1 Mbps: 1.30 dBm (0.0013 W) 2 Mbps: 1.29 dBm (0.0013 W)Operating SoftwareRTLBTAPP v5.2.2.50Test ModelAT10DONGLESample StatusEngineering Sample	Equipment	Dongle
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Power Rating       DC 5V         Products Covered       N/A         HVIN       AT10DONGLE         FVIN       N/A         Operation Band       2400 MHz ~ 2483.5 MHz         Operation Frequency       2402 MHz ~ 2480 MHz         Modulation Technology       GFSK         Transfer Rate       1 Mbps, 2 Mbps         Output Power Max.       1 Mbps: 1.30 dBm (0.0013 W)         2 Mbps: 1.29 dBm (0.0013 W)         Operating Software       RTLBTAPP v5.2.2.50         Test Model       AT10DONGLE         Sample Status       Engineering Sample	Model Difference	N/A
Products CoveredN/AHVINAT10DONGLEFVINN/AOperation Band2400 MHz ~ 2483.5 MHzOperation Frequency2402 MHz ~ 2480 MHzModulation TechnologyGFSKTransfer Rate1 Mbps, 2 MbpsOutput Power Max.1 Mbps: 1.30 dBm (0.0013 W) 2 Mbps: 1.29 dBm (0.0013 W)Operating SoftwareRTLBTAPP v5.2.2.50Test ModelAT10DONGLESample StatusEngineering Sample	Power Source	DC voltage supplied from USB port.
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Output Power Max.       2 Mbps: 1.29 dBm (0.0013 W)         Operating Software       RTLBTAPP v5.2.2.50         Test Model       AT10DONGLE         Sample Status       Engineering Sample	Transfer Rate	1 Mbps, 2 Mbps
Operating Software     RTLBTAPP v5.2.2.50       Test Model     AT10DONGLE       Sample Status     Engineering Sample	Output Power Max	
Test Model AT10DONGLE Sample Status Engineering Sample		2 Mbps: 1.29 dBm (0.0013 W)
Sample Status Engineering Sample	Operating Software	RTLBTAPP v5.2.2.50
	Test Model	AT10DONGLE
EUT Modification(s) N/A		Engineering Sample
	EUT Modification(s) N/A	

#### NOTE:

(1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

#### (2) Channel List:

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



#### (3) Table for Filed Antenna:

	ine al l'anteriniea				
Antenna	Brand	Part number	Туре	Connector	Gain (dBi)
-	Shenzhen HamyWe Technology Co., Ltd.	HM3216ANT2450-HM02	Ceramic Antenna	N/A	4.34

(4) The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.



#### 2.2 TEST MODES

Test Items	Test mode	Channel	Note
AC power line conducted emissions	Normal/Idle	-	-
Transmitter Radiated Emissions (below 1GHz)	BLE 5.0 / 1 Mbps	19	-
Transmitter Radiated Emissions	BLE 5.0 / 1/2 Mbps	00/39	Bandedge
(above 1GHz)	BLE 5.0 / 1/2 Mbps	00/19/39	Harmonic
Bandwidth	BLE 5.0 / 1/2 Mbps	00/19/39	-
Output Power	BLE 5.0 / 1/2 Mbps	00/19/39	-
Power Spectral Density	BLE 5.0 / 1/2 Mbps	00/19/39	-
Antenna conducted Spurious Emission	BLE 5.0 / 1/2 Mbps	00/19/39	-

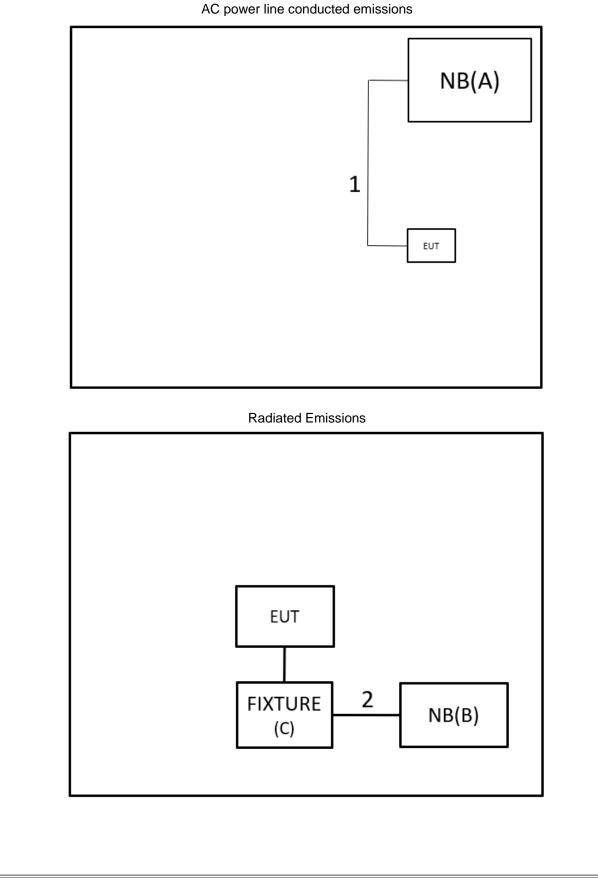
NOTE:

- (1) For radiated emission band edge test, both Vertical and Horizontal are evaluated, but only the worst case (Horizontal) is recorded.
- (2) All X, Y and Z axes are evaluated, but only the worst case (X axis) is recorded.
  (3) The EUT supports both BLE 4.0 and 5.0, we will pick BLE 5.0 for testing.



#### 2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Equipment letters and Cable numbers refer to item numbers described in the tables of clause 2.4.





### 2.4 SUPPORT UNITS

It	tem	Equipment	Brand	Model No.	Series No.	Remarks
	А	NB	ASUS	X555L	X555LN-0021B421 0U	Furnished by test lab.
	В	NB	HP	TPN-C125	N/A	Furnished by test lab.
	С	FIXTURE	N/A	N/A	N/A	Furnished by test lab.
_						
			E 14 O			

Item	Shielded	Ferrite Core	Length	Cable Type	Remarks
1	No	No	1.5m	USB Cable	Furnished by test lab.
2	No	No	1m	USB extension Cable	Furnished by test lab.



#### 3 AC POWER LINE CONDUCTED EMISSIONS TEST

#### 3.1 LIMIT

Frequency	Limit (dBµV)		
(MHz)	Quasi-peak	Average	
0.15 - 0.5	66 - 56 *	56 - 46 *	
0.50 - 5.0	56	46	
5.0 - 30.0	60	50	

NOTE:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.
- (3) The test result calculated as following:
  - Measurement Value = Reading Level + Correct Factor

```
Correct Factor = Insertion Loss + Cable Loss + Attenuator Factor (if use)
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Margin Level = Measurement Value - Limit Value

Calculation example:

Reading Level		Correct Factor		Measurement Value
38.22	+	3.45	Ш	41.67

Measurement Value		Limit Value		Margin Level
41.67	-	60	=	-18.33

The following table is the setting of the receiver.

Receiver Parameter	Setting				
Attenuation	10 dB				
Start Frequency	0.15 MHz				
Stop Frequency	30 MHz				
IF Bandwidth	9 KHz				

#### 3.2 TEST PROCEDURE

a. The EUT was placed 0.8 m above the horizontal ground plane with the EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipment were powered from an additional LISN(s).

- The LISN provides 50 Ohm/50uH of impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle to keep the cable above 40 cm.
- c. Excess I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable will be terminated, using the correct terminating impedance. The overall length shall not exceed 1 m.
- The LISN is spaced at least 80 cm from the nearest part of the EUT chassis. d
- e. For the actual test configuration, please refer to the related Item EUT TEST PHOTO.

#### NOTE:

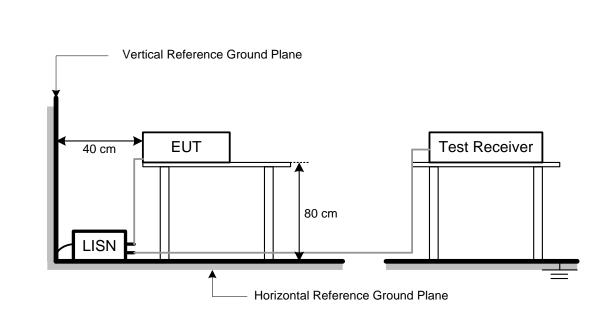
- (1) In the results, each reading is marked as Peak, QP or AVG per the detector used. BW=9 kHz (6 dB Bandwidth)
- (2) All readings are Peak unless otherwise stated QP or AVG in column of Note. Both the QP and the AVG readings must be less than the limit for compliance.

#### 3.3 DEVIATION FROM TEST STANDARD

No deviation.



#### 3.4 TEST SETUP



#### 3.5 TEST RESULT

Please refer to the APPENDIX A.



### 4 RADIATED EMISSIONS TEST

#### 4.1 LIMIT

In case the emission fall within the restricted band specified on 15.205, then the 15.209 limit in the table below has to be followed.

#### LIMITS OF RADIATED EMISSIONS MEASUREMENT (9 kHz to 1000 MHz)

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

#### LIMITS OF RADIATED EMISSIONS MEASUREMENT (Above 1000 MHz)

Frequency (MHz)	Radiated I (dBu	Measurement Distance	
(IVIHZ)	Peak	Average	(meters)
Above 1000	74	54	3

NOTE:

- (1) The limit for radiated test was performed according to FCC CFR Title 47, Part 15, Subpart C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).
- (4) The test result calculated as following:
  - Measurement Value = Reading Level + Correct Factor
  - Correct Factor = Antenna Factor + Cable Loss Amplifier Gain(if use)

Margin Level = Measurement Value - Limit Value Calculation example:

Calculation example.				
Reading Level		Correct Factor		Measurement Value
41.91	+	-8.36	=	33.55

Measurement Value		Limit Value		Margin Level
33.55	1	43.50	Π	-9.95

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RBW / VBW	1MHz / 3MHz for Peak,
(Emission in restricted band)	1MHz / 1/T for Average
· · · · · · · · · · · · · · · · · · ·	
Mode	VBW(Hz)
BLE (1M)	470
BLE (2M)	1k
Spectrum Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9KHz~90KHz for PK/AVG detector
Start ~ Stop Frequency	90KHz~110KHz for QP detector
Start ~ Stop Frequency	110KHz~490KHz for PK/AVG detector
Start ~ Stop Frequency	490KHz~30MHz for QP detector
Start ~ Stop Frequency	30MHz~1000MHz for QP detector





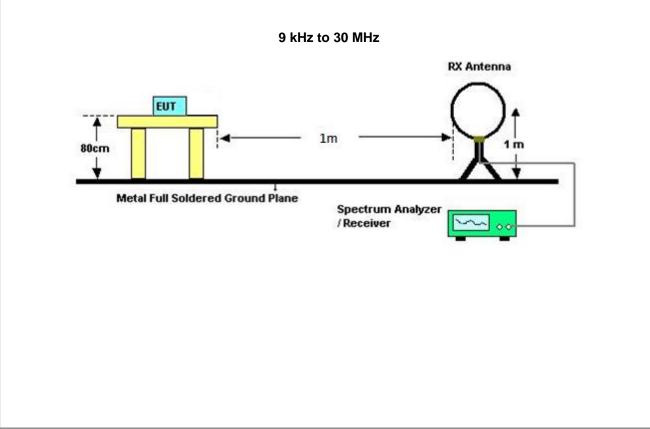
#### 4.2 TEST PROCEDURE

- a. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The measuring distance of 3 m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m or 1.5 m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights find the maximum reading (used Bore sight function).
- e. The receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1GHz.
- f. The initial step in collecting radiated emission data is a receiver peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- g. All readings are Peak unless otherwise stated QP in column of Note. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measurement didn't perform. (below 1GHz)
- All readings are Peak Mode value unless otherwise stated AVG in column of Note. If the Peak Mode Measured value compliance with the Peak Limits and lower than AVG Limits, the EUT shall be deemed to meet both Peak & AVG Limits and then only Peak Mode was measured, but AVG Mode didn't perform. (above 1GHz)
- i. For the actual test configuration, please refer to the related Item EUT TEST PHOTO.
- j. In the Radiation bandedge test, the software was automatically obtained the maximum emission point in 2310-2390 MHz and 2483.5-2500 MHz.

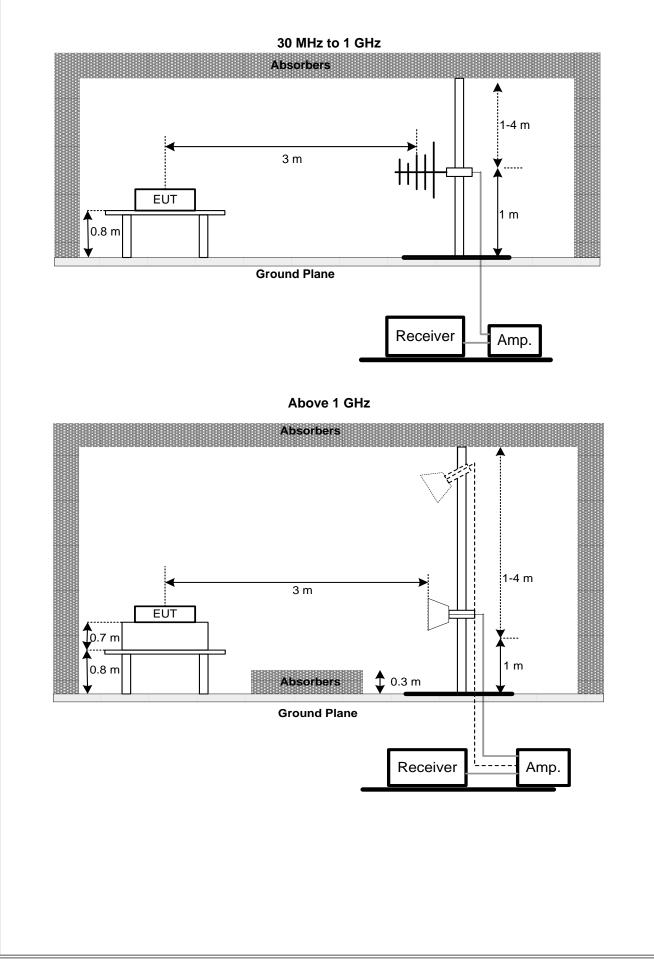
#### 4.3 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.4 TEST SETUP









#### 4.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

#### 4.6 TEST RESULT – BELOW 30 MHZ

There were no emissions found below 30 MHz within 20 dB of the limit.

#### 4.7 TEST RESULT – 30 MHZ TO 1 GHZ

Please refer to the APPENDIX B.

#### 4.8 TEST RESULT – ABOVE 1 GHZ

Please refer to the APPENDIX C.

NOTE:

(1) No limit: This is fundamental signal, the judgment is not applicable. For fundamental signal judgment was referred to Peak output test.



### 5 BANDWIDTH TEST

#### 5.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(a)(2)	Bandwidth	>= 500KHz (6dB bandwidth)	2400-2483.5	PASS

#### 5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

#### 5.3 DEVIATION FROM STANDARD

No deviation.

#### 5.4 TEST SETUP



#### 5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 5.6 TEST RESULTS

Please refer to the APPENDIX D.



### 6 OUTPUT POWER TEST

#### 6.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3) Maximum Output Power		1 watt or 30dBm	2400-2483.5	PASS

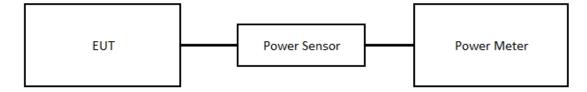
#### 6.2 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. The maximum peak conducted output power was performed in accordance with FCC KDB 558074 D01 15.247 Meas Guidance.

#### 6.3 DEVIATION FROM STANDARD

No deviation.

#### 6.4 TEST SETUP



#### 6.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 6.6 TEST RESULTS

Please refer to the APPENDIX E.



### 7 POWER SPECTRAL DENSITY TEST

#### 7.1 APPLIED PROCEDURES / LIMIT

Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(e)	Power Spectral Density	8 dBm (in any 3KHz)	2400-2483.5	PASS

#### 7.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW=3KHz, VBW=10 KHz, Sweep time = auto.

#### 7.3 DEVIATION FROM STANDARD

No deviation.

#### 7.4 TEST SETUP



#### 7.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 7.6 TEST RESULTS

Please refer to the APPENDIX F.



### 8 ANTENNA CONDUCTED SPURIOUS EMISSION

#### 8.1 APPLIED PROCEDURES / LIMIT

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

#### 8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW=300KHz, Sweep time = 10 ms.

#### 8.3 DEVIATION FROM STANDARD

No deviation.

#### 8.4 TEST SETUP



#### 8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 3.5 unless otherwise a special operating condition is specified in the follows during the testing.

#### 8.6 TEST RESULTS

Please refer to the APPENDIX G.



### 9 LIST OF MEASURING EQUIPMENTS

		AC Pow	er Line Conducted	d Emissions		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	TWO-LINE V-NETWORK	R&S	ENV216	101521	2022/9/28	2023/9/27
2	Test Cable	EMCI	EMCRG58-BM-B M-9000	220331	2023/3/30	2024/3/29
3	EMI Test Receiver	R&S	ESR 7	101433	2022/11/16	2023/11/15
4	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

			Radiated Emission	ons		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Preamplifier	EMCI	EMC330N	980850	2022/9/19	2023/9/18
2	Preamplifier	EMCI	EMC118A45SE	980819	2023/3/7	2024/3/6
3	Pre-Amplifier	EMCI	EMC184045SE	980907	2022/9/28	2023/9/27
4	Preamplifier	EMCI	EMC001340	980579	2022/9/30	2023/9/29
5	Test Cable	EMCI	EMC104-SM-SM- 1000	220319	2023/3/14	2024/3/13
6	Test Cable	EMCI	EMC104-SM-SM- 3000	220322	2023/3/14	2024/3/13
7	Test Cable	EMCI	EMC104-SM-SM- 7000	220324	2023/3/14	2024/3/13
8	EXA Signal Analyzer	keysight	N9020B	MY57120120	2023/2/24	2024/2/23
9	Loop Ant	Electro-Metrics	EMCI-LPA600	291	2022/9/19	2023/9/18
10	Horn Antenna	RFSPIN	DRH18-E	211202A18EN	2023/5/12	2024/5/11
11	Horn Ant	Schwarzbeck	BBHA 9170D	1136	2023/5/12	2024/5/11
12	Log-bicon Antenna	Schwarzbeck	VULB9168	1369	2023/5/9	2024/5/8
13	6dB Attenuator	EMCI	EMCI-N-6-06	AT-06001	2023/5/9	2024/5/8
14	Test Cable	EMCI	EMC101G-KM-K M-3000	220329	2023/3/14	2024/3/13
15	Test Cable	EMCI	EMC102-KM-KM- 1000	220327	2023/3/14	2024/3/13
16	Measurement Software	EZ	EZ_EMC (Version NB-03A1-01)	N/A	N/A	N/A

			Bandwidth			
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer R&S		FSP38	101139	2023/3/9	2024/3/8

			Output Power	•		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Power Meter	Keysight	8990B	MY51000517	2023/3/15	2024/3/14
2	Power Sensor	Keysight	N1923A	MY58310005	2023/3/15	2024/3/14



		F	ower Spectral De	nsity		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer	R&S	FSP38	101139	2023/3/9	2024/3/8

		Antenna	conducted Spurio	ous Emission		
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Calibrated Until
1	Spectrum Analyzer R&S		FSP38	101139	2023/3/9	2024/3/8

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



### 10 EUT TEST PHOTO

Please refer to document Appendix No.: TP-2301G001-FCCP-1 (APPENDIX-TEST PHOTOS).

### 11 EUT PHOTOS

Please refer to document Appendix No.: EP-2301G001-1 (APPENDIX-EUT PHOTOS).



# APPENDIX A AC POWER LINE CONDUCTED EMISSIONS



st Mod	e N	lormal					Т	ested Date	2023/6/9
st Freq	uency -						P	hase	Line
80.0	dBuV								
70 -									
60									
-									
50 1									
40			5						
30	3		х 6						
20 ¥	4 ×		×		- 7 - X	9 X			11
10 -					8 X	1 X			X 12
0									×
-10									
-20.0 0.1	50		0.5		(MHz)		5		30.000
		Reading	Correct	Measure	-				
No. Mk.		Level	Factor	ment	Limit	Margin			
4	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	0.1500	41.86	0.04	41.90	66.00	-24.10	QP		
2	0.1500	18.82	0.04	18.86	56.00	-37.14	AVG		
3	0.2490	24.66	0.03	24.69	61.79	-37.10	QP		
4	0.2490	17.46	0.03	17.49	51.79	-34.30	AVG		
5	0.5190	32.99	0.02	33.01	56.00	-22.99	QP		
6 *	0.5190	24.20	0.02	24.22	46.00	-21.78	AVG		
7	1.9748	19.36	0.07	19.43	56.00	-36.57	QP		
8	1.9748	11.99	0.07	12.06	46.00	-33.94	AVG		
9	3.8873	18.68	0.05	18.73	56.00	-37.27	QP		
10	3.8873	10.08	0.05	10.13	46.00	-35.87	AVG		
11	15.2835	16.10	0.15	16.25	60.00	-43.75	QP		
12	15.2835	7.15	0.15	7.30	50.00	-42.70	AVG		



st Moo	de	Normal					Т	ested Date	2023/	/6/9
st Fre	quency	-					F	hase	Neutr	ral
80.0	dBuV									
70										
60			-							
50										
40 ×	<u>د</u>									
30	3		5 X					9		
2 20 ×	×						7 X	Ťo ×	11 X	
			6 X				8 ×		12	
10	4 ×								×	
0										
-10										
-20.0										
0.1	150		0.5		(MHz)		5		:	30.000
lo. Mk	. Freq.	Reading Level	Correct Factor	Measure ment	- Limit	Margin				
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment		
1 *	0.1500	40.96	0.04	41.00	66.00	-25.00	QP			
2	0.1500		0.04	20.47	56.00	-35.53	AVG			
3	0.2490		0.03	25.81	61.79	-35.98	QP			
4	0.2490		0.03	5.08	51.79	-46.71	AVG QP			
5 6	0.5325		0.02	29.06 15.46	56.00 46.00	-26.94 -30.54	AVG			
7	4.6658		0.02	22.25	56.00	-33.75	QP			
8	4.6658		0.05	12.20	46.00	-33.80	AVG			
9	8.0295		0.09	26.09	60.00	-33.91	QP			
10	8.0295	20.21	0.09	20.30	50.00	-29.70	AVG			
	15.2025	23.30	0.15	23.45	60.00	-36.55	QP			
11	15.2025	23.30	0.15	20.40	00.00	-30.33	G			



est Mo	de	Idle									Te	sted D	Date	20	2023/6/9		
Test Frequency -							Ph	ase		Li	Line						
80.0	dBuV															-	
70											-					1	
60											-					-	
50																-	
40	×																
				5 X										11 X			
30	2	3 X		6						7 X		9 X		X 12 X		1	
20		4 ×		×						8	_	10 X					
10		^								×		^					
0																	
U																1	
-10			_								-					{	
-20.0 0	150			0.5			(MI	[_]		5					30.0		
0.	150	Po			rract	Measure-									30.0		
No. M	k. Freq	Reading q. Level		Factor		ment	Li	mit	Margir	ו							
	MHz	d	BuV	dB		dBuV	dBuV		dB	Detector		Comm	ent				
1 *	0.1522		2.47		.04	42.51	65.		-23.37	QP							
2	0.1522		3.99		.04	24.03			-31.85	AVC	3						
3	0.2872		4.60		0.02	24.62			-35.98	QP							
4	0.2872		5.86		0.02	15.88	50.		-34.72	AVC	5						
5	0.5302		2.46		0.02	32.48	56.		-23.52	QP							
6	0.5302		1.90		0.02	21.92	46.		-24.08	AVC	כ						
7 8	4.1843		3.59 4.75		).05 ).05	23.64 14.80			-32.36 QF		2						
o 9	8.326		4.75 3.87		).10 ).10	23.97	60.		-31.20 AVG -36.03 QP								
10	8.326		5.96		).10	16.06	50.		-38.03 QF		3						
11	15.0968		1.69		0.15	31.84	60.		-28.16	QP							
12	15.0968		5.33		0.15	25.48	50.		-24.52								



											ate	2023/6/9		
st Fre	-				Phase	Neutral								
80.0	dBu¥													
70														
60														
		_												
50	,													
40	•													
30	2		3	5 X					7	9 X 10	11 X 12			
20	{		×	6					×	10 X	12 X	!		
10			4 X	×					8 X					
0														
-10														
-20.0 0.1	150			0.5			(MHz)		5			30.00		
		Reading Correct		Measure-										
lo. Mk		Freq. Level		Factor		ment	Limit	Margin						
1 *	MHz 0.1500	dB ) 42.			ав 0.04	dBu∨ 42.87	dBu∨ 66.00	dB -23.13	Detecto QP	or Comme	ent			
2	0.1500				.04	24.41	56.00	-31.59	AVG					
3	0.4154				.02	24.67			-32.87 QP					
4	0.4154				.02	11.87	47.54	-35.67		AVG				
5	0.5324	4 29.	30	0	.02	29.32	56.00	-26.68	QP					
6	0.5324	<b>1</b> 6.	58	0	.02	16.60	46.00	-29.40	-29.40 AVG					
7	4.6792				.05	22.98	56.00	-33.02	QP					
8	4.6792				.05	13.06	46.00	-32.94	AVG					
9	8.0586				.09	26.83	60.00	-33.17	QP					
10	8.0586				.09	20.61	50.00	-29.39	AVG					
11	14.9437	<b>7</b> 26.	43	0	.15	26.58	60.00	-33.42	QP					



## APPENDIX B RADIATED EMISSIONS - 30 MHZ TO 1 GHZ



	Test Mo	de	BLE 5.0	) (1 Mbps)		Test Date		2023/6/9			
	Test Frequency			0MHz		Polarizatio		Vertical			
Temp			2	2°C		Hum.	51%				
80.0 d	Bu¥/m										
70											
60											
50											
40		3 X	4 ×		5 X		6 X				
30	x X	^	×								
20											
10											
0.0											
30.000	127.00		321.00	418.00			9.00 806	5.00	1000.00 MH		
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment		
1	*	68.5413	45.57	-13.77	31.80	40.00	-8.20	peak			
2		119.6280	41.84	-14.47	27.37	43.50	-16.13	peak			
3		180.7056	47.18	-13.44	33.74	43.50	-9.76	peak			
4		351.6520	43.01	-10.19	32.82	46.00	-13.18	peak			
5		531.0697	41.69	-5.75	35.94	46.00	-10.06	peak			
6		714.9492	38.91	-2.35	36.56	46.00	-9.44	peak			



	Test Mo	de	BLE 5.	0 (1 Mbps)		Test Date		2023/6/9 Horizontal			
Te	st Frequ	iency	244	40MHz		Polarizatio	n				
Temp			2	2°C		Hum.		51%			
80.0 dl	3uV/m										
70											
60											
50											
40					_		2				
	2 X	× ×	4 X		5 X		8 X				
30											
20											
10											
0.0											
30.000	127.00	224.00	321.00	418.00	515.00 6	12.00 70	9.00 800	6.00	 1000.00 MH;		
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment		
1		68.5413	43.70	-13.77	29.93	40.00	-10.07	QP			
2		143.5547	48.25	-12.42	35.83	43.50	-7.67	peak			
3	*	191.3432	51.45	-14.70	36.75	43.50	-6.75	QP			
4		351.5227	46.33	-10.19	36.14	46.00	-9.86	peak			
5		530.9727	42.92	-5.75	37.17	46.00	-8.83	peak			
6		713.3973	39.65	-2.39	37.26	46.00	-8.74	peak			



# APPENDIX C RADIATED EMISSIONS - ABOVE 1 GHZ



	Test Mod		Bl	E 5.0	) (1 N 2MH:					est Dat				3/6/9	
165	t Freque Temp	псу			2°C	Z		Polarization Hum.					Horizontal 51%		
130.0 dB	uV/m			2	20		]			Tium.			5	1 /0	
															٦
120															
110															
100							5	ī							
90															
80							-	<u> </u>							
70															
60							X								
50		happener	i X		1.4.0								warmen ward	6	
40	productions and the	n-hy-philiphiliphiliphiliphiliphiliphiliphil	2 X	udenum	80/**********	hrije verskipten	No.ette	NAMANA ANA	(N-A)9	un na mana	elen er er	WarneyAman	VQ134.4.4.24.MARANIP3414.44	7 X	v1
30			^											^	
20															
10.0															
2302.00	0 2322.00	2342.0	) 236	2.00	2382	.00	2402	2.00	2422	2.00	2442.	00 246	52.00	2502.00	мн
No.	Mk.	Freq.		iding vel		rrect ctor		easure- ment	•	Limit		Over			
		MHz		BuV		B		BuV/m		dBuV/m	n	dB	Detector	Comme	ent
1		2354.353		.09		.44		19.65	C	74.00		-24.35	peak	0011110	
2		2354.353		.07		.44		38.63		54.00		-15.37	AVG		
3		2400.000		.40		.37	62.03			74.00		-11.97	peak	No Lin	nit
4		2402.000		.29		.36	92.93			74.00		18.93	peak	No Lin	
5	*	2402.000	) 97	.68	-5	.36	g	92.32		54.00		38.32	AVG	No Lin	nit
6		2492.660	) 54	.38	-5	.20	4	19.18		74.00		-24.82	peak		
7		2492.660	) 43	.92	-5	.20	2	38.72		54.00		-15.28	AVG		

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

	Test M	ode	BLE 5	5.0 (1 Mbps)		Test Date		202	3/6/9
	Test Freq			480MHz		Polarization	۱		zontal
	Tem			22°C		Hum.		5′	1%
130.0	dBuV/m								
120									
110									
100 -									
90									
80 -									
70 -									
60 -									Б
_  -		democked with meth	unaterrited	untransportung to the state	with white the	nhananalininaan	Apphanonation	nandarangeran	
50 <mark>x</mark> 40	1 14/1/1/14/14/14/14/14/14/14/14/14/14/14/	rkennen kunskelmiskel	in a teasy state of the office	understanderstaderstaderstaderstaderstaderstaderstaderstaderstaderstaderstaderstaderstaderstaderstaderstadersta	with wronduly	shewnes with the sec	Angehannonander	nan karakara	5 X X X 6 X
		demonikansk Missik	ing lagest frankt for her bleveler	ustant, engeligtende	nessent in conclusio	nyhetuaraanalla, Maarta	hyp, maashe	nturandatuturatugiteetur <sup>a</sup> tu	6
50 <mark>x</mark> 40		theorem have by Lander Versille	unalessed enderstander	unterson and a fill of the state	hallow harring harring	nder eine Brichart	Angramora de la	rta, webser and second second	6
50 <mark>-</mark> 40 - 30 - 10.0	2 X								6
50 40 30 - 10.0 238	2 X 80.000 2400.	00 2420.00	2440.00	2460.00	2480.00 2	2500.00 252	20.00 254	10.00	6
50 <mark></mark>	2 X 80.000 2400.			2460.00 g Correct		2500.00 252			6 ×
50 40 30 - 10.0 238	2 X 80.000 2400.	00 2420.00	2440.00 Readin	2460.00 g Correct Factor	2480.00 2 Measure-	2500.00 252	20.00 254 Over dB		6 ×
50 × 40 - 30 - 20 - 238	2 X 80.000 2400.	00 2420.00 Freq.	2440.00 Readin Level	2460.00 g Correct Factor dB	2480.00 2 Measure- ment	2500.00 252 Limit	20.00 254 Over	40.00	6 × 2580.00 MH
50 40 30 20 10.0 238 No. 1 2 2 38	2 X 80.000 2400. b. Mk.	00 2420.00 Freq. MHz	2440.00 Readin Level dBuV	2460.00 g Correct Factor dB -5.39	2480.00 2 Measure- ment dBuV/m	2500.00 257 Limit dBuV/m	20.00 254 Over dB	0.00 Detector	6 × 2580.00 MH
50 440 30 20 238 No. <u>1</u> 238 3	2 X 80.000 2400. 0. Mk.	00 2420.00 Freq. MHz 2386.287 2386.287 2480.000	2440.00 Readin Level dBuV 55.55 43.70 97.20	2460.00 g Correct Factor dB -5.39 -5.39 -5.22	2480.00 2 Measure- ment dBuV/m 50.16 38.31 91.98	2500.00 252 Limit dBuV/m 74.00 54.00 74.00	20.00 254 Over dB -23.84 -15.69 17.98	Detector peak AVG peak	6 × 2580.00 MH Comment
50 40 30 20 10.0 238 No. <u>1</u> 238 3 4	2 X 80.000 2400. 0. Mk.	00 2420.00 Freq. MHz 2386.287 2386.287 2480.000 2480.000	2440.00 Readin Level dBuV 55.55 43.70 97.20 96.49	2460.00 g Correct Factor dB -5.39 -5.39 -5.22 -5.22	2480.00 2 Measure- ment dBuV/m 50.16 38.31 91.98 91.27	2500.00 257 Limit dBuV/m 74.00 54.00 74.00 54.00	20.00 254 Over dB -23.84 -15.69 17.98 37.27	Detector peak AVG peak AVG	6 × 2580.00 MH
50 40 30 20 10.0 238 No. 1 2 3	2 X 80.000 2400. 0. Mk.	00 2420.00 Freq. MHz 2386.287 2386.287 2480.000	2440.00 Readin Level dBuV 55.55 43.70 97.20	2460.00 g Correct Factor dB -5.39 -5.39 -5.22 -5.22	2480.00 2 Measure- ment dBuV/m 50.16 38.31 91.98	2500.00 252 Limit dBuV/m 74.00 54.00 74.00	20.00 254 Over dB -23.84 -15.69 17.98	Detector peak AVG peak	6 X 2580.00 MH Comment

	Test Mod st Freque			5.0 (2 № 402MH					t Date rizatio			23/6/9 izontal
163	Temp	псу	Ζ'	22°C	IZ				um.	11		1%
130.0 dB	uV/m			22 0		_		- 11	um.		J J	1 /0
120												
10												
00						5						
90						Ă						
30												
70						4						
50 <u> </u>												
50 <b></b>	water	whenever	were where we proper services	hilling the second part	WWWW	hand	hopping	un water	www.wheeda	Nonmantin	Willyans million	
40					2 X							7 X
30												
20												
10.0												
2302.00	0 2322.00	2342.00	2362.00	238	2.00	2402	.00	2422.00	) 24	142.00 2	2462.00	2502.00 M
No.	Mk.	Freq.	Readin Level	0	orrect actor		asure- nent	. L	imit	Over		
		MHz	dBuV		dB	dB	BuV/m	dB	uV/m	dB	Detector	Comment
1		2387.187	55.69	-{	5.39	5	0.30	74	4.00	-23.70	) peak	
2		2387.187	44.91		5.39		9.52		4.00	-14.48		
3		2400.000	79.32		5.37		3.95		4.00	-0.05		No Limit
4		2402.000	99.89		5.36	9	4.53		4.00	20.53		No Limit
5		2402.000	98.51		5.36		3.15		4.00	39.15		No Limit
6		2485.593	55.14		5.21		9.93		4.00	-24.07		
7		2485.593	44.57	-{	5.21	3	9.36	54	4.00	-14.64	1 AVG	



	Test Mo	de	BIE 5 (	) (2 Mbps)		Test Date		202	3/6/9
1	Test Frequ			0MHz		Polarization	1		zontal
	Temp			2°C		Hum.			1%
130.0	dBu¥/m								
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70									
60 -									
50 🐇	your many have	and the second states and the	where and an and a start way	and an and a second as	www.	pharlipeasure and pharter whe	minum huma	Annal Maria and Anna and Aladar	and the ground and game
40 <mark>2</mark>							6 X		
30 -							^		
30 20									
20 10.0 2380	0.000 2400.00		2440.00	2460.00			20.00 254	0.00	2580.00 MH
20 10.0	0.000 2400.0 Mk.	0 2420.00 Freq.	2440.00 Reading Level	2460.00 Correct Factor	2480.00 2 Measure- ment	500.00 252 Limit		0.00	2580.00 MH
20 10.0 2380			Reading	Correct	Measure-		20.00 254	0.00 Detector	2580.00 MH
20 10.0 2380		Freq.	Reading Level	Correct Factor	Measure- ment	Limit	20.00 254 Over		
20 10.0 2380		Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	20.00 254 Over dB	Detector	
20 10.0 2380 No.	Mk.	Freq. MHz 2381.287	Reading Level dBuV 55.45 44.59 97.51	Correct Factor dB -5.39 -5.39 -5.22	Measure- ment dBuV/m 50.06 39.20 92.29	Limit dBuV/m 74.00 54.00 74.00	20.00 254 Over dB -23.94 -14.80 18.29	Detector peak AVG peak	Comment No Limit
20 10.0 2380 No.	Mk.	Freq. MHz 2381.287 2381.287 2480.000 2480.000	Reading Level dBuV 55.45 44.59	Correct Factor dB -5.39 -5.39	Measure- ment dBuV/m 50.06 39.20	Limit dBuV/m 74.00 54.00	20.00 254 Over dB -23.94 -14.80	Detector peak AVG	Comment
20 10.0 2380 No. 1 2 3	Mk.	Freq. MHz 2381.287 2381.287 2480.000	Reading Level dBuV 55.45 44.59 97.51	Correct Factor dB -5.39 -5.39 -5.22	Measure- ment dBuV/m 50.06 39.20 92.29	Limit dBuV/m 74.00 54.00 74.00	20.00 254 Over dB -23.94 -14.80 18.29	Detector peak AVG peak	Comment No Limit

	Test Mo t Freq			0 (1 Mbps) 02MHz		Test Date Polarization	n		3/6/9 rtical
100	Tem			2°C		Hum.			1%
130.0 dB	uV/m	•		- 0		, ion		0	.,,,
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50									
50		ž							
10 <b></b>		X							
30									
20									
10.0									
1000.00				10840.00				680.00	25600.00 MH
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	) 48.66	0.53	49.19	74.00	-24.81	peak	
2	*	4804.000	) 42.50	0.53	43.03	54.00	-10.97	AVG	

	Test Mo st Frequ			) (1 Mbps) 2MHz		Test Date Polarizatior	)		3/6/9 zontal
16	Temp			2°C		Hum.	1		1%
130.0 di	3uV/m								. , 0
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90									
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	0 3460.0	0 5920.00	8380.00	10840.00	13300.00 1	5760.00 182	220.00 206	80.00	25600.00 MH
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	00.00	23000.00 MI
			Level	Factor	ment	Linin	0.00		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000		0.53	49.86	74.00	-24.14	peak	
2	*	4804.000	43.81	0.53	44.34	54.00	-9.66	AVG	

	est Mo Frequ					(1 Mbps) )MHz				Fest Da olarizat				3/6/9 tical
	Temp					2°C				Hum.				1%
130.0 dBu	iV/m													
120														
110														
100														
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80														
70														
60														
50		1 2												
40		X												
30														
20														
10.0			00	0000.0		10040.00	1000	0.00	457	00.00	1000		200.00	25000.00 1411
1000.000 No.	мк.	0 5920. Freq.		8380.0 Readi		10840.00 Correct	1330 Ma	easure		60.00 Limit	18220	Over	680.00	25600.00 MH
INU.	IVIN.	rieq.		Leve		Factor		ment	-	LIIIII				
		MHz		dBu\	/	dB	d	3uV/m		dBuV/r	n	dB	Detector	Comment
1		4880.00	00	46.6	6	0.75	2	17.41		74.00		-26.59	peak	
2	*	4880.00	00	41.7	7	0.75	2	12.52		54.00		-11.48	AVG	

	est Mo t Frequ			.0 (1 Mbps) 40MHz		Test Date Polarization			3/6/9 zontal
163	Temp			22°C		Hum.	•		1%
130.0 dB	.₩/m			•					. , 0
120									
10									
00									
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50									
50		8							
io		×							
30									
20									
10.0									
1000.000				10840.00				680.00	25600.00 MH
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4880.000	) 49.38	0.75	50.13	74.00	-23.87	peak	
2	*	4880.000	0 44.79	0.75	45.54	54.00	-8.46	AVG	

	est Mo t Frequ				) (1 Mbps) 0MHz		Test Date Polarizatio			3/6/9 tical
	Temp				2°C		Hum.			1%
130.0 dB	ıV/m							1		
120										
110										
100										
90										
80										
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50		1 2								
40		×								
30										
20										
10.0	3460.0	0 5920.0	10 E	380.00	10840.00	13300.00	15760.00 18	3220.00 206	80.00	25600.00 MH
No.	Mk.	Freq.	R	leading Level	Correct Factor	Measure ment		Over		
		MHz		dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.00	0	44.90	1.00	45.90	74.00	-28.10	peak	
2	*	4960.00	0	38.65	1.00	39.65	54.00	-14.35	AVG	

	Test Mo st Frequ			) (1 Mbps) 0MHz		Test Date Polarizatior	1		3/6/9 zontal
	Temp		2	2°C		Hum.		5′	1%
130.0 de	uV/m								
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10									
00									
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50									
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10 <u> </u>		×							
30									
20									
10.0									
1000.00 No.	0 3460.0 Mk.			10840.00	13300.00 1 Measure-	5760.00 182 Limit		80.00	25600.00 MH
INU.	IVIK.	Freq.	Reading Level	Correct Factor	ment		Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	46.20	1.00	47.20	74.00	-26.80	peak	
2	*	4960.000	41.52	1.00	42.52	54.00	-11.48	AVG	

	Test Mo st Frequ			0 (2 Mbps) 02MHz		Test Date Polarizatior	1		3/6/9 tical
	Temp			22°C		Hum.			1%
130.0 dl	luV/m								
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100									
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40		1 X X							
30									
20									
10.0									
	0 3460.0			10840.00				80.00	25600.00 MH;
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4804.000	) 43.39	0.53	43.92	74.00	-30.08	peak	
2	*	4804.000	) 39.30	0.53	39.83	54.00	-14.17	AVG	

	est Mo t Frequ		E		) (2 Mbps) 2MHz	)			lest Da olariza				3/6/9 zontal
165	Temp				2°C			г	Hum.				1%
130.0 dBu	.₩/m	/		<u> </u>	20				Tiurri.			0	170
120													
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00													
0													
30													
'0 <b></b>													
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50		1 X 2											
10 <b></b>		2 X											
0													
20													
10.0													
1000.000	3460.0	0 5920.0	0 83	BO.00	10840.00	1330	0.00	157	60.00	1822	20.00 20	680.00	25600.00 MI
No.	Mk.	Freq.		ading	Correct		easure	-	Limit		Over		
				evel	Factor		nent						
		MHz		BuV	dB		3uV/m		dBuV/ı		dB	Detector	Comment
1		4804.00		7.80	0.53		8.33		74.00		-25.67	peak	
2	*	4804.00	0 4	0.37	0.53	4	10.90		54.00	)	-13.10	AVG	

т.	Test Mo			) (2 Mbps)		Test Date			3/6/9
IE	est Freq			0MHz 2°C		Polarizatior Hum.	1		tical 1%
130.0 d	Temj IBu¥/m	þ	Z	20		num.		5	1 70
120									
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Ŭ									
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10.0	)00 3460.	00 5920.00	) 8380.00	10840.00	13300.00 1	5760.00 182	20.00 206	80.00	25600.00 MH
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	00.00	23000.00 MH
INU.	IVIN.	i ieq.	Level	Factor	ment	LIIIII	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4880.000		0.75	48.10	74.00	-25.90	peak	
2	*	4880.000		0.75	39.94	54.00	-14.06	AVG	

	Test Mo st Frequ			) (2 Mbps) 0MHz		Test Date Polarizatior			3/6/9 zontal
	Temp			2°C		Hum.	•		1%
130.0 dl	Bu¥/m			20		- Torrit		0	170
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40 L		2 X							
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	0 3460.0	)0 5920.00	8380.00	10840.00	13300.00 1	5760.00 182	220.00 206	580.00	25600.00 MH
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		1.	Level	Factor	ment				
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4880.000	48.95	0.75	49.70	74.00	-24.30	peak	
2	*	4880.000	41.48	0.75	42.23	54.00	-11.77	AVG	

	Test Mo st Frequ			5.0 (2 Mbps) 480MHz		Test Date Polarizatio			3/6/9 tical
	Temp			22°C		Hum.			%
130.0 dE	BuV/m								
120									
110									
90									
BO									
70									
50									
50		1 X							
10		2 X							
30		×							
20									
10.0 1000.00	0 3460.0	0 5920.0	0 8380.00	10840.00	13300.00 1	15760.00 18	220.00 206	80.00	25600.00 MH
No.	Mk.	Freq.	Readir		Measure-		Over		2000.00 MI
		·····	Leve		ment				
		MHz	dBuV	′ dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.00			45.53	74.00	-28.47	peak	
2	*	4960.00	0 35.75	5 1.00	36.75	54.00	-17.25	AVG	

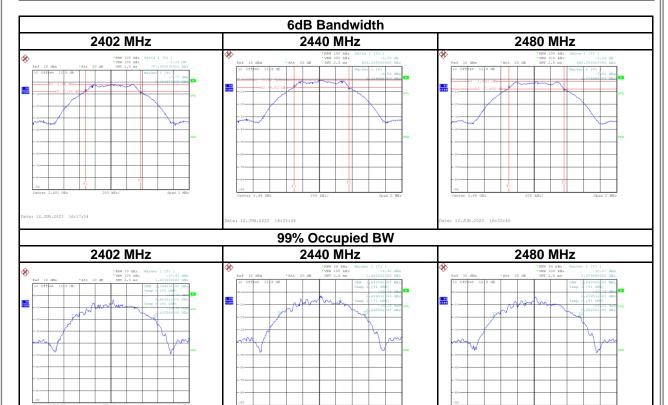
Т	Test Mo est Freq			) (2 Mbps) 0MHz		Test Date Polarization			3/6/9 zontal
	Temp			2°C		Hum.			1%
130.0	dBuV/m	5		20		T MITH.		0	170
120 —									
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30 -									
20									
10.0	000 3460.	00 5920.00	) 8380.00	10840.00	13300.00 1	5760.00 182	20.00 206	80.00	25600.00 MH
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	00.00	23000.00 MN
110.	IVIIX.	ricq.	Level	Factor	ment	Luun	0,00		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		4960.000	) 46.07	1.00	47.07	74.00	-26.93	peak	
2	*	4960.000	) 38.33	1.00	39.33	54.00	-14.67	AVG	



# APPENDIX D BANDWIDTH



Test Mode: BLE 5.0_1 Mbps						
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result		
2402	0.71	1.04	500	Pass		
2440	0.67	1.04	500	Pass		
2480	0.67	1.04	500	Pass		



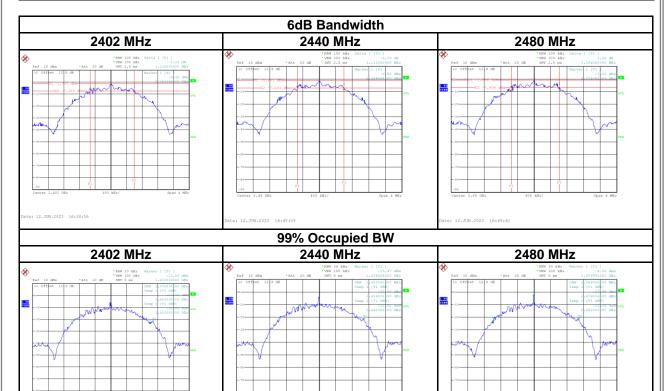
te: 12.JUN.2023 16:17:20

te: 12.JUN.2023 16:25:43

: 12.JUN.2023 16:33:45



Test Mode: BLE 5.0_2 Mbps					
Frequency (MHz)	6dB Bandwidth (MHz)	99% Occupied BW (MHz)	Min. Limit (kHz)	Test Result	
2402	1.13	2.07	500	Pass	
2440	1.13	2.08	500	Pass	
2480	1.16	2.06	500	Pass	



te: 12.JUN.2023 16:38:19

te: 12.JUN.2023 16:46:01

: 12.JUN.2023 16:49:47



# APPENDIX E OUTPUT POWER



Test Mode :	BLE 5.0_1 Mb	ested Date 2	2023/6/12		
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	1.30	0.0013	30.00	1.0000	Pass
2440	1.11	0.0013	30.00	1.0000	Pass
2480	0.22	0.0011	30.00	1.0000	Pass

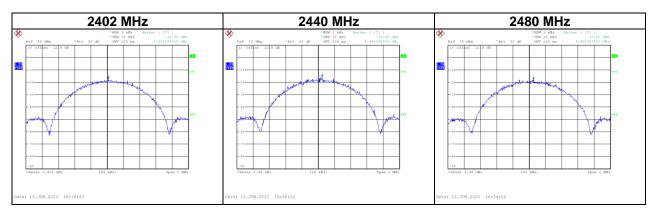
Test Mode :	BLE 5.0_2 Mb	Tested Date 2	2023/6/12		
Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Max. Limit (dBm)	Max. Limit (W)	Test Result
2402	1.29	0.0013	30.00	1.0000	Pass
2440	1.01	0.0013	30.00	1.0000	Pass
2480	0.61	0.0012	30.00	1.0000	Pass



## APPENDIX F POWER SPECTRAL DENSITY TEST

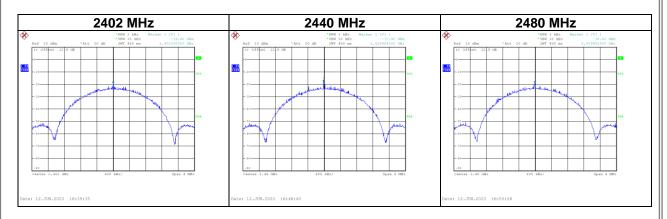


Test Mode : BLE 5.0_1 Mbps						
Frequency (MHz)	Power Density (dBm/3kHz)	Max. Limit (dBm/3kHz)	Test Result			
2402	-16.86	8	Pass			
2440	-15.26	8	Pass			
2480	-17.60	8	Pass			



Test Mode : BLE 5.0_2 Mbps						
Frequency	Power Density	Max. Limit	Test Result			

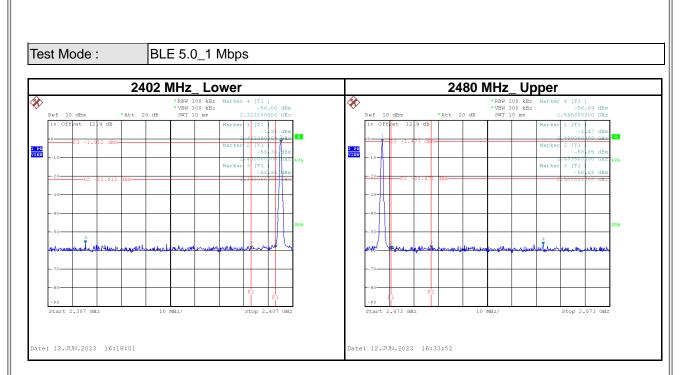
(MHz)	(dBm/3kHz)	(dBm/3kHz)	Test Result
2402	-19.60	8	Pass
2440	-17.90	8	Pass
2480	-18.93	8	Pass



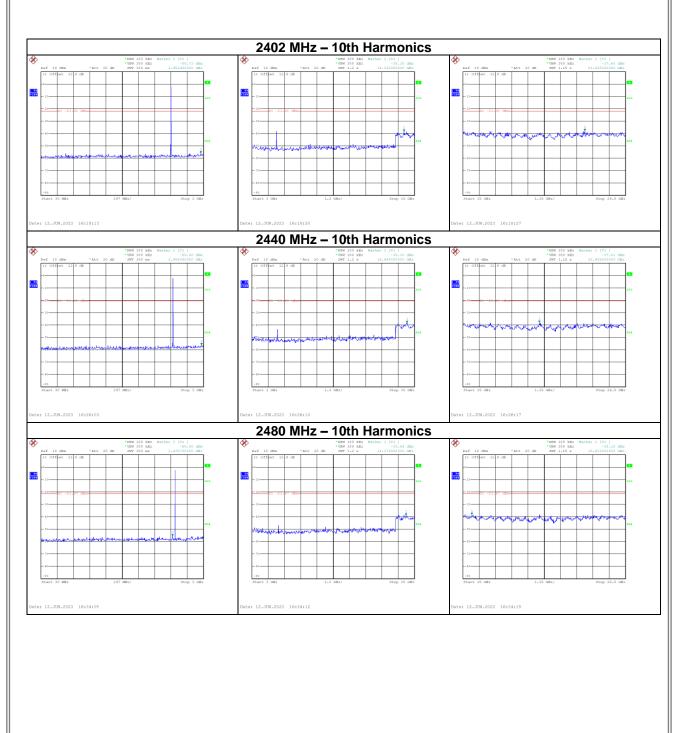


## APPENDIX G ANTENNA CONDUCTED SPURIOUS EMISSION

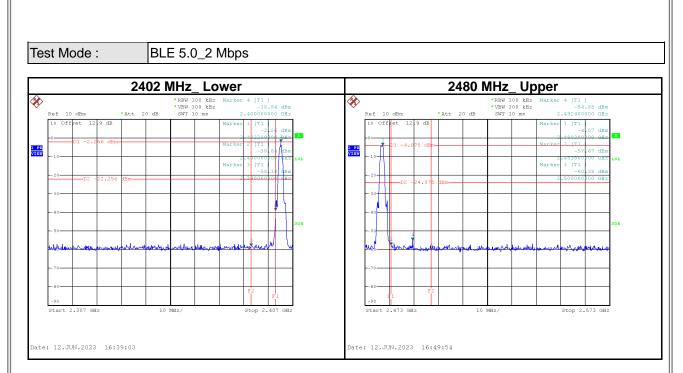




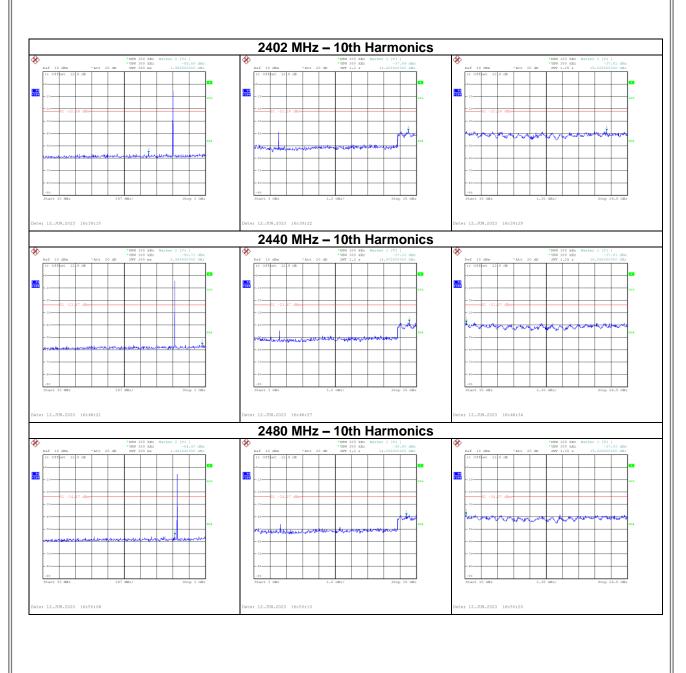












End of Test Report