

RF TEST REPORT

FCC ID: 2AJYL-AB23

Product Name	:	AIRBOLT CELLULAR GPS
Brand Name	:	AIRBOLT
Test Model	:	ABGPS-23
Series Model	:	N/A
Applicant	:	AirBolt Pty Ltd
Address	:	PO Box 192,Bulleen,Victoria,Australia 3105
Manufacturer	:	BOTERLAN TECHNOLOGY CO., LIMITED
Address	:	4F,Buliding B2,Guangshen high and new science and technology park
		Youmagang,Jiangshi,Gongming,Guangming new zone,Shenzhen,
		Guangdong,China
Date of Receipt	:	2022.12.27
Date of Test	:	2022.12.27-2023.01.06
Issued Date	:	2023.01.06
Report Version	:	V1.0
Test Sample	:	Engineering Sample No.: AIT22122704-1
Standard(s)	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
		Lab:Dongguan Yaxu (AiT) Technology Limited Add:No.22,Jinqianling 3rd Street,Jitigang,Huangjiang,Dongguan, Guangdong,China
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		above has been tested by Dongguan Yaxu (AiT) Technology Limited and the
		the equipment under test (EUT) is in compliance with the FCC requirements.
		y to the tested sample identified in the report.

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Approved by:

Seal Chen



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Revision History

Revision	Issue Date	Revisions	Revised By
V1.0	2023.01.06	Initial Issue	Seal Chen



1 .Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	§15.203	Pass
On Time and Duty Cycle	1	/
Maximum Conducted Peak Output Power	§15.247 (b)(3)	Pass
Power Spectral Density	§15.247 (e)	Pass
6dB Bandwidth	§15.247 (a)(2)	Pass
Radiated Spurious Emissions	§15.205/15.209	PASS
Emissions at Restricted Band	§15.205/15.209	Pass
Conducted Spurious Emissions and Band Edges Emissions	§15.205, §15.247(d)	Pass
AC Mains Conducted Emissions	§ 15.207(a)	Pass

Note

- 1. Test according to ANSI C63.10:2013.
- 2. The measurement uncertainty is not included in the test result.
- 3. Test results in other test report (RF Exposure Evaluation Report)

1.1 Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 - 4 "Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements" and is documented in the AiT quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

1.2 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes		
Radiated Emission	0.009MHz-30MHz	3.10dB	(1)		
Radiated Emission	30MHz-1GHz	3.75dB	(1)		
Radiated Emission	1GHz-18GHz	3.88dB	(1)		
Radiated Emission	18GHz-40GHz	3.88dB	(1)		
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	1.20dB	(1)		
Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.					



2 .Test Facility

Company:	Dongguan Yaxu (AiT) Technology Limited
Address:	No.22, Jinqianling 3rd Street, Jitigang, Huangjiang,Dongguan,
Address.	Guangdong, China
CNAS Registration Number:	CNAS L6177
A2LA Registration Number:	6317.01
FCC Accredited Lab. Designation Number:	CN1313
FCC Test Firm Registration Number:	703111

2.1 Deviation from standard

None

2.2 Abnormalities from standard conditions

None



3 .General Information

EUT Name:	AIRBOLT CELLULAR GPS
Model No:	ABGPS-23
Serial Model:	N/A
Serial No.:	N/A
Operation frequency:	2402MHz-2480MHz
Channel Number:	40 channels
Modulation Technology:	GFSK
Antenna Type:	Ceram antenna
Antenna gain:	1.5 dBi
Hardware version.:	N/A
Software version.:	N/A
Power supply:	DC 3.7V 400mAh
Note:	For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



3.1 Test frequencies

EUT channels and frequencies list:

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

3.2 EUT Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

3.3 Test Peripheral List

No.	Equipment	Manufacturer	EMC Compliance	Model No.	Serial No.	Power cord	Signal cord
1	Adapter	NOKIA	CE	AD-10W U	N/A	N/A	N/A



3.4 TEST METHODOLOGY

All measurements contained in this report were conducted with ANSI C63.10-2013, American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

The radiated testing was performed at an antenna-to-EUT distance of 3 meters. All radiated and conducted emissions measurement was performed at Dongguan Yaxu (AiT) Technology Limit.

EUT Configuration

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

EUT Exercise

The EUT was operated in the normal operating mode for Hopping Numbers and Dwell Time test and a continuous transmits mode for other tests.

According to its specifications, the EUT must comply with the requirements of the Section 15.203, 15.205, 15.207, 15.209, 15.247 under the FCC Rules Part 15 Subpart C, ANSI C63.10-2013.

General Test Procedures

Conducted Emissions

The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 6.2.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using Quasi-peak and average detector modes.

Radiated Emissions

The EUT is placed on a turn table, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 6.3 of ANSI C63.10-2013.



3.5 Description of Test Modes

The EUT has been tested under operating condition.

AC main conducted emission pre-test voltage at both AC 120V/60Hz and AC 240V/50Hz, recorded worst case;

AC main conducted emission pre-test at charge from power adapter modes, recorded worst case;

Worst-case mode and channel used for 150 KHz-30 MHz power line conducted emissions was the mode and channel with the highest output power that was determined to be TX (1Mbps).

Worst-case mode and channel used for 9 KHz-1000 MHz radiated emissions was the mode and channel with the highest output power, that was determined to be TX(3Mbps-Low Channel).

This test was performed with EUT in X, Y, Z position and the worst case was found when EUT in X position.

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Transmitting mode	Keep the EUT in continuously transmitting mode.				
Test software:	EMI_Test_Tool				
Frequency	2402 MHz	2440 MHz	2480 MHz		
Parameters(1Mbps)	Default Default Default				
Parameters(2Mbps)	Default	Default	Default		



4 .Equipment Used during Test

No	Test Equipment	Manufacturer	Model No	Serial No	Cal. Date	Cal. Due Date
1	Spectrum Analyzer	R&S	FSV40	101470	2022.09.02	2023.09.01
2	EMI Measuring Receiver	R&S	ESR	101660	2022.09.02	2023.09.01
3	Low Noise Pre Amplifier	HP	HP8447E	1937A0185 5	2022.09.02	2023.09.01
4	Low Noise Pre Amplifier	Tsj	MLA-0120-A0 2-34	2648A0473 8	2022.09.02	2023.09.01
5	Passive Loop	ETS	6512	00165355	2022.09.03	2024.09.02
6	TRILOG Super Broadband test Antenna	SCHWARZBE CK	VULB9160	9160-3206	2021.08.29	2024.08.28
7	Broadband Horn Antenna	SCHWARZBE CK	BBHA9120D	452	2021.08.29	2024.08.28
8	SHF-EHF Horn Antenna 15-40GHz	SCHWARZBE CK	BBHA9170	BBHA9170 367d	2020.11.24	2023.11.23
9	EMI Test Receiver	R&S	ESCI	100124	2022.09.02	2023.09.01
10	LISN	Kyoritsu	KNW-242	8-837-4	2022.09.02	2023.09.01
11	LISN	R&S	ESH3-Z2	0357.8810.54 101161-S2	2022.09.02	2023.09.01
12	Pro.Temp&Humi.cham ber	MENTEK	MHP-150-1C	MAA081125 01	2022.09.02	2023.09.01
13	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
14	Signal Generator	Agilent	N5182A	MY5014300 9	2022.09.02	2023.09.01
15	Wideband Radio communication tester	R&S	CMW500	1201.0002K 50	2022.09.02	2023.09.01
16	RF Automatic Test system	MW	MW100-RFCB	21033016	2022.09.02	2023.09.01
17	DC power supply	ZHAOXIN	RXN-305D-2	280700025 59	N/A	N/A
18	RE Software	EZ	EZ-EMC_RE	Ver.AIT-03A	N/A	N/A
19	CE Software	EZ	EZ-EMC_CE	Ver.AIT-03A	N/A	N/A
20	RF Software	MW	MTS 8310	2.0.0.0	N/A	N/A
21	temporary antenna connector(Note)	NTS	R001	N/A	N/A	N/A
Note	: The temporary antenna c temporary antenna conne			ard in order to p	erform conducte	ed tests and this



5 .EN300 328Test Requirements

5.1 Antenna requirement

6.1.1 Standard reqSuirement:

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

And according to §15.247(4)(1), system operating in the 2400-2483.5MHz bands that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.

6.1.2 EUT Antenna:

The antenna is PCB antenna, the best case gain of the antenna is 1.5 dBi reference to the Internal photos for details



5.2 On Time and Duty Cycle

6.2.1 Standard requirement:

None; for reporting purpose only

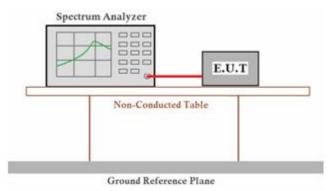
6.2.2 Measuring Instruments and Setting:

Please refer to equipments list in this report. The following table is the setting of the spectrum analyser.

6.2.3 Test Procedures

- 1. Set the centre frequency of the spectrum analyser to the transmitting frequency;
- 2. Set the span=0MHz, RBW=8MHz, VBW=50MHz, Sweep time=20.27ms;
- 3. Detector = peak;
- 4. Trace mode = Single hold

6.2.4 Test Setup Layout



6.2.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.2.6 Test result

For reporting purpose only.

Please refer to Appendix A



5.3 Maximum Conducted Output Peak Power Measurement

6.3.1 Standard requirement:

According to §15.247(b): For systems using digital modulation in the 2400-2483.5 MHz and 5725-5850 MHz band, the limit for maximum peak conducted output power is 30dBm. The limited has to be reduced by the amount in dB that the gain of the antenna exceeds 6dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

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

6.3.2 Measuring Instruments:

Please refer to equipment's list in this report.

6.3.3 Test Procedures:

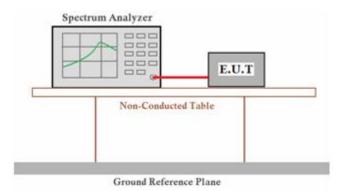
The transmitter output (antenna port) was connected to the spectrum analyzer.

According to KDB558074 D01 DTS Measurement Guidance Section 9.1 Maximum peak conducted output power 9.1.1.

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

- a) Set the RBW \geq DTS bandwidth.
- b) Set VBW \ge 3 × RBW. Set span \ge 3 x RBW.
- c) Sweep time = auto couple.
- d) Detector = peak.
- e) Trace mode = max hold.
- f) Allow trace to fully stabilize.
- g) Use peak marker function to determine the peak amplitude level.

6.3.4 Test Setup Layout



6.3.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



6.3.6 Test result

Pass

Please refer to Appendix B

Remark: 1) Test results including cable loss.



5.4 6 dB Spectrum Bandwidth Measurement

6.4.1 Standard requirement:

FCC Part15 C Section 15.247 (a)(2):

DTSs include systems that employ digital modulation techniques resulting in spectral characteristics similar to direct sequence systems. The following applies to the bands 902-928 MHz and 2400-2483.5 MHz:

a). The minimum 6 dB bandwidth shall be 500 kHz.

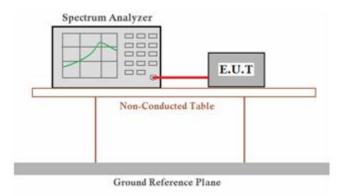
6.4.2 Measuring Instruments:

Please refer to equipment's list in this report.

6.4.3 Test Procedures

- 1. The transmitter output (antenna port) was connected to the spectrum analyzer in peak hold mode.
- 2. Set RBW/VBW = 100 KHz/300KHz.
- 3. Measured the 6dB bandwidth by related function of the spectrum analyzer.

6.4.4 Test Setup Layout



6.4.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.4.6 Test result

PASS

Please refer to Appendix C

Remark:

1). Measured 6dB Bandwidth at difference data rate for each mode and recorded worst case for each mode.

2). Test results including cable loss;



5.5 Power Spectral Density

6.5.1 Standard requirement:

According to §15.247(e): For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

6.5.2 Measuring Instruments and Setting:

Please refer to equipment's list in this report.

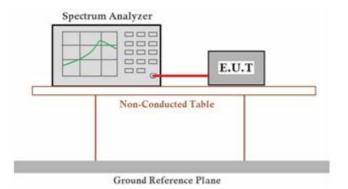
6.5.3 Test Procedures

1. Use this procedure when the maximum peak conducted output power in the fundamental emission is used to demonstrate compliance.

2. The power was monitored at the coupler port with a Spectrum Analyzer. The power level was set to the maximum level.

- 3. Set the RBW = 3 kHz.
- 4. Set the VBW \geq 3*RBW
- 5. Set the span to 1.5 times the DTS channel bandwidth.
- 6. Detector = peak.
- 7. Sweep time = auto couple.
- 8. Trace mode = max hold.
- 9. Allow trace to fully stabilize.
- 10. Use the peak marker function to determine the maximum power level.
- 11. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.
- 12. The resulting peak PSD level must be 8 dBm.

6.5.4 Test Setup Layout



6.5.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



6.5.6 Test result

PASS

Please refer to Appendix D

Remark: 1). Test results including cable loss;



5.6 Conducted Spurious Emissions and Band Edges Test

6.6.1 Standard requirement:

According to §15.247 (d): In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.6.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of the spectrum analyzer.

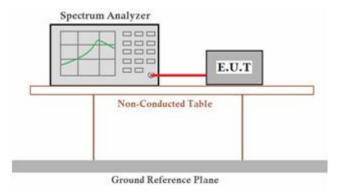
Spectrum Parameter	Setting
Detector	Peak
Attenuation	Auto
RB / VB (Emission in restricted band)	100KHz/300KHz
RB / VB (Emission in non-restricted band)	100KHz/300KHz

6.6.3 Test Procedures

The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz

The spectrum from 9 kHz to 26.5GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

6.6.4 Test Setup Layout



6.6.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.



6.6.6 Test result

PASS

Please refer to Appendix E for conducted spurious emissions;

Please refer to Appendix F for conducted band edge emission.

Remark:

1). Test results including cable loss;

2).. Not recorded emission from 9 KHz to 30 MHz as emission level at least 20dBc lower than emission limit.



5.7 Restrict-band Band-edge Measurements

6.7.1 Standard requirement:

According to §15.247(d)/§15.209/ §15.205 or RSS-247§5.5/RSS-Gen

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator 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 the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.205(c)).

6.7.2 Measuring Instruments and Setting:

Please refer to equipment list in this report.

6.7.3 Test Procedures

According to KDB 558074 D01 for Antenna-port conducted measurement. Antenna-port conducted measurements may also be used as an alternative to radiated measurements for demonstrating compliance in the restricted frequency bands. If conducted measurements are performed, then proper impedance matching must be ensured and an additional radiated test for cabinet/case spurious emissions is required.

1). Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

2). Remove the antenna from the EUT and then connect to a low loss RF cable from the antenna port to an EMI test receiver, then turn on the EUT and make it operate in transmitting mode. Then set it to Low Channel and High Channel within its operating range, and make sure the instrument is operated in its linear range.

3). Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge, for Radiated emissions restricted band RBW=1MHz, VBW=3MHz for peak detector and RBW=1MHz, VBW=1/B for AV detector.

4). Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

5). Repeat above procedures until all measured frequencies were complete.

6). Measure the conducted output power (in dBm) using the detector specified by the appropriate regulatory agency (see 12.2.2, 12.2.3, and 12.2.4 for guidance regarding measurement procedures for determining quasi-peak, peak, and average conducted output power, respectively).

7). Add the maximum transmit antenna gain (in dBi) to the measured output power level to determine the EIRP level (see 12.2.5 for guidance on determining the applicable antenna gain)

8). Add the appropriate maximum ground reflection factor to the EIRP level (6 dB for frequencies \leq 30 MHz, 4.7 dB for frequencies between 30 MHz and 1000 MHz, inclusive and 0 dB for frequencies > 1000 MHz).

9). For devices with multiple antenna-ports, measure the power of each individual chain and sum the EIRP of all chains in linear terms (e.g., Watts, mW).



10). Convert the resultant EIRP level to an equivalent electric field strength using the following relationship:

E = EIRP - 20log D + 104.77=EIRP+95.23

Where:

E = electric field strength in $dB\mu V/m$,

EIRP = equivalent isotropic radiated power in dBm

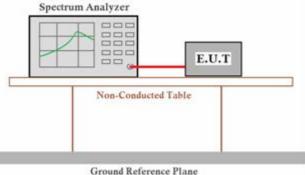
D = specified measurement distance in meters.

11). Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.

12). Compare the resultant electric field strength level to the applicable regulatory limit.

13). Perform radiated spurious emission test duress until all measured frequencies were complete.

6.7.4 Test Setup Layout



Crosse reserver in

6.7.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.7.6 Test result

PASS

Please refer to Appendix G Remark:

Remark:

1). Test results including cable loss;

2). "---"means that the fundamental frequency not for 15.209 limits requirement;

3). The average measurement was not performed when the peak measured data under the limit of average detection.

4). Detector AV is setting spectrum/receiver. RBW=1MHz/VBW=10Hz/Sweep time=Auto/Detector

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=Peak.

5). Since the out-of-band characteristics of the EUT transmit antenna will often be unknown, the use of a conservative antenna gain value is necessary. Thus, when determining the EIRP based on the measured conducted power, the upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands, or 2 dBi, whichever is greater. However, for devices that operate in multiple frequency bands while using the same transmit antenna, the highest gain of the antenna within the operating band nearest in frequency to the restricted band emission being measured may be used in lieu of the overall highest gain when the emission is at a frequency that is within 20 percent of the nearest band edge frequency, but in no case shall a value less than 2 dBi be used.



5.8 Radiated Emissions Measurement

6.8.1 Standard requirement:

According to §15.247 (d): 20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies	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
Above 960	500	3

6.8.2 Measuring Instruments and Setting:

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP



6.8.3 Test Procedures

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions.
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna height is 1.5 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the premeasurement the software maximizes by rotating the turntable position (0° to 360°) and by rotating the elevation axes (0° to 360°).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QPK detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.



2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height changes from 1 to 3 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.



3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 3 meter.
- --- The EUT was set into operation.

Premeasurement:

- --- The turntable rotates from 0° to 315° using 45° steps.
- --- The antenna is polarized vertical and horizontal.
- --- The antenna height scan range is 1 meter to 2.5 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable position (± 45°) and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.



Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

- --- Auxiliary equipment and cables were positioned to simulate normal operation conditions
- --- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.
- --- The measurement distance is 1 meter.
- --- The EUT was set into operation.

Premeasurement:

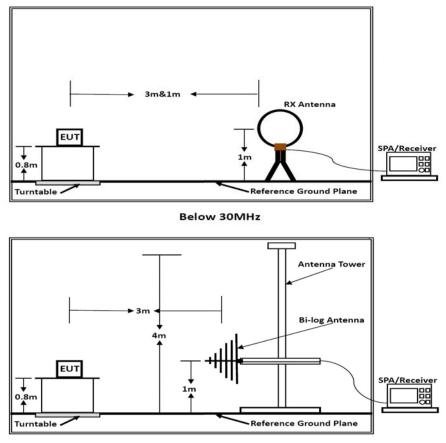
--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the premeasurements with Peak and Average detector.

--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement and the limit will be stored.

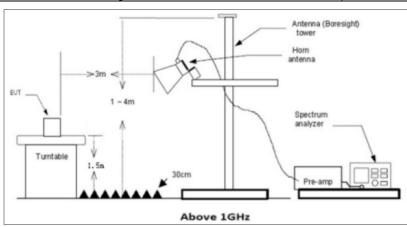
6.8.4 Test Setup Layout



Below 1GHz



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Above 18 GHz shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade form 3m to 1m.

Distance extrapolation factor = 20 log (specific distance [3m] / test distance [1m]) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor [6 dB].

6.8.5 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.8.6 Test result

Temperature	26.2 ℃	Humidity	52.1%
Test Engineer	Simba Huang	Configurations	BLE

Remarks:

- 1. Only the worst case Main Antenna test data.
- 2. Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis which it is worse case.
- Results of Radiated Emissions (9 KHz~30MHz)

Freq.	Level	Over Limit	Over Limit	Remark
(MHz)	(dBuV)	(dB)	(dBuV)	
-	-	-	-	See Note

Note:

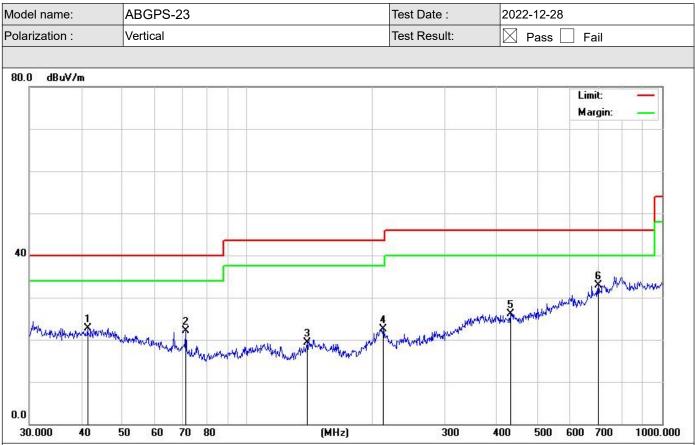
The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB); Limit line = specific limits (dBuV) + distance extrapolation factor.



Results of Radiated Emissions (30MHz~1GHz)

Pre-scan all test modes, found worst case at GFSK (LCH), and so only show the test result of GFSK (LCH).

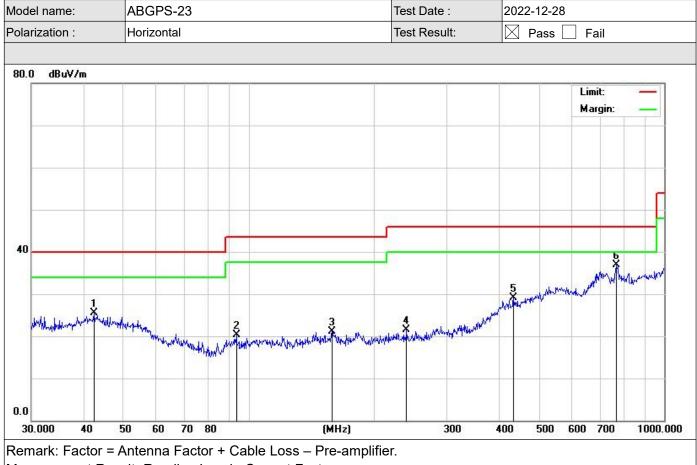


Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Measurement Result=Reading Level +Correct Factor; Over Limit= Measurement Result- Limit;

No.	Mk.	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		41.4215	27.12	-4.34	22.78	40.00	-17.22	QP
2		71.3300	32.50	-10.46	22.04	40.00	-17.96	QP
3		139.8508	26.94	-7.71	19.23	43.50	-24.27	QP
4		213.0151	27.27	-4.82	22.45	43.50	-21.05	QP
5		431.0316	27.36	-1.17	26.19	46.00	-19.81	QP
6	*	701.7610	29.72	3.27	32.99	46.00	-13.01	QP



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Measurement Result=Reading Level +Correct Factor; Over Limit= Measurement Result- Limit;

No.	Mk	. Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		42.4508	27.42	-1.97	25.45	40.00	-14.55	QP
2		93.4402	28.94	-8.57	20.37	43.50	-23.13	QP
3		158.6677	27.80	-6.68	21.12	43.50	-22.38	QP
4		239.9874	28.33	-6.78	21.55	46.00	-24.45	QP
5		434.0651	27.67	1.46	29.13	46.00	-16.87	QP
6	*	768.7481	30.55	6.39	36.94	46.00	-9.06	QP



Results for Radiated Emissions (1- 26 GHz)

Test channel:	Lowest channel
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Н

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804.000	47.08	5.06	52.14	74.00	-21.86	PEAK
4804.000	35.55	5.06	40.61	54.00	-13.39	AVG
7206.000	43.01	7.03	50.04	74.00	-23.96	PEAK
7206.000	30.64	7.03	37.67	54.00	-16.33	AVG

V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4804.000	45.91	5.06	50.97	74.00	-23.03	PEAK
4804.000	35.43	5.06	40.49	54.00	-13.51	AVG
7206.000	40.43	7.03	47.46	74.00	-26.54	PEAK
7206.000	31.69	7.03	38.72	54.00	-15.28	AVG

Test channel:	Middle channel
---------------	----------------

H						
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Turpe
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4880.000	47.49	5.14	52.63	74.00	-21.37	PEAK
4880.000	35.04	5.14	40.18	54.00	-13.82	AVG
7320.000	41.51	7.52	49.03	74.00	-24.97	PEAK
7320.000	31.45	7.52	38.97	54.00	-15.03	AVG

V

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4880.000	43.87	5.14	49.01	74.00	-24.99	PEAK
4880.000	36.08	5.14	41.22	54.00	-12.78	AVG
7320.000	39.87	7.52	47.39	74.00	-26.61	PEAK
7320.000	31.76	7.52	39.28	54.00	-14.72	AVG

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Test channel:

Highest channel

Н						
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Turce
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960.000	46.66	5.22	51.88	74.00	-22.12	PEAK
4960.000	34.36	5.22	39.58	54.00	-14.42	AVG
7440.000	39.60	8.06	47.66	74.00	-26.34	PEAK
7440.000	30.36	8.06	38.42	54.00	-15.58	AVG
V						
Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
(MHz)	(dBµV)	(dB/m)	(dBµV/m)	(dBµV/m)	(dB)	Detector Type
4960.000	45.76	5.22	50.98	74.00	-23.02	PEAK
4960.000	34.83	5.22	40.05	54.00	-13.95	AVG
7440.000	38.90	8.06	46.96	74.00	-27.04	PEAK
7440.000	30.74	8.06	38.80	54.00	-15.20	AVG

Remarks:

1). Measuring frequencies from 9 KHz - 10th harmonic or 26.5GHz (which is less), No emission found between lowest internal used/generated frequency to 30MHz.

2). Radiated emissions measured in frequency range from 9 KHz~10th harmonic or 26.5GHz (which is less) were made with an instrument using Peak detector mode.

3). Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

4). Margin= Final Level – Limit

5).Final Level =Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor

6). All the modes have been tested and the only shows the worst case GFSK mode



5.9 Conducted Emissions

6.9.1 Standard requirement:

According to §15.207 (a): For an intentional radiator which is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range is listed as follows:

Frequency Range	Limits (dE	βμV)
(MHz)	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

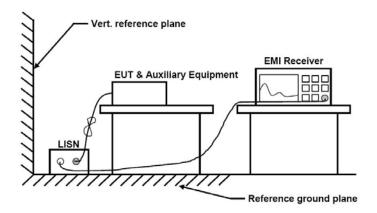
* Decreasing linearly with the logarithm of the frequency

6.9.2 Test Procedures

The transmitter output is connected to EMI receiver. The resolution bandwidth is set to 9 kHz. The video bandwidth is set to 30 kHz, Sweep time=Auto

The spectrum from 150 kHz to 30MHz is investigated with the transmitter set to the lowest, middle, and highest channels.

6.9.3 Test Setup Layout



6.9.4 EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

6.9.5 Test result

PASS

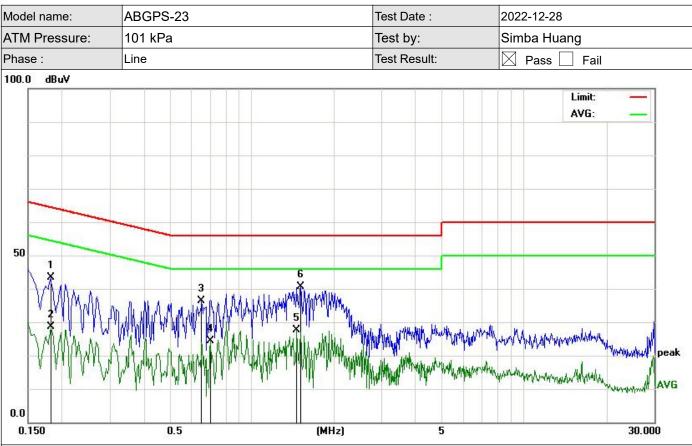
The test data please refer to following page.

Temperature	26.2 ℃	Humidity	52.1%
Test Engineer	Simba Huang	Configurations	BLE



Measurement data:

Pre-scan all test modes, found worst case at GFSK 2480MHz, and so only show the test result of GFSK 2480MHz

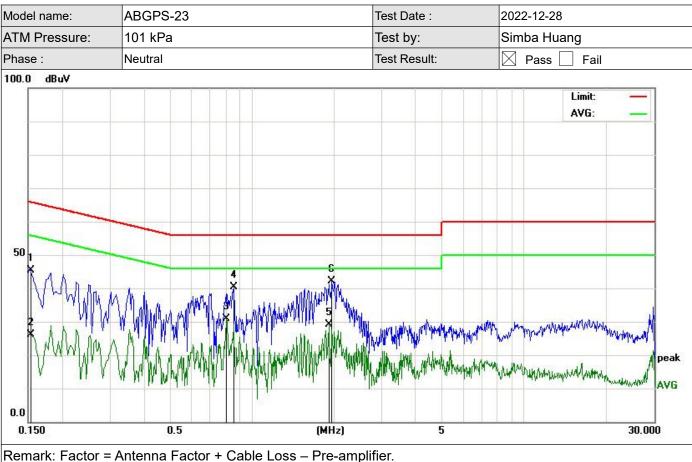


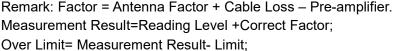
Remark: Factor = Antenna Factor + Cable Loss – Pre-amplifier. Measurement Result=Reading Level +Correct Factor; Over Limit= Measurement Result- Limit;

No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0.1819	32.02	11.36	43.38	64.39	-21.01	QP
2	0.1819	17.34	11.36	28.70	54.39	-25.69	AVG
3	0.6540	26.48	9.95	36.43	56.00	-19.57	QP
4	0.7019	14.44	9.94	24.38	46.00	-21.62	AVG
5	1.4620	17.58	9.93	27.51	46.00	-18.49	AVG
6 *	1.5060	30.60	9.93	40.53	56.00	-15.47	QP



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No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over	
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1	0.1539	33.52	<mark>11.84</mark>	45.36	65.78	-20. <mark>4</mark> 2	QP
2	0.1539	14.24	11.84	26.08	55.78	-29. <mark>70</mark>	AVG
3	0.8059	21.01	9.92	30.93	46.00	-15.07	AVG
4	0.8540	30. <mark>4</mark> 5	9.91	40.36	56.00	-15.64	QP
5	1.9140	19.05	9.96	29.01	46.00	-16.99	AVG
6 *	1.9620	32.06	9.96	42.02	56.00	-13.98	QP

Notes:

- 1. An initial pre-scan was performed on the line and neutral lines with peak detector.
- 2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
- 3. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

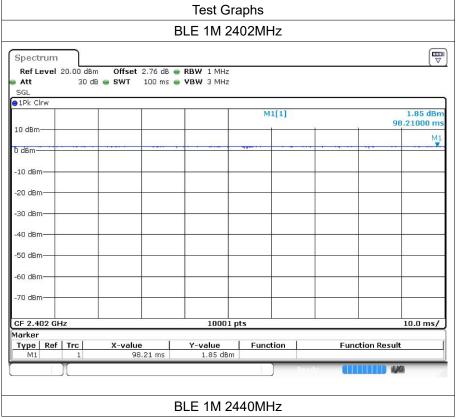
6 .Appendix test data

Appendix A. On Time and Duty Cycle

Test Result

Mode	Frequency (MHz)	Duty Cycle (%)	1/T (kHz)
BLE 1M	2402	100	0.01
BLE 1M	2440	100	0.01
BLE 1M	2480	100	0.01
BLE 2M	2402	100	0.01
BLE 2M	2440	100	0.01
BLE 2M	2480	100	0.01

Test Graphs





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Spectrum					7
Ref Level 20.00 dB	m Offset 2.80 dB (BRBW 1 MHz			
	IB 画 SWT 🛛 100 ms 🤅	VBW 3 MHz			
SGL					
1Pk Clrw					
			M1[1]	51 TR	1.70 dBr 98.55000 m
LO dBm					M
) dBm-					
10 dBm					
20 dBm					
30 dBm					
40 dBm					
50 dBm					
60 dBm					
70 dBm					
CF 2.44 GHz	×		ts		10.0 ms/
larker	X-value	V	E	E	Descult
Type Ref Trc M1 1	98.55 ms	Y-value 1.70 dBm	Function	Function	Result
1				eady.	100

Spectrum Ref Level 20.00 dBr	n Offset 2.81 dB 🖷				
		VBW 3 MHz			
1Pk Clrw			M1[1]		2.01 dBr
l0 dBm				M1	75.53000 m
) dBm				Y	
10 dBm					
20 dBm					
30 dBm					
40 dBm					
50 dBm					
60 dBm					
70 dBm		-		a	
CF 2.48 GHz		10001 pts			10.0 ms/
larker Type Ref Trc M1 1	X-value 75.53 ms	Y-value 2.01 dBm	Function	Function	Result
			Real	· • • • • • • • • • • • • • • • • • • •	1) A)A



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Spectrum									
Ref Level	20.00 dB	m Offset	2.76 dB 🧉	RBW 1 MHz					
Att	30 d	B 👄 SWT	100 ms 🧉	VBW 3 MHz					
SGL									
1Pk Clrw									
					M1[1]			1.57 dB
LO dBm							3	3:	2.54000 m
LO GOIN			M1						
) dBm						19			
10 dBm		-		+ +					
				1 1					
20 dBm				-					
				1 1					
30 dBm							2		
40 dBm									
40 UBIII									
50 dBm				-					-
				1 1					
60 dBm									
1000000000000				1 1					
70 dBm			-	+ +			-		
				1 1					
CF 2.402 GH	Iz		<u>.</u>	10001	pts				10.0 ms/
larker									
Type Ref		X-valu		Y-value	Function	n	Fund	ction Resul	t
M1	1	3:	2.54 ms	1.57 dBm					
	Π					Ready			0

Spectrum Ref Level 20.00 dBm Offset Att 30 dB SWT SGL 1PK Cirw	2.80 dB 👄 RBW 1 MH 100 ms 👄 VBW 3 MH			♥
Att 30 dB SWT				<u> </u>
SGL	100 ms 🖶 YBW 3 MP	12		
1Pk Clrw				
		M1[1]	1.41 (ID
10 - 10		with	25.05000	
10 dBm				
0'dBm				-
-10 dBm				
-20 dBm				
-30 dBm				
-40 dBm				
-50 dBm				
-60 dBm				
-70 dBm				
CF 2.44 GHz	1000	D1 pts	10.0 m	15/
Marker				_
Type Ref Trc X-value M1 1 25	e Y-value 5.05 ms 1.41 d	Bm Function	Function Result	
		Reads		
10000		12		
	BLE 2M	2480MHz		



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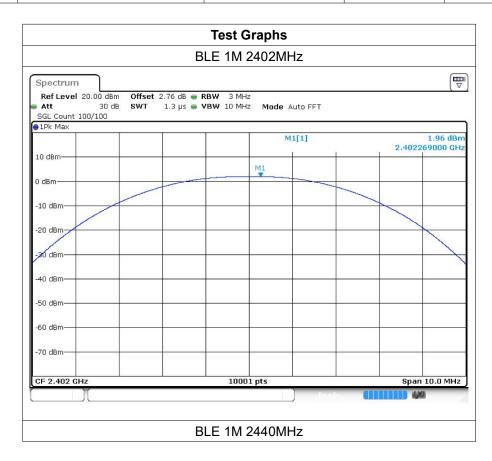
Spectrum Ref Level	20.00 dBm	Offset 2.81 dB	RBW 1 MHz			T (T
Att	30 dB		SMHz			
SGL						
1Pk Clrw						
				M1[1]		1.74 dBr 62.90000 m
LO dBm				M1		
) dBm			·····			
10 dBm						
20 dBm						
30 dBm						
40 dBm			_			
50 dBm						
60 dBm						
70 dBm						
CF 2.48 GH:	z		 10001 p	ts		10.0 ms/
larker						
Type Ref M1	Trc 1	X-value 62.9 ms	Y-value 1.74 dBm	Function	Func	tion Result
	<u>۱</u>				eady 📶	430



Test Result

Appendix B. Maximum Conducted Output Peak Power Measurement

Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
BLE 1M	2402	1.96	30	Pass
BLE 1M	2440	1.81	30	Pass
BLE 1M	2480	2.11	30	Pass
BLE 2M	2402	1.93	30	Pass
BLE 2M	2440	1.8	30	Pass
BLE 2M	2480	2.1	30	Pass

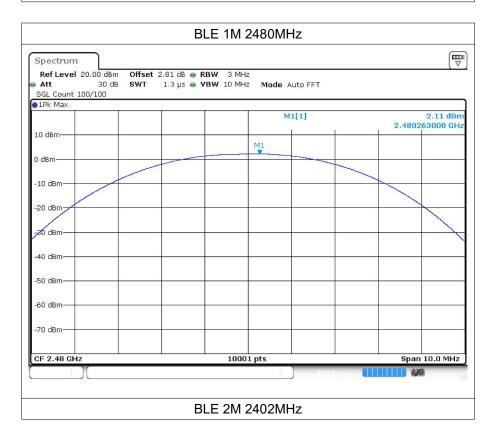


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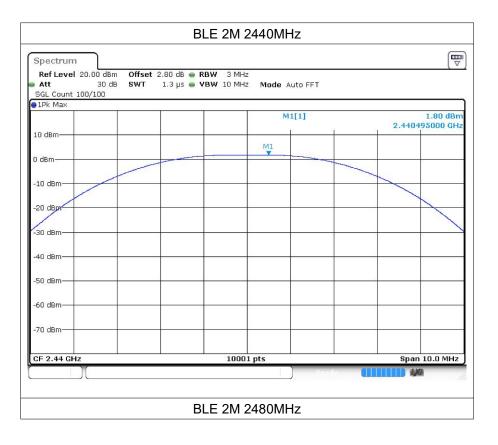
Ref Level 20.00 di Att 30 SGL Count 100/100		2.80 dB 👄 R 1.3 µs 👄 V	BW 3 MHz BW 10 MHz		Auto FFT		
1Pk Max							
				N	11[1]	 2.4402	1.81 dB 80000 GF
10 dBm				M1			
0 dBm				V V			
10 dBm		-					
20 dBm							
30 dBm	1				2		
-40 dBm							
-50 dBm							
So abiii							
-60 dBm				0			
-70 dBm							
CF 2.44 GHz			1000	L pts		Span	10.0 MH
T I					Read		_





Page 43 of 68

Ref Level 20.00 dBr Att 30 d SGL Count 100/100	2.76 dB 👄 F 1.3 µs 👄 V	KBW 3 MHz VBW 10 MHz	Mode A	uto FFT			(.
91Pk Max			м	1[1]		2.4024	1.93 dBr 197000 GH
10 dBm			M1				
0 dBm							
-10 dBm							
-20 dBm							
-30 dBm							
-40 dBm							
-50 dBm							
-60 dBm							
-70 dBm							
CF 2.402 GHz		10001	pts			Span	10.0 MHz
			1) Rea	4y 🗰		0





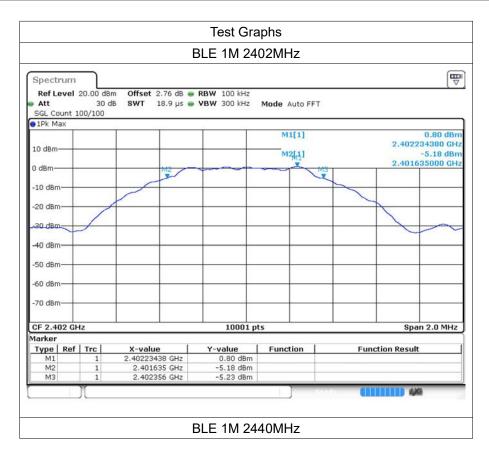
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	● RBW 3 MHz ● VBW 10 MHz Mode Auto FFT	7
)1Pk Max		
	M1[1]	2.10 dBr 2.480489000 GH
LO dBm	M1	
) dBm		
10 dBm		
10 dBm		
20 dBm		
30 dBm		
00.405.204		
40 dBm		
50 dBm		
60 dBm		
70 dBm		
CF 2.48 GHz	10001 pts	Span 10.0 MHz
Ĩ	Ready	4/4



Appendix C. 6 dB Spectrum Bandwidth Measurement

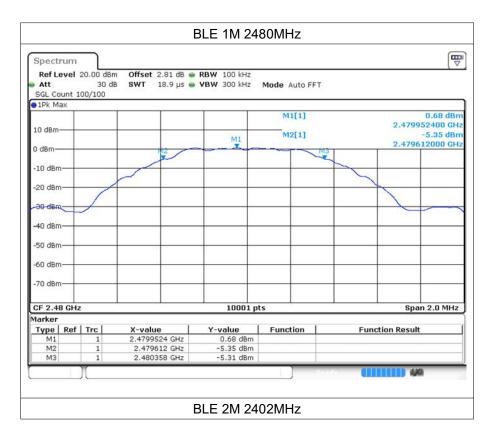
Test Res	ult			
Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
BLE 1M	2402	0.721	0.5	Pass
BLE 1M	2440	0.75	0.5	Pass
BLE 1M	2480	0.746	0.5	Pass
BLE 2M	2402	1.305	0.5	Pass
BLE 2M	2440	1.341	0.5	Pass
BLE 2M	2480	1.288	0.5	Pass





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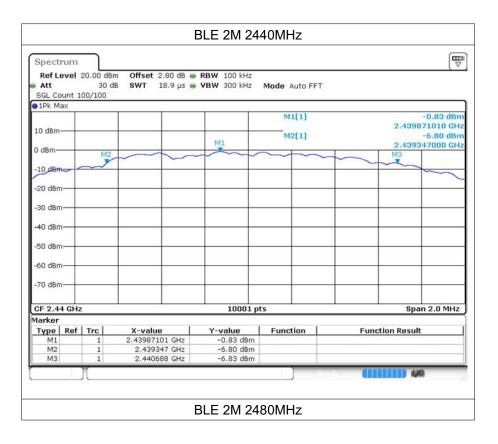
Ref Level Att SGL Count 1	30			RBW 100 kHz VBW 300 kHz	Mode Auto FF	т		
1Pk Max	00/100							
10 dBm					M1[1]		2.439753	.37 dB 020 GF .65 dB
0 dBm			M				2.439626	
J dBm-			MZ		- market	EIM		
-10 dBm		-		-				
-20 dBm		1				-		
2	/							
30 dBm	/		1					~
40 dBm						_		
50 dBm		_					2	
60 dBm								
ou ubiii								
70 dBm							_	
CF 2.44 GH	z	_		10001 p	ts		Span 2	.0 MHz
larker								
Type Ref	Trc	X-value	1	Y-value	Function	Fu	nction Result	
M1	1	2.4397530		0.37 dBm				
M2	1	2.43962		-5.65 dBm				
M3	1	2.44037	76 GHz	-5.63 dBm				





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Ref Level			BRBW 100 kHz			
SGL Count 1	30 d	B SWT 18.9 µs	VBW 300 kHz	Mode Auto FF	T	
1Pk Max	.00,200					
				M1[1]		-0.97 dBr
10 dBm						2.402026600 GH
10 dbm				M2[1]		-6.94 dBr
0 dBm			N.	11		2.401288000 GH
	M2				M	8
-10 dBm	1		-			
						1
-20 dBm						
-30 dBm						
-40 dBm						
40 UBIII						
-50 dBm						
-60 dBm		-				
-70 dBm			-			<u>.</u>
CF 2.402 GH	łz	200	10001	pts		Span 2.0 MHz
larker	~ ~			and a second		
Type Ref	Trc	X-value	Y-value	Function	Func	tion Result
M1	1	2.4020266 GHz	-0.97 dBm			
M2	1	2.401288 GHz	-6.94 dBn			
M3	1	2.402593 GHz	-6.96 dBm	1		
	1				Desider Color	





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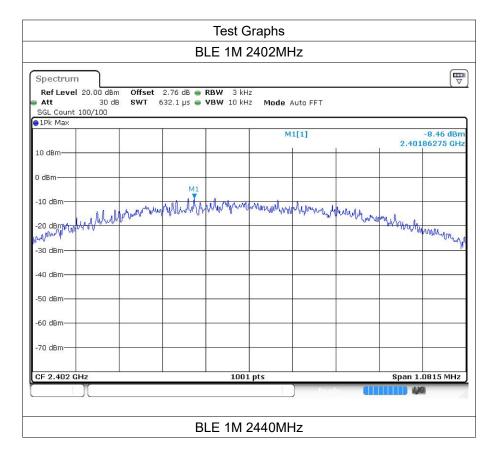
Ref Level Att	30		RBW 100 kHz VBW 300 kHz	Mode Auto FFT	ti.	
SGL Count 1 1Pk Max	.00/100					
				M1[1]		-0.15 dBr
10 dBm						2.480073190 GH
				M2[1]		-6.14 dBr
0 dBm	M2			-		2.479342000 GH
	Y					-
10 dBm			-			
						51
20 dBm						
30 dBm						
SU UBIII						
40 dBm						
-50 dBm			-			
-60 dBm			-			
-70 dBm						
CF 2.48 GH	2		10001 p	ts		Span 2.0 MHz
larker	(- I				-	
Type Ref M1	Trc 1	2.48007319 GHz	-0.15 dBm	Function	Func	tion Result
M1 M2	1	2.48007319 GHz	-0.15 dBm			
M3	1	2.48063 GHz	-6.11 dBm	5		
	27					



Appendix D. Power Spectral Density

Test Result

Mode	Frequency (MHz)	Conducted PSD (dBm/3-100kHz)	Limit (dBm/3kHz)	Verdict
BLE 1M	2402	-8.46	≤8	Pass
BLE 1M	2440	-9.29	≤8	Pass
BLE 1M	2480	-9.32	≤8	Pass
BLE 2M	2402	-10.58	≤8	Pass
BLE 2M	2440	-11.28	≤8	Pass
BLE 2M	2480	-11.64	≤8	Pass

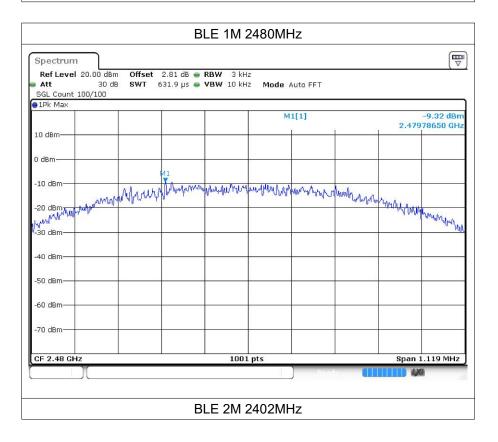


Dongguan Yaxu (AiT) Technology Limited No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan, Guangdong, China.



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Spectrum					
Ref Level 20.00 dB			a Auto FFT		
SGL Count 100/100		i i i i i i i i i i i i i i i i i i i			
1Pk Max	× 7	14. T			
			M1[1]	-9	9.29 dBr
10 dBm			 	2.77012	1030 GH
0 dBm					
JUBIN			M1		
-10 dBm		AND A LOW MAR MAR IN A			
al Mich of	MMMMMMM	the why has not on a low and	r v r vun grann	Warmanha	
-20 dBm				mortingen	and
-30 dBm					- Walth
200.000					
-40 dBm					
-50 dBm					
-60 dBm					
-oo dam					
-70 dBm					
CF 2.44 GHz		1001 pts		Span 1.1	125 MHz
Π (Ready		





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Spectrum Ref Level 20.00 dl	Bm Offset 2.76 dB	RBW 3 kHz		
Att 30		-	Auto FFT	
SGL Count 100/100	ub awi 032.1 µs	WIDW TO KHZ MIDUE		
1Pk Max				
		M	1[1]	-10.58 dBr
				2.40215645 GH
10 dBm				
0 dBm				
-10 dBm		M1		
	and the Mind	nadhadhangtangtangtangtan	a allowing a second	
20 dpm A the M	all the way way the way the	Chevely and a contract of the second second to the	and man parter and the state of the	Milliant a constant of
A MAY WAY MAY WHY			Court Creative	1 100 WWWWWW PARENT LINE
MY and a				a a south M
-30 dBm				8
2002/00/07/07/07				
-40 dBm				
-50 dBm				
-60 dBm				
-70 dBm				
CF 2.402 GHz		1001 pts		Span 1.9575 MHz
Y		2002 pro	Door la	

Cooturuss	ר						
Spectrum Ref Level 20.	00 dBm Offse	t 2,80 dB 👄	RBW 3 kHz				(V
Att	30 dB SWT		VBW 10 kHz	Mode Auto	FFT		
SGL Count 100/ 1Pk Max	100						
IPK Mdx				M1[1]	5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	-	11.28 dBn
				ĩ	ĵ.	2.439	65235 GH
10 dBm							
0 dBm							
-10 dBm		M1					
	14 MALANAMAN	prophylic and the prophylic an	Approved Attacker	And which the particular	here have been a		
-20 dBm	March of the state				hurning	What what has a second	And A second
-30 dBm	65					a ser outer	and salad the
-30 UBIII							3
-40 dBm						3	
-50 dBm							
-60 dBm							
-60 UBIII							
-70 dBm							
-70 dBm			1001	ots		Span 2.	0115 MHz
-70 dBm							
			1001		Ready		8



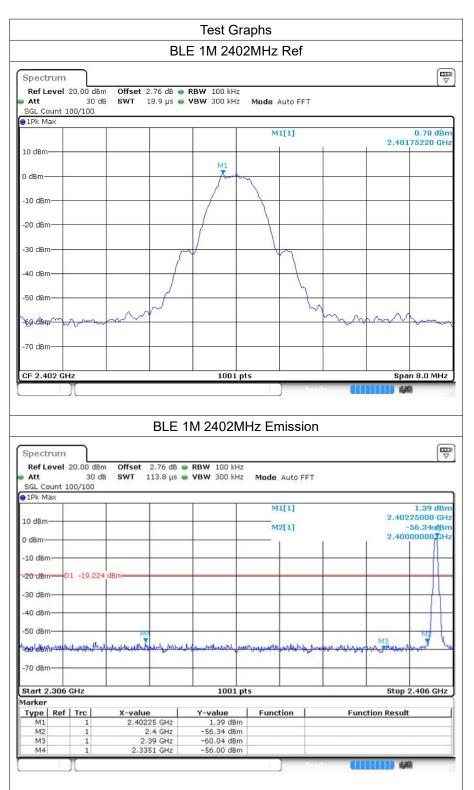
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Spectrum Ref Level 20.00 d	Bm Offset	2.81 dB 👄	RBW 3 kH	łz				7
Att 30	dB SWT 6	532.1 μs 🧉	VBW 10 kH	z Mode	Auto FFT			
SGL Count 100/100								
1Pk Max								
					M1[1]			-11.64 dBr 002320 GH
10 dBm					-	1	2,40	
0 dBm								
, abiii								
-10 dBm				М1				
10 dbm	and A and	A. M. A.M. A. L.	Just and All	human	and a set	St 1555		
an dam huller	MANNAMAN	lutral un harriva	d how on man is a	the allow of the	under services addition	4444 MAN MAN	Marsh	
20 dBm						1.	a rata Mar all	MAN AND AND
WWW 0								- will
-30 dBm								
-40 dBm								
-40 aBm								
Fo db-r								
-50 dBm								
50 JD-								
-60 dBm							22	
70.10-								
-70 dBm								
CF 2.48 GHz			100	1 pts			Snan	1.932 MHz
			100	- Pro			opan	1.902 (1112



Appendix E. Conducted Spurious Emissions and Band Edges Test

Test Result				
Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	2402	-56.78	-20	Pass
BLE 1M	2480	-57.82	-20	Pass
BLE 2M	2402	-55.71	-20	Pass
BLE 2M	2480	-56.12	-20	Pass

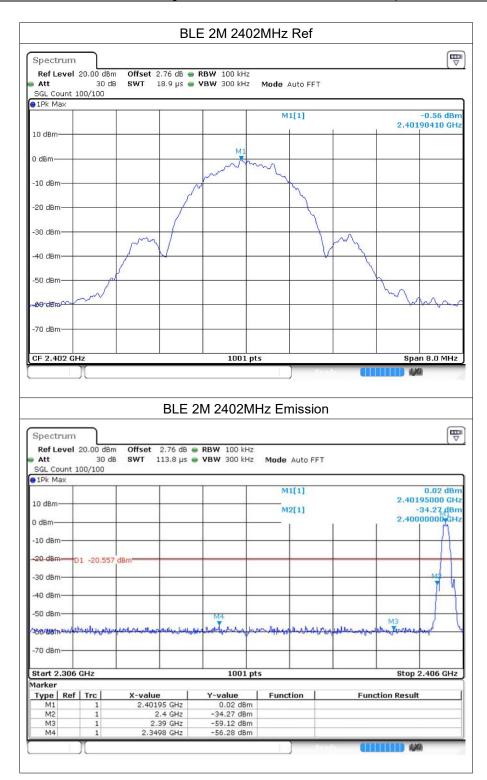


Dongguan Yaxu (AiT) Technology Limited No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan, Guangdong, China.

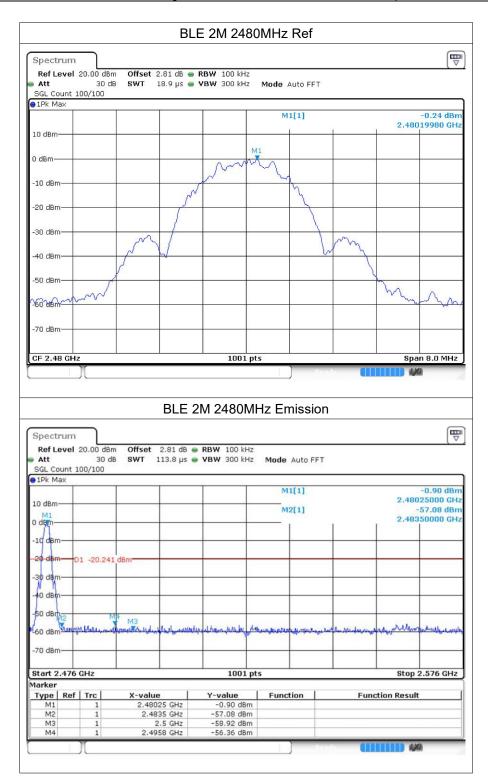


		BLE 1M 248	0MHz Ref			
ectrum						
tef Level 20.00	dBm Offset 2.81 di	B 🖷 RBW 100 kHz				
		s 👄 VBW 300 kHz	Mode Auto FFT			
GL Count 100/10 Pk Max	0					
PK Max			M1[1]		0	88 dBm
			wiftl		2.480008	
dBm						and the second
		M1				
IBm		- m	√_			
) dBm						
) dBm						
		1				
) dBm		N	Um.			
) dBm			X			
GBII	7	/				
) dBm			1			
0	m		1	2		
NdBm man				whym	mon	m
) dBm						
2.48 GHz		1001 p	ts		Span 8	.0 MHz
				adv 👘		
	BL	E 1M 2480M	Hz Emissio	n		
pectrum			~			
tt 20.00		dB 🥌 RBW 100 kHz µs 😁 VBW 300 kHz		•		
GL Count 100/10		15 - 1011 500 km2	Mode Adto PP1			
Pk Max	83 7.535	201 5.2				
			M1[1]			89 dBm
dBm			M2[1]		2.479750	06 dBm
iem-					2.483500	
n I					· · · · · · · · · · · · · · · · · · ·	
dBm-						
CBm 01 -19	117 dBm			_		
dBm						
dBm				-		
dem						
	M3	and second a	and the second	a constant	1000	(1997)
dBharman	phina musulling	henry the sale of the state of the	and a speaker of the for	ensere and the second states	under Malline	Photo -
) dBm						
art 2.476 GHz		1001 p	ts		Stop 2.5	76 GHz
rker	y					
pe Ref Trc	X-value	Y-value	Function	Func	tion Result	
			-			
M3 1	2.5 GH	z -59.96 dBm				
M4 1	2.4843 GH	z -56.94 dBm				
I II						14
Ref Trc M1 1 M2 1 M3 1	2.47975 GH: 2.4835 GH: 2.5 GH:	Y-value z 1.89 dBm z -59.06 dBm z -59.96 dBm		Func		7







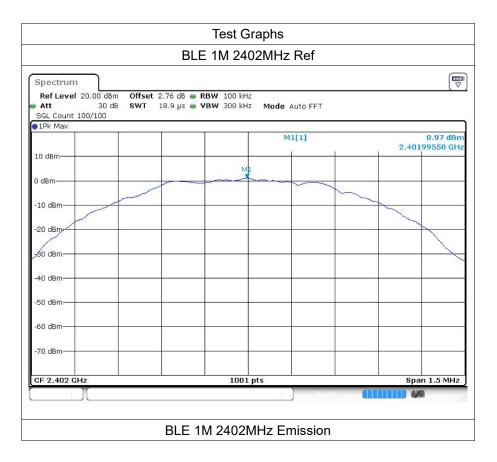




Appendix F. Conducted RF Spurious Emission

Test Result

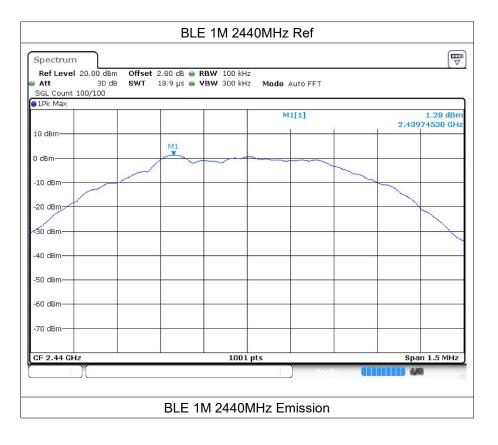
Mode	Frequency (MHz)	Max Value (dBc)	Limit (dBc)	Verdict
BLE 1M	2402	-47.12	-20	Pass
BLE 1M	2440	-47.25	-20	Pass
BLE 1M	2480	-47.05	-20	Pass
BLE 2M	2402	-44.7	-20	Pass
BLE 2M	2440	-45.33	-20	Pass
BLE 2M	2480	-45.02	-20	Pass





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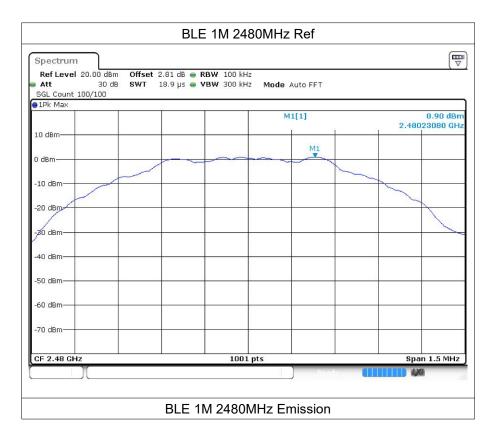
Ref Lo Att SGL Co		20.00 dB 30 c 0/10		RBW 100 kHz VBW 300 kHz	Mode Auto Swi	вер	
1Pk M	ax						
					M1[1]		0.09 dBr 2.3970 GH
10 dBm	M1				M2[1]		-46.15 dBr
) dBm-	VII						19.2472 GH
						1 1	20 00 00 00 00 00 00 00 00 00 00 00 00 0
-10 dBm	1						
20 dBm		1 -19.03	IS dBm				
20 001							
-30 dBm	1						
10.10						1.000	
40 dBm						M2	
50 dBm		M	13 M4 M5	unametrolimore	man Allanda	an pureken way	Carlandora Marcalena
when	merine	manut	13 MA MS	Des and and a set of the set			
-60 dBm	1						
70 dBm						_	
Start 3	0.0 M	IHz		1001 pt	s		Stop 26.5 GHz
larker							
Type	Ref	Trc	X-value	Y-value	Function	Funct	tion Result
M1		1	2.397 GHz	0.09 dBm			
M2		1	19.2472 GHz	-46.15 dBm			
M3 M4	-	1	4.9269 GHz 7.071 GHz	-53.89 dBm -51.83 dBm			
M5		1	9.4268 GHz	-52.17 dBm			
			21 1600 GHE	ourar donn			





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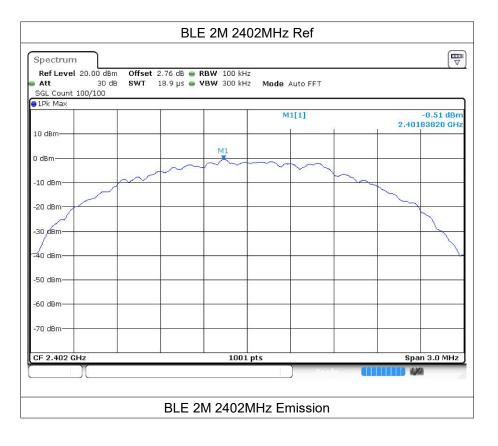
Att SGL Co		20.00 dBr 30 d		RBW 100 kHz VBW 300 kHz	Mode Auto Swe	вер	
1Pk M		0/10	20. 0.024	22 52			
					M1[1]		-0.05 dBr
10 dBm	-						2.4500 GH
	M1				M2[1]		-45.97 dBi
0 dBm-					1	a r	16.3355 GH
-10 dBm			· · · · · · · · · · · · · · · · · · ·				
-20 dBm		1 -18.719	9 dBm	_			
-30 dBm	דן י						
-40 dBm					M2		
			MA MS			and the second second	the second characteristic
-50 dBm	1	Ma	1 M4 M2	May in with targer	Confrage Magnes	un a de la forde de la	estamply wardshirts
-60 dBm	monthe	fille and the and the	they are called a series				
-60 aBu	-						
-70 dBm							
Start 3	0.0 M	IHz		1001 pt	s		Stop 26.5 GHz
larker							
Type	Ref	Trc	X-value	Y-value	Function	Function	n Result
M1		1	2.45 GHz	-0.05 dBm			
M2		1	16.3355 GHz	-45.97 dBm			
M3		1	4.9269 GHz	-53.42 dBm			
M4 M5		1	7.3093 GHz 9.8768 GHz	-52.85 dBm -51.09 dBm			
		1	9.8708 GHZ	-51.09 UBM			





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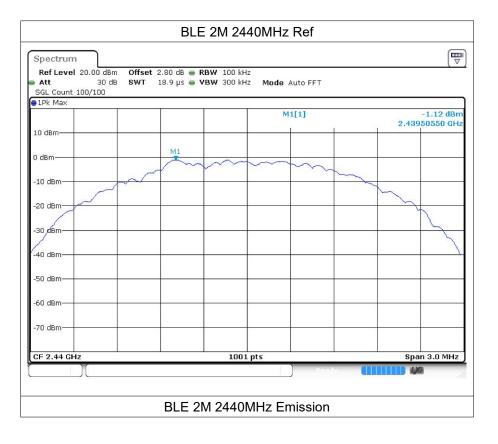
Att		20.00 dBr 30 d		RBW 100 kHz VBW 300 kHz	Mode Auto Swe	вер	
SGL Co		0/10					
					M1[1]		0.80 dBi
10 dBm							2.4760 GH
	MI				M2[1]		-46.15 dB
0 dBm-				-	1	a r	19.3002 GH
-10 dBm							
-10 ubii							
-20 dBm		1 -19.100	0 dBm				
-30 dBm	1-1-1						
-40 dBm							
10 000			M4 M5			m2	
-50 dBm	1	M	have the bedrightless	whenter and	remover to detail and	un pathers and	Janoban and a stand and
-60 dBm	menter	kongardan and	the contraction		1		
-60 dBm							
-70 dBm							
Start 3	0.0 M	IHz		1001 pt	s		Stop 26.5 GHz
larker							
Type	Ref	Trc	X-value	Y-value	Function	Function	on Result
M1		1	2.476 GHz	0.80 dBm			
M2		1	19.3002 GHz	-46.15 dBm			
M3		1	5.1122 GHz	-53.07 dBm			
M4		1	7.4151 GHz 9.8239 GHz	-52.09 dBm			
MS				-52.15 dBm			





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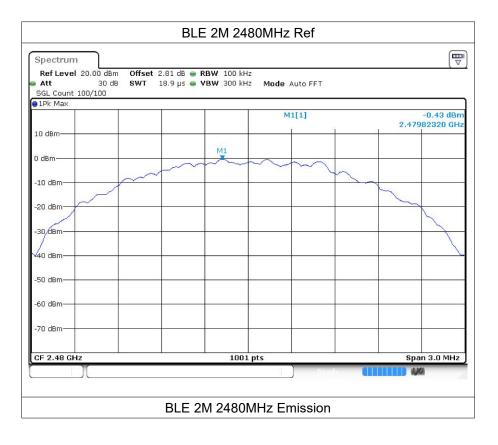
Ref Lo Att SGL Co		20.00 dB 30 d 0/10		 RBW 100 kHz VBW 300 kHz 	Mode Auto Sw	еер	
1Pk M	ax			1 1	M1[1]		-1.61 dBr
					WILI		2.3970 GH
10 dBm					M2[1]		-45.21 dBr
0 dBm-	M1						19.3266 GH
-10 dBm	ווי						1
20 dBm		1 -20.50	ig dBm			_	
		1 -20.00	John				
-30 dBm	+						
-40 dBm						M2	
-40 UBII			13 M4 M5			-	
-50 dBm	1	M	13 M4 M5	. en and and and and and and and and and an	Course Andread	wellow in the well when the	monorphania and a later
60 dBm	wellow	4 hrow annulated	when a month a sur		1. S.		A SALE OF SALES
-ou abri							
70 dBm				_			
Start 3	0.0 M	IHz		1001 pt	s	· ·	Stop 26.5 GHz
larker							
Type	Ref		X-value	Y-value	Function	Funct	ion Result
M1	_	1	2.397 GHz	-1.61 dBm			
M2		1	19.3266 GHz	-45.21 dBm	-		
M3 M4		1	4.9799 GHz 7.071 GHz	-52.39 dBm -51.68 dBm			
M5		1	9.5857 GHz	-52.22 dBm			
			state. dite				





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Ref Lo Att SGL Co		20.00 dB 30 c 0/10		RBW 100 kHz VBW 300 kHz	Mode Auto Swe	eep	
1Pk M	ax						
12/12/07					M1[1]		-1.56 dBr 2.4500 GH
10 dBm	639				M2[1]		-46.46 dBi
0 dBm-	M1						19.4060 GH
					1	1 1	
10 dBm	۱			-			
-20 dBm							
211 1460		1 -21.11	7 dBm				
-30 dBm	n					_	
-40 dBm	יורי		1	201		M2	
-50 dBm		MB	Withington water	5	my Handred Homore and	aborpation and some	Man and an Andrew Party on the Date of the
dista an	mar	monsterne	Aller March March Marchan	and and a second a second	5		and the second second
60 dBm	1						
-70 dBm	-						
70 000	<u> </u>						
Start 3	0.0 M	IHz		1001 pt	s		Stop 26.5 GHz
larker							
Type	Ref		X-value	Y-value	Function	Functio	n Result
M1		1	2.45 GHz	-1.56 dBm			
M2 M3		1	19.406 GHz	-46.46 dBm -53.02 dBm			
M4	-	1	4.7681 GHz 7.4681 GHz	-53.02 dBm			
M5	8	1	9.9563 GHz	-51.90 dBm			





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Att SGL Co		20.00 dB 30 (RBW 100 kHz VBW 300 kHz	Mode Auto Sw	veep	
1Pk M		0/10	54 11-11-1				
					M1[1]		-0.43 dBr
LO dBm-	_						2.4760 GH
	MI		1	1 1	M2[1]		-45.46 dBi
) dBm—	-					a n	12.3915 GH
10 40 -			-				
10 dBm	1						
20 dBm		1 -20.43	3 dBm			_	
		2 20.10					
-30 dBm							
40 dBm							
40 UBII	' T		10 M4 M	M2			
50 dBm		M	13 M4 M	or war with the state	marchen to Marchanes	were produced by the	and a contraction of the second
ander sur	anner	owner	the averent the prover the fund	Leitheacter framely .	Street 20		and the second sec
60 dBm	-						
70 dBm							
vo ubii	<u> </u>						
Start 3	0.0 M	Hz		1001 pt:	s		Stop 26.5 GH
larker							
Type	Ref	Trc	X-value	Y-value	Function	Functio	on Result
M1		1	2.476 GHz	-0.43 dBm			
M2		1	12.3915 GHz	-45.46 dBm			
M3		1	4.9534 GHz	-53.05 dBm			
M4		1	7.2828 GHz	-52.90 dBm			
M5		1	10.0092 GHz	-51.61 dBm			



Appendix G. Restrict Band

Test Result

Mada	Frequency	Spur Freq	Power	Gain	E	Detector	Limit	Verdiet
Mode	(MHz)	(MHz)	(dBm)	(dBi)	(dBuV/m)	Detector	(dBuV/m)	Verdict
BLE 1M	2402	2310	-49.62	1.5	47.14	Peak	74	Pass
BLE 1M	2402	2310	-58.39	1.5	38.37	Average	54	Pass
BLE 1M	2402	2320.848	-45.55	1.5	51.21	Peak	74	Pass
BLE 1M	2402	2338.224	-56.73	1.5	40.03	Average	54	Pass
BLE 1M	2402	2390	-49.81	1.5	46.95	Peak	74	Pass
BLE 1M	2402	2390	-58.6	1.5	38.16	Average	54	Pass
BLE 1M	2480	2483.5	-48.39	1.5	48.37	Peak	74	Pass
BLE 1M	2480	2483.5	-57.78	1.5	38.98	Average	54	Pass
BLE 1M	2480	2490.52	-47.3	1.5	49.46	Peak	74	Pass
BLE 1M	2480	2483.512	-57.78	1.5	38.98	Average	54	Pass
BLE 1M	2480	2500	-50.09	1.5	46.67	Peak	74	Pass
BLE 1M	2480	2500	-58.14	1.5	38.62	Average	54	Pass
BLE 2M	2402	2310	-50.29	1.5	46.47	Peak	74	Pass
BLE 2M	2402	2310	-58.38	1.5	38.38	Average	54	Pass
BLE 2M	2402	2340.72	-45.41	1.5	51.35	Peak	74	Pass
BLE 2M	2402	2338.32	-56.7	1.5	40.06	Average	54	Pass
BLE 2M	2402	2390	-48.03	1.5	48.73	Peak	74	Pass
BLE 2M	2402	2390	-58.62	1.5	38.14	Average	54	Pass
BLE 2M	2480	2483.5	-47.54	1.5	49.22	Peak	74	Pass
BLE 2M	2480	2483.5	-56.36	1.5	40.4	Average	54	Pass
BLE 2M	2480	2499.712	-46.74	1.5	50.02	Peak	74	Pass
BLE 2M	2480	2483.512	-56.36	1.5	40.4	Average	54	Pass
BLE 2M	2480	2500	-47.29	1.5	49.47	Peak	74	Pass
BLE 2M	2480	2500	-58.16	1.5	38.6	Average	54	Pass



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Test Graphs BLE 1M 2402MHz Peak Spectrum Ref Level 20.00 dBm Att 30 dB Offset 3.76 dB ● RBW 1 MHz SWT 13.4 µs ● VBW 3 MHz Att Mode Auto FFT SGL Count 100/100 ●1Pk Max M1[1] 2.93 dBr 2.4022120 GHz 10 dBm M2[1] -49.62 dBm 2.3100000 GHz 0 dBm 10 dBm -20 dBm -30 dBr -40 dBm M3 X Sodem -60 dBm -70 dBm Stop 2.406 GHz 1001 pts Start 2.31 GHz Marker Type Ref Trc M1 1 M2 1 Y-value X-value 1 Function **Function Result** 2.402212 GHz 2.31 GHz 2.39 GHz 2.320848 GHz 2.93 dBm -49.62 dBm M3 M4 -49.82 dBm -45.55 dBm 1 BLE 1M 2402MHz Average Spectrum Ref Level 20.00 dBm Offset 3.76 dB 🖷 RBW 1 MHz SWT 220.2 ms 👄 VBW 10 Hz Att 30 dB Mode Auto FFT SGL Count 10/10 1Pk Max M1[1] 2.42 dBm 2.4020200 GHz 10 dBm -58.40/dBn 2.3100000 GH M2[1] 0 dBm -10 dBm -20 dBm -30 dBm 40 dBm -50 dBn МЗ -ou dBm--70 dBm Stop 2.406 GHz Start 2.31 GHz 1001 pts Marker Type Ref Trc M1 1 M2 1 2.40202 GHz 2.42 dBm -58.40 dBm Function Function Result 2.31 GHz 2.39 GHz 2.338224 GHz -58.60 dBm -56.73 dBm M3 M4 1 4/4

Dongguan Yaxu (AiT) Technology Limited No.22, Jinqianling 3rd Street, Jitigang, Huangjiang, Dongguan, Guangdong, China.



	_						C
Spectrun							[
Ref Leve Att SGL Count	1 20.00 dBr 30 d 100/100			ode Auto FFT			
1Pk Max	1		1 1	A44743		0.11	a do
10 dBm	1			M1[1]		3.11 2.479752	
	MI			M2[1]		-48.49	
0 dBm	1				1 1	2.463300	U Gr
-10 dBm	1		-		-		
-20 dBm	/						
-30 dBm-							
40 dBm		M2		N14			
50 dBm-							-
-60 dBm	-				-		
-70 dBm						a	
Start 2.47	6 GHz	ala salisi	1001 pts			Stop 2.5	GH
larker Type Re	f	X-value	Y-value	Function	Func	tion Result	
M1	1	2.479752 GHz	3.12 dBm				
M2 M3	1	2.4835 GHz 2.5 GHz	-48.49 dBm -50.09 dBm				
M4	1	2.49052 GHz	-47.31 dBm	Hz Average		dijili	
		2.49052 GHz	-47.31 dBm	Hz Average	* (11	436)	
		2.49052 GHz		Hz Average	* 01	424	
M4 Spectrun Ref Leve	n	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz		an C ÌÌ	4,40) 4,40	(ª
M4 Spectrun Ref Leve Att	n 1 20.00 dBr 30 d	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Hz Average		4,40) 4,40)	
M4 Spectrun Ref Leve Att SGL Count	n 1 20.00 dBr 30 d	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	lode Auto FFT		4,40) (10)	
M4 Spectrun Ref Leve Att SGL Count	n 1 20.00 dBr 30 d	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz) dB
M4 Spectrun Ref Leve Att SGL Count	n 1 20.00 dBr 30 d	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	lode Auto FFT		2.479992) dB 0 GI 7 dB
M4 Spectrun Ref Leve Att SGL Count 1Pk Max	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT	1	2.479992) dB 0 GH 7 dB
M4 Spectrun Ref Leve Att SGL Count 1Pk Max 10 dBm	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GH 7 dB
M4 Spectrum Ref Leve Att SGL Count 1Pk Max 10 dBm	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrun Ref Leve Att SGL Count 10 dBm	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrum Ref Leve Att SGL Count 1Pk Max 10 dBm	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrum Ref Leve Att SGL Count 1Pk Max 10 dBm	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrum Ref Leve Att SGL Count 10 dBm- -10 dBm- -20 dBm- -30 dBm- -40 dBm-	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE M Offset 3.81 dB SWT 62.9 ms	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrun Ref Leve Att SGL Count PIPk Max 10 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 50 dBm 50 dBm	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB @	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GH 7 dB
M4 Spectrum Ref Leve Att SGL Count 1PK Max 10 dBm -0 dBm -20 dBm -30 dBm -40 dBm -50 d	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE M Offset 3.81 dB SWT 62.9 ms	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrun Ref Leve	n 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE M Offset 3.81 dB SWT 62.9 ms	1M 2480MI RBW 1 MHz	Node Auto FFT		2.479992) dB 0 GF 7 dB
M4 Spectrun Ref Leve Att SGL Count PIPk Max 10 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 70 dBm 70 dBm 70 dBm	n 30 d 1 10/10	2.49052 GHz BLE M Offset 3.81 dB SWT 62.9 ms	1M 2480MI RBW 1 MHz	M1[1] M2[1]		2.479992	7 dB 0 GF
M4 Spectrum Ref Leve Att SGL Count PIPk Max 10 dBm 10 dBm 10 dBm 30 dBm 30 dBm 30 dBm 70 dBm 70 dBm Start 2.47 Tarker	m 1 20.00 dB/ 30 d 1 10/10	2.49052 GHz BLE m Offset 3.81 dB B SWT 62.9 ms	1M 2480MI	M1[1] M2[1]		2.479992 -57.7 2.483500) dB 0 GH 7 dB 0 GH
M4 Spectrun Ref Leve Att SGL Count 10 dBm 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm -70 dBm -70 dBm -70 dBm -70 dBm	n 1 20.00 dBa 30 d 10/10 M1 6 GHz 6 GHz 1	2.49052 GHz BLE M Offset 3.81 dB SWT 62.9 ms MB X-value 2.479992 GHz	1M 2480MI RBW 1 MHz VBW 10 Hz N 1001 pts Y-value 2.60 dBm	M1[1] M2[1]		2.479992 -57.7 2.483500) dB 0 GH 7 dB 0 GH
M4 Spectrum Ref Leve Att SGL Count 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm Start 2.477 Tarker Type	n 30 d 30 d 1 20.00 dB/ 30 d 1 10/10 M1 M1 6 GHz	2.49052 GHz BLE MB Offset 3.81 dB BSWT 62.9 ms	1M 2480MI	M1[1] M2[1]		2.479992 -57.7 2.483500) dB 0 GH 7 dB 0 GH



	~			2M 2402					
Spectrum									[
Ref Level 2				RBW 1 MHz					
Att SGL Count 10	30 dB 00/100	SWT 1	l3.4 µs 📟	VBW 3 MHz	Mode Aut	to FFT			
1Pk Max			22						
					MI	[1]		0	2.91 di
.0 dBm				+ +	M2	[1]		2.	4025000 G
dBm							a ::	2.	3100000
10 dBm									
			1						
20 dBm			2				-	-	
30 dBm			-	-				-	
40 dBm			140						
	0.0		ha	- oh	1.0			M3	
SO dBm	w wy	www.ww		and the	sou Ast		Charles of the second s		www.
50 dBm			-				-	-	-
70 dBm			-				-	ų	
tart 2.31 G	Iz			1001 p	ts			Sto	p 2.406 GH
arker	- 1				1 -				0.44
Type Ref M1	Trc 1	X-value 2,402	25 GHz	2.91 dBm	Funct	ion	Fund	ction Res	ult
M2	1	2.3	31 GHz	-50.29 dBm					
M3 M4	1		39 GHz	-48.04 dBm	3				
141-4			72 CH2	-45 41 dBm	5				
		2.3407	BLE 2	-45.41 dBm 2M 2402M	1Hz Av	erage			1)(h)
Spectrum		2.3407			1Hz Av	erage			
			BLE 2	2M 2402M	1Hz Av	erage	jetvi 🚺		6)40) (1
Spectrum Ref Level 2 Att		Offset	BLE 2		1Hz Av Mode A		ydw 💶		6360) (1
Ref Level 2 Att GGL Count 10	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M					(1
Ref Level 2 Att GGL Count 10	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			
Ref Level 2 Att SGL Count 10 1Pk Max	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT		2.	1.33 di 4020200 G
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att 5GL Count 10 1Pk Max 0 dBm dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm dBm 10 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm dBm 10 dBm 20 dBm 30 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm 1 dBm 10 dBm 20 dBm 30 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm 10 dBm 20 dBm 30 dBm 40 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT		2.	1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT			1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm 1 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT		2. 	1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm 1 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm	20.00 dBm 30 dB	Offset	BLE 2	2M 2402M	Mode A	uto FFT		2. 	1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm 1 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 50 dBm 70 dBm	20.00 dBm 30 dB 3/10	Offset	BLE 2	2M 2402M	Mode A M1 M2	uto FFT		2. M3	1.33 di 4020200 G -58.38,di 3100000
Ref Level 2 Att SGL Count 10 IPk Max 0 dBm dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 50 dBm 70 dBm 70 dBm	20.00 dBm 30 dB 3/10	Offset	BLE 2	2M 2402M	Mode A M1 M2	uto FFT		2. M3	1.33 di 4020200 G -58.38/di
Ref Level 2 Att SGL Count 10 1Pk Max 0 dBm 1 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 50 dBm 50 dBm 60 dBm 70 dBm itart 2.31 Gl arker Type Ref	20.00 dBm 30 dB 0/10	Offset SWT 2	BLE 2	2M 2402M RBW 1 MHz VBW 10 Hz	Mode A M1 M2	uto FFT [1] [1]		2. M3	1.33 di 4020200 G -58.38.di 31000007
Ref Level 2 Att SGL Count 10 IPk Max 0 dBm 10 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 70 dBm 70 dBm 8tart 2.31 GH m1	20.00 dBm 30 dB 30/10	Offset SWT 2	BLE 2	2M 2402M	Mode A M3 M2 ts	uto FFT [1] [1]		2. M3	1.33 di 4020200 G -58.38.di 31000007
Att SGL Count 10 SGL Count 10 IPk Max ID dBm ID dBm	20.00 dBm 30 dB 0/10	Offset SWT 2 	BLE 2	2M 2402M RBW 1 MHz VBW 10 Hz	Mode A M1 M2 ts	uto FFT [1] [1]		2. M3	1.33 di 4020200 G -58.38.di 31000007



		BL	E 2M 2480	MHz Peak		
Spectrum						
Ref Level		Offset 3.81 dB 🖷				
Att SGL Count 1	30 dB	SWT 3.8 µs 🖷	VBW 3 MHz N	lode Auto FFT		
1Pk Max	00,200	23 (1913	ax 550			
				M1[1]		3.08 (
10 dBm	M1			M2[1]		2.4795120
) dBm	m				1	2.4835000
10 dBm						
1						
20 dBm						
30 dBm						
40 dBm		M2				
50 dBm						
				~		
60 dBm						
70 dBm						<u> </u>
Start 2.476 larker	GHZ		1001 pt	s		Stop 2.5 G
Type Ref	Trc	X-value	Y-value	Function	Fun	ction Result
M1 M2	1	2.479512 GHz 2.4835 GHz	3.08 dBm -47.37 dBm			
M3	1	2.5 GHz	-47.30 dBm			
M4	1					
)[2.499712 GHz	-46.75 dBm	Hz Averag	e	
		BLE	2M 2480M	Hz Averag	e) 430
Ref Level 3 Att	20.00 dBm 30 dB	BLE Offset 3.81 dB	2M 2480M	Hz Averag	e	
Ref Level 3 Att SGL Count 1	20.00 dBm 30 dB	BLE Offset 3.81 dB	2M 2480M		e	
Ref Level 3 Att SGL Count 1	20.00 dBm 30 dB	BLE Offset 3.81 dB	2M 2480M		e	1.52 (
Ref Level 3 Att SGL Count 10 1Pk Max	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e	2.4800160
Ref Level 3 Att SGL Count 1 1Pk Max	20.00 dBm 30 dB	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e	
Ref Level 3 Att SGL Count 10 11Pk Max	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 11Pk Max 10 dBm 10 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 11Pk Max 10 dBm 10 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 11Pk Max 0 dBm 10 dBm 10 dBm 20 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 D1Pk Max 0 dBm 10 dBm 20 dBm 20 dBm 30 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 10 11Pk Max 10 dBm 10 dBm 20 dBm 30 dBm 40 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 1Pk Max 10 1D dBm 10 10 dBm 10 20 dBm 30 30 dBm 40 40 dBm 50	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 1Pk Max 10 1D dBm 10 10 dBm 10 20 dBm 30 30 dBm 40 40 dBm 50	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level : Att SGL Count 11 01Pk Max 0 dBm 10 dBm 10 dBm 20 dBm 30 dBm 30 dBm 50 dBm 60 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level 3 Att SGL Count 11 SGL Count 11 11 11Pk Max 0 0 dBm 10 dBm 10 dBm 10 dBm 20 dBm 30 dBm 40 dBm 50 dBm 60 dBm 70 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT	e 	2.4800160 -56.18 (
Ref Level Att Att SGL Count 11 91Pk Max 91Pk Max 10 dBm 90 dBm 10 dBm 90 dBm 10 dBm 90 dBm 20 dBm 90 dBm 30 dBm 90 dBm 30 dBm 90 dBm 40 dBm 90 dBm 50 dBm 90 dBm 60 dBm 90 dBm	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT		2.4800160 -56.18 (2.4835000
Ref Level Att Att SGL Count 11 91Pk Max 91Pk Max 10 dBm 90 dBm 910 dBm 91 dBm <	20.00 dBm 30 dB 0/10	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT		2.4800160 -56.18 (2.4835000
Att SGL Count 11 IPk Max ID dBm ID dBm ID dBm ID dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -60 dBm -70 dBm Start 2.476 d Marker Type Ref M1	20.00 dBm 30 dB 0/10 M1 GHz GHz	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT		2.4800160 -56.18 (2.4835000
Ref Level Att Att SGL Count 11 91Pk Max 91Pk Max 10 dBm 90 dBm 10 dBm 90 dBm -10 dBm 90 dBm -20 dBm 90 dBm -30 dBm 90 dBm -50 dBm 90 dBm -60 dBm 90 dBm -70 dBm 90 dBm	20.00 dBm 30 dB 0/10 M1 GHz GHz	BLE Offset 3.81 dB SWT 62.9 ms	2M 2480M	Mode Auto FFT		2.4800160 -56.18 (2.4835000

----END OF REPORT----