

TEST REPORT

Applicant: Particle Industries, Inc.

EUT Description: M-SoM LTE-M/2G/Satellite + Wi-Fi for Global

Model: M635e

Brand: Particle

IC: 20127-M635

Standards: RSS-Gen Issue 5
RSS-247 Issue 4

Date of Receipt: 2026/05/14

Date of Test: 2026/05/14 to 2026/06/05

Date of Issue: 2026/06/17

TOWE. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

the results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of the model are manufactured with identical electrical and mechanical components. All sample tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise. without written approval of TOWE, the test report shall not be reproduced except in full.


Jim Huang
Approved By:


Carey Chen
Reviewed By:

Revision History

Rev.	Issue Date	Description	Revised by
01	2026/06/17	Original	Carey Chen

Summary of Test Results

Clause	ISED Part	Test Items	Result
4.1	RSS-Gen 6.8	Antenna Requirement	PASS
4.2	RSS-Gen 8.8	AC Power Line Conducted Emission	Reference report IC2312WDG0147-1
4.3	RSS-247 6.3.2	Output Power	
4.4	RSS-Gen 6.7 RSS-247 6.3.1	Occupied Bandwidth	
4.5	RSS-247 6.3.1	Power Spectral Density	
4.6	RSS-247 6.6	Band Edge for Conducted Emissions	
4.7	RSS-247 6.6	Spurious RF Conducted Emissions	
4.8	RSS-Gen 8.9 & 8.10	Radiated Spurious emissions and Band Edge	PASS
Test Method: ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024, KDB 558074 D01 15.247 Mesa Guidance v05r02. Remark: Pass is EUT meets standard requirements.			

Remark:

Review this report and original report, this report also updates the following standard:

Original report standard:	The newest report standard:
RSS-247 Issue 3 ANSI C63.10-2013	RSS-247 Issue 4 ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

In this report the worst data of Radiated Spurious emissions and Band Edge were spot checked, and the other data please refer to the previous report with report number IC2312WDG0147-1 (IC: 20127-M404) issued by Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch.

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1 General Description

1.1 Lab Information

1.1.1 Testing Location

These measurements tests were conducted at the Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. facility located at F401 and F101, Building E, Hongwei Industrial Zone, Liuxian 3rd Road, Bao'an District, Shenzhen, China. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014

Tel.: +86-755-27212361

Contact Email: info@towewireless.com

1.1.2 Test Facility / Accreditations

A2LA (Certificate Number: 7088.01)

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

FCC Designation No.: CN1353

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized as an accredited testing laboratory.

Test Firm Registration Number: 684095

Designation Number: CN1353.

ISED CAB identifier: CN0152

Sushi TOWE Wireless Testing(Shenzhen) Co., Ltd. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0152

Company Number: 31000

1.2 Client Information

1.2.1 Applicant

Applicant:	Particle Industries, Inc.
Address:	548 Market St, PMB 34833, San Francisco, CA 94104, USA

1.2.2 Manufacturer

Manufacturer:	Particle Industries, Inc.
Address:	548 Market St, PMB 34833, San Francisco, CA 94104, USA

1.3 Product Information

EUT Description:	M-SoM LTE-M/2G/Satellite + Wi-Fi for Global	
Model/HVIN:	M635e	
PMN:	M-Series LTE M1/2G/Satellite	
Brand:	Particle	
Hardware Version:	v0.2	
Software Version/FVIN:	v6.4.1	
IMEI:	862063070036368	
Bluetooth Version:	Bluetooth V5.0	
Support Mode:	☒ LE 1M PHY:1Mbps	☒ LE 2M PHY:2Mbps
Modulation Type:	GFSK	
Frequency Range:	2400 ~ 2483.5MHz	
Channel Frequency:	2402 ~ 2480MHz	
Channel Number:	40	
Antenna Type:	PCB Antenna	
Antenna Gain:	Ant2 (dBi)	
	3	
Remark: The above EUT's information was declared by applicant, please refer to the specifications or user's manual for more detailed description.		

2 Test Configuration

2.1 Test Channel

Operation Frequency of each channel for GFSK							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz
Remark: 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:							
Test Channel				Test Frequency			
The Lowest channel(CH0)				2402MHz			
The Middle channel(CH19)				2440MHz			
The Highest channel(CH39)				2480MHz			

2.2 Worst-case configuration and Mode

Modulation Type	BLE_1M	BLE_2M
Transmitting mode	Keep the EUT was programmed to be in continuously transmitting mode	
Normal Link	Keep the EUT operation to normal function.	

2.3 Support Unit used in test

Description	Manufacturer	Model	Serial Number
Laptop	Lenovo	Thinkbook 14 G4+IAP	YX05AZ13

2.4 Test Environment

Temperature:	Normal: 15°C ~ 35°C
Humidity:	45 ~ 56 % RH Ambient
Voltage:	DC 3.80V
Remark: The testing environment is within the scope of the EUT user manual and meets the requirements of the standard testing environment.	

2.5 Test RF Cable

For all conducted test items: The offset level is set spectrum analyzer to compensate the RF cable loss and attenuator factor between RF conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level will be exactly the RF output level.

The spectrum analyzer offset is derived from RF cable loss and attenuator factor.

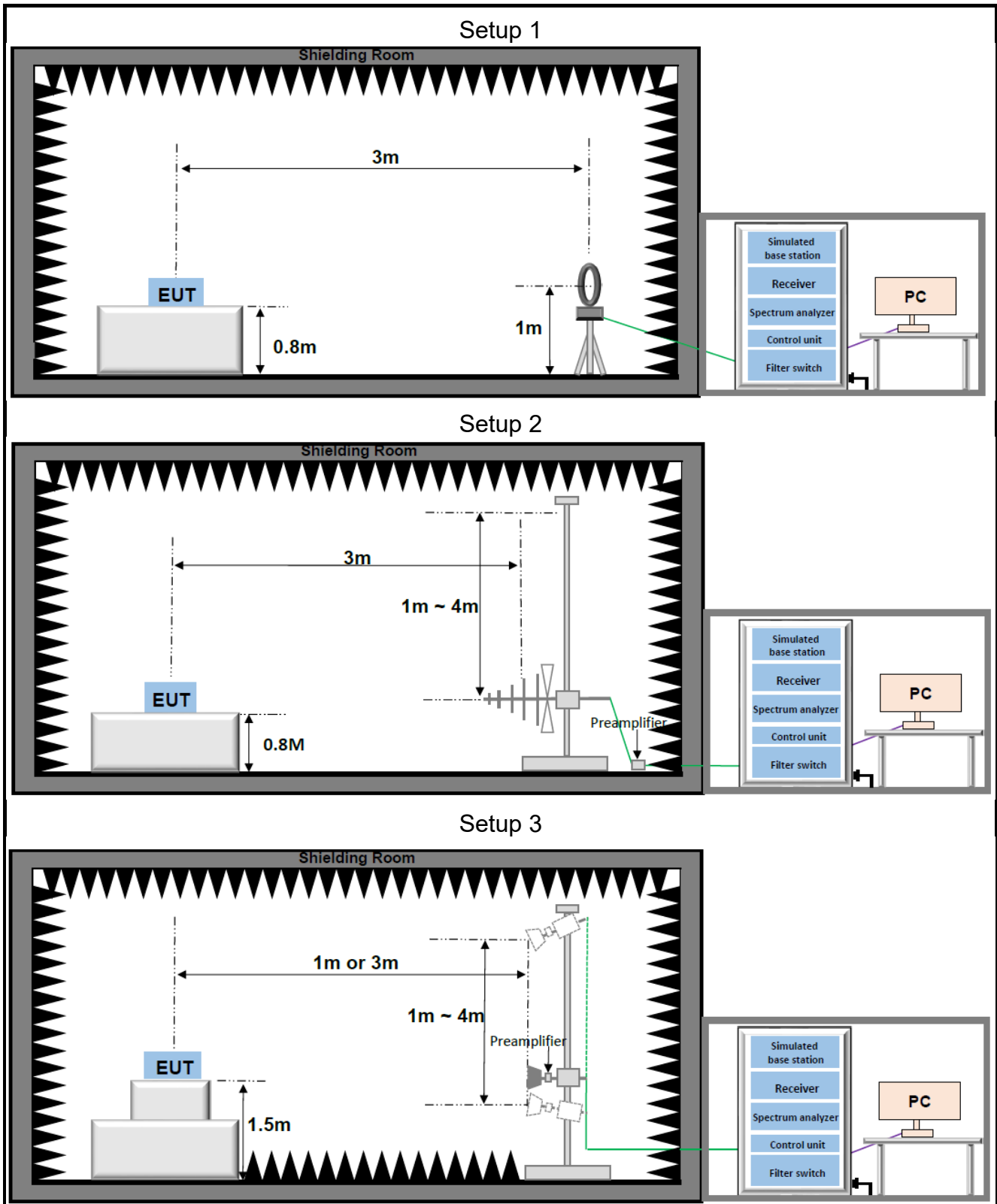
Offset = RF cable loss + attenuator factor.

2.6 Modifications

No modifications were made during testing.

2.7 Test Setup Diagram

2.7.1 Radiated Configuration



3 Equipment and Measurement Uncertainty

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, whichever is less, and where applicable is traceable to recognized national standards.

3.1 Test Equipment List

Radiated Emission					
Description	Manufacturer	Model	S.N.	Last Due	Cal Due
Biconic Logarithmic Periodic Antennas	Schwarzbeck	VULB9163	1643	2023/06/25	2026/06/24
Double-Ridged Horn Antennas	Schwarzbeck	BBHA 9120D	2809	2023/06/25	2026/06/24
Broad-Band Horn Antenna	Schwarzbeck	BBHA 9170	1290	2023/06/25	2026/06/24
Loop Antenna	Schwarzbeck	FMZB 1519C	1519C-028	2023/06/29	2026/06/28
Signal Analyzer	Keysight	N9020A	MY49100252	2026/04/03	2027/04/02
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY63440541	2025/05/29	2026/05/28
				2026/05/29	2027/05/28
Wideband Radio Communication Tester	R&S	CMW500	150645	2026/03/06	2027/03/05
Low Noise Amplifier	Tonscend	TAP9K3G40	AP23A8060273	2025/03/11	2027/03/10
Low Noise Amplifier	Tonscend	TAP01018050	AP22G806258	2025/03/11	2027/03/10
Low Noise Amplifier	Tonscend	TAP18040048	AP22G806247	2025/03/11	2027/03/10
Hygrometer	BINGYU	HTC-1	N/A	2025/07/25	2026/07/24
Band Reject Filter Group	Townshend	JS0806-F	23A806F0652	N/A	N/A
Test Software	Tonscend	TS+	Version: 5.0.0	N/A	N/A

3.2 Measurement Uncertainty

Parameter	U _{lab}
Radiated Emissions(9kHz~30MHz)	2.40dB
Radiated Emissions(30MHz~1000MHz)	4.66dB
Radiated Emissions(1GHz~18GHz)	5.42dB
Radiated Emissions(18GHz~40GHz)	5.46dB

Uncertainty figures are valid to a confidence level of 95%

4 Test Results

4.1 Antenna Requirement

Standard Applicable:	RSS-Gen Issue 5 Section 6.8
The antenna gain and type as provided by the manufacturer are as follows: The antenna Type is PCB Antenna. With Antenna gain is 3dBi (Ant2). Antenna Anti-Replacement Construction: An embedded-in antenna design is used.	

4.2 Radiated Spurious Emissions and Band Edge

Limits

Spurious emissions are permitted in an of the frequency bands:

MHz	MHz	MHz	MHz	GHz	GHz
0.090 - 0.110	12.29 - 12.293	149.9 - 150.05	1660 - 1710	4.5 - 5.15	14.47 - 14.5
0.495 - 0.505	12.51975 - 12.52025	156.52475 - 156.52525	1718.8 - 1722.2	5.35 - 5.46	15.35 - 16.2
2.1735 - 2.1905	12.5767 - 12.57725	156.7 - 156.9	2200 - 2300	7.25 - 7.75	17.7 - 21.4
4.125 - 128	13.36 - 13.41	162.0125 - 167.17	2310 - 2390	8.025 - 8.5	22.01 - 23.12
4.17725 - 4.17775	16.42 - 16.423	167.72 - 173.2	2483.5 - 2500	9.0 - 9.2	23.6 - 24.0
4.20725 - 4.20775	16.69475 - 16.69525	240 - 285	2655 - 2900	9.3 - 9.5	31.2 - 31.8
6.215 - 6.218	1680425 - 1680475	322 - 335.4	3260 - 3267	10.6 - 12.7	36.43 - 36.5
6.26775 - 6.26825	25.5 - 25.67	399.9 - 410	3332 - 3339	13.25 - 13.4	Above 38.6
6.31175 - 6.31225	37.5 - 38.25	608 - 614	3345.8 - 3358		
8.291 - 8.294	73 - 74.6	960 - 1240	3600 - 4400		
8.362 - 8.366	74.8 - 75.2	1300 - 1427			
8.37625 - 8.38675	108 - 121.94	1435 - 1626.5			
8.41425 - 8.41475	123 - 138	1645.5 - 1646.5			

Radiated disturbance of an intentional radiator:

Frequency	Field strength ($\mu\text{A}/\text{m}$)	Limit (dB $\mu\text{V}/\text{m}$)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	6.37/F(kHz)	-	-	300
0.490MHz-1.705MHz	63.7/F(kHz)	-	-	30
1.705MHz-30MHz	0.08	-	-	30
Frequency	Field strength ($\mu\text{V}/\text{m}$)	Limit (dB $\mu\text{V}/\text{m}$)	Remark	Measurement distance (m)
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	74.0	Peak	3
		54.0	Average	

Test Procedure

ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 Section 6.4 & 6.5 & 6.6 & 11.11&11.12

Test Settings

- For radiated emissions measurements performed at frequencies less than or equal to 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the reference ground plane.
- For radiated emissions measurements performed at frequencies above 1GHz, the EUT shall be placed on a RF-transparent table or support at a nominal height of 80cm above the ground plane.
- Radiated measurements shall be made with the measurement antenna positioned in both horizontal and vertical polarization. The measurement antenna shall be varied from 1m to 4m in height above the reference ground in a search for the relative positioning that produces the maximum radiated signal level (i.e, field strength or received power), when orienting the measurement antenna in vertical polarization, the minimum height of the lowest element of the antenna shall clear the site reference ground plane by at least 25cm.
- For each suspected emission, the EUT was ranged its worst case and then tune the antenna tower(from 1~4m) and turntable(from 0~360°) find the maximum reading. Preamplifier and a high pass filter are used for the test in order get better signal level comply with the guidelines.
- Set to the maximum power setting and enable the EUT transmit continuously.
- The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

7. spectrum analyzer setting:
Measurements Below 1000MHz: RBW = 120 kHz; VBW $\geq$ 300 kHz; Detector = Peak
Measurements Above 1000MHz: RBW = 1 MHz; VBW $\geq$ 3 MHz; Detector = Peak
Average Measurements Above 1000MHz:
RBW = 1 MHz; VBW $\geq$ 3 MHz; Detector = RMS; Trace (RMS) averaging was performed over at least 100 traces.
8. The field strength is calculated by adding the Antenna Factor, Cable Factor. The basic equation with a sample calculation is as follows:
Level = Reading(dB μ V) + Factor(dB):
Factor = Cable Factor(dB) + AF(dB/m) - Preamplifier gain(dB)
AF = Antenna Factor(dB/m)
Margin = Limit(dB μ V/m) – Level(dB μ V/m)
9. Repeat above procedures until all frequencies measured was complete.
10. Measure and record the results in the test report.

Test Notes

1. Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.
2. Radiated spurious emissions were investigated from 9kHz to 30MHz, 30MHz-1GHz and above 1GHz. the disturbance between 9kHz to 30MHz and 18GHz to 40GHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be recorded, so only the harmonics had been displayed.
3. These frequencies which near "-" should be ignored because they are Fundamental frequency.

Test Setup

Refer to section 2.7.1 for details.

Measuring Instruments

The measuring equipment is listed in the section 3.1 of this test report.

Test Result

The detailed test data see: **Appendix**.

5 Test Setup Photos

The detailed test data see: **Appendix A - BLEWIFI Setup Photos**

Appendix

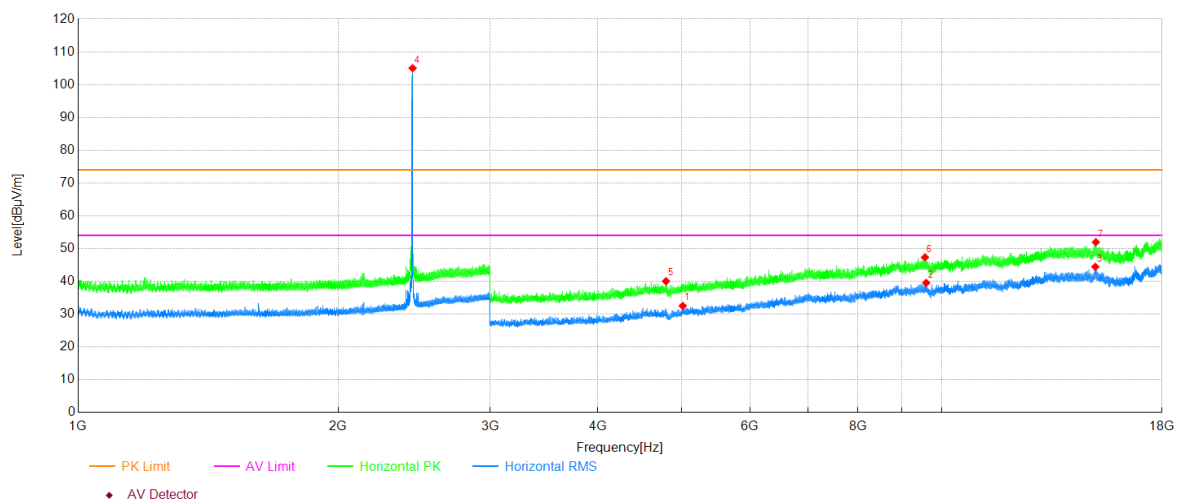
Radiated Spurious Emissions

Test for spot check:

Test Result

Project Information			
Mode:	BLE	Band:	-
Bandwidth	2M	Channel	0
IMEI:	862063070036368	Engineer:	Tian shuo
Remark:			

Test Graph

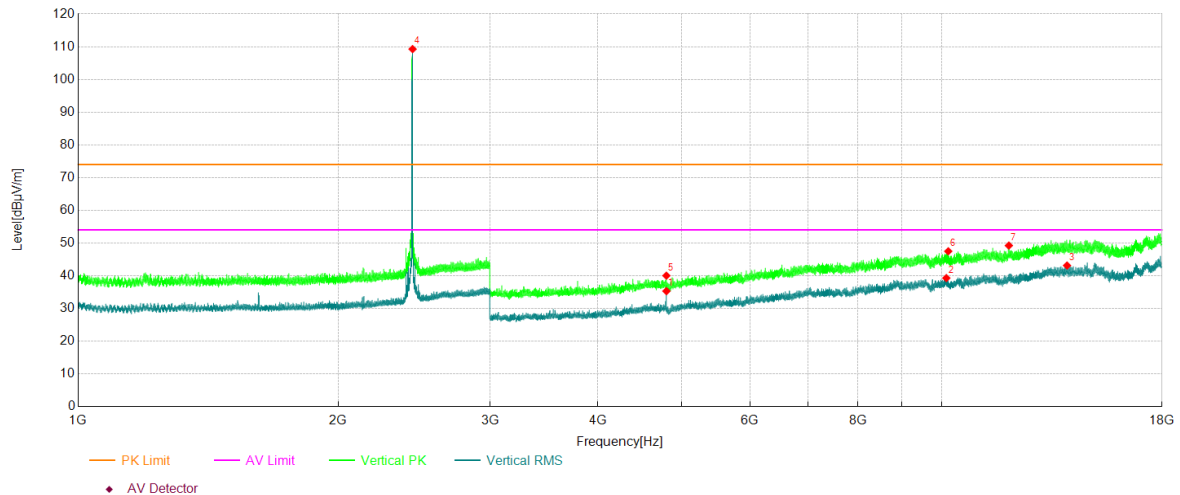


Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity	Verdict
1	5014.00	38.76	-6.24	32.52	54.00	21.48	250	Horizontal	PASS
2	9597.00	36.19	3.34	39.53	54.00	14.47	150	Horizontal	PASS
3	15066.50	34.18	10.25	44.43	54.00	9.57	250	Horizontal	PASS
4	2439.80	103.46	1.55	105.01	-	-	100	Horizontal	NA
5	4794.50	46.76	-6.71	40.05	74.00	33.95	200	Horizontal	PASS
6	9566.00	44.08	3.24	47.32	74.00	26.68	250	Horizontal	PASS
7	15086.50	41.32	10.64	51.96	74.00	22.04	100	Horizontal	PASS

Project Information

Mode:	BLE	Band:	-
Bandwidth	2M	Channel	0
IMEI:	862063070036368	Engineer:	Tian shuo
Remark:			

Test Graph



Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity	Verdict
1	4800.50	42.02	-6.70	35.32	54.00	18.68	200	Vertical	PASS
2	10127.00	35.40	3.90	39.30	54.00	14.70	150	Vertical	PASS
3	13971.50	33.79	9.34	43.13	54.00	10.87	100	Vertical	PASS
4	2439.50	107.72	1.55	109.27	-	-	250	Vertical	NA
5	4800.00	46.74	-6.70	40.04	74.00	33.96	200	Vertical	PASS
6	10179.00	43.50	3.99	47.49	74.00	26.51	200	Vertical	PASS
7	11963.50	43.37	5.86	49.23	74.00	24.77	100	Vertical	PASS

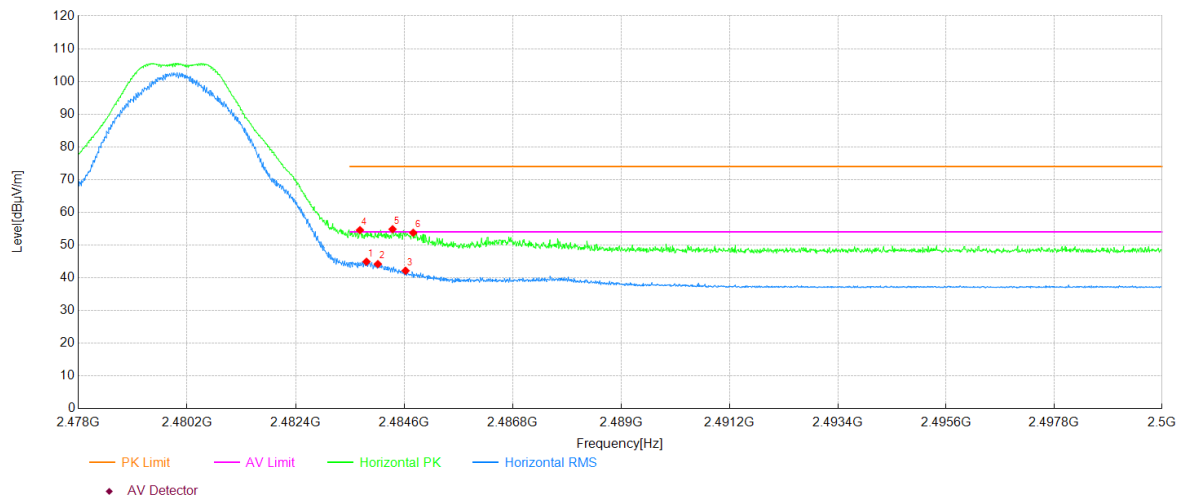
Radiated Band Edge

Test for spot check:

Test Result

Project Information			
Mode:	BLE	Band:	-
Bandwidth	2M	Channel	0
IMEI:	862063070036368	Engineer:	Tian shuo
Remark:			

Test Graph

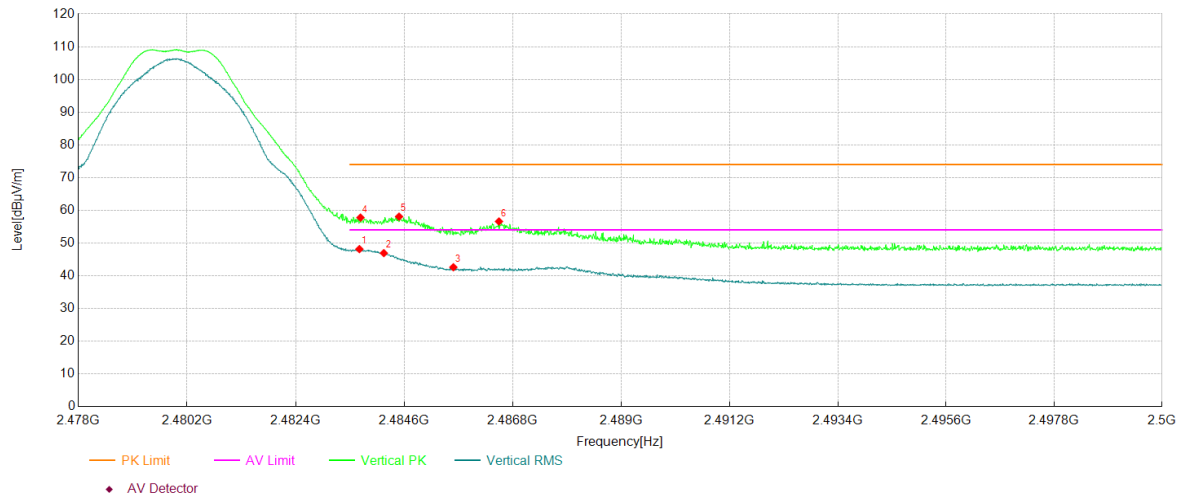


Data List									
NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity	Verdict
1	2483.83	43.15	1.76	44.91	54.00	9.09	200	Horizontal	PASS
2	2484.06	42.43	1.76	44.19	54.00	9.81	250	Horizontal	PASS
3	2484.63	40.39	1.76	42.15	54.00	11.85	200	Horizontal	PASS
4	2483.70	52.81	1.75	54.56	74.00	19.44	200	Horizontal	PASS
5	2484.36	53.08	1.76	54.84	74.00	19.16	200	Horizontal	PASS
6	2484.78	51.99	1.76	53.75	74.00	20.25	200	Horizontal	PASS

Project Information

Mode:	BLE	Band:	-
Bandwidth	2M	Channel	0
IMEI:	862063070036368	Engineer:	Tian shuo
Remark:			

Test Graph



Data List

NO.	Freq. [MHz]	Reading [dBμV]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Polarity	Verdict
1	2483.69	46.39	1.75	48.14	54.00	5.86	200	Vertical	PASS
2	2484.19	45.16	1.76	46.92	54.00	7.08	250	Vertical	PASS
3	2485.59	40.84	1.76	42.60	54.00	11.40	250	Vertical	PASS
4	2483.71	56.03	1.75	57.78	74.00	16.22	250	Vertical	PASS
5	2484.49	56.31	1.76	58.07	74.00	15.93	200	Vertical	PASS
6	2486.52	54.83	1.77	56.60	74.00	17.40	200	Vertical	PASS

~The End~