

Project No:
Report No.:TM-2203000166P
TMWK2203000912KR

FCC ID: SW8TM51010

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Rev.: 01

RADIO TEST REPORT

FCC 47 CFR PART 15 SUBPART C

Test Standard**FCC Part 15.247****Product name****Wi-Fi & BLE M.2 Wireless Module****Brand Name****GOOD WAY****Model No.****TM51010****Test Result****Pass****Statements of Conformity****Determination of compliance is based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.**

The test Result was tested by Compliance Certification Services Inc. The test data, data evaluation, test procedures, and equipment configurations shown in this report were given in ANSI C63.10: 2013 and compliance standards.

The test results of this report relate only to the tested sample (EUT) identified in this report.

The test Report of full or partial shall not copy. Without written approval of Compliance Certification Services Inc. (Wugu Laboratory)

Approved by:



Shawn Wu
Supervisor

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.
除非另有說明，此報告結果僅對測試之樣品負責，同時此樣品僅保留90天。本報告未經本公司書面許可，不可部份複製。

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Revision History

Rev.	Issue Date	Revisions	Effect Page	Revised By
00	May 16, 2022	Initial Issue	ALL	Doris Chu
01	May 19, 2022	See the following Note Rev. (01)	P.5	Doris Chu

Rev. (01)

1. Revised Modulation Type in section 1.2.

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1. GENERAL INFORMATION

1.1 EUT INFORMATION

Applicant	GOOD WAY TECHNOLOGY CO., LTD. 3F, No. 135, Ln. 235, Baociao Rd., Sindian Dist., New Taipei City 231, Taiwan
Manufacturer	GOOD WAY TECHNOLOGY CO., LTD. 3F, No. 135, Ln. 235, Baociao Rd., Sindian Dist., New Taipei City 231, Taiwan
Equipment	Wi-Fi & BLE M.2 Wireless Module
Model No.	TM51010
Model Discrepancy	N/A
Trade Name	GOOD WAY
Received Date	March 10, 2022
Date of Test	March 18 ~ 29, 2022
Power Supply	Power from host system. 3.3VDC, 1A
HW Version	V1.0
SW Version	V2.0.2
Host	The subject approved module is being used in a specific host. [Product: USB-C Smart Dock, Brand name/ Model: GOOD WAY / DUD8070, Adapter: Chicony / A18-135P1B I/P: 100-240VAC, 50-60Hz, 2.37A O/P: 20VDC, 6.75A, 135W]

Remark:

1. For more details, please refer to the User's manual of the EUT.
2. Disclaimer: Antenna information is provided by the applicant, test results of this report are applicable to the sample EUT received.

1.2 EUT CHANNEL INFORMATION

Frequency Range	2402MHz-2480MHz
Modulation Type	FSK for BLE 1 Mbps
Number of channels	40 Channels

Remark:

Refer as ANSI C63.10: 2013 clause 5.6.1 Table 4 for test channels

Number of frequencies to be tested		
Frequency range in which device operates	Number of frequencies	Location in frequency range of operation
<input type="checkbox"/> 1 MHz or less	1	Middle
<input type="checkbox"/> 1 MHz to 10 MHz	2	1 near top and 1 near bottom
<input checked="" type="checkbox"/> More than 10 MHz	3	1 near top, 1 near middle, and 1 near bottom

1.3 ANTENNA INFORMATION

Antenna Type	<input type="checkbox"/> PCB <input checked="" type="checkbox"/> PIFA <input type="checkbox"/> Dipole <input type="checkbox"/> Coils
Antenna Gain	Gain: 1.52 dBi

Remark:

1.The antenna(s) of the EUT are permanently attached and there are no provisions for connection to an external antenna. So the EUT complies with the requirements of §15.203.

1.4 MEASUREMENT UNCERTAINTY

PARAMETER	UNCERTAINTY
AC Powerline Conducted Emission	+/- 1.2575
Emission bandwidth, 20dB bandwidth	+/- 0.0014
RF output power, conducted	+/- 1.14
Power density, conducted	+/- 1.40
Radiated Emission_9kHz-30MHz	+/- 3.814
Radiated Emission_30MHz-200MHz	+/- 4.272
Radiated Emission_200MHz-1GHz	+/- 4.619
Radiated Emission_1GHz-6GHz	+/- 5.522
Radiated Emission_6GHz-18GHz	+/- 5.228
Radiated Emission_18GHz-26GHz	+/- 4.089
Radiated Emission_26GHz-40GHz	+/- 4.019

Remark:

1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2
2. ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report.

1.5 FACILITIES AND TEST LOCATION

All measurement facilities used to collect the measurement data are located at No.11, Wugong 6th Rd., Wugu Dist., New Taipei City, Taiwan. (R.O.C.)

CAB identifier: TW1309

Test site	Test Engineer	Remark
AC Conduction Room	Jack Chen	-
Radiation	Ray Li	-
RF Conducted	Marco Chan	-

Remark: The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC public Access Link (PAL) database, FCC Registration No. :444940, the FCC Designation No.:TW1309

1.6 INSTRUMENT CALIBRATION

RF Conducted Test Site					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
EXA Signal Analyzer	KEYSIGHT	N9010B	MY55460167	09/07/2021	09/06/2022
Power Meter	Anritsu	ML2496A	2136002	12/06/2021	12/05/2022
Power Seneor	Anritsu	MA2411B	1911386	08/19/2021	08/18/2022
Power Seneor	Anritsu	MA2411B	1911387	08/19/2021	08/18/2022
Software	Radio Test Software				

Conducted Emission Room					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Date	Calibration Due
CABLE	EMCI	CFD300-NL	CERF	06/28/2021	06/27/2022
EMI Test Receiver	R&S	ESCI	100064	07/05/2021	07/04/2022
LISN	SCHAFFNER	NNB 41	03/10013	02/15/2022	02/14/2023
Software	EZ-EMC(CCS-3A1-CE-WUGU)				

3M 966 Chamber Test Site					
Equipment	Manufacturer	Model	Serial Number	Cal Date	Cal Due
Band Reject Filters	MICRO TRONICS	BRM 50702	112	11/23/2021	11/22/2022
Bilog Antenna	Sunol Sciences	JB3	A030105	07/19/2021	07/18/2022
Coaxial Cable	HUBER SUHNER	SUCOFLEX 104PEA	20995	02/23/2022	02/22/2023
Coaxial Cable	EMCI	EMC105	190914+1111	09/17/2021	09/16/2022
Coaxial Cable	Woken	J-1099	201709090004	12/23/2021	12/22/2022
Digital Thermo-Hygro Meter	WISEWIND	1206	D07	12/28/2021	12/27/2022
Horn Antenna	ETS LINDGREN	3116	00026370	11/30/2021	11/29/2022
Horn Antenna	ETS LINDGREN	3117	00055165	07/29/2021	07/28/2022
K Type Cable	Huber+Suhner	SUCOFLEX 102	29406/2	12/05/2021	12/04/2022
Pre-Amplifier	EMEC	EM330	060609	02/23/2022	02/22/2023
Pre-Amplifier	HP	8449B	3008A00965	12/24/2021	12/23/2022
PSA Series Spectrum Analyzer	Agilent	E4446A	MY46180323	12/06/2021	12/05/2022
Antenna Tower	CCS	CC-A-1F	N/A	N.C.R	N.C.R
Controller	CCS	CC-C-1F	N/A	N.C.R	N.C.R
Turn Table	CCS	CC-T-1F	N/A	N.C.R	N.C.R
Software	e3 6.11-20180413				

Remark: Each piece of equipment is scheduled for calibration once a year.

1.7 SUPPORT AND EUT ACCESSORIES EQUIPMENT

EUT Accessories Equipment					
No.	Equipment	Brand	Model	Series No.	FCC ID
	N/A				

Support Equipment						
No.	Equipment	Brand	Model	Series No.	FCC ID	IC
1	NB	Lenovo	20175	N/A	TX2-RTL8723AS	6317A-RTL8723AS
2	AC power Source	Extech	6805	N/A	N/A	N/A
3	NB(E)	Lenovo	IBM 7663	N/A	N/A	N/A
4	NB(L)	Toshiba	PORTEGE R30-A	N/A	PD97260H	N/A

1.8 TEST METHODOLOGY AND APPLIED STANDARDS

The test methodology, setups and results comply with all requirements in accordance with ANSI C63.10:2013, FCC Part 2, FCC Part 15.247 and FCC KDB 558074.

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2. TEST SUMMARY

FCC Standard Section	Report Section	Test Item	Result
15.203	1.3	Antenna Requirement	Pass
15.207(a)	4.1	AC Conducted Emission	Pass
15.247(a)(2)	4.2	6 dB Bandwidth	Pass
-	4.2	Occupied Bandwidth (99%)	Pass
15.247(b)(3)	4.3	Output Power Measurement	Pass
15.247(e)	4.4	Power Spectral Density	Pass
15.247(d)	4.5	Conducted Band Edge	Pass
15.247(d)	4.5	Conducted Spurious Emission	Pass
15.247(d)	4.6	Radiation Band Edge	Pass
15.247(d)	4.6	Radiation Spurious Emission	Pass

3. DESCRIPTION OF TEST MODES

3.1 THE WORST MODE OF OPERATING CONDITION

Operation mode	BLE Mode (1Mbps)
Test Channel Frequencies	1.Lowest Channel : 2402MHz 2.Middle Channel : 2442MHz 3.Highest Channel : 2480MHz

Remark:

1. EUT pre-scanned data rate of output power for each mode, the worst data rate were recorded in this report.

3.2 THE WORST MODE OF MEASUREMENT

AC Power Line Conducted Emission	
Test Condition	AC Power line conducted emission for line and neutral
Power supply Mode	Mode 1: EUT power by Adapter
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Radiated Emission Measurement Above 1G	
Test Condition	Radiated Emission Above 1G
Power supply Mode	Mode 1: EUT power by Adapter
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4
Worst Position	<input type="checkbox"/> Placed in fixed position. <input checked="" type="checkbox"/> Placed in fixed position at X-Plane (E2-Plane) <input type="checkbox"/> Placed in fixed position at Y-Plane (E1-Plane) <input type="checkbox"/> Placed in fixed position at Z-Plane (H-Plane)

Radiated Emission Measurement Below 1G	
Test Condition	Radiated Emission Below 1G
Power supply Mode	Mode 1: EUT power by Adapter
Worst Mode	<input checked="" type="checkbox"/> Mode 1 <input type="checkbox"/> Mode 2 <input type="checkbox"/> Mode 3 <input type="checkbox"/> Mode 4

Remark:

1. The worst mode was record in this test report.
2. EUT pre-scanned in three axis ,X, Y, Z and two polarity, for radiated measurement. The worst case(X-Plane) were recorded in this report
3. AC power line conducted emission and for below 1G radiation emission were performed the EUT transmit at the highest output power channel as worse case.

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3.3 EUT DUTY CYCLE

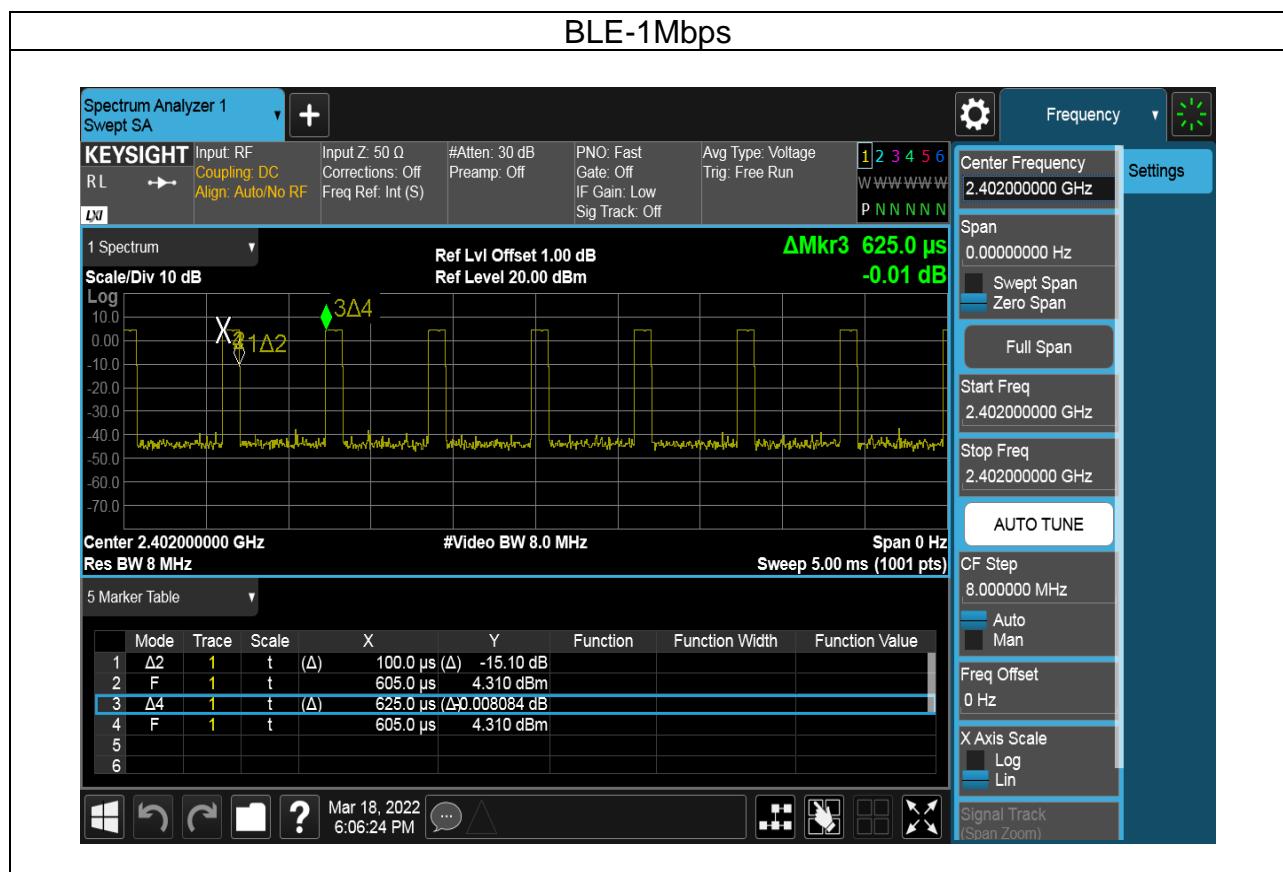
Temperature: 24.5°C

Humidity: 50% RH

Tested by: Marco Chan

Test date: March 18, 2022

Duty Cycle				
Configuration	Duty Cycle (%)	Duty Factor (dB)	1/T (kHz)	VBW Setting (kHz)
BLE-1Mbps	16.00	7.96	10.00	10.00



4. TEST RESULT

4.1 AC POWER LINE CONDUCTED EMISSION

4.1.1 Test Limit

According to §15.207(a),

Frequency Range (MHz)	Limits(dB μ V)	
	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

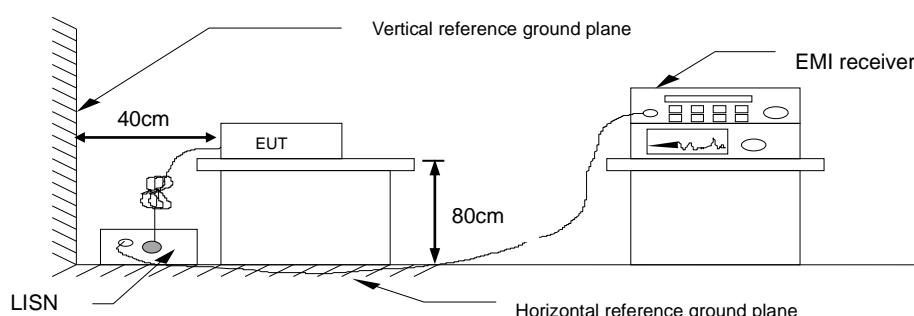
* Decreases with the logarithm of the frequency.

4.1.2 Test Procedure

Test method Refer as ANSI C63.10: 2013 clause 6.2,

1. The EUT was placed above horizontal ground plane and 0.4m above vertical ground plane
2. EUT connected to the line impedance stabilization network (LISN)
3. Receiver set RBW of 9kHz and Detector Peak, and note as quasi-peak and average.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. Recorded Line for Neutral and Line.

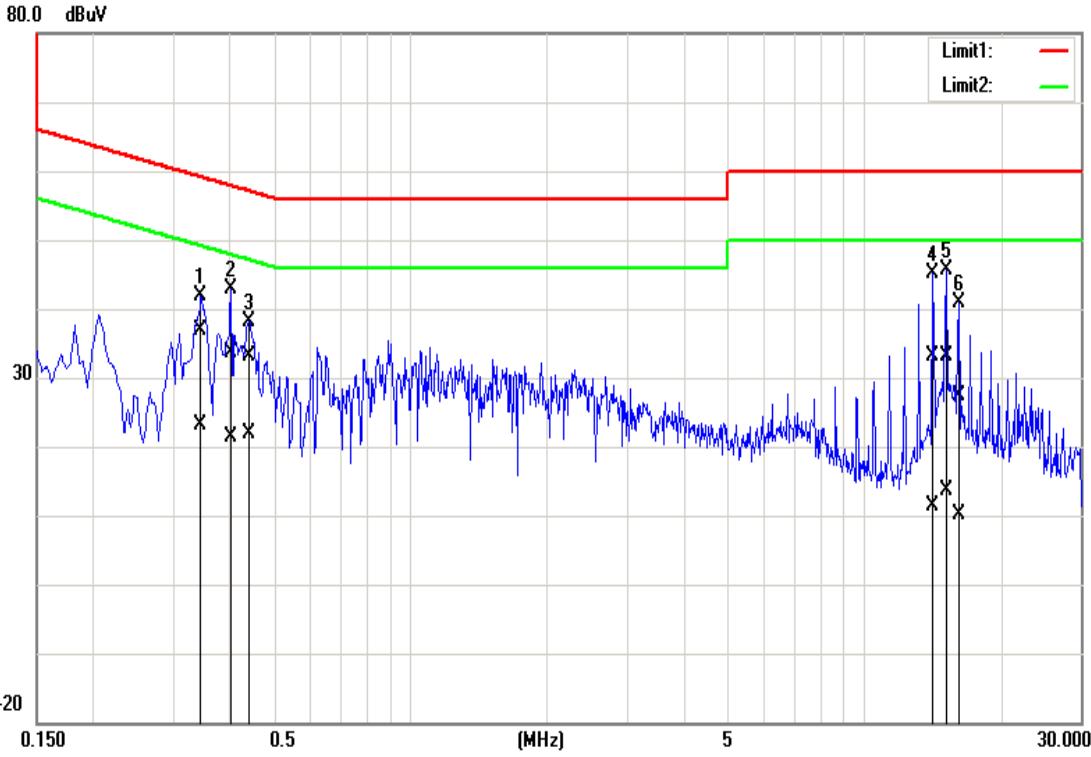
4.1.3 Test Setup



4.1.4 Test Result

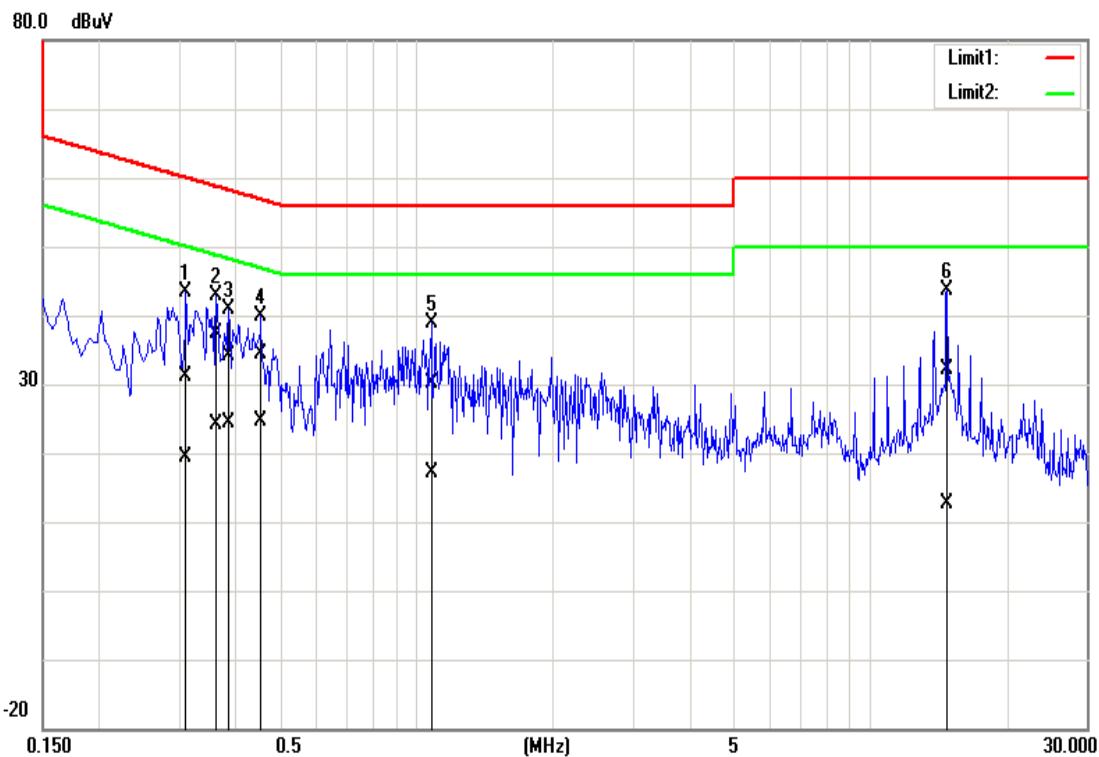
PASS

Test Data

Test Mode:	Mode 1		Temp/Hum		24(°C)/ 61%RH					
Phase:	Line		Test Date		March 21, 2022					
Configuration	BLE-1Mbps		Test Engineer		Jack Chen					
										
Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.3460	26.77	13.03	10.19	36.96	23.22	59.06	49.06	-22.10	-25.84	Pass
0.4020	23.42	11.16	10.19	33.61	21.35	57.81	47.81	-24.20	-26.46	Pass
0.4420	22.97	11.72	10.19	33.16	21.91	57.02	47.02	-23.86	-25.11	Pass
14.2060	22.67	0.94	10.36	33.03	11.30	60.00	50.00	-26.97	-38.70	Pass
15.1580	22.68	3.34	10.37	33.05	13.71	60.00	50.00	-26.95	-36.29	Pass
16.1580	17.10	-0.18	10.36	27.46	10.18	60.00	50.00	-32.54	-39.82	Pass

Note: Correction factor = LISN loss + Cable loss.

Test Mode:	Mode 1	Temp/Hum	24(°C)/ 61%RH
Phase:	Neutral	Test Date	March 21, 2022
Configuration	BLE-1Mbps	Test Engineer	Jack Chen



Frequency (MHz)	Quasi Peak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	Quasi Peak result (dBuV)	Average result (dBuV)	Quasi Peak limit (dBuV)	Average limit (dBuV)	Quasi Peak margin (dB)	Average margin (dB)	Remark
0.3100	20.85	9.15	10.18	31.03	19.33	59.97	49.97	-28.94	-30.64	Pass
0.3620	27.17	14.03	10.18	37.35	24.21	58.68	48.68	-21.33	-24.47	Pass
0.3860	24.04	14.09	10.18	34.22	24.27	58.15	48.15	-23.93	-23.88	Pass
0.4540	24.26	14.54	10.18	34.44	24.72	56.80	46.80	-22.36	-22.08	Pass
1.0780	19.89	7.01	10.20	30.09	17.21	56.00	46.00	-25.91	-28.79	Pass
14.7500	21.68	2.26	10.38	32.06	12.64	60.00	50.00	-27.94	-37.36	Pass

Note: Correction factor = LISN loss + Cable loss.

4.2 6dB BANDWIDTH AND OCCUPIED BANDWIDTH (99%)

4.2.1 Test Limit

According to §15.247(a)(2)

6 dB Bandwidth :

Limit	Shall be at least 500kHz
-------	--------------------------

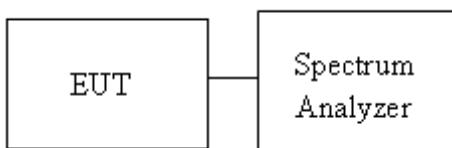
Occupied Bandwidth(99%) : For reporting purposes only.

4.2.2 Test Procedure

Test method Refer as ANSI C63.10: 2013,

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT.
3. SA set RBW =100KHz, VBW = 300KHz and Detector = Peak, to measurement 6dB Bandwidth.
4. SA set RBW = 1% ~ 5% OBW, VBW = three times the RBW and Detector = Peak, to measurement 99% Bandwidth.
5. Measure and record the result of 6 dB Bandwidth and 99% Bandwidth. in the test report.

4.2.3 Test Setup



4.2.4 Test Result

Temperature: 24.5°C**Humidity:**

50% RH

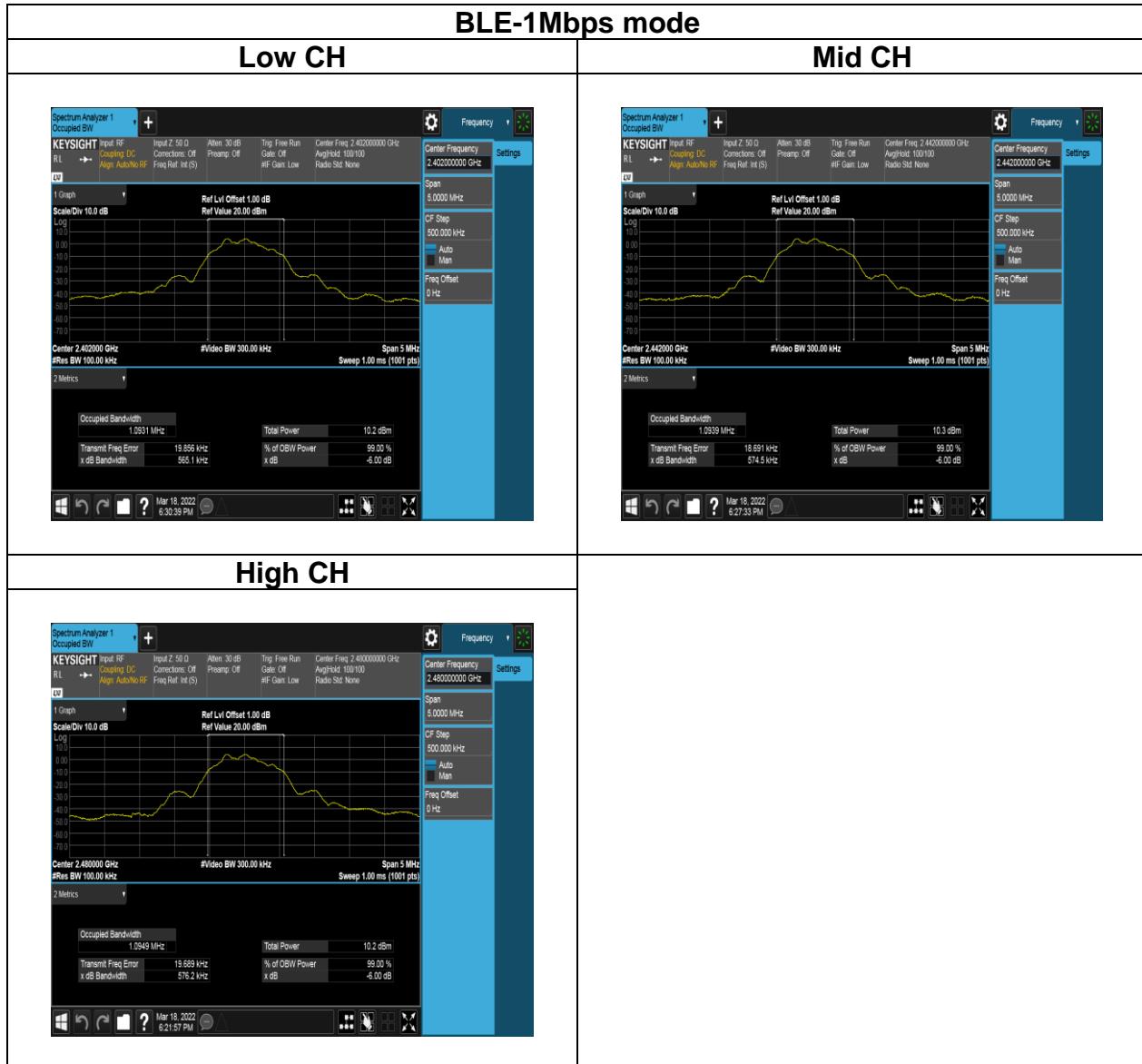
Tested by: Marco Chan**Test date:**

March 18, 2022

Test mode: BLE-1Mbps mode / 2402-2480 MHz				
Channel	Frequency (MHz)	OBW (99%) (MHz)	6dB BW (MHz)	6dB limit (kHz)
Low	2402	1.0333	0.5651	≥500
Mid	2442	1.0342	0.5745	
High	2480	1.0358	0.5762	

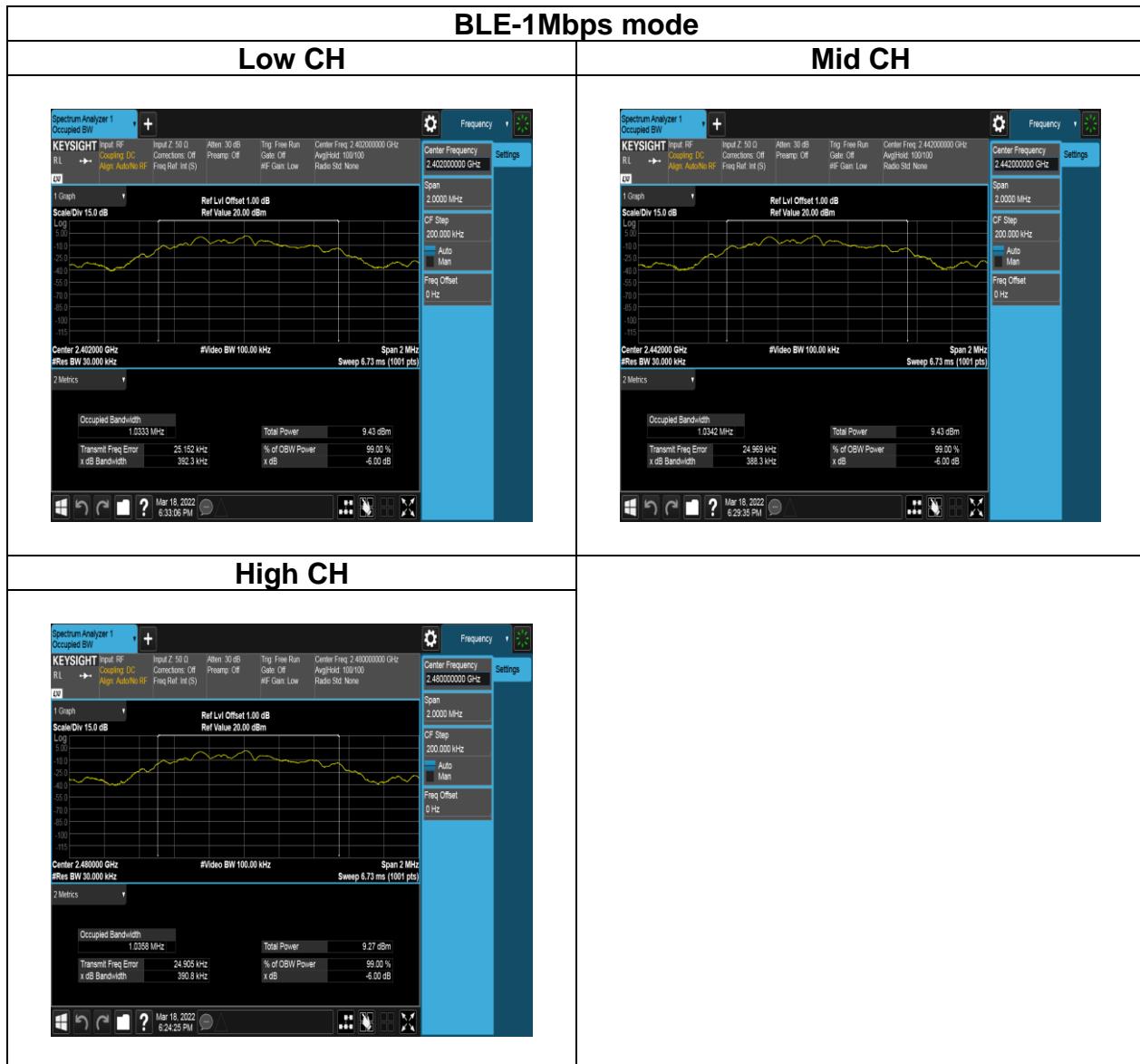
Test Data

6dB BANDWIDTH



Test Data

BANDWIDTH (99%)



4.3 OUTPUT POWER MEASUREMENT

4.3.1 Test Limit

According to §15.247(b)(3)

Peak output power :

FCC

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement,

Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 30dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi [Limit = 30 – (DG – 6)] <input type="checkbox"/> Point-to-point operation
-------	---

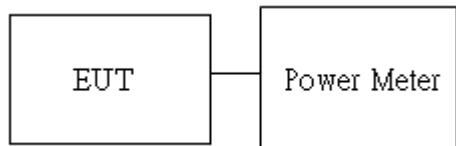
Average output power : For reporting purposes only.

4.3.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT RF output connected to the power meter by RF cable.
2. Setting maximum power transmit of EUT.
3. The path loss was compensated to the results for each measurement.
4. Measure and record the result of Peak output power and Average output power. in the test report.

4.3.3 Test Setup



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4.3.4 Test Result

Temperature:	24.5°C	Humidity:	50% RH
Tested by:	Marco Chan	Test date:	March 18, 2022

Peak output power :

BLE 1M mode:

CH	Frequency (MHz)	Power set	Peak Power Output (dBm)	Required Limit (dBm)
Low	2402	4	4.24	30
Mid	2442	4	4.17	30
High	2480	4	4.14	30

Average output power :

BLE 1M mode:

CH	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Required Limit (dBm)
Low	2402	4	3.86	30
Mid	2442	4	4.07	30
High	2480	4	4.03	30

4.4 POWER SPECTRAL DENSITY

4.4.1 Test Limit

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.

Limit	<input checked="" type="checkbox"/> Antenna not exceed 6 dBi : 8dBm <input type="checkbox"/> Antenna with DG greater than 6 dBi [Limit = 8 – (DG – 6)] <input type="checkbox"/> Point-to-point operation :
-------	---

4.4.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT RF output connected to the spectrum analyzer by RF cable.
2. Setting maximum power transmit of EUT
3. SA set RBW = 3kHz, VBW = 10kHz, Span = 1.5 times DTS Bandwidth (6 dB BW), Detector = Peak, Sweep Time = Auto and Trace = Max hold.
4. The path loss and Duty Factor were compensated to the results for each measurement by SA.
5. Mark the maximum level.
6. Measure and record the result of power spectral density. in the test report.

4.4.3 Test Setup



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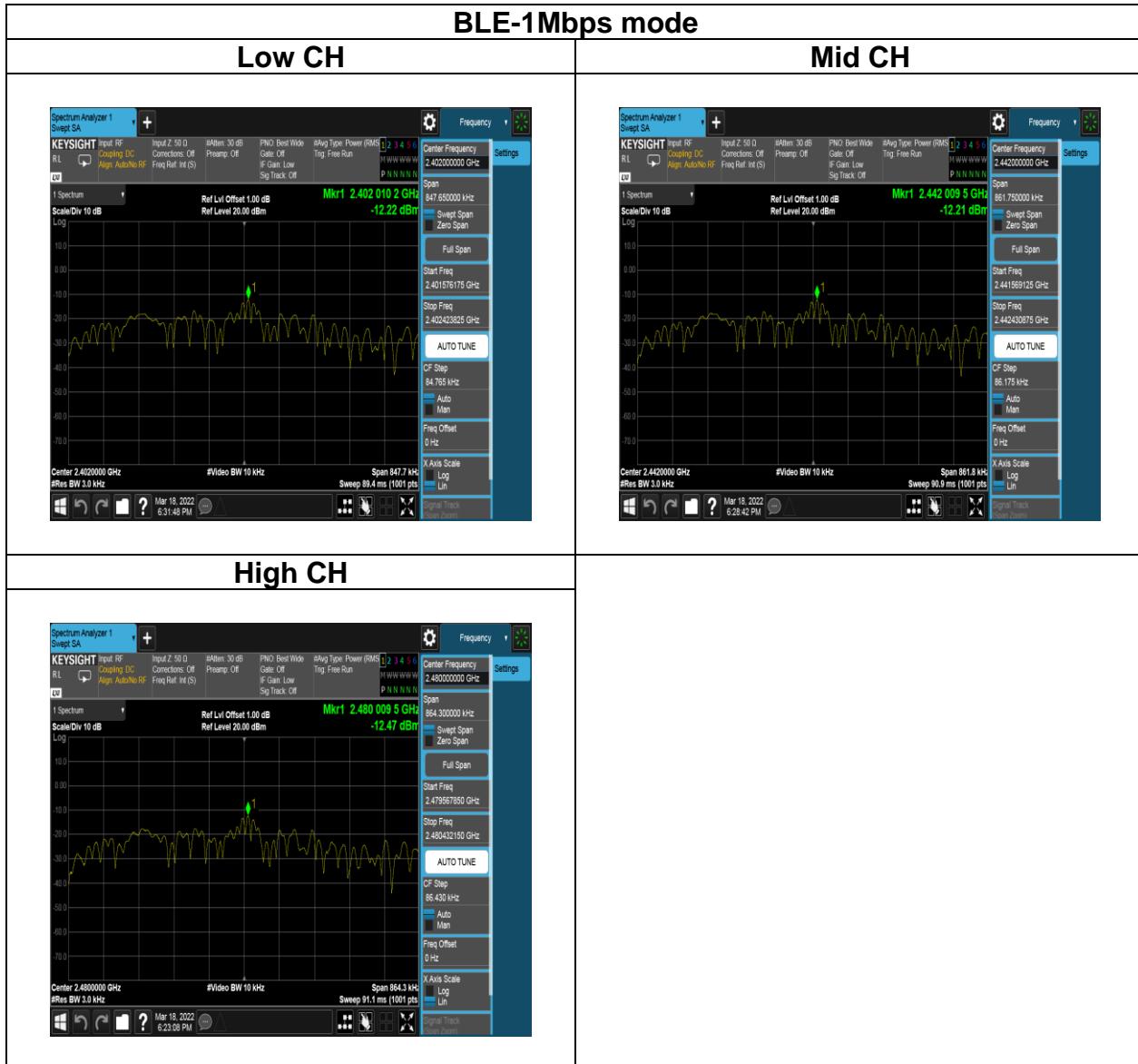
4.4.4 Test Result

Temperature: 24.5°C **Humidity:** 50% RH
Tested by: Marco Chan **Test date:** March 18, 2022

BLE 1M mode

Frequency (MHz)	RF Power Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2402	-12.22	8	PASS
2442	-12.21	8	PASS
2480	-12.47	8	PASS

Test Data



4.5 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

4.5.1 Test Limit

According to §15.247(d)

FCC: In any 100 kHz bandwidth outside the authorized frequency band,

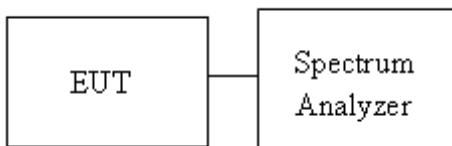
Non-restricted bands shall be attenuated at least 20 dB/30 dB relative to the maximum PSD level in 100 kHz by RF conducted or a radiated measurement which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a).

4.5.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. EUT RF output port connected to the SA by RF cable, and the path loss was compensated to result.
2. SA setting, RBW=100kHz, VBW=300kHz, Detector=Peak, Trace mode = max hold, SWT = Auto.
3. In any 100 kHz bandwidth outside the authorized frequency band, shall be attenuated at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when conducted power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

4.5.3 Test Setup



4.5.4 Test Result

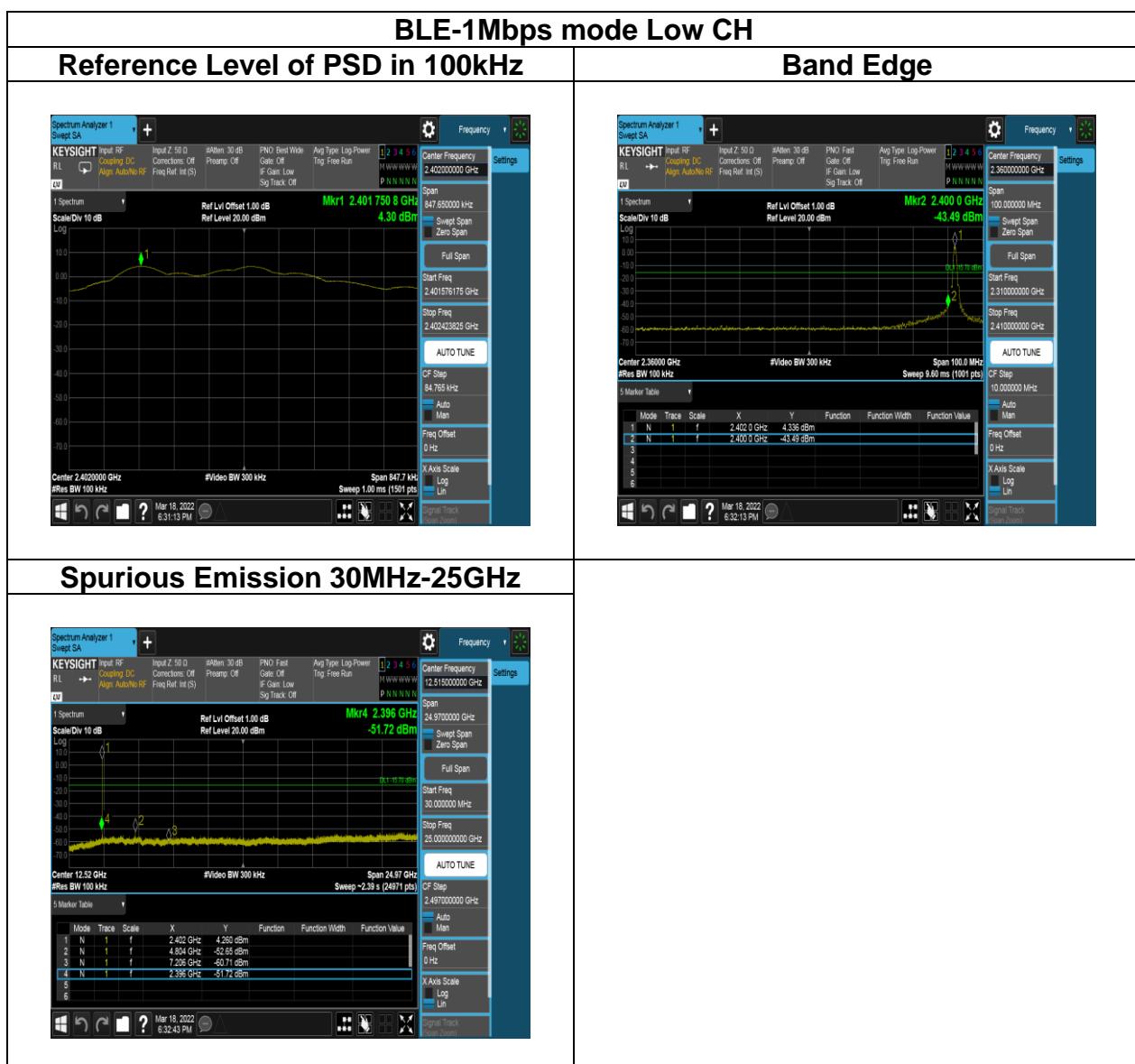
Test Data

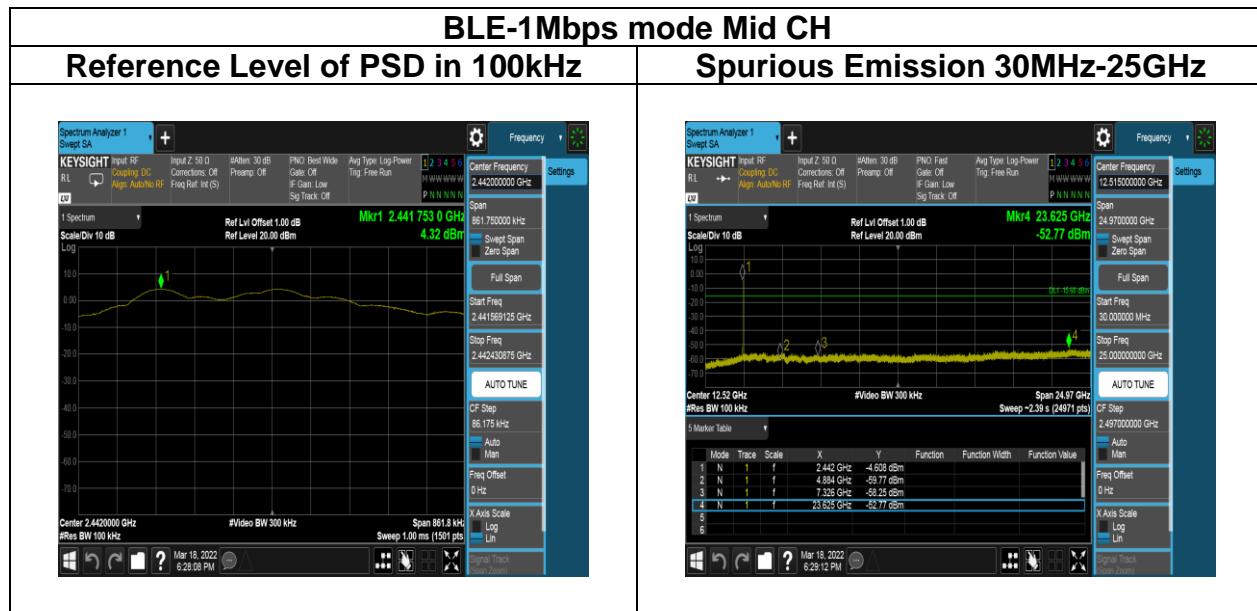
Temperature: 24.5°C

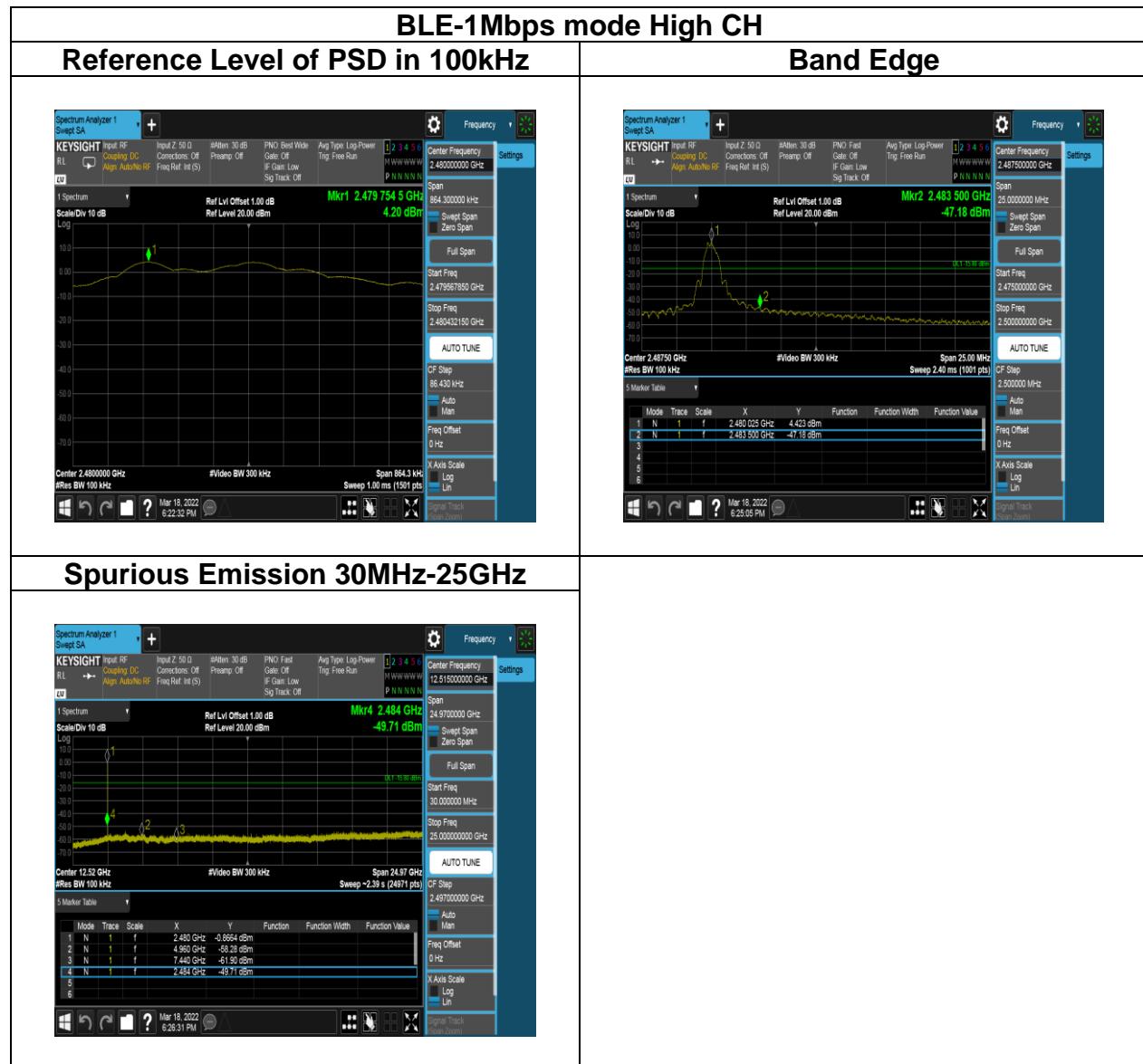
Humidity: 50% RH

Tested by: Marco Chan

Test date: March 18, 2022







4.6 RADIATION BANDEDGE AND SPURIOUS EMISSION

4.6.1 Test Limit

FCC according to §15.247(d), §15.209 and §15.205,

In any 100 kHz bandwidth outside the authorized frequency band, all harmonic and spurious must be least 20 dB below the highest emission level with the authorized frequency band. Radiation emission which fall in the restricted bands must also follow the FCC section 15.209 as below limit in table.

Below 30 MHz

Frequency	Field Strength (microvolts/m)	Magnetic H-Field (microamperes/m)	Measurement Distance (metres)
9-490 kHz	2,400/F (F in kHz)	2,400/F (F in kHz)	300
490-1,705 kHz	24,000/F (F in kHz)	24,000/F (F in kHz)	30
1.705-30 MHz	30	N/A	30

Above 30 MHz

Frequency (MHz)	Field Strength microvolts/m at 3 metres (watts, e.i.r.p.)	
	Transmitters	Receivers
30-88	100 (3 nW)	100 (3 nW)
88-216	150 (6.8 nW)	150 (6.8 nW)
216-960	200 (12 nW)	200 (12 nW)
Above 960	500 (75 nW)	500 (75 nW)

Remark:

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.

4.6.2 Test Procedure

Test method Refer as ANSI C63.10:2013.

1. The EUT is placed on a turntable, Above 1 GHz is 1.5m and below 1 GHz is 0.8m above ground plane. The EUT Configured un accordance with ANSI C63.10: 2013, and the EUT set in a continuous mode.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. And EUT is set 3m away from the receiving antenna, which is scanned from 1m to 4m above the ground plane to find out the highest emissions. Measurement are made polarized in both the vertical and the horizontal positions with antenna.
3. Span shall wide enough to full capture the emission measured. The SA from 9KHz to 26.5GHz set to the low, Mid and High channels with the EUT transmit.

Remark:

1. Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site. Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 414788.
2. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

3. The SA setting following :

- (1) Below 1G : RBW = 100kHz, VBW \geq 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
- (2) Above 1G :
 - (2.1) For Peak measurement : RBW = 1MHz, VBW \geq 3 RBW, Sweep = Auto, Detector = Peak, Trace = Max hold.
 - (2.2) For Average measurement : RBW = 1MHz, VBW
 - If Duty Cycle \geq 98%, VBW=10Hz.
 - If Duty Cycle < 98%, VBW=1/T.

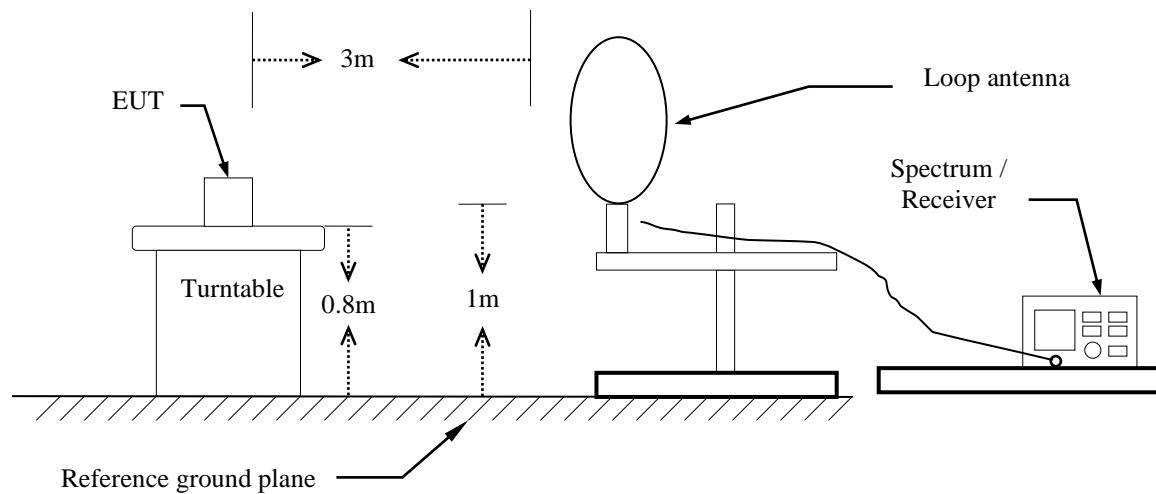
4. Data result

Actual FS=Spectrum Reading Level+Factor

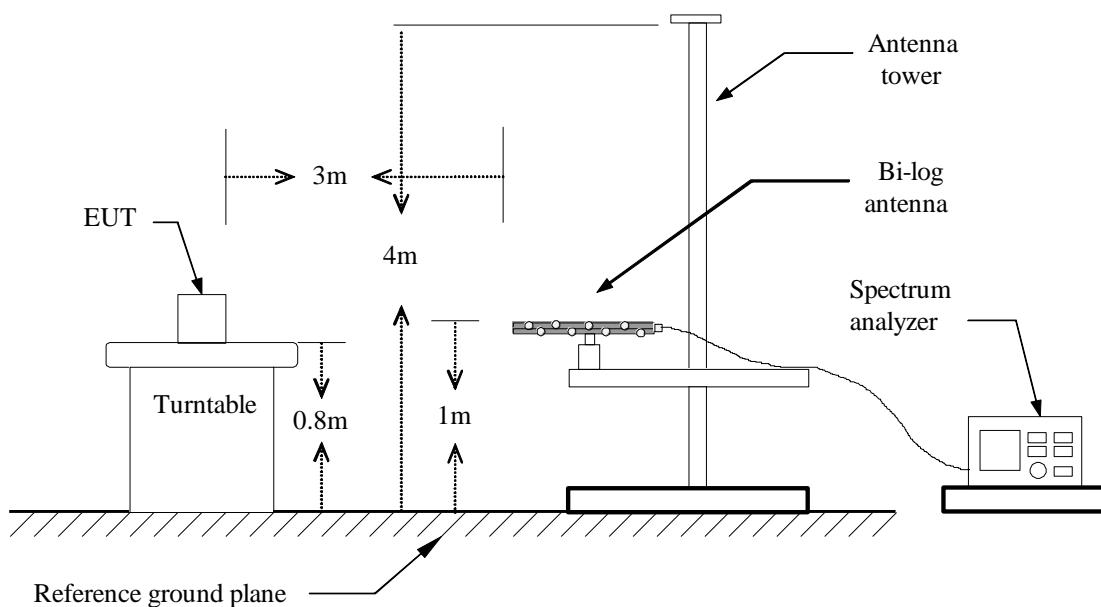
Margin=Actual FS- Limit

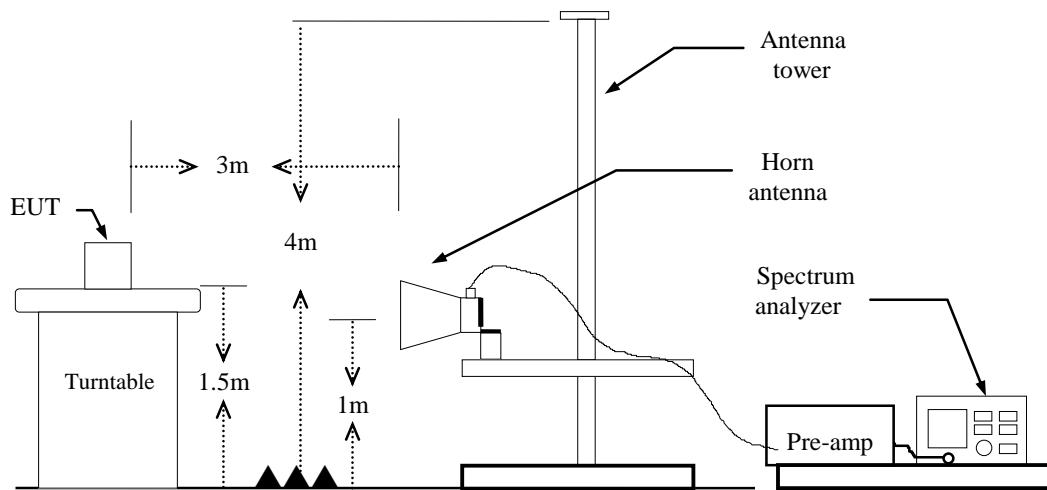
4.6.3 Test Setup

9kHz ~ 30MHz



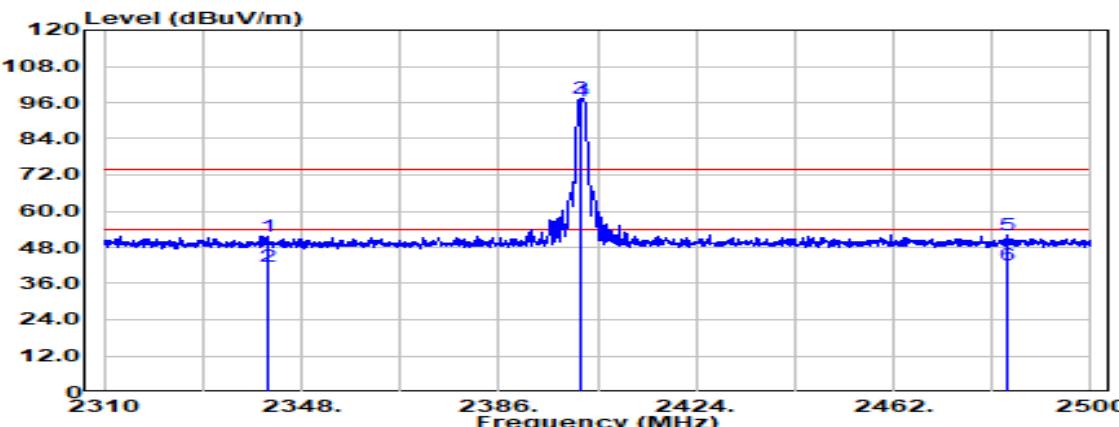
30MHz ~ 1GHz



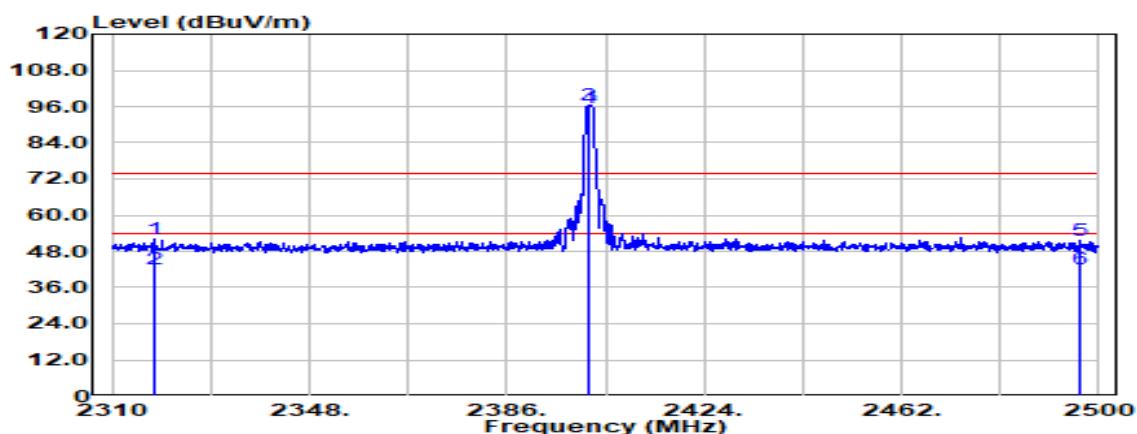
Above 1 GHz

4.6.4 Test Result

Band Edge Test Data

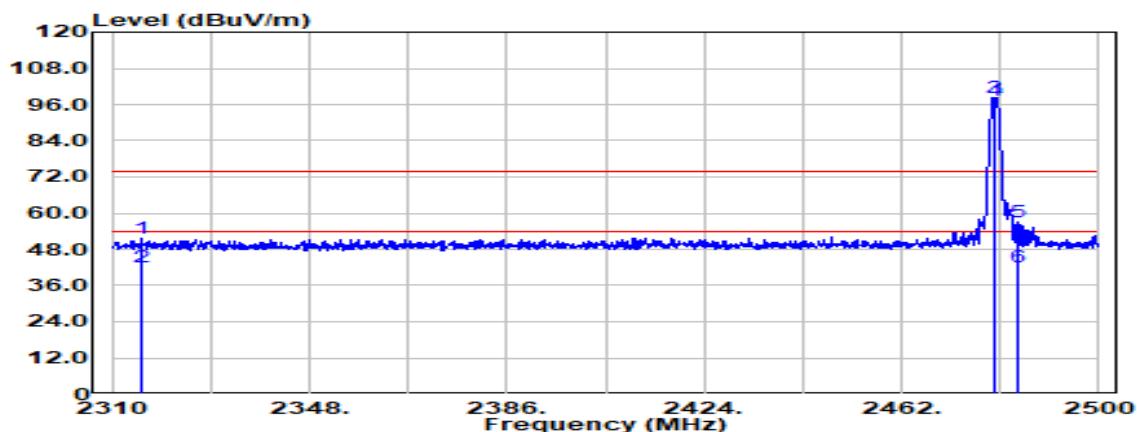
Test Mode:	BLE-1Mbps Low CH		Temp/Hum	21.8(°C)/ 64%RH																																																			
Test Item	Band Edge		Test Date	March 29, 2022																																																			
Polarize	Vertical		Test Engineer	Ray Li																																																			
Detector	Peak / Average																																																						
																																																							
<table border="1"> <thead> <tr> <th>Freq. MHz</th> <th>Detector Mode PK/QP/AV</th> <th>Spectrum Reading Level dBμV</th> <th>Factor dB</th> <th>Actual FS dBμV/m</th> <th>Limit @3m dBμV/m</th> <th>Margin dB</th> </tr> </thead> <tbody> <tr> <td>2341.350</td><td>Peak</td><td>39.51</td><td>12.27</td><td>51.77</td><td>74.00</td><td>-22.23</td></tr> <tr> <td>2341.350</td><td>Average</td><td>29.61</td><td>12.27</td><td>41.88</td><td>54.00</td><td>-12.12</td></tr> <tr> <td>2402.000</td><td>Peak</td><td>84.93</td><td>12.54</td><td>97.47</td><td>-</td><td>-</td></tr> <tr> <td>2402.000</td><td>Average</td><td>83.92</td><td>12.54</td><td>96.46</td><td>-</td><td>-</td></tr> <tr> <td>2483.755</td><td>Peak</td><td>39.19</td><td>13.08</td><td>52.27</td><td>74.00</td><td>-21.73</td></tr> <tr> <td>2483.755</td><td>Average</td><td>28.85</td><td>13.08</td><td>41.93</td><td>54.00</td><td>-12.07</td></tr> </tbody> </table>							Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB	2341.350	Peak	39.51	12.27	51.77	74.00	-22.23	2341.350	Average	29.61	12.27	41.88	54.00	-12.12	2402.000	Peak	84.93	12.54	97.47	-	-	2402.000	Average	83.92	12.54	96.46	-	-	2483.755	Peak	39.19	13.08	52.27	74.00	-21.73	2483.755	Average	28.85	13.08	41.93	54.00	-12.07
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB																																																	
2341.350	Peak	39.51	12.27	51.77	74.00	-22.23																																																	
2341.350	Average	29.61	12.27	41.88	54.00	-12.12																																																	
2402.000	Peak	84.93	12.54	97.47	-	-																																																	
2402.000	Average	83.92	12.54	96.46	-	-																																																	
2483.755	Peak	39.19	13.08	52.27	74.00	-21.73																																																	
2483.755	Average	28.85	13.08	41.93	54.00	-12.07																																																	

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Band Edge	Test Date	March 29, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak / Average		



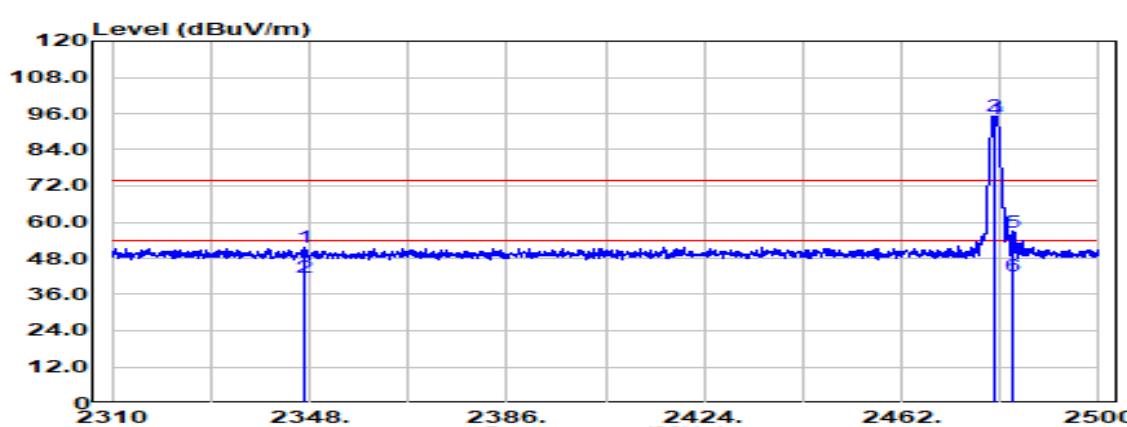
Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2317.980	Peak	39.65	12.23	51.88	74.00	-22.12
2317.980	Average	29.67	12.23	41.89	54.00	-12.11
2402.000	Peak	84.00	12.54	96.54	-	-
2402.000	Average	82.98	12.54	95.52	-	-
2496.200	Peak	38.42	13.16	51.58	74.00	-22.42
2496.200	Average	28.77	13.16	41.93	54.00	-12.07

Test Mode:	BLE-1Mbps High CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Band Edge	Test Date	March 29, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak / Average		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2315.510	Peak	39.25	12.22	51.48	74.00	-22.52
2315.510	Average	29.67	12.22	41.89	54.00	-12.11
2480.000	Peak	85.29	13.05	98.35	-	-
2480.000	Average	84.26	13.05	97.32	-	-
2484.420	Peak	43.88	13.08	56.97	74.00	-17.03
2484.420	Average	29.12	13.08	42.20	54.00	-11.80

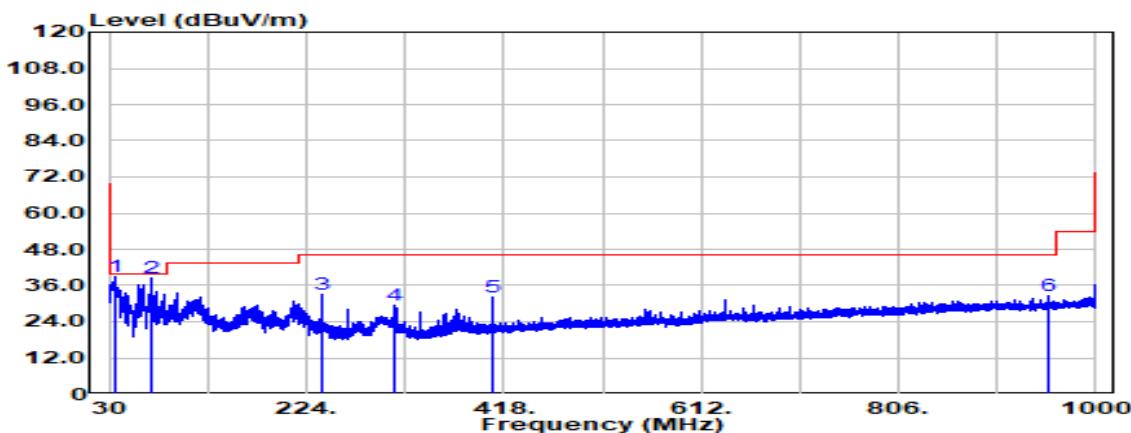
Test Mode:	BLE-1Mbps High CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Band Edge	Test Date	March 29, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak / Average		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
2346.860	Peak	39.13	12.27	51.40	74.00	-22.60
2346.860	Average	29.42	12.27	41.69	54.00	-12.31
2480.000	Peak	82.14	13.05	95.19	-	-
2480.000	Average	81.11	13.05	94.17	-	-
2483.565	Peak	43.49	13.08	56.57	74.00	-17.43
2483.565	Average	29.13	13.08	42.21	54.00	-11.79

Below 1G Test Data

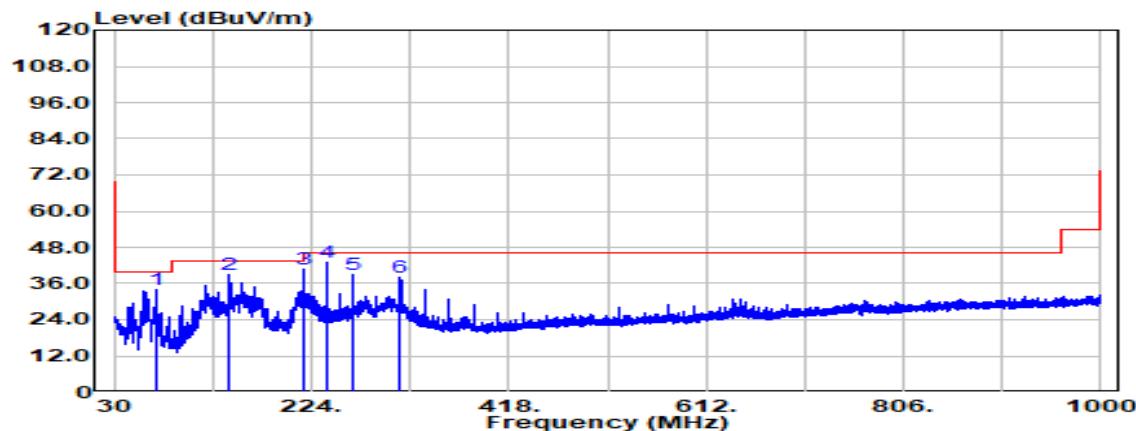
Test Mode:	BLE-1Mbps Mode	Temp/Hum	21.8(°C)/ 64%RH
Test Item	30MHz-1GHz	Test Date	March 29, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
36.063	Peak	46.10	-7.06	39.04	40.00	-0.96
71.953	Peak	54.05	-15.40	38.65	40.00	-1.35
239.763	Peak	43.95	-10.88	33.07	46.00	-12.93
311.664	Peak	38.29	-8.64	29.65	46.00	-16.35
408.058	Peak	37.98	-5.81	32.16	46.00	-13.84
953.561	Peak	29.11	3.51	32.62	46.00	-13.38

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

Test Mode:	BLE-1Mbps Mode	Temp/Hum	21.8(°C)/ 64%RH
Test Item	30MHz-1GHz	Test Date	March 29, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak		

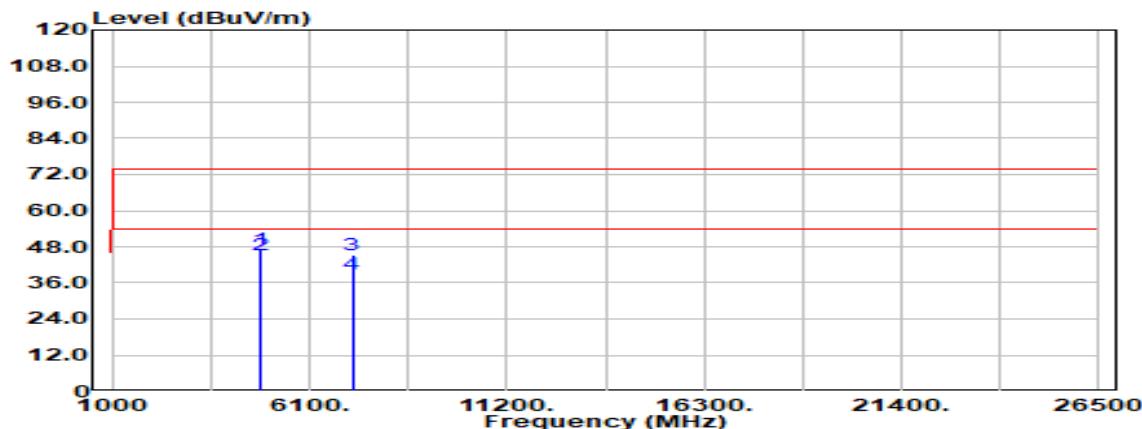


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
71.953	Peak	49.32	-15.40	33.93	40.00	-6.07
143.854	Peak	49.18	-10.40	38.78	43.50	-4.72
215.755	Peak	52.69	-12.12	40.57	43.50	-2.93
239.763	Peak	53.80	-10.88	42.92	46.00	-3.08
263.770	Peak	48.49	-9.60	38.89	46.00	-7.11
311.664	Peak	46.52	-8.64	37.88	46.00	-8.12

Note: No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz).

Above 1G Test Data

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Harmonic	Test Date	March 29, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak & Average		

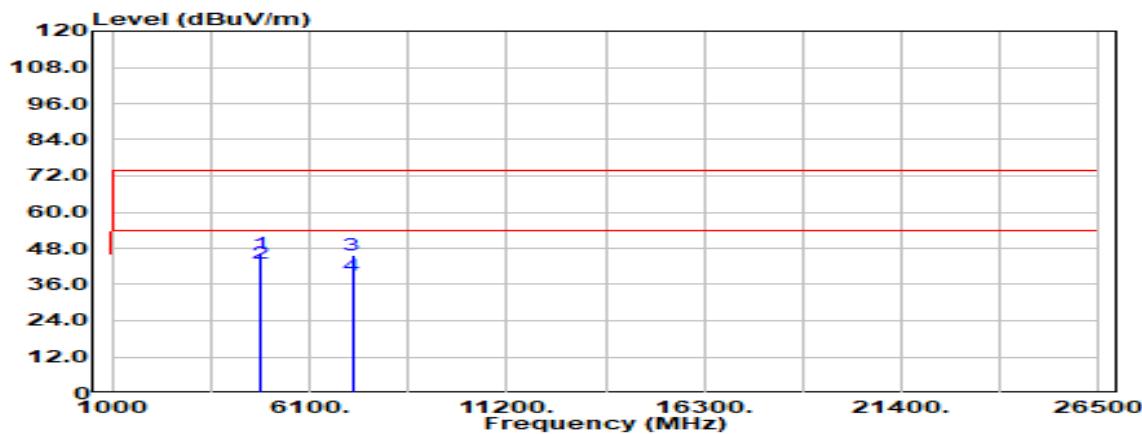


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4804.000	Peak	37.50	9.46	46.97	74.00	-27.03
4804.000	Average	35.64	9.46	45.10	54.00	-8.90
7206.000	Peak	31.71	13.51	45.22	74.00	-28.78
7206.000	Average	25.35	13.51	38.86	54.00	-15.14
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps Low CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Harmonic	Test Date	March 29, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak & Average		

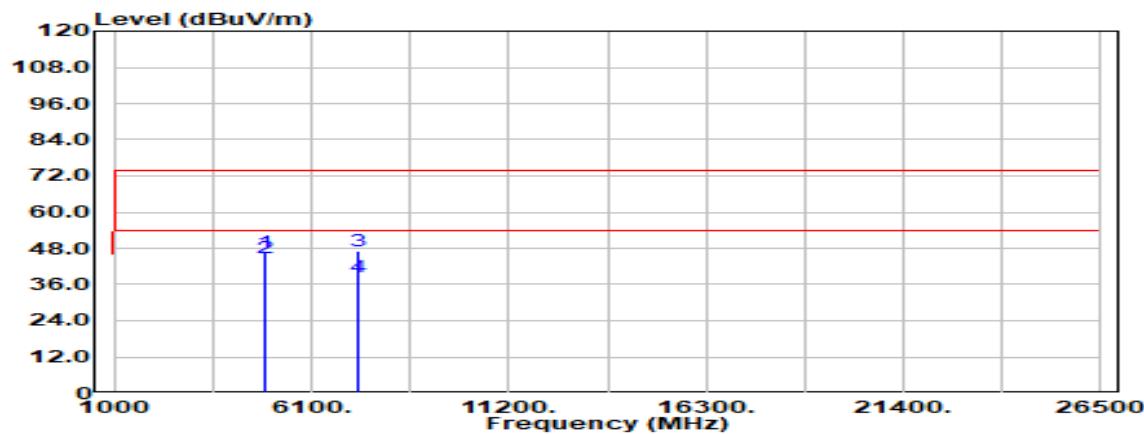


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4804.000	Peak	36.81	9.46	46.27	74.00	-27.73
4804.000	Average	33.41	9.46	42.87	54.00	-11.13
7206.000	Peak	32.07	13.51	45.58	74.00	-28.42
7206.000	Average	25.47	13.51	38.98	54.00	-15.02
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps Mid CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Harmonic	Test Date	March 29, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak & Average		

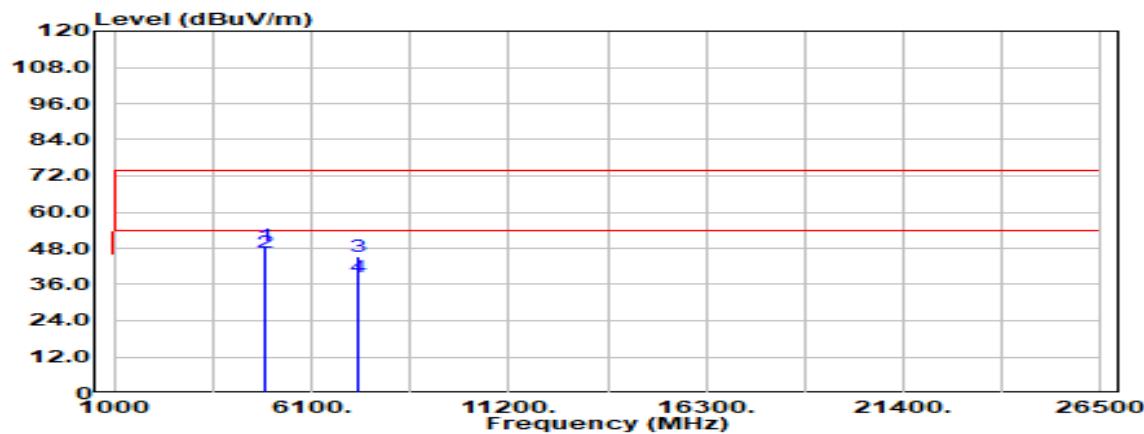


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4884.000	Peak	37.05	9.59	46.64	74.00	-27.36
4884.000	Average	35.08	9.59	44.67	54.00	-9.33
7326.000	Peak	33.93	13.24	47.17	74.00	-26.83
7326.000	Average	25.32	13.24	38.56	54.00	-15.44
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps Mid CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Harmonic	Test Date	March 29, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak & Average		

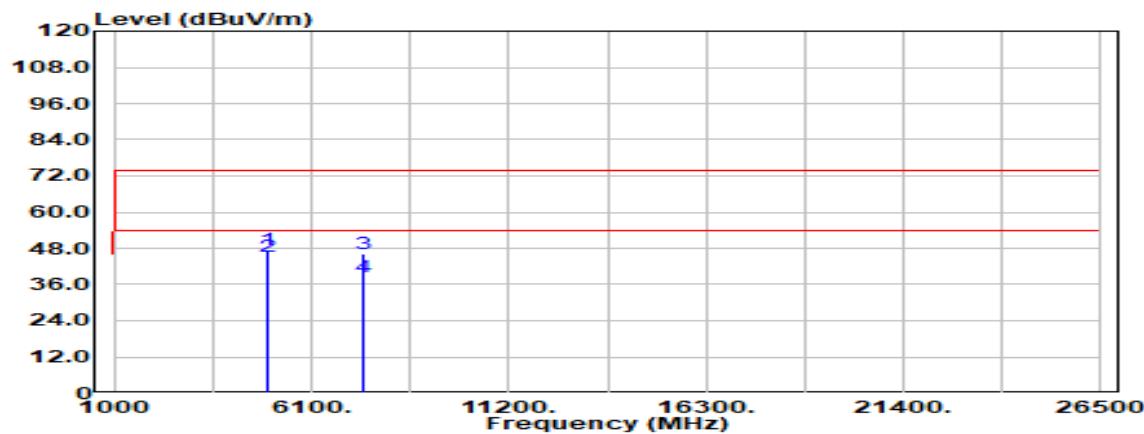


Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4884.000	Peak	39.18	9.59	48.77	74.00	-25.23
4884.000	Average	37.23	9.59	46.82	54.00	-7.18
7326.000	Peak	31.95	13.24	45.19	74.00	-28.81
7326.000	Average	25.31	13.24	38.55	54.00	-15.45
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps High CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Harmonic	Test Date	March 29, 2022
Polarize	Vertical	Test Engineer	Ray Li
Detector	Peak & Average		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4960.000	Peak	37.65	9.71	47.36	74.00	-26.64
4960.000	Average	35.71	9.71	45.41	54.00	-8.59
7440.000	Peak	32.63	13.54	46.17	74.00	-27.83
7440.000	Average	24.82	13.54	38.36	54.00	-15.64
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

Test Mode:	BLE-1Mbps High CH	Temp/Hum	21.8(°C)/ 64%RH
Test Item	Harmonic	Test Date	March 29, 2022
Polarize	Horizontal	Test Engineer	Ray Li
Detector	Peak & Average		



Freq. MHz	Detector Mode PK/QP/AV	Spectrum Reading Level dB μ V	Factor dB	Actual FS dB μ V/m	Limit @3m dB μ V/m	Margin dB
4960.000	Peak	40.72	9.71	50.43	74.00	-23.57
4960.000	Average	35.33	9.71	45.04	54.00	-8.96
7440.000	Peak	32.15	13.54	45.69	74.00	-28.31
7440.000	Average	25.26	13.54	38.80	54.00	-15.20
N/A						

Remark:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

--End of Test Report--