

TEST REPORT

Product Name : HAYLOU PurFree Buds
Brand Mark : HAYLOU
Model No. : Haylou OW01
FCC ID : 2AMQ6-OW01
Report Number : BLA-EMC-202206-A13703
Date of Sample Receipt : 2022/7/5
Date of Test : 2022/7/5 to 2022/7/21
Date of Issue : 2022/7/21
Test Standard : 47 CFR Part 15, Subpart C 15.247
Test Result : Pass

Prepared for:

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Room 401-410, Building 1, No.86 Hongtu Road, Nancheng District,
Dongguan City, Guangdong, China.

Prepared by:

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REPORT REVISE RECORD

Version No.	Date	Description
00	2022/7/21	Original

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1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.209 & 15.247(d)	Pass
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass

Remark: All the above test items are tested on the left and right earphone

2 GENERAL INFORMATION

Applicant	Dongguan Liesheng Electronic Co., Ltd.
Address	Room 401-410, Building 1, No.86 Hongtu Road, Nancheng District, Dongguan City, Guangdong, China.
Manufacturer	Dongguan Liesheng Electronic Co., Ltd.
Address	Room 401-410, Building 1, No.86 Hongtu Road, Nancheng District, Dongguan City, Guangdong, China.
Factory	Dongguan Zhengrong Electronic Co., Ltd.
Address	No.4, Shugang Avenue, Hongmei Town, Dongguan City, Guangdong
Product Name	HAYLOU PurFree Buds
Test Model No.	Haylou OW01

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V1.0
Software Version	V1.0
Operation Frequency:	2402MHz-2480MHz
Modulation Type:	GFSK
Channel Spacing:	2MHz
Number of Channels:	40
Antenna Type:	Internal Antenna
Antenna Gain:	-0.96dBi (Provided by the customer)

4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	25°C	DC3.7V

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
TX	Keep the EUT in transmitting mode

Remark: Only the data of the worst mode would be recorded in this report.

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30MHz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB

7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
AC Adapter	UGREEN	CD112	N/A	N/A
PC	HASEE	K610D	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:

BlueAsia of Technical Services(Shenzhen) Co., Ltd.

Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673

No tests were sub-contracted.

9 TEST INSTRUMENTS LIST

Test Equipment Of Conducted Emissions at AC Power Line (150kHz-30MHz)					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Shield room	SKET	833	N/A	25/11/2020	24/11/2023
Receiver	R&S	ESPI3	101082	24/9/2021	23/9/2022
LISN	R&S	ENV216	3560.6550.15	24/9/2021	23/9/2022
LISN	AT	AT166-2	AKK1806000003	26/9/2021	25/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

Test Equipment Of Conducted Band Edges Measurement					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022

Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Radiated Emissions which fall in the restricted bands

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	10/11/2020	9/11/2023
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Receiver	R&S	ESR7	101199	24/9/2021	23/9/2022
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	26/9/2020	25/9/2022
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	26/9/2020	25/9/2022
Amplifier	SKET	LNPA-0118-45	N/A	24/9/2021	23/9/2022
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	26/9/2020	25/9/2022

Test Equipment Of Conducted Spurious Emissions

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Power Spectrum Density

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due

Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Conducted Peak Output Power

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Minimum 6dB Bandwidth

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	24/9/2021	23/9/2022
Spectrum	Agilent	N9020A	MY49100060	24/9/2021	23/9/2022
Signal Generator	Agilent	N5182A	MY49060650	24/9/2021	23/9/2022
Signal Generator	Agilent	E8257D	MY44320250	24/9/2021	23/9/2022

Test Equipment Of Antenna Requirement

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due

9 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

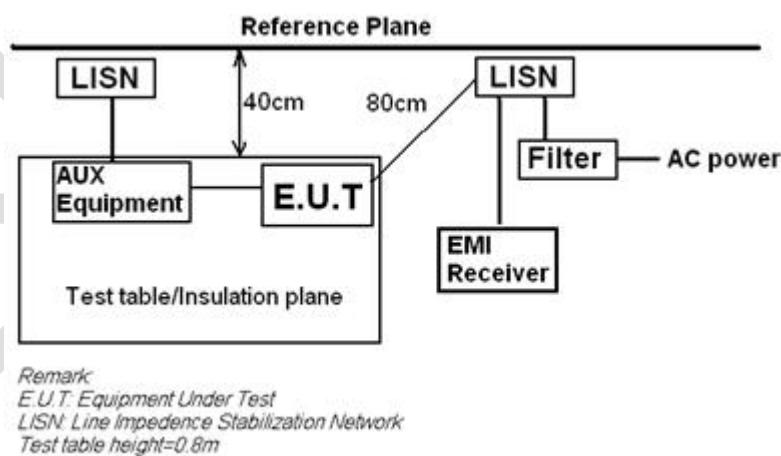
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25°C
Humidity	55%

9 LIMITS

Frequency of emission(MHz)	Conducted limit(dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

9.1 BLOCK DIAGRAM OF TEST SETUP



9.2 PROCEDURE

- 1) The mains terminal disturbance voltage test was conducted in a shielded room.
- 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 50hm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

- 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,
- 4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.
- 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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9.3 TEST DATA

[TestMode: TX]; [Line: Line];[Power:AC120V/60Hz]



Site	Phase:	L1	Temperature: (C)
Limit: FCC Class B Conduction(QP)	Power:		Humidity: %RH
EUT: HAYLOU PurFree buds			
M/N: haylou ow01			
Mode: BLE-TX mode			
Note:			

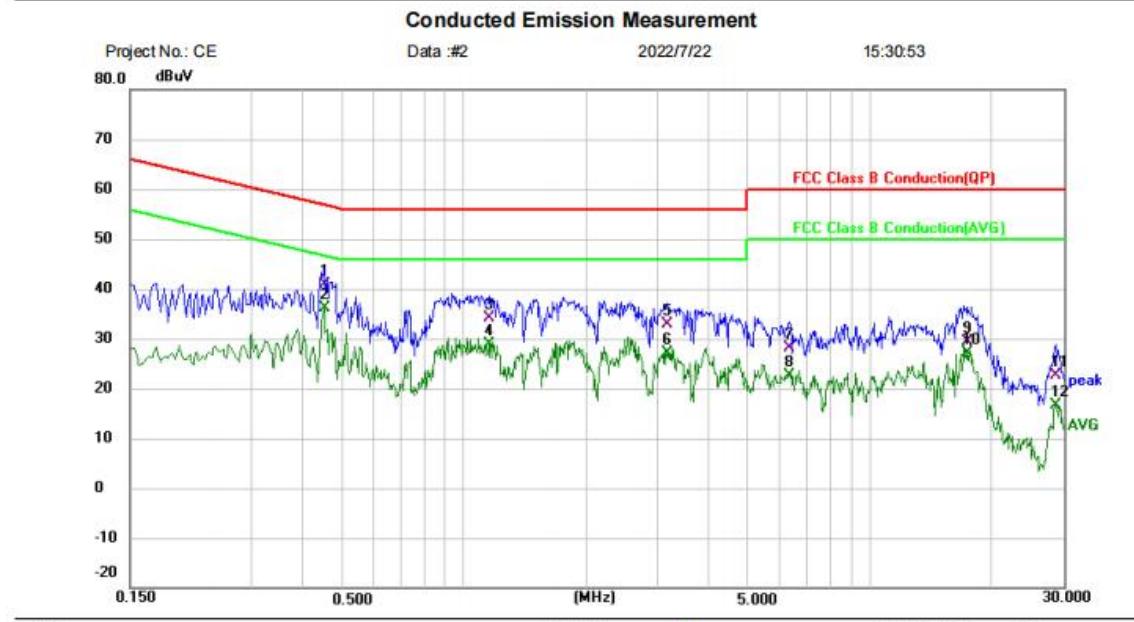
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	
			Level	Factor	ment			
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.4500	36.81	9.86	46.67	56.88	-10.21	QP
2	*	0.4500	31.47	9.86	41.33	46.88	-5.55	AVG
3		1.0660	30.00	9.92	39.92	56.00	-16.08	QP
4		1.0660	20.66	9.92	30.58	46.00	-15.42	AVG
5		2.2780	26.90	9.95	36.85	56.00	-19.15	QP
6		2.2780	17.42	9.95	27.37	46.00	-18.63	AVG
7		2.9900	26.16	9.97	36.13	56.00	-19.87	QP
8		2.9900	16.95	9.97	26.92	46.00	-19.08	AVG
9		5.5340	20.73	10.04	30.77	60.00	-29.23	QP
10		5.5340	12.10	10.04	22.14	50.00	-27.86	AVG
11		12.8020	20.84	10.27	31.11	60.00	-28.89	QP
12		12.8020	16.19	10.27	26.46	50.00	-23.54	AVG

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX]; [Line: Nutral]; [Power:AC120V/60Hz]



Site: Phase: **N** Temperature: (C)
Limit: FCC Class B Conduction(QP) Power: Humidity: %RH
EUT: HAYLOU PurFree buds
M/N: haylou ow01
Mode: BLE-TX mode
Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.4500	30.98	9.79	40.77	56.88	-16.11	QP	
2	*	0.4500	26.39	9.79	36.18	46.88	-10.70	AVG	
3		1.1539	24.35	9.84	34.19	56.00	-21.81	QP	
4		1.1539	18.94	9.84	28.78	46.00	-17.22	AVG	
5		3.1660	23.08	9.90	32.98	56.00	-23.02	QP	
6		3.1660	17.33	9.90	27.23	46.00	-18.77	AVG	
7		6.3500	18.03	10.00	28.03	60.00	-31.97	QP	
8		6.3500	12.63	10.00	22.63	50.00	-27.37	AVG	
9		17.3180	18.94	10.36	29.30	60.00	-30.70	QP	
10		17.3180	16.84	10.36	27.20	50.00	-22.80	AVG	
11		28.6700	12.20	10.47	22.67	60.00	-37.33	QP	
12		28.6700	6.15	10.47	16.62	50.00	-33.38	AVG	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

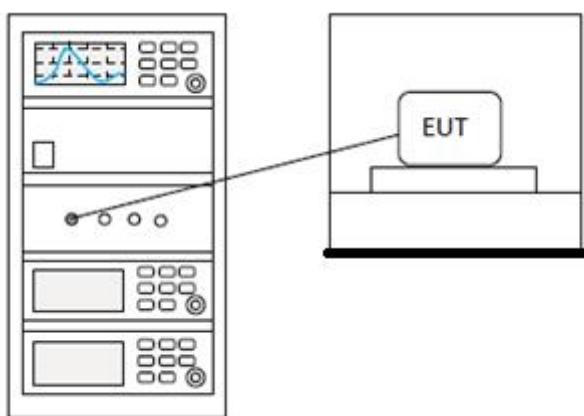
10 CONDUCTED BAND EDGES MEASUREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25°C
Humidity	55%

10.1 LIMITS

Limit:	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 §15.209(a) (see §15.205(c)).
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10.2 BLOCK DIAGRAM OF TEST SETUP



10.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

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11 RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

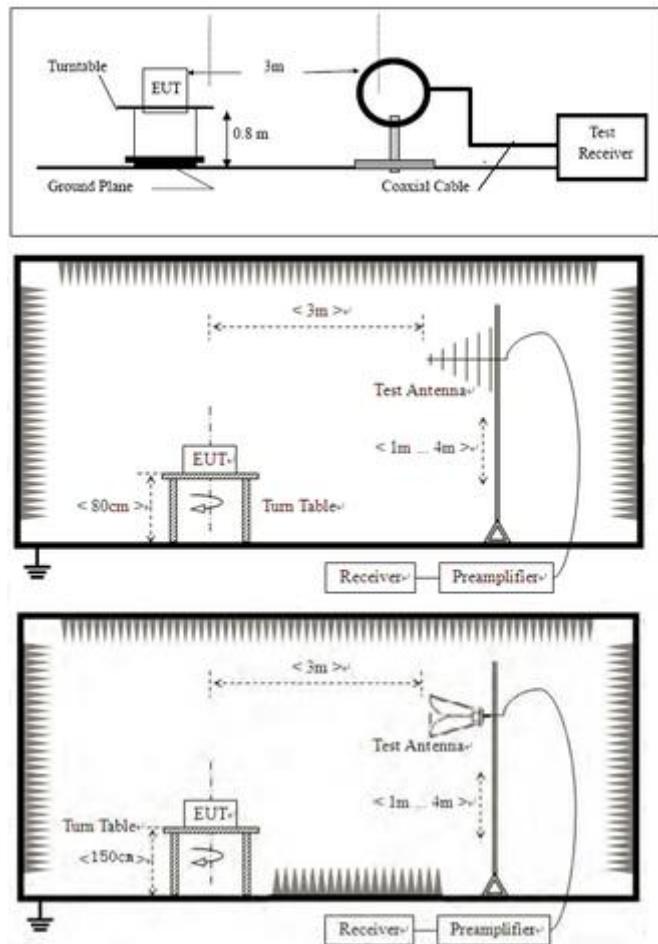
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25 °C
Humidity	55%

11.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

11.2 BLOCK DIAGRAM OF TEST SETUP



11.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

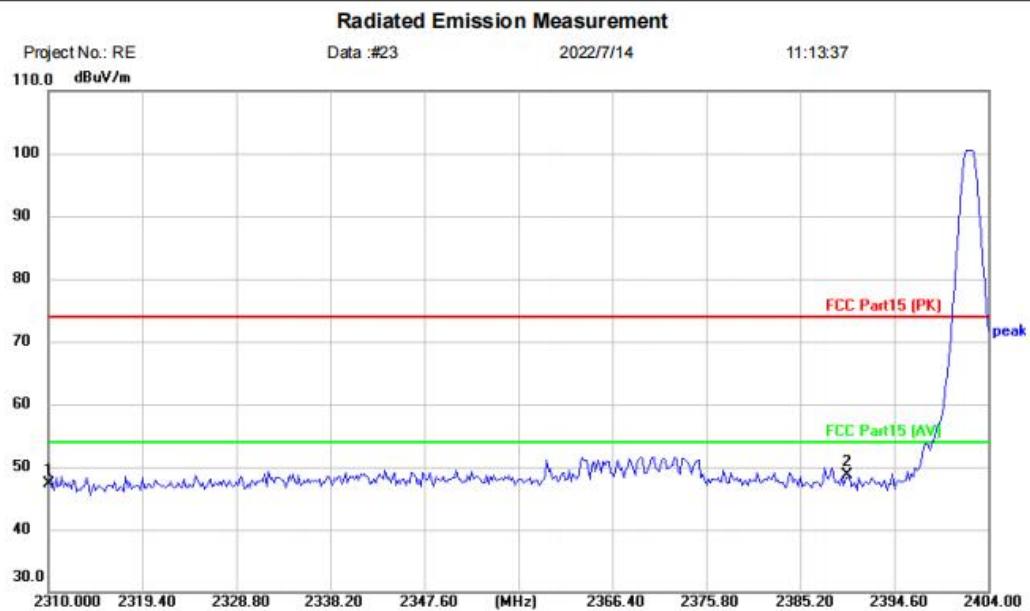
Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

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11.4 TEST DATA

left channel:

[TestMode: TX low channel]; [Polarity: Horizontal]



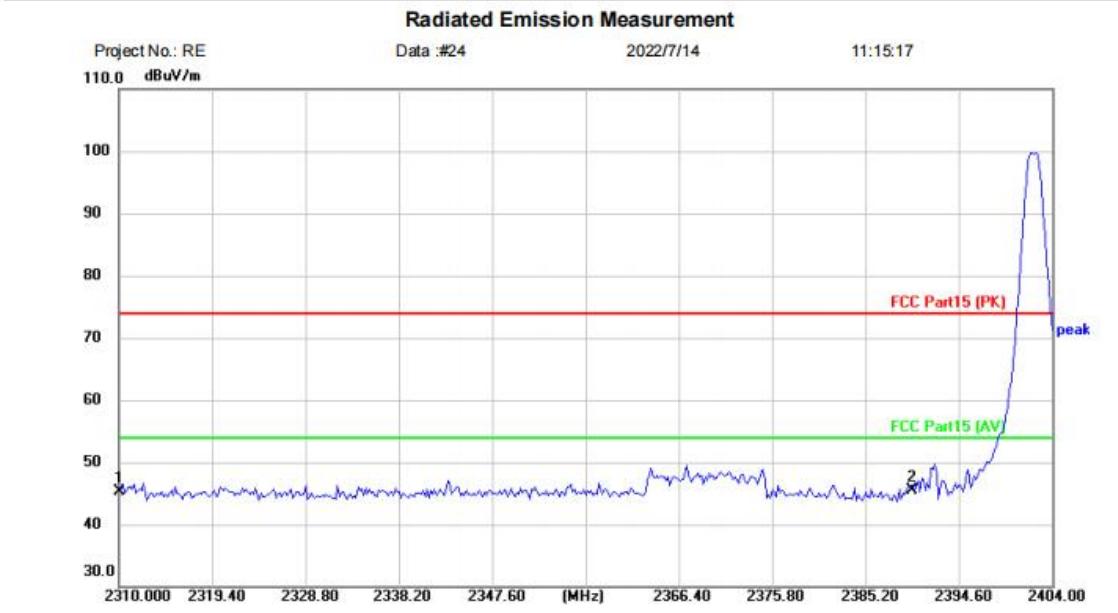
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over						
							MHz	dBuV	dB/m	dBuV/m	dB	Detector	Comment
1		2310.000	51.28	-3.93	47.35	74.00	-26.65	peak					
2	*	2390.000	52.25	-3.58	48.67	74.00	-25.33	peak					

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX low channel]; [Polarity: Vertical]



Site

Polarization: **Vertical**

Temperature: (C)

Limit: FCC Part15 (PK)

Power:

Humidity: %RH

EUT: HAYLOU Purfree Buds

M/N: Haylou ow01

Mode: BLE1M TX-L

Note:

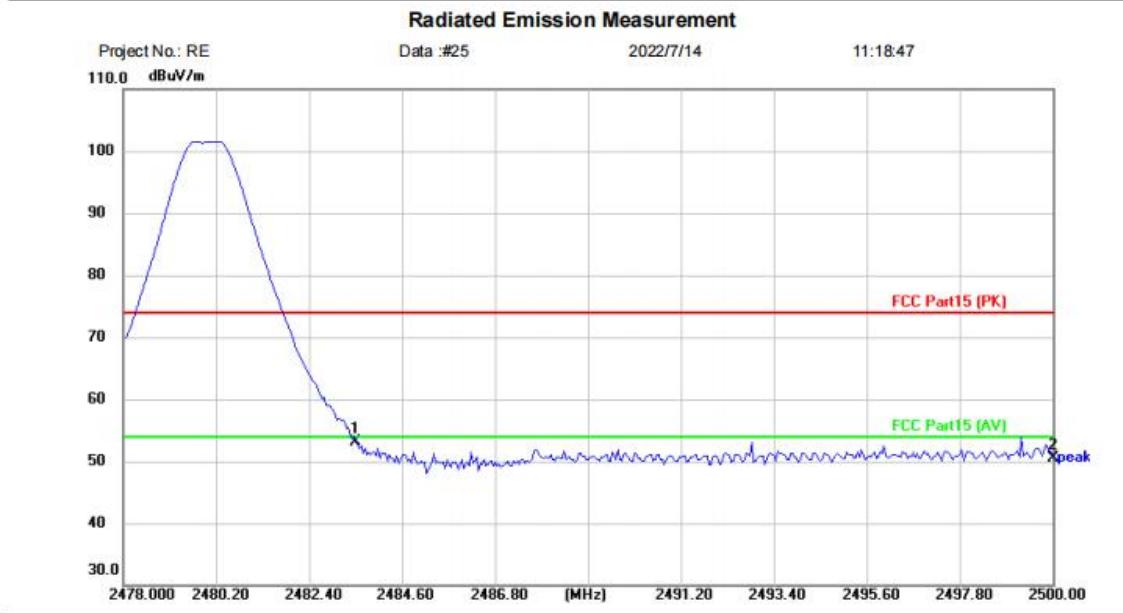
No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB/m	dBuV/m	dB			
1		2310.000	49.26	-3.93	45.33	74.00	-28.67	peak	
2	*	2390.000	49.08	-3.58	45.50	74.00	-28.50	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX High channel]; [Polarity: Horizontal]



Site: Limit: FCC Part15 (PK) EUT: HAYLOU Purfree Buds M/N: Haylou ow01 Mode: BLE1M TX-H Note: Polarization: **Horizontal** Power: Temperature: (C) Humidity: %RH

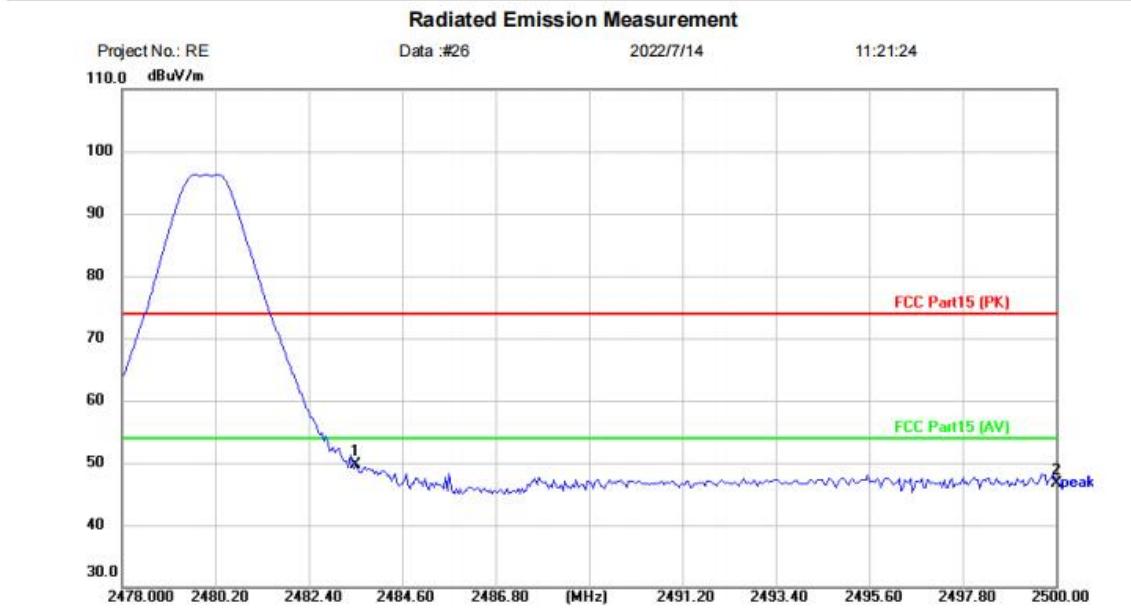
No.	Mk.	Reading		Correct Factor	Measure- ment	Limit	Over			
		MHz	dBuV				dBuV/m	dBuV/m	dB	Detector
1	*	2483.500	56.17	-3.14	53.03	74.00	-20.97	peak		
2		2500.000	53.64	-3.08	50.56	74.00	-23.44	peak		

*:Maximum data x:Over limit !:over margin

(Reference Only

Test Result: Pass

[TestMode: TX High channel]; [Polarity: Vertical]



Site	Polarization: Vertical	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: HAYLOU Purfree Buds		
M/N: Haylou ow01		
Mode: BLE1M TX-H		
Note:		

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over					
							MHz	dBuV	dB/m	dBuV/m	dB	Detector
1	*	2483.500	52.80	-3.14	49.66	74.00	-24.34		peak			
2		2500.000	49.69	-3.08	46.61	74.00	-27.39		peak			

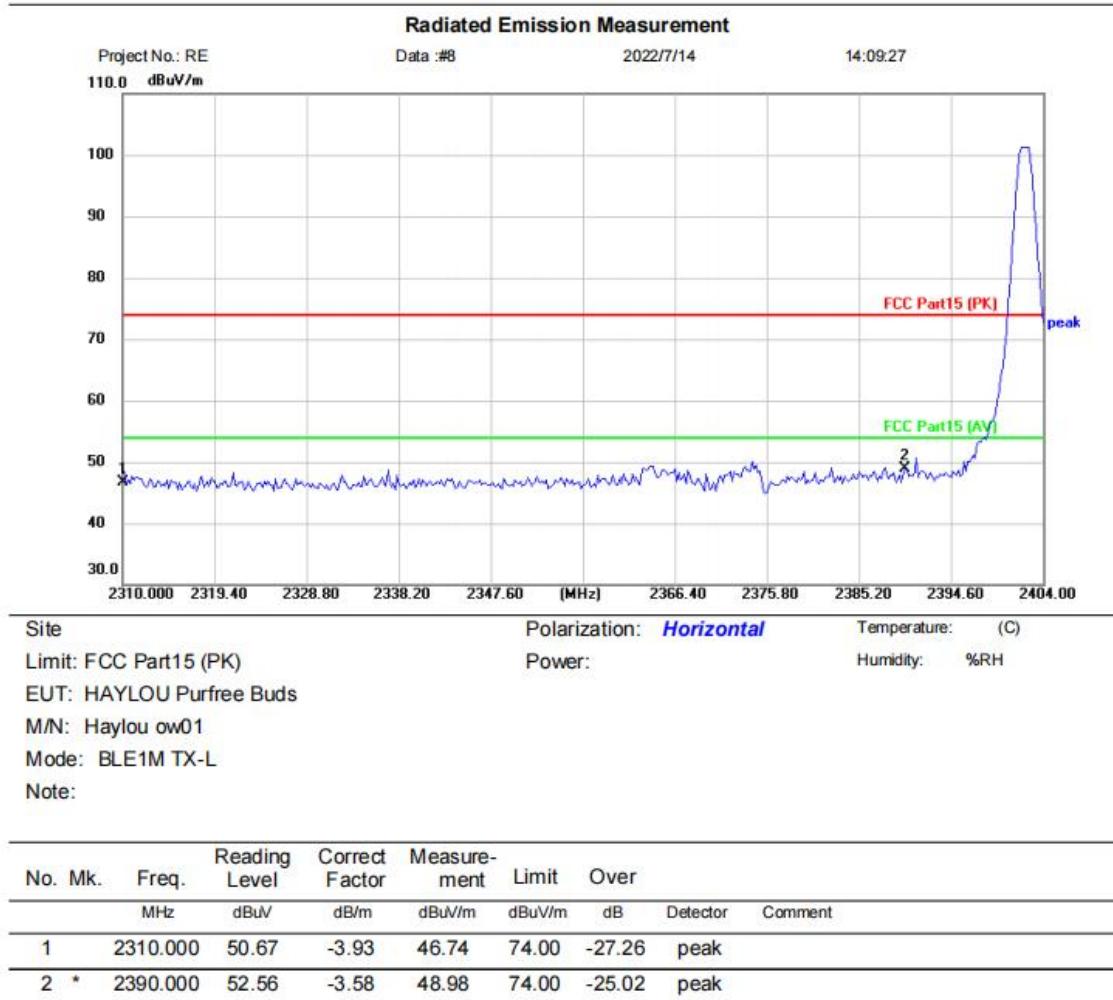
*:Maximum data x:Over limit !:over margin

(Reference Only

Test Result: Pass

right channel:

[TestMode: TX low channel]; [Polarity: Horizontal]

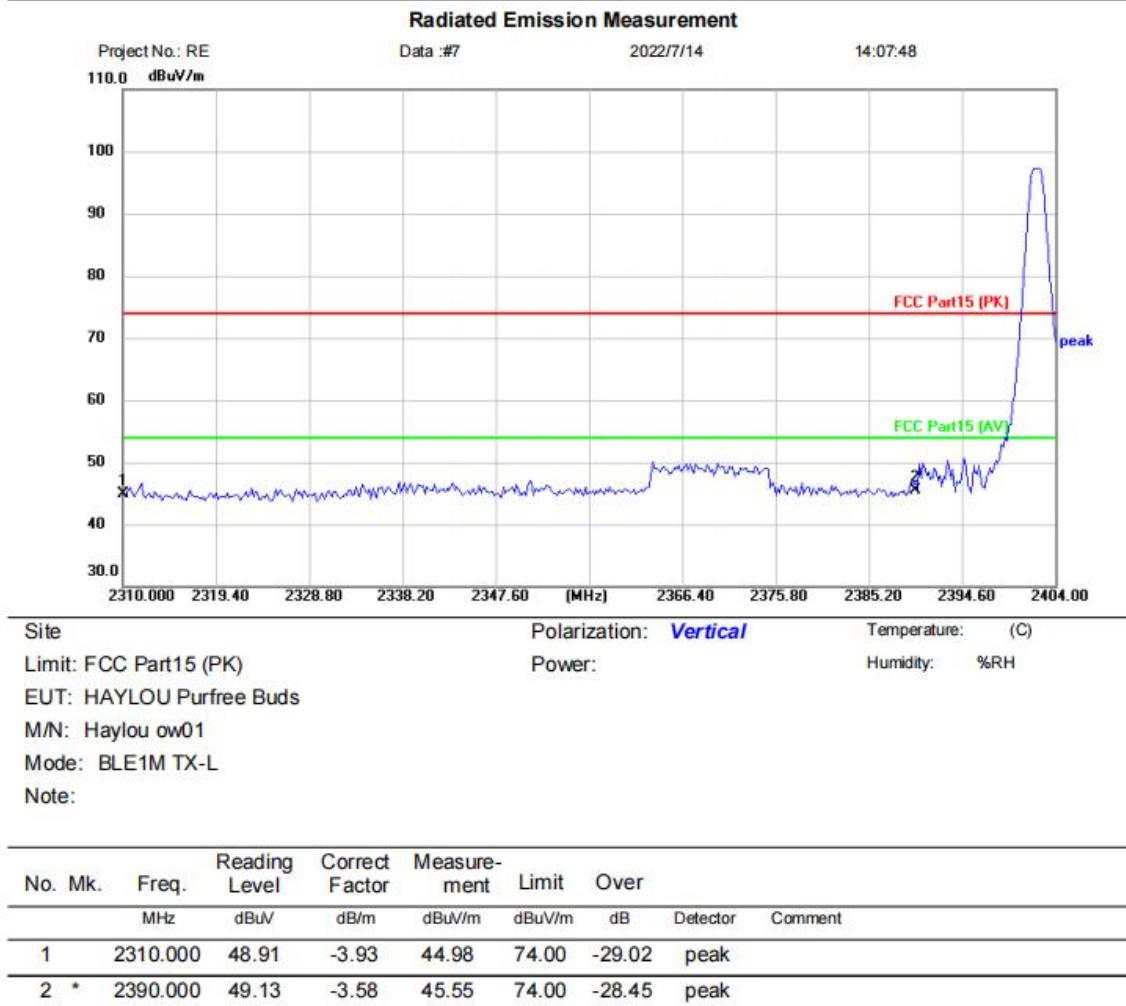


*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMethod: TX low channel]; [Polarity: Vertical]

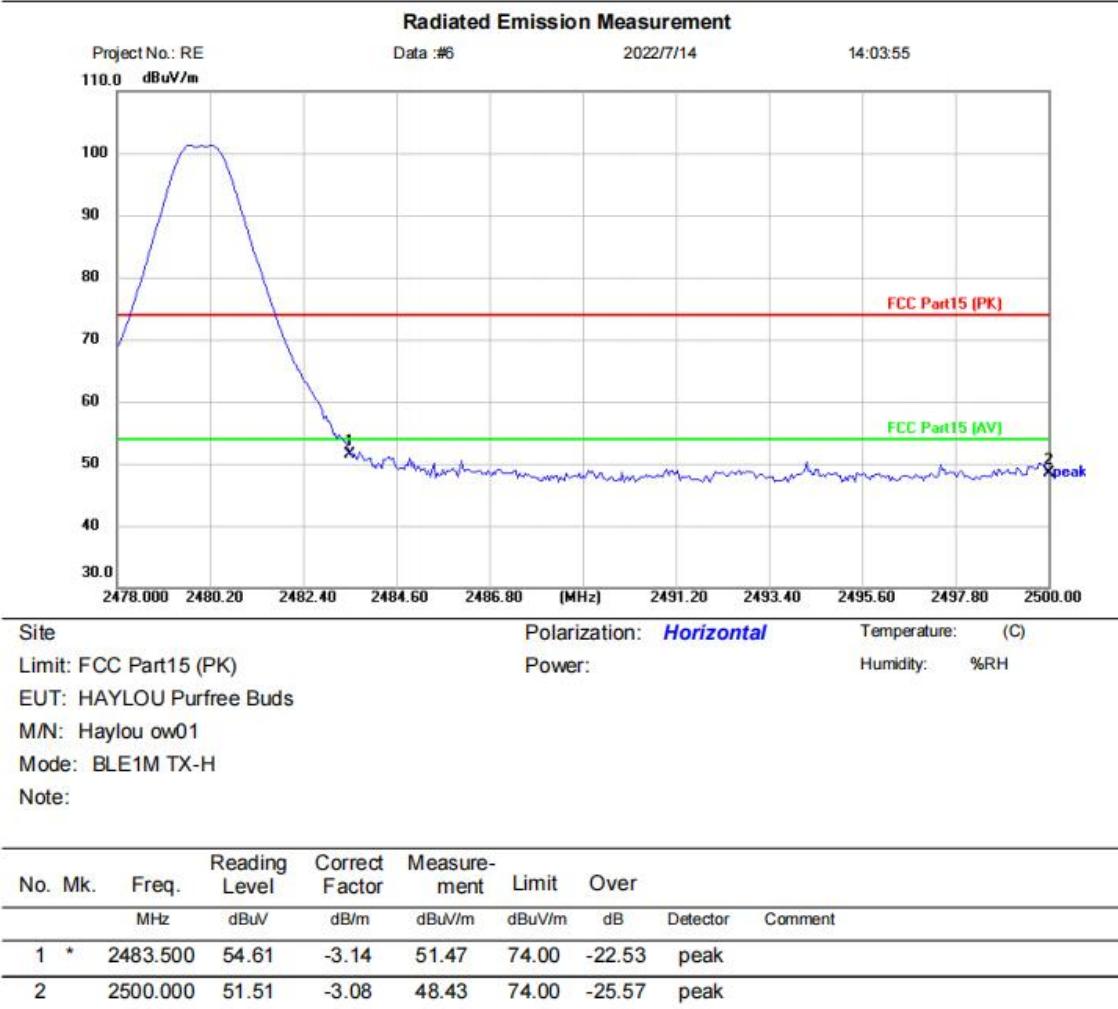


*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMethod: TX High channel]; [Polarity: Horizontal]

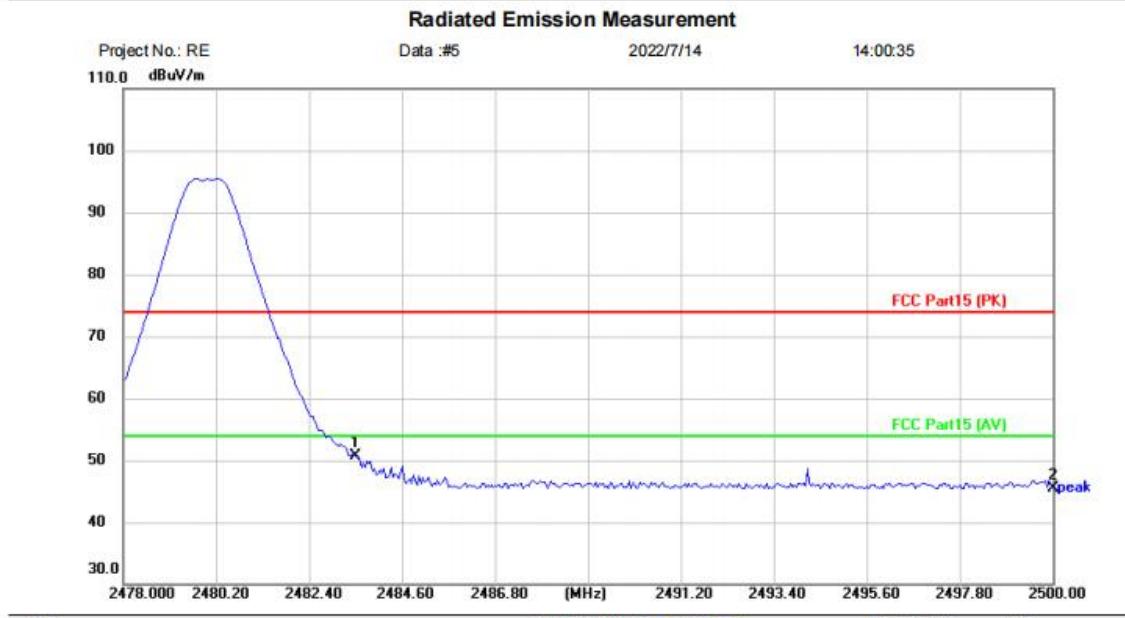


*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result: Pass

[TestMode: TX High channel]; [Polarity: Vertical]



Site: Limit: FCC Part15 (PK) Polarization: **Vertical** Temperature: (C)
EUT: HAYLOU Purfree Buds Power: Humidity: %RH
M/N: Haylou ow01
Mode: BLE1M TX-H
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over							
							MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	53.90	-3.14	50.76	74.00	-23.24	peak						
2		2500.000	48.61	-3.08	45.53	74.00	-28.47	peak						

*:Maximum data x:Over limit !:over margin

(Reference Only

Test Result: Pass

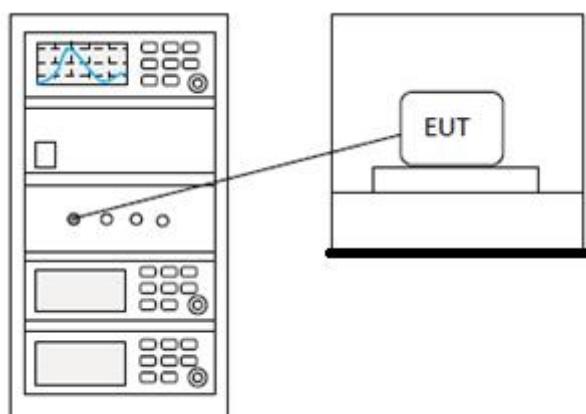
12 CONDUCTED SPURIOUS EMISSIONS

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25°C
Humidity	55%

12.1 LIMITS

Limit:	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 §15.209(a) (see §15.205(c)).
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12.2 BLOCK DIAGRAM OF TEST SETUP



12.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia

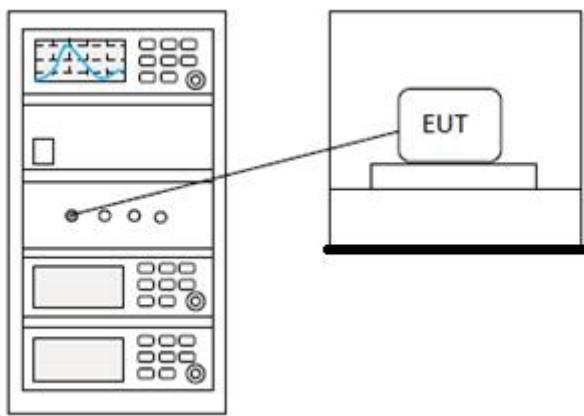
13 POWER SPECTRUM DENSITY

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.10.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25 °C
Humidity	55%

13.1 LIMITS

Limit: $\leq 8\text{dBm}$ in any 3 kHz band during any time interval of continuous transmission

13.2 BLOCK DIAGRAM OF TEST SETUP



13.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

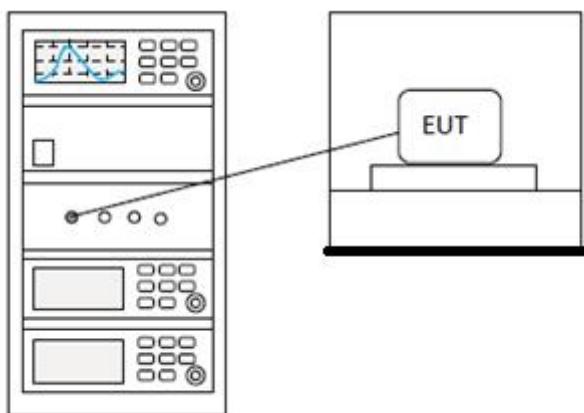
14 CONDUCTED PEAK OUTPUT POWER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25 °C
Humidity	55%

14.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq$ hopping channels < 50
	1 for digital modulation
2400-2483.5	1 for ≥ 75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

14.2 BLOCK DIAGRAM OF TEST SETUP



14.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia

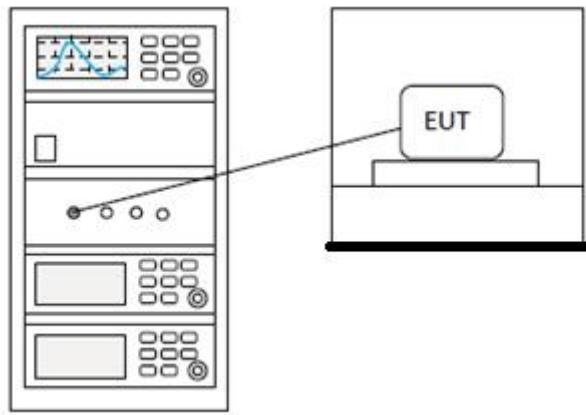
15 MINIMUM 6DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.8.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25 °C
Humidity	55%

15.1 LIMITS

Limit: ≥ 500 kHz

15.2 BLOCK DIAGRAM OF TEST SETUP



15.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

16 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

16.1 CONCLUSION

Standard Requirement:

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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

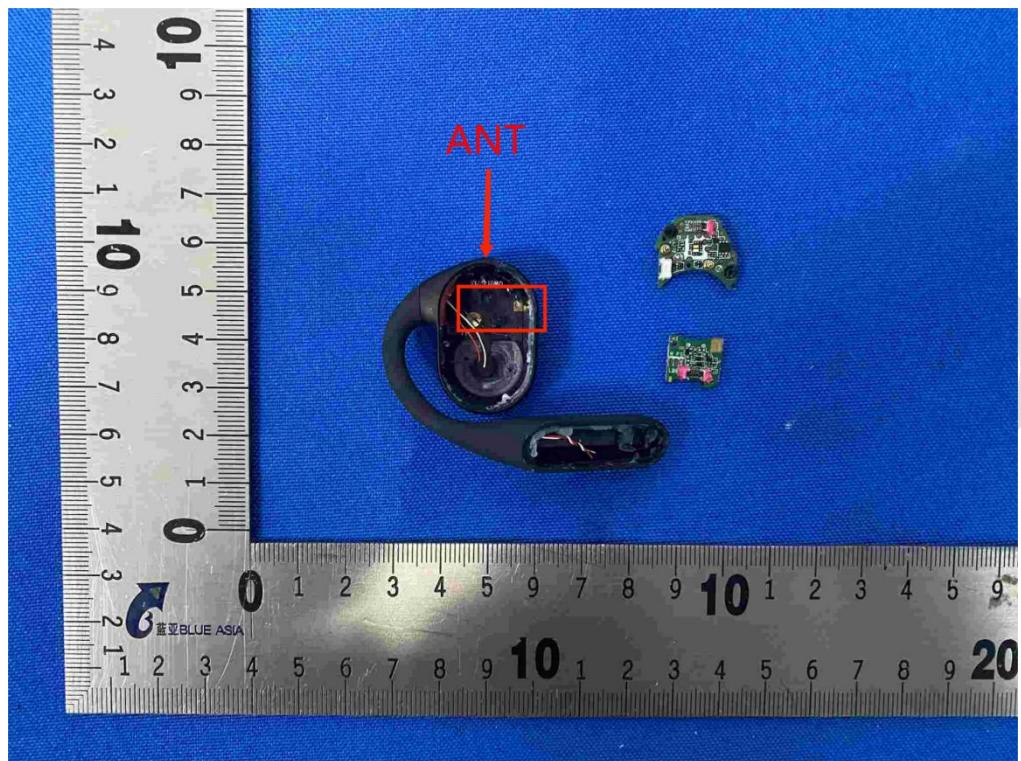
EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -0.96dBi.

left channel:



right channel:



17 RADIATED SPURIOUS EMISSIONS

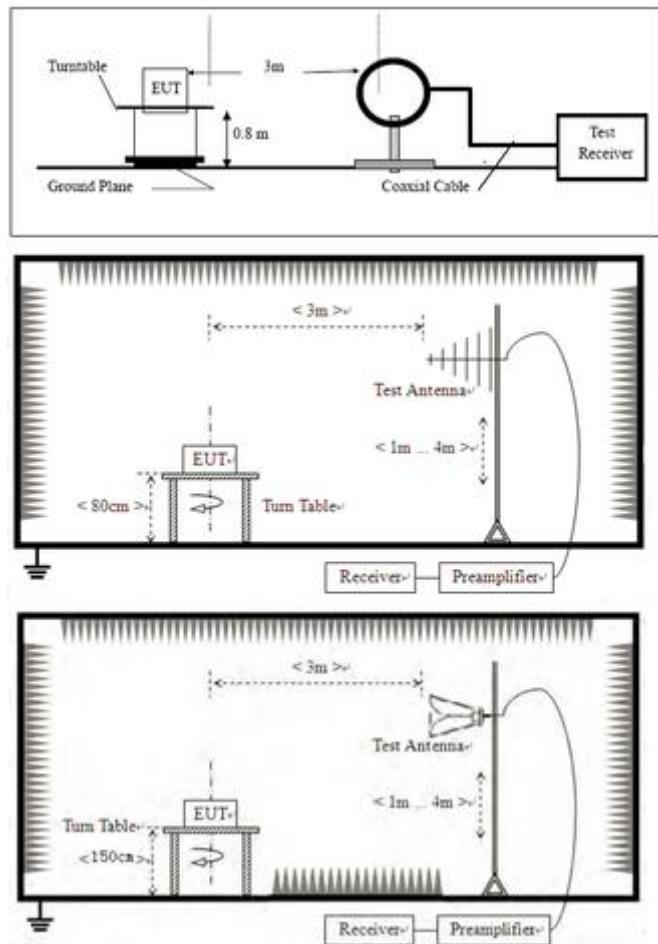
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Charlie
Temperature	25°C
Humidity	55%

17.1 LIMITS

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

17.2 BLOCK DIAGRAM OF TEST SETUP



17.3 PROCEDURE

- For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

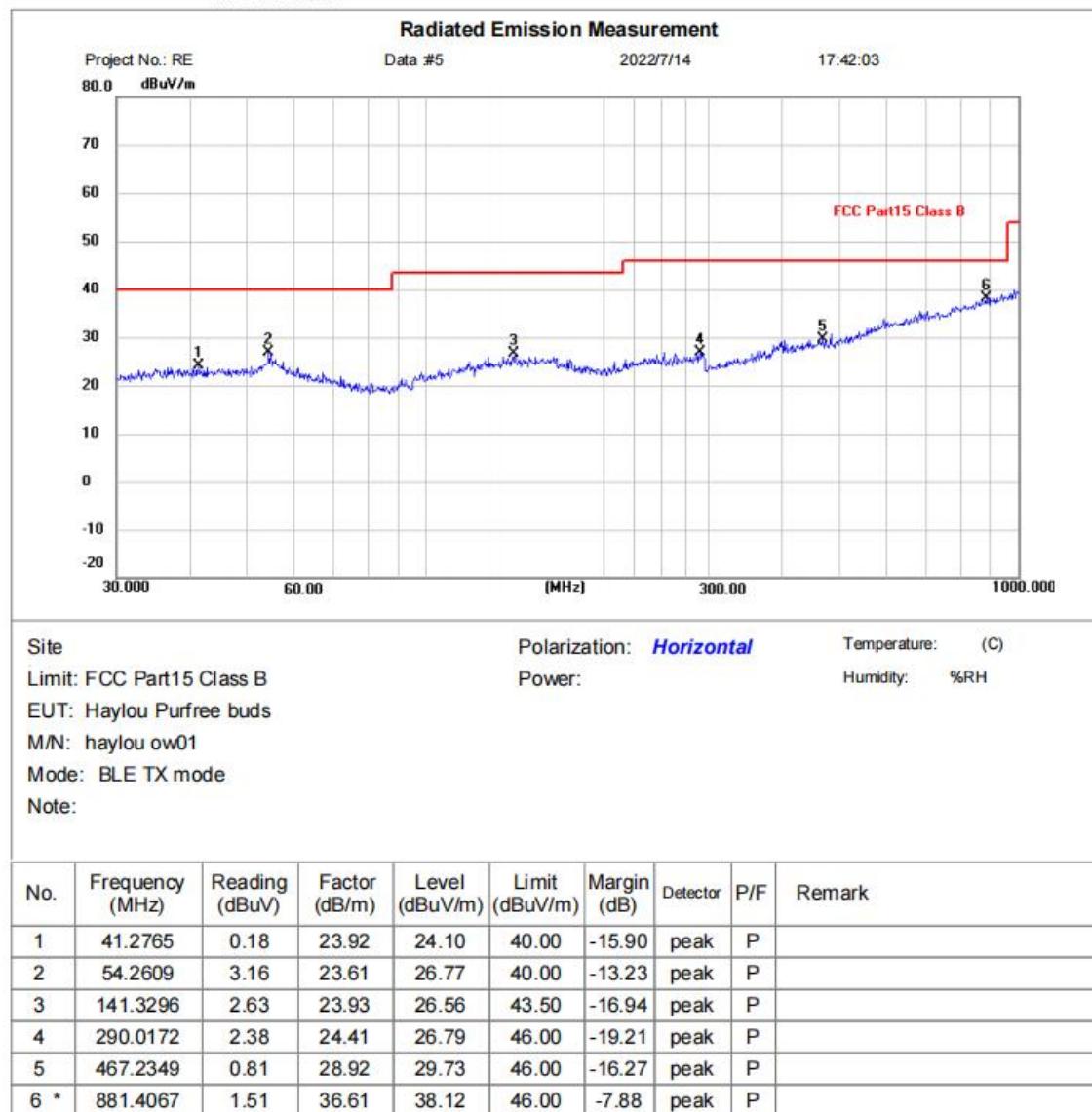
- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor
- 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. fundamental frequency is blocked by filter, and only spurious emission is shown.
- 4) For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

17.4 TEST DATA

Below 1GHz

left channel:

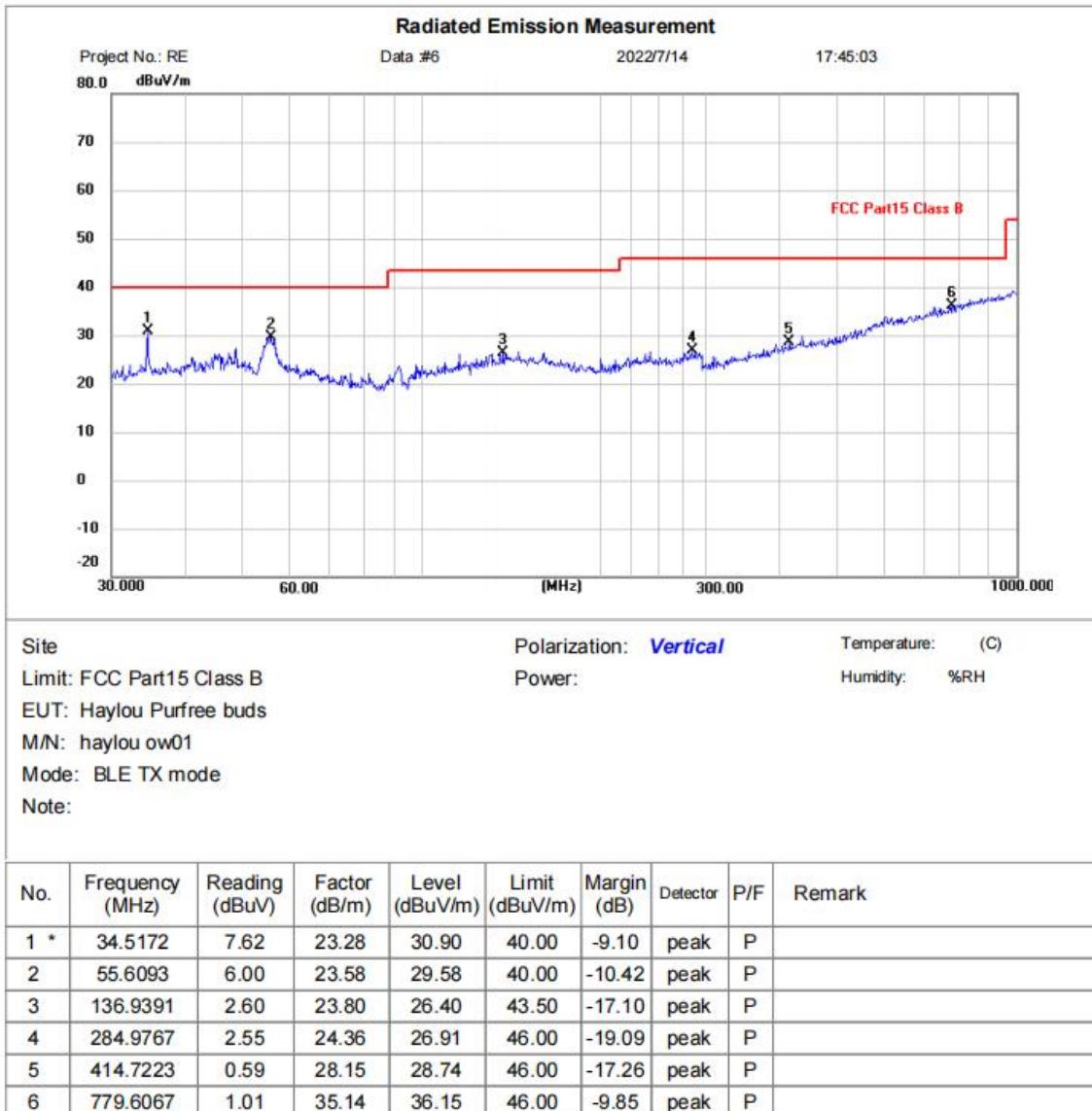
[TestMode: TX]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result:

[TestMode: TX]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

Test Result:

Above 1GHz

left channel:

[TestMode: TX low channel]; [Polarity: Horizontal]

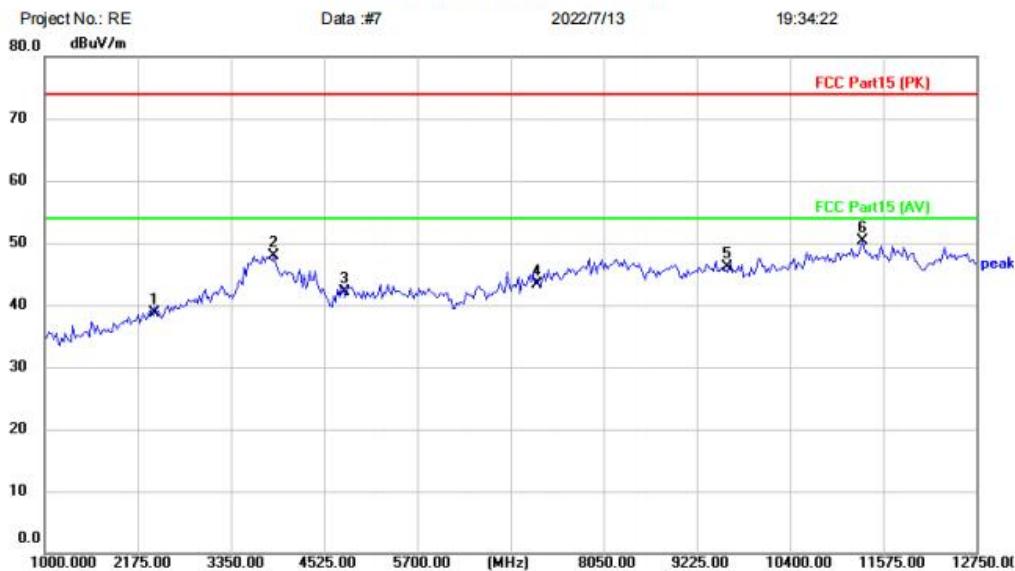


*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMethod: TX low channel]; [Polarity: Vertical]

Radiated Emission Measurement


Site

Polarization: **Vertical**

Temperature: (C)

Limit: FCC Part15 (PK)

Power:

Humidity: %RH

EUT: HAYLOU Purfree Buds

M/N: Haylou ow01

Mode: BLE1M TX-L

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Detector	Comment
			Level	Factor	ment				
		MHz	dBuV	dB/m	dBuV/m	dB			
1		2402.000	39.55	-0.93	38.62	74.00	-35.38	peak	
2		3890.500	41.38	6.53	47.91	74.00	-26.09	peak	
3		4804.000	38.45	3.71	42.16	74.00	-31.84	peak	
4		7206.000	37.28	5.96	43.24	74.00	-30.76	peak	
5		9608.000	36.74	9.29	46.03	74.00	-27.97	peak	
6	*	11316.500	38.39	11.88	50.27	74.00	-23.73	peak	

*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

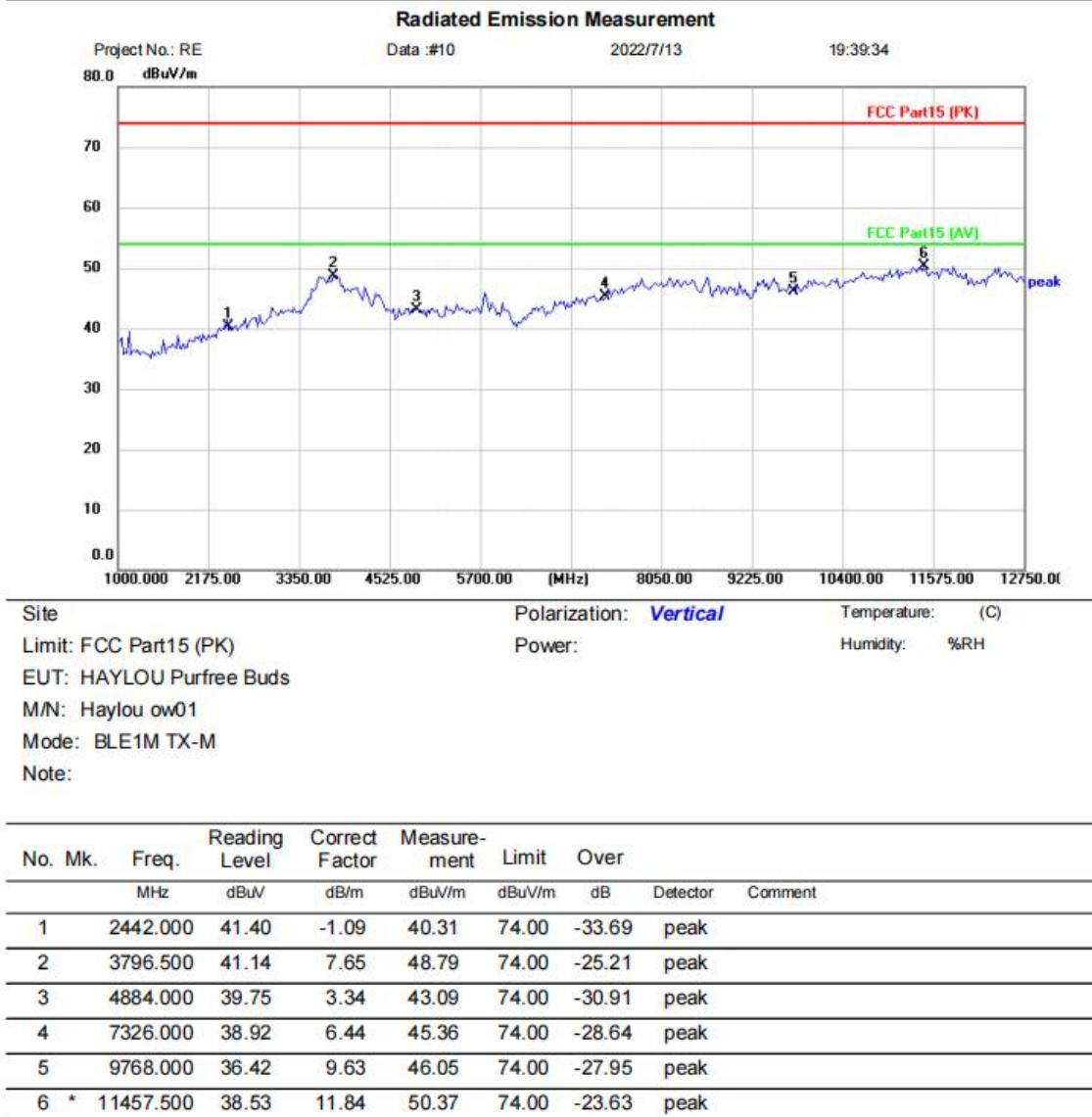
[TestMode: TX middle channel]; [Polarity: Horizontal]


*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMode: TX middle channel]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMethod: TX High channel]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMode: TX High channel]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

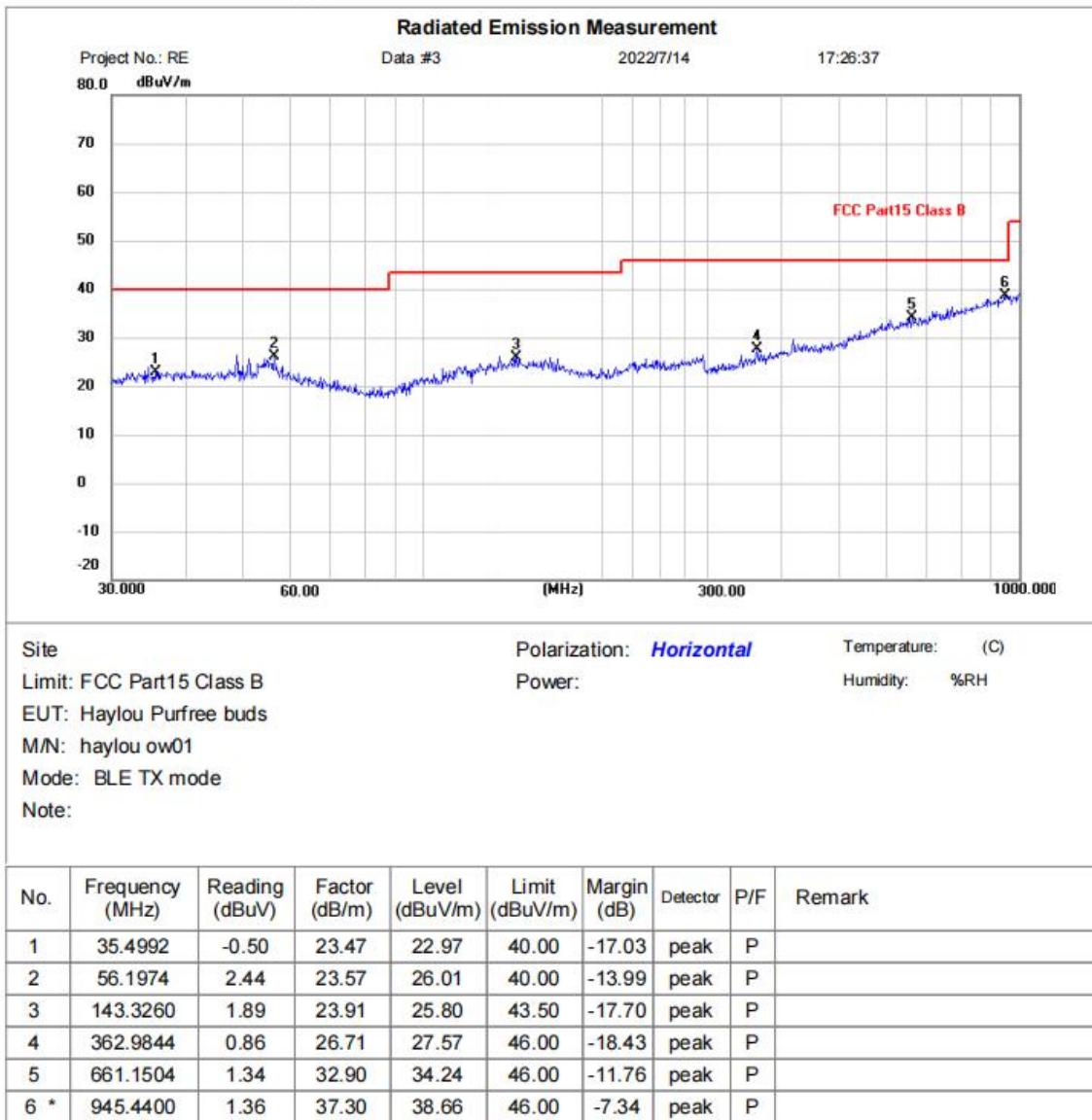
(Reference Only)

Test Result:

Below 1GHz

right channel:

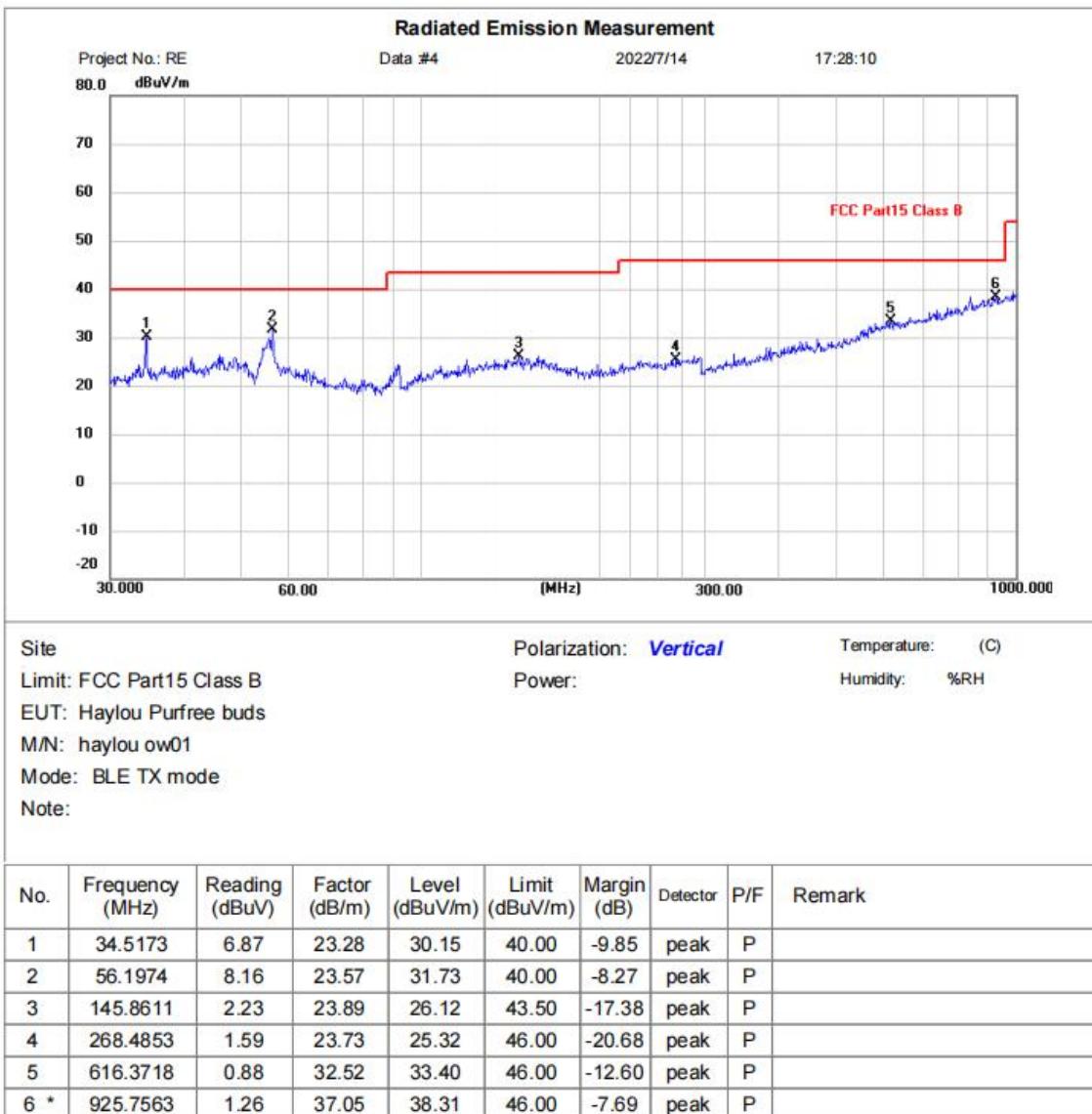
[TestMode: TX]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

Test Result:

[TestMode: TX]; [Polarity: Vertical]



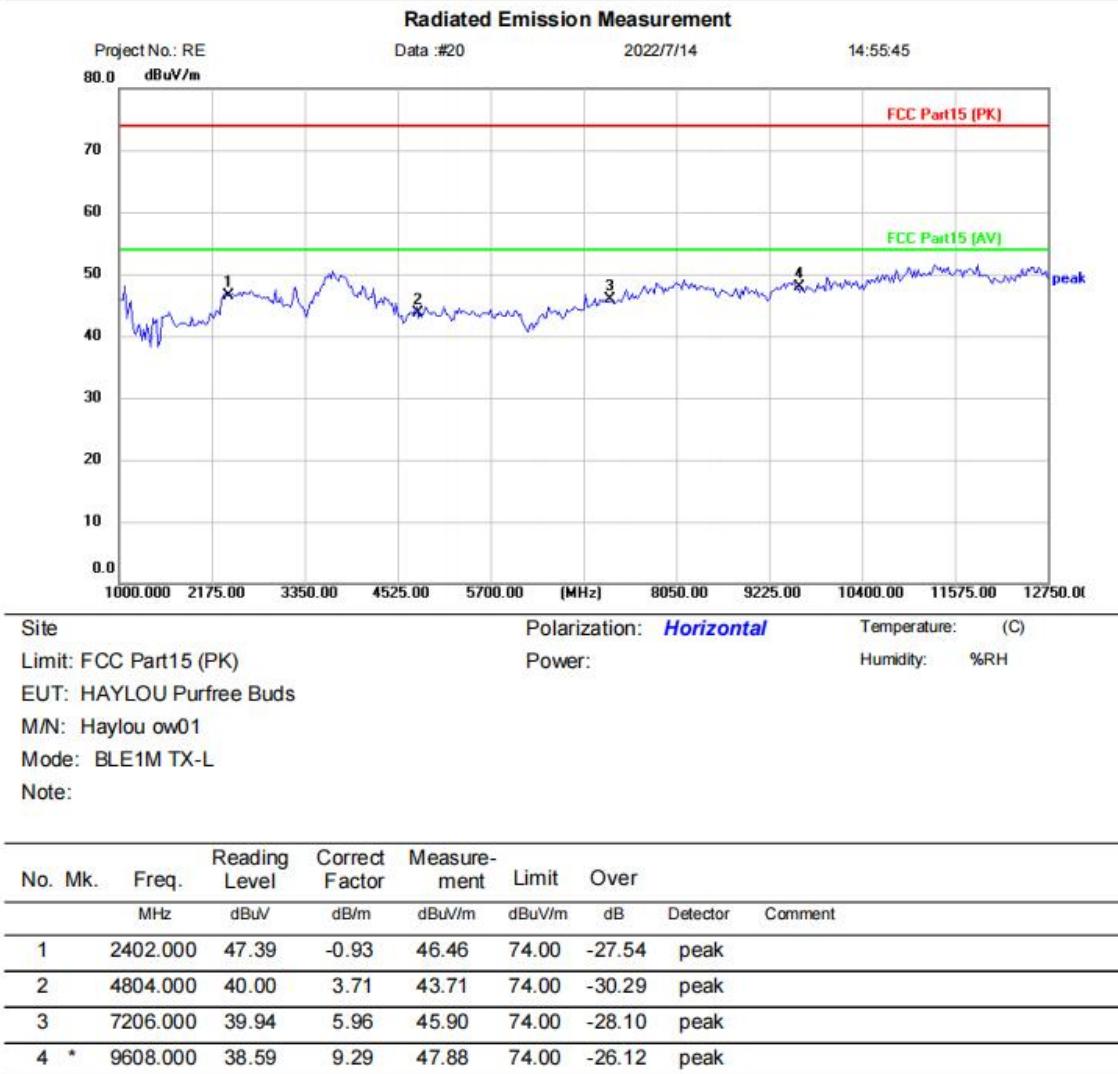
*:Maximum data x:Over limit !:over margin

Test Result:

Above 1GHz

right channel:

[TestMode: TX low channel]; [Polarity: Horizontal]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMethod: TX low channel]; [Polarity: Vertical]



*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMode: TX middle channel]; [Polarity: Horizontal]

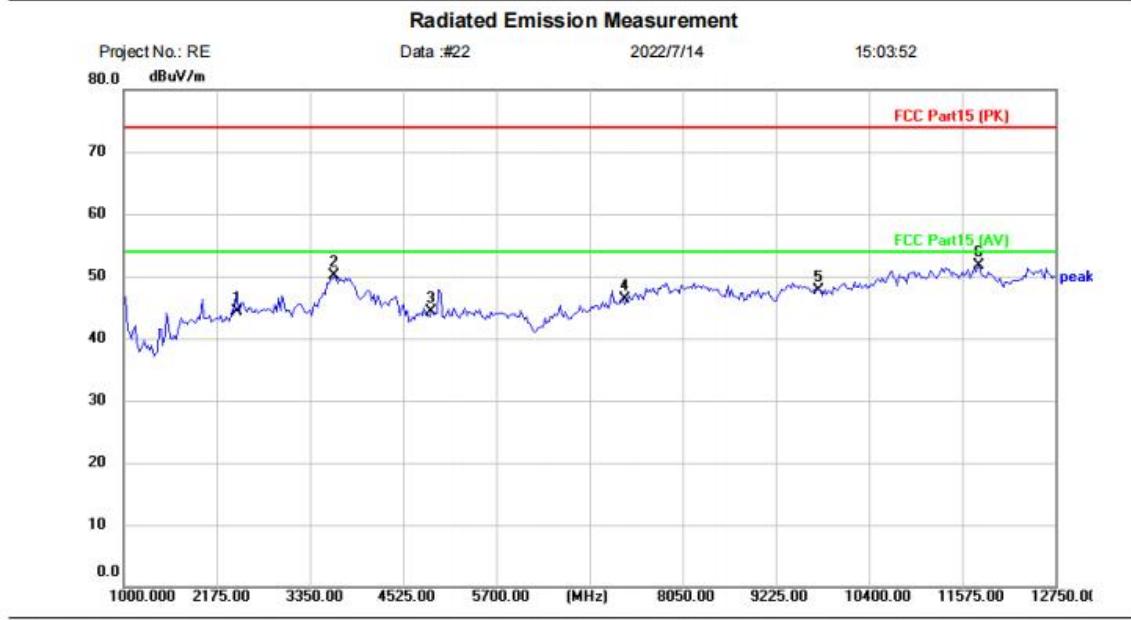


*:Maximum data x:Over limit !:over margin

(Reference Only)

Test Result:

[TestMode: TX middle channel]; [Polarity: Vertical]



Site	Polarization: Vertical	Temperature: (C)
Limit: FCC Part15 (PK)	Power:	Humidity: %RH
EUT: HAYLOU Purfree Buds		
M/N: Haylou ow01		
Mode: BLE1M TX-M		
Note:		

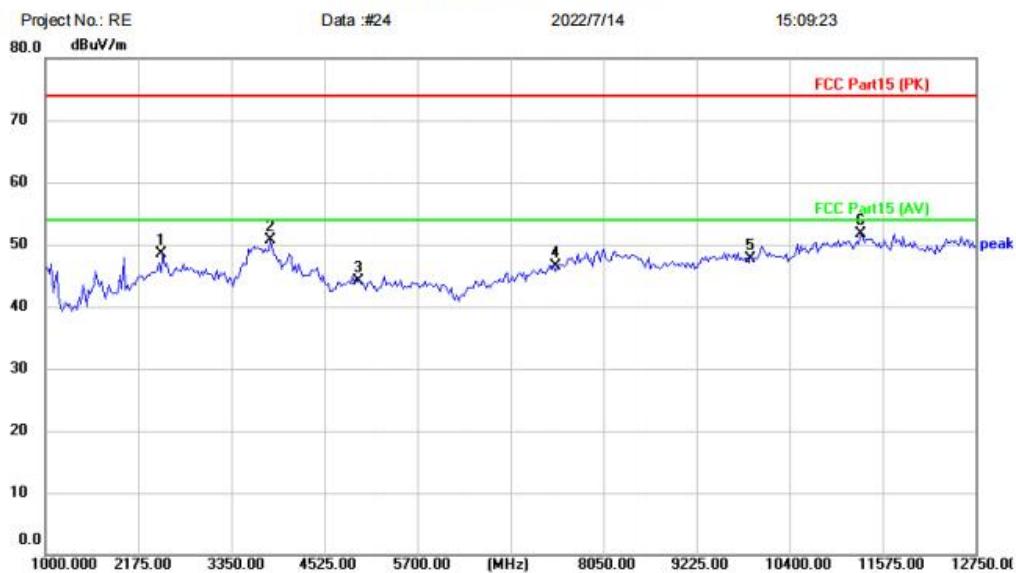
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Over					
							MHz	dBuV	dB/m	dBuV/m	dB	Detector
1		2442.000	45.32	-1.09	44.23	74.00	-29.77		peak			
2		3655.500	42.26	7.76	50.02	74.00	-23.98		peak			
3		4884.000	41.06	3.34	44.40	74.00	-29.60		peak			
4		7326.000	39.79	6.44	46.23	74.00	-27.77		peak			
5		9768.000	37.99	9.63	47.62	74.00	-26.38		peak			
6	*	11786.500	40.20	11.57	51.77	74.00	-22.23		peak			

*:Maximum data x:Over limit !:over margin

(Reference Only

Test Result:

[TestMode: TX High channel]; [Polarity: Horizontal]

Radiated Emission Measurement

Site Polarization: **Horizontal** Temperature: (C)

Limit: FCC Part15 (PK) Power: Humidity: %RH

EUT: HAYLOU Purfree Buds

M/N: Haylou ow01

Mode: BLE1M TX-H

Note:

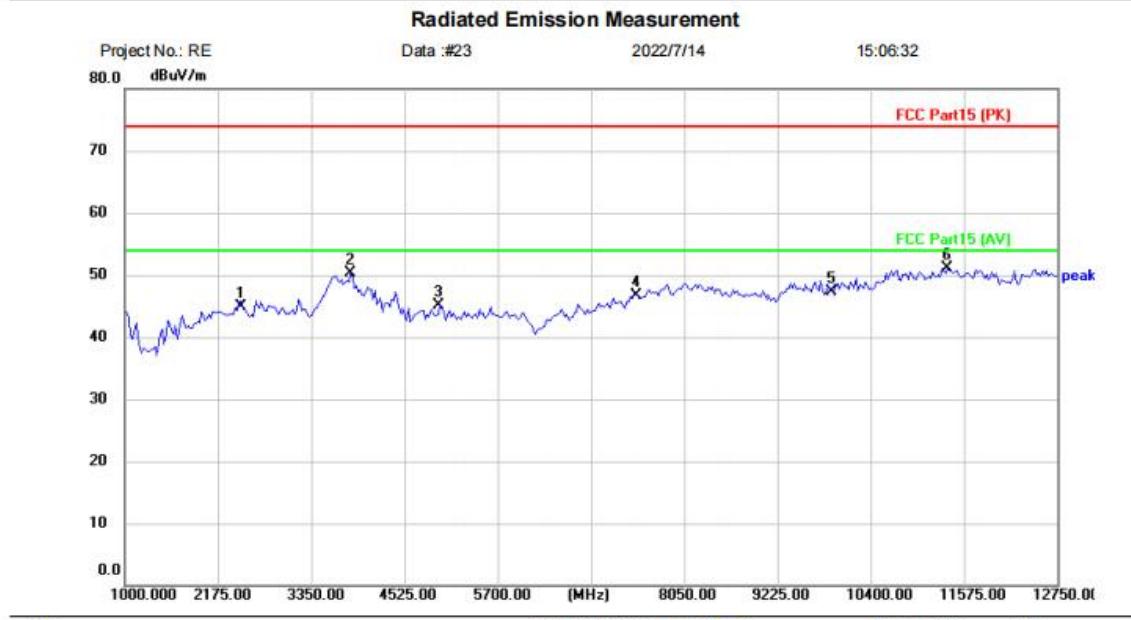
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2480.000	49.75	-1.26	48.49	74.00	-25.51	peak	
2		3843.500	43.56	7.12	50.68	74.00	-23.32	peak	
3		4960.000	40.35	3.75	44.10	74.00	-29.90	peak	
4		7440.000	39.69	6.86	46.55	74.00	-27.45	peak	
5		9920.000	37.50	10.16	47.66	74.00	-26.34	peak	
6	*	11293.000	39.71	11.91	51.62	74.00	-22.38	peak	

*:Maximum data x:Over limit l:over margin

(Reference Only)

Test Result:

[TestMode: TX High channel]; [Polarity: Vertical]



Site: Limit: FCC Part15 (PK) Polarization: **Vertical** Temperature: (C)
EUT: HAYLOU Purfree Buds Power: Humidity: %RH
M/N: Haylou ow01
Mode: BLE1M TX-H
Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
			Level	Factor	ment				
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		2480.000	46.14	-1.26	44.88	74.00	-29.12	peak	
2		3843.500	43.24	7.12	50.36	74.00	-23.64	peak	
3		4960.000	41.45	3.75	45.20	74.00	-28.80	peak	
4		7440.000	39.90	6.86	46.76	74.00	-27.24	peak	
5		9920.000	37.15	10.16	47.31	74.00	-26.69	peak	
6	*	11363.500	39.28	11.81	51.09	74.00	-22.91	peak	

*:Maximum data x:Over limit !:over margin

Reference Only

Test Result:

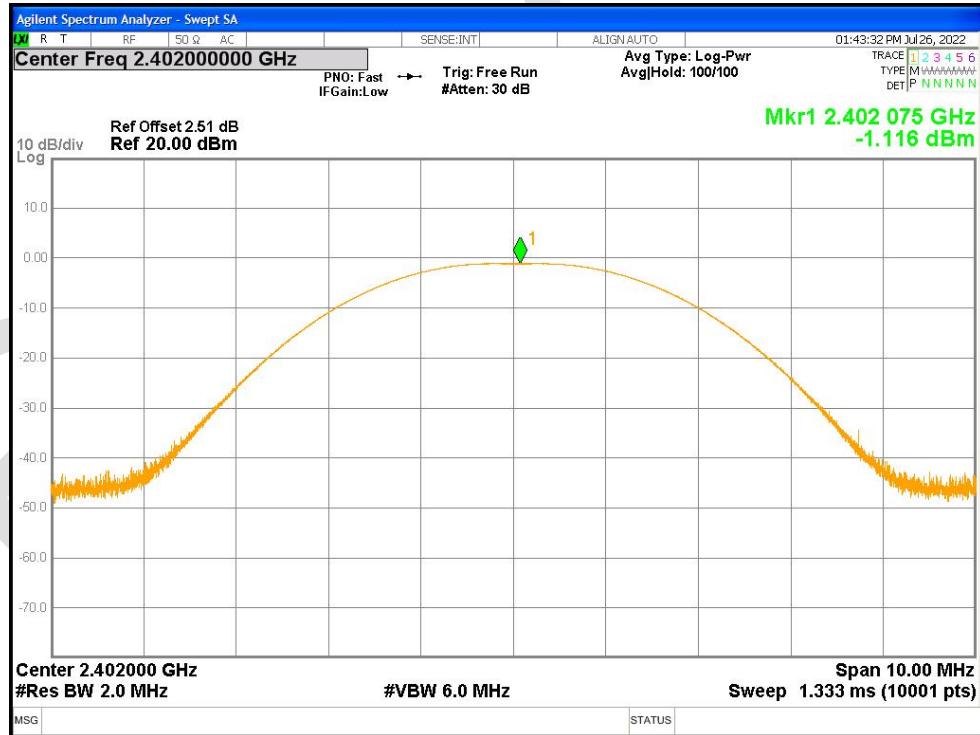
18 APPENDIX

Appendix1 left channel:

Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-1.116	30	Pass
NVNT	BLE 1M	2442	Ant1	-1.368	30	Pass
NVNT	BLE 1M	2480	Ant1	-0.741	30	Pass
NVNT	BLE 2M	2402	Ant1	-1.122	30	Pass
NVNT	BLE 2M	2442	Ant1	-1.375	30	Pass
NVNT	BLE 2M	2480	Ant1	-0.735	30	Pass

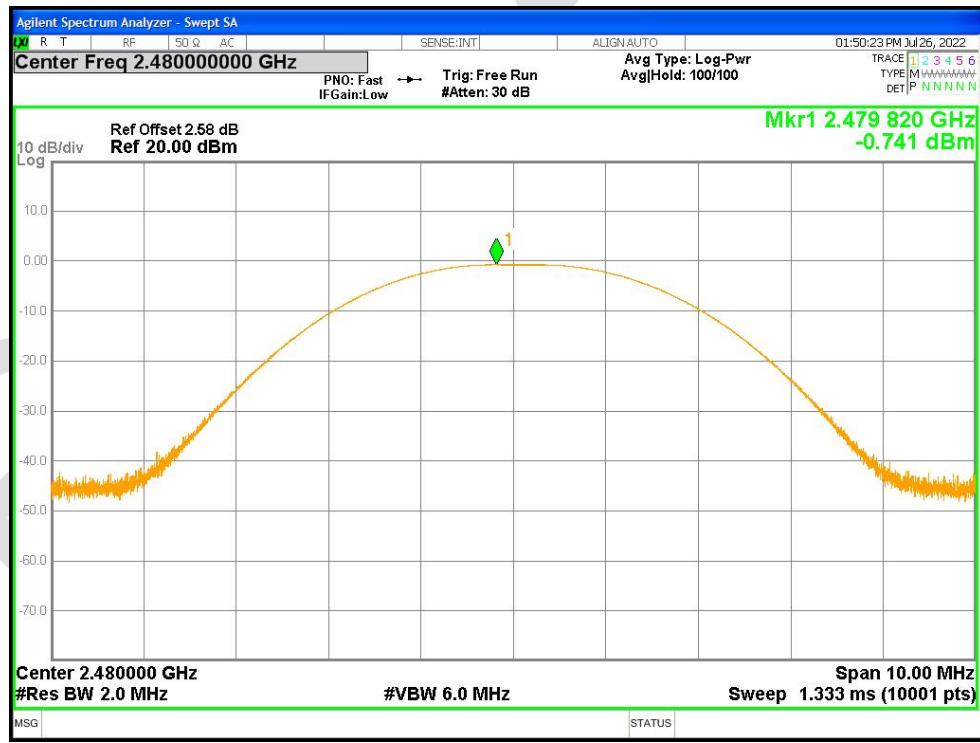
Power NVNT BLE 1M 2402MHz Ant1



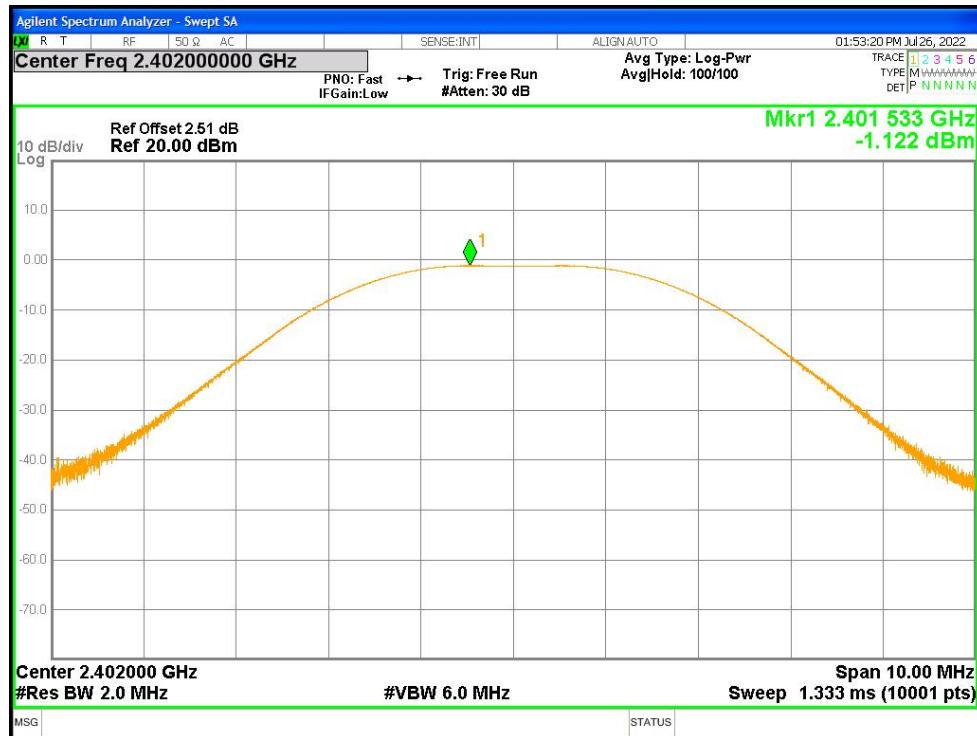
Power NVNT BLE 1M 2442MHz Ant1



Power NVNT BLE 1M 2480MHz Ant1



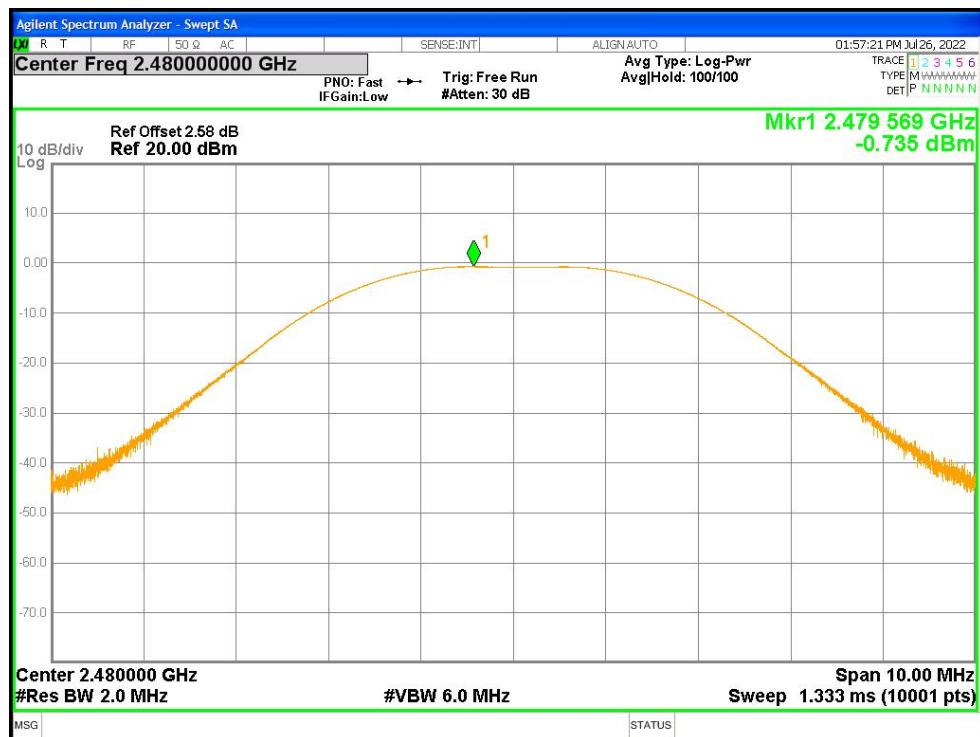
Power NVNT BLE 2M 2402MHz Ant1



Power NVNT BLE 2M 2442MHz Ant1

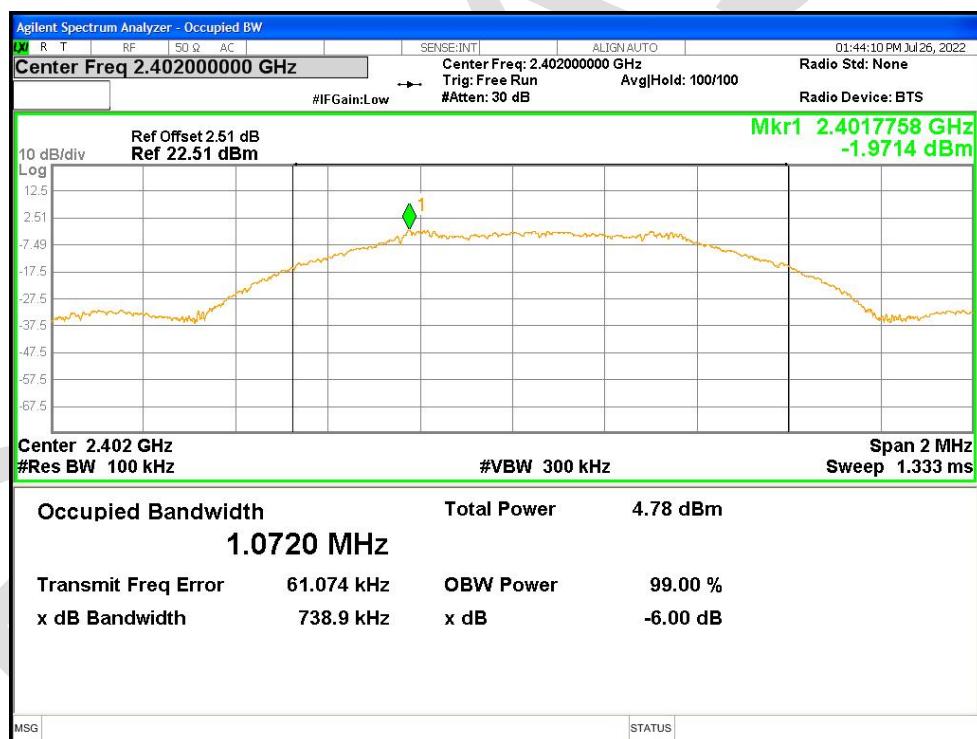


Power NVNT BLE 2M 2480MHz Ant1



-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.739	0.5	Pass
NVNT	BLE 1M	2442	Ant1	0.697	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.716	0.5	Pass
NVNT	BLE 2M	2402	Ant1	1.474	0.5	Pass
NVNT	BLE 2M	2442	Ant1	1.466	0.5	Pass
NVNT	BLE 2M	2480	Ant1	1.462	0.5	Pass

-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1

-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1