

TEST REPORT

Product Name : TRUE WIRELESS STEREO
EARPHONES
Brand Mark : SHARP
Model No. : SMBT-0647/HP-TW10
FCC ID : 2ADZH-0647
Report Number : BLA-EMC-202007-A9101
Date of Sample Receipt : 2020/7/29
Date of Test : 2020/7/29 to 2020/8/10
Date of Issue : 2020/8/13
Test Standard : 47 CFR Part 15, Subpart C 15.247
Test Result : Pass

Prepared for:

Dongguan Siyoto Electronics Co., Ltd.
No.15, 16, 17, Seven street of north QiaodongTown, Dongguan city,
Guangdong province, China

Prepared by:

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.
IOT Test Centre of BlueAsia
No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen,China
TEL: +86-755-28682673

Compiled by:

Jozu.

Review by:

Sweet. Liang

Approved by:

Jmen li

Date:

2020/8/13



REPORT REVISE RECORD

Version No.	Date	Description
00	2020/8/13	Original

BlueAsia



TABLE OF CONTENTS

1	TEST SUMMARY	6
2	GENERAL INFORMATION	7
3	GENERAL DESCRIPTION OF E.U.T.	7
4	TEST ENVIRONMENT	8
5	TEST MODE	8
6	MEASUREMENT UNCERTAINTY	8
7	DESCRIPTION OF SUPPORT UNIT.....	9
8	LABORATORY LOCATION.....	9
9	TEST INSTRUMENTS LIST	10
	ANTENNA REQUIREMENT.....	14
	CONCLUSION.....	14
	CONDUCTED SPURIOUS EMISSIONS.....	15
	LIMITS.....	15
	BLOCK DIAGRAM OF TEST SETUP.....	15
	TEST DATA	16
	CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)	17
	LIMITS.....	17
	BLOCK DIAGRAM OF TEST SETUP.....	17
	PROCEDURE	17
	TEST DATA	19
	RADIATED SPURIOUS EMISSIONS	21
	LIMITS.....	21
	BLOCK DIAGRAM OF TEST SETUP.....	22
	PROCEDURE	22
	TEST DATA	24
	RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS	32
	LIMITS.....	32
	BLOCK DIAGRAM OF TEST SETUP.....	33
	PROCEDURE	33
	TEST DATA	35



CONDUCTED BAND EDGES MEASUREMENT	39
LIMITS.....	39
BLOCK DIAGRAM OF TEST SETUP	39
TEST DATA	40
DWELL TIME.....	41
LIMITS.....	41
BLOCK DIAGRAM OF TEST SETUP	41
TEST DATA	42
HOPPING CHANNEL NUMBER.....	43
LIMITS.....	43
BLOCK DIAGRAM OF TEST SETUP	43
TEST DATA	43
CARRIER FREQUENCIES SEPARATION	44
LIMITS.....	44
BLOCK DIAGRAM OF TEST SETUP	44
TEST DATA	44
20DB BANDWIDTH	45
BLOCK DIAGRAM OF TEST SETUP.....	45
TEST DATA	45
CONDUCTED PEAK OUTPUT POWER	46
LIMITS.....	46
BLOCK DIAGRAM OF TEST SETUP.....	46
TEST DATA	47
10 APPENDIX.....	48
10.1 APPENDIX: 20DBEMISSION BANDWIDTH.....	48
Test Result.....	48
Test Graphs.....	49
10.2 APPENDIX: MAXIMUM CONDUCTED OUTPUT POWER	51
Test Result.....	51
Test Graphs.....	52
10.3 APPENDIX: CARRIER FREQUENCY SEPARATION	55
Test Result.....	55
Test Graphs.....	56



10.4	APPENDIX: TIME OF OCCUPANCY.....	57
	<i>Test Result</i>	57
	<i>Test Graphs</i>	58
10.5	APPENDIXF: NUMBER OF HOPPING CHANNELS.....	60
	<i>Test Result</i>	60
	<i>Test Graphs</i>	61
10.6	APPENDIX: BAND EDGE MEASUREMENTS.....	62
	<i>Test Result</i>	62
	<i>Test Graphs</i>	63
10.7	APPENDIX: CONDUCTED SPURIOUS EMISSION.....	66
	<i>Test Result</i>	66
	<i>Test Graphs</i>	67
APPENDIX A: PHOTOGRAPHS OF TEST SETUP		73
APPENDIX B: PHOTOGRAPHS OF EUT		75



1 TEST SUMMARY

Test item	Test Requirement	Test Method	Class/Severity	Result
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	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
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
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 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
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	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



2 GENERAL INFORMATION

Applicant	Dongguan Siyoto Electronics Co., Ltd.
Address	No.15, 16, 17, Seven street of north QiaodongTown, Dongguan city, Guangdong province, China
Manufacturer	Dongguan Siyoto Electronics Co., Ltd.
Address	No.15, 16, 17, Seven street of north QiaodongTown, Dongguan city, Guangdong province, China
Factory	Dongguan Siyoto Electronics Co., Ltd.
Address	No.15, 16, 17, Seven street of north QiaodongTown, Dongguan city, Guangdong province, China
Product Name	TRUE WIRELESS STEREO EARPHONES
Test Model No.	SMBT-0647/HP-TW10

3 GENERAL DESCRIPTION OF E.U.T.

Hardware Version	V1
Software Version	V069
Operation Frequency:	2402MHz~2480MHz
Modulation Type:	GFSK, $\pi/4$ DQPSK
Channel Spacing:	1MHz
Number of Channels:	79
Antenna Type:	Chip Antenna
Antenna Gain:	0.0 dBi (Provided by the customer)



4 TEST ENVIRONMENT

Environment	Temperature	Voltage
Normal	+25°C	3.7Vdc

5 TEST MODE

TEST MODE	TEST MODE DESCRIPTION
Transmitting mode	Keep the EUT in continuously transmitting mode with modulation. (hopping and non hopping mode all have been tested, non hopping mode is worse case for RE)
Remark: Full battery is used during all test except ac conducted emission, DH1,DH3, DH5 all have been tested, during the test, GFSK, Pi/4QPSK modulation were all pre-scanned only worse case is reported.	

6 MEASUREMENT UNCERTAINTY

Parameter	Expanded Uncertainty (Confidence of 95%)
Radiated Emission	±4.34dB
Radiated Emission	±4.24dB
Radiated Emission	±4.68dB
AC Power Line Conducted Emission	±3.45dB

Parameter	Expanded Uncertainty (Confidence of 95%)
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %
Radiated Emission (30MHz ~ 1000MHz)	±4.35 dB
Radiated Emission (1GHz ~ 18GHz)	±4.44 dB



7 DESCRIPTION OF SUPPORT UNIT

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	HASEE	K610D	N/A	N/A
AC Adapter	PISEN	TS-C051	N/A	N/A

8 LABORATORY LOCATION

All tests were performed at:
BlueAsia of Technical Services(Shenzhen) Co., Ltd.
IOT Test Centre of BlueAsia
No. 448 Bulong Road, Bantian Street, Longgang District, Shenzhen, China
Telephone: TEL: +86-755-28682673 FAX: +86-755-28682673
No tests were sub-contracted.



9 TEST INSTRUMENTS LIST

Test Equipment Of Conducted Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

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	6/10/2018	6/9/2021
Receiver	R&S	ESPI3	101082	4/20/2020	4/19/2021
LISN	R&S	ENV216	3560.6550.15	7/4/2020	7/3/2021
LISN	AT	AT166-2	AKK1806000003	12/17/2019	12/16/2020
EMI software	EZ	EZ-EMC	N/A	N/A	N/A

Test Equipment Of Radiated Spurious Emissions					
Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Chamber	SKET	966	N/A	5/8/2018	5/7/2021
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Receiver	R&S	ESR7	101199	4/20/2020	4/19/2021
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	7/14/2019	7/13/2021



Horn Antenna	Schwarzbeck	9120D	01892 P:00331	7/14/2019	7/13/2021
Amplifier	SKET	LNPA-0118-45	N/A	7/4/2020	7/3/2021
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2/14/2019	2/13/2022
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	N/A	N/A	N/A

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	5/8/2018	5/7/2021
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Receiver	R&S	ESR7	101199	4/20/2020	4/19/2021
broadband Antenna	Schwarzbeck	VULB9168	00836 P:00227	7/14/2019	7/13/2021
Horn Antenna	Schwarzbeck	9120D	01892 P:00331	7/14/2019	7/13/2021
Amplifier	SKET	LNPA-0118-45	N/A	7/4/2020	7/3/2021
EMI software	EZ	EZ-EMC	N/A	N/A	N/A
Loop antenna	SCHNARZBECK	FMZB1519B	00102	2/14/2019	2/13/2022
Controller	SKET	N/A	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-02	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-03	N/A	N/A	N/A
Coaxial Cable	BlueAsia	BLA-XC-01	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	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Dwell Time

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Hopping Channel Number

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Carrier Frequencies Separation

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020



Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021
------------------	---------	--------	------------	-----------	-----------

Test Equipment Of 20dB Bandwidth

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021

Test Equipment Of Conducted Peak Output Power

Equipment	Manufacturer	Model	S/N	Cal.Date	Cal.Due
Spectrum	R&S	FSP40	100817	7/4/2020	7/3/2021
Spectrum	Agilent	N9020A	MY49100060	12/17/2019	12/16/2020
Signal Generator	Agilent	N5182A	MY49060650	12/17/2019	12/16/2020
Signal Generator	Agilent	E8257D	MY44320250	4/20/2020	4/19/2021



ANTENNA REQUIREMENT

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

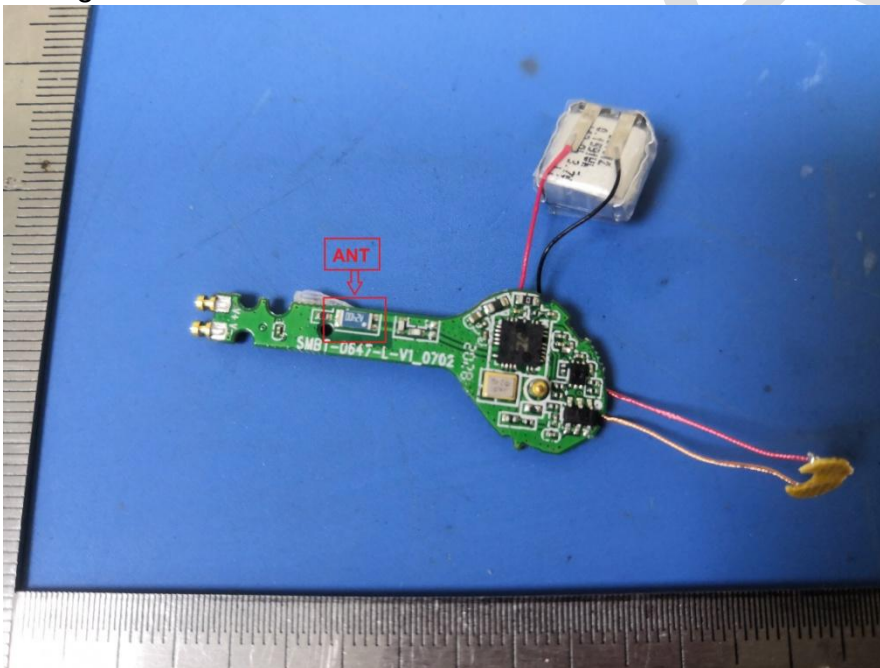
CONCLUSION

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 an 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 0.0dBi.



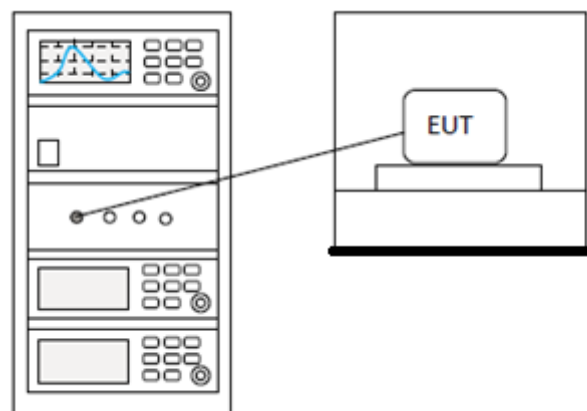
CONDUCTED SPURIOUS EMISSIONS

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	Jozu
Temperature	25℃
Humidity	60%

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)).
---------------	--

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia



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

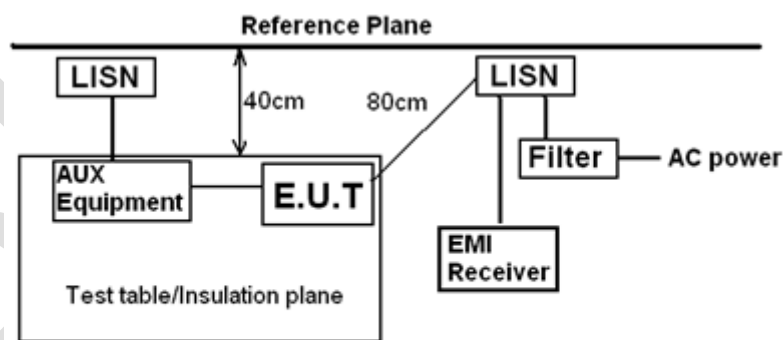
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX mode
Test Mode (Final Test)	TX mode
Tester	Jozu
Temperature	25℃
Humidity	58%

LIMITS

Frequency of emission(MHz)	Conducted limit(dBμV)	
	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.

BLOCK DIAGRAM OF TEST SETUP



Remark
E.U.T: Equipment Under Test
LISN: Line Impedance Stabilization Network
Test table height=0.8m

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/50VH + 5ohm 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.

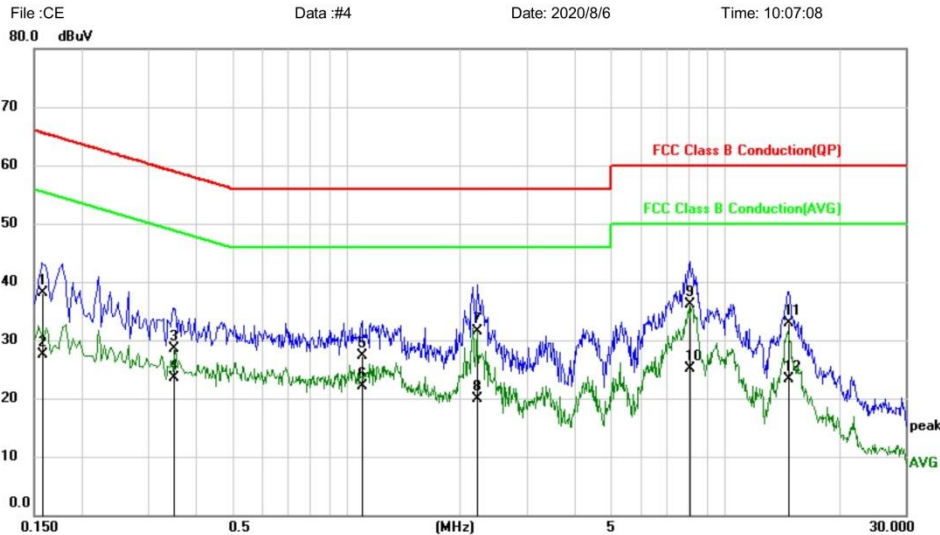
Remark: $LISN = Read\ Level + Cable\ Loss + LISN\ Factor$



TEST DATA

[TestMode: TX mode]; [Phase: Neutral]

Conducted Emission Measurement



Site: Phase: **N** Temperature: 26
Limit: FCC Class B Conduction(QP) Power: AC 120V 60Hz Humidity: 60 %
EUT: TRUE WIRELESS STEREO EARPHONES
M/N: SMBT-0647/HP-TW10
Mode: BT mode
Note:

No. Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
	MHz	dBuV	dB	dBuV	dBuV	dB		
1	0.1580	28.21	9.88	38.09	65.57	-27.48	QP	
2	0.1580	17.54	9.88	27.42	55.57	-28.15	AVG	
3	0.3500	18.83	9.77	28.60	58.96	-30.36	QP	
4	0.3500	13.77	9.77	23.54	48.96	-25.42	AVG	
5	1.1019	17.50	9.81	27.31	56.00	-28.69	QP	
6	1.1019	12.23	9.81	22.04	46.00	-23.96	AVG	
7	2.2139	21.72	9.86	31.58	56.00	-24.42	QP	
8	2.2139	10.14	9.86	20.00	46.00	-26.00	AVG	
9 *	8.0900	26.18	9.87	36.05	60.00	-23.95	QP	
10	8.0900	15.18	9.87	25.05	50.00	-24.95	AVG	
11	14.6780	22.91	10.01	32.92	60.00	-27.08	QP	
12	14.6780	13.31	10.01	23.32	50.00	-26.68	AVG	

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

(Reference Only)

File :CEDData :#4

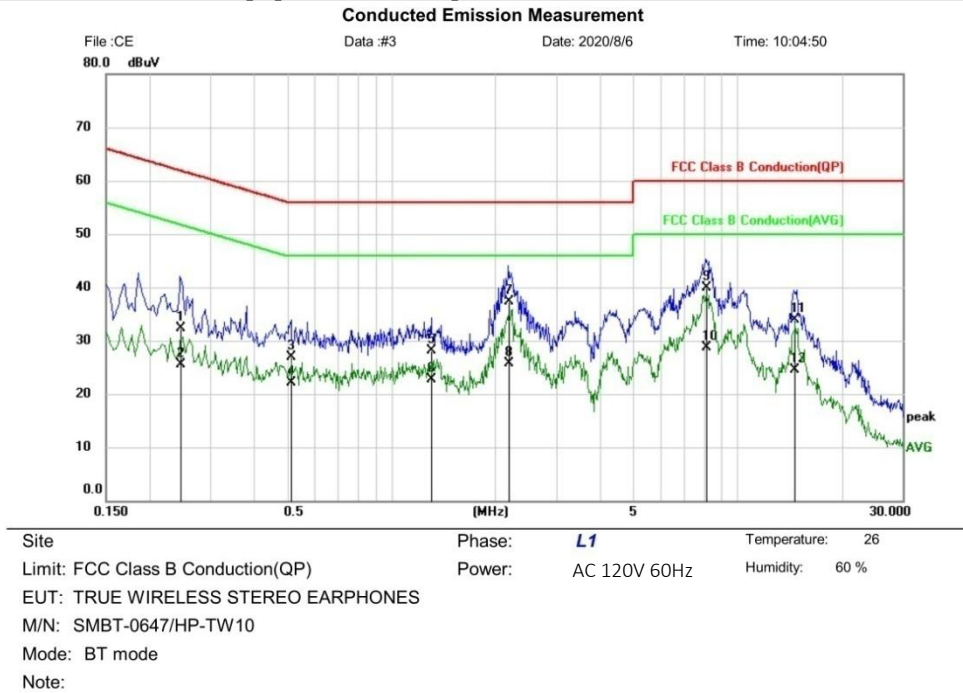
Page: 1

Engineer Signature:

Test Result: Pass



[TestMode: TX mode]; [Phase: Line]



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.2460	22.34	9.94	32.28	61.89	-29.61	QP	
2	0.2460	15.48	9.94	25.42	51.89	-26.47	AVG	
3	0.5140	17.22	9.73	26.95	56.00	-29.05	QP	
4	0.5140	12.30	9.73	22.03	46.00	-23.97	AVG	
5	1.3060	18.22	9.82	28.04	56.00	-27.96	QP	
6	1.3060	12.94	9.82	22.76	46.00	-23.24	AVG	
7 *	2.1860	27.42	9.82	37.24	56.00	-18.76	QP	
8	2.1860	15.88	9.82	25.70	46.00	-20.30	AVG	
9	8.1140	30.07	9.88	39.95	60.00	-20.05	QP	
10	8.1140	18.83	9.88	28.71	50.00	-21.29	AVG	
11	14.5820	23.94	9.97	33.91	60.00	-26.09	QP	
12	14.5820	14.54	9.97	24.51	50.00	-25.49	AVG	

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

⟨Reference Only

File : CE\Data :#3

Page: 1

Engineer Signature:

Test Result: Pass



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 mode (SE)
Test Mode (Final Test)	TX mode (SE)
Tester	Jozu
Temperature	23℃
Humidity	53%

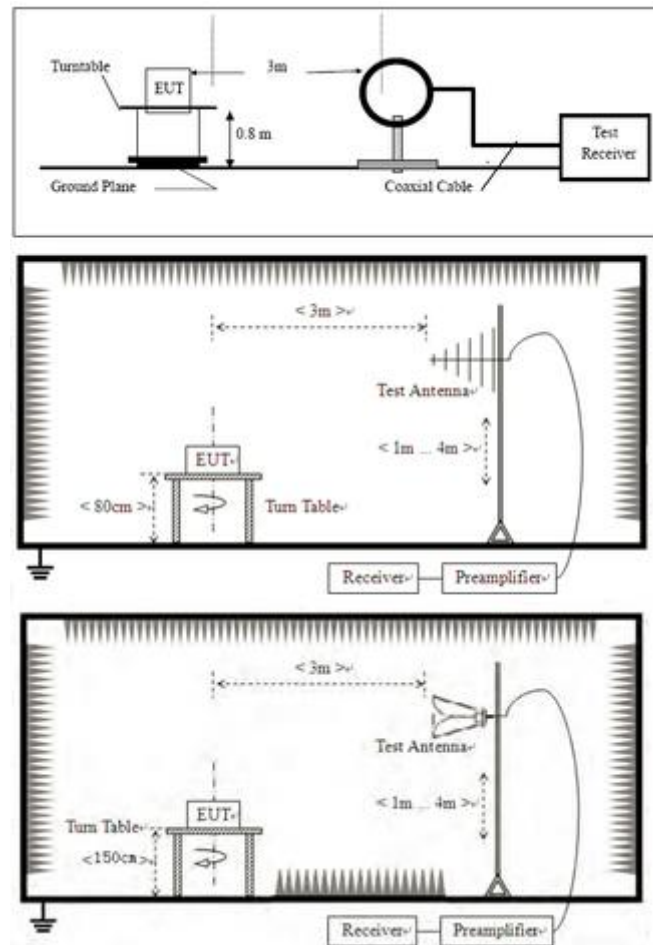
LIMITS

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.



BLOCK DIAGRAM OF TEST SETUP



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.

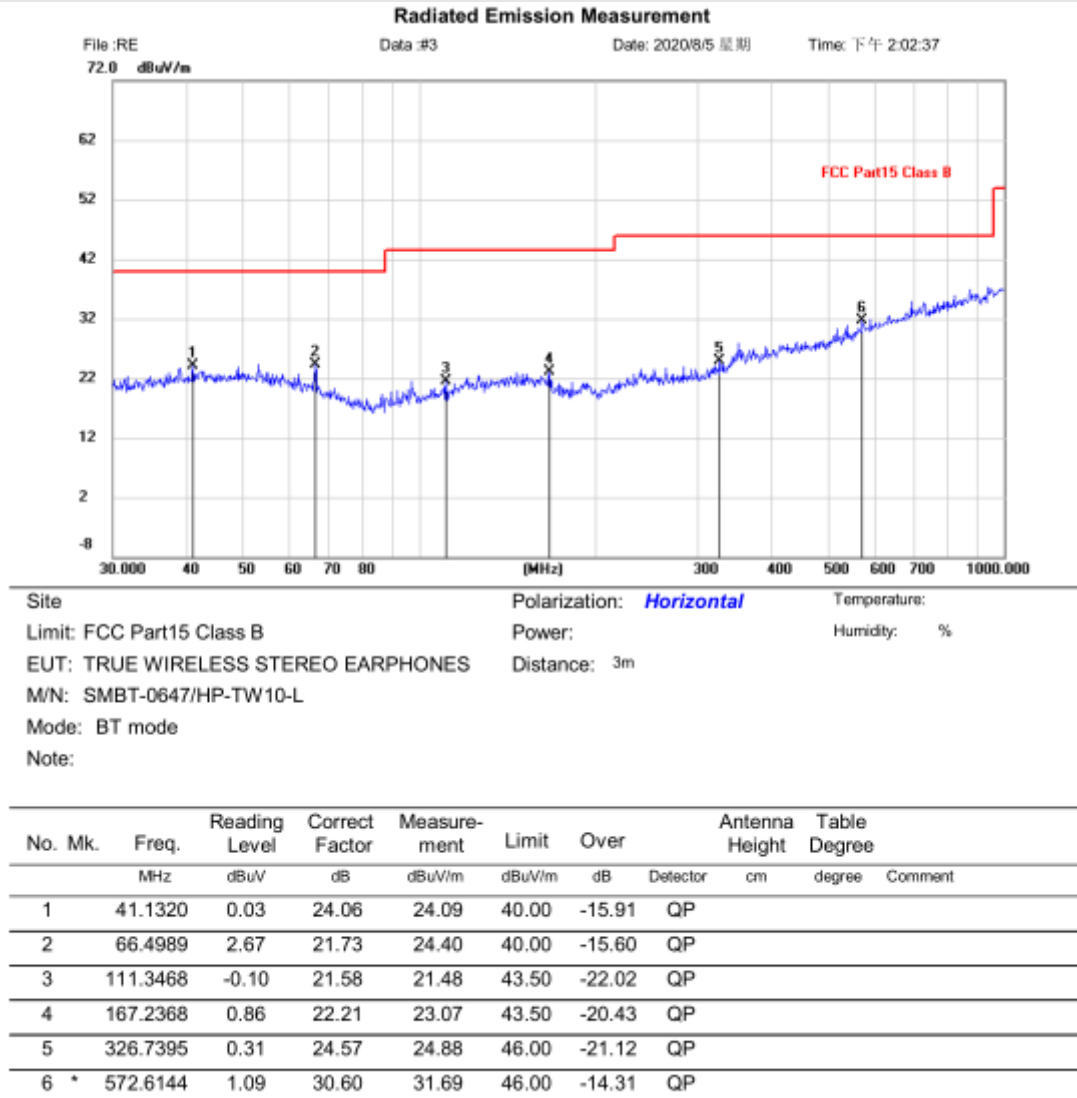
Remark:

- 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 13 GHz 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.
- 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.



TEST DATA

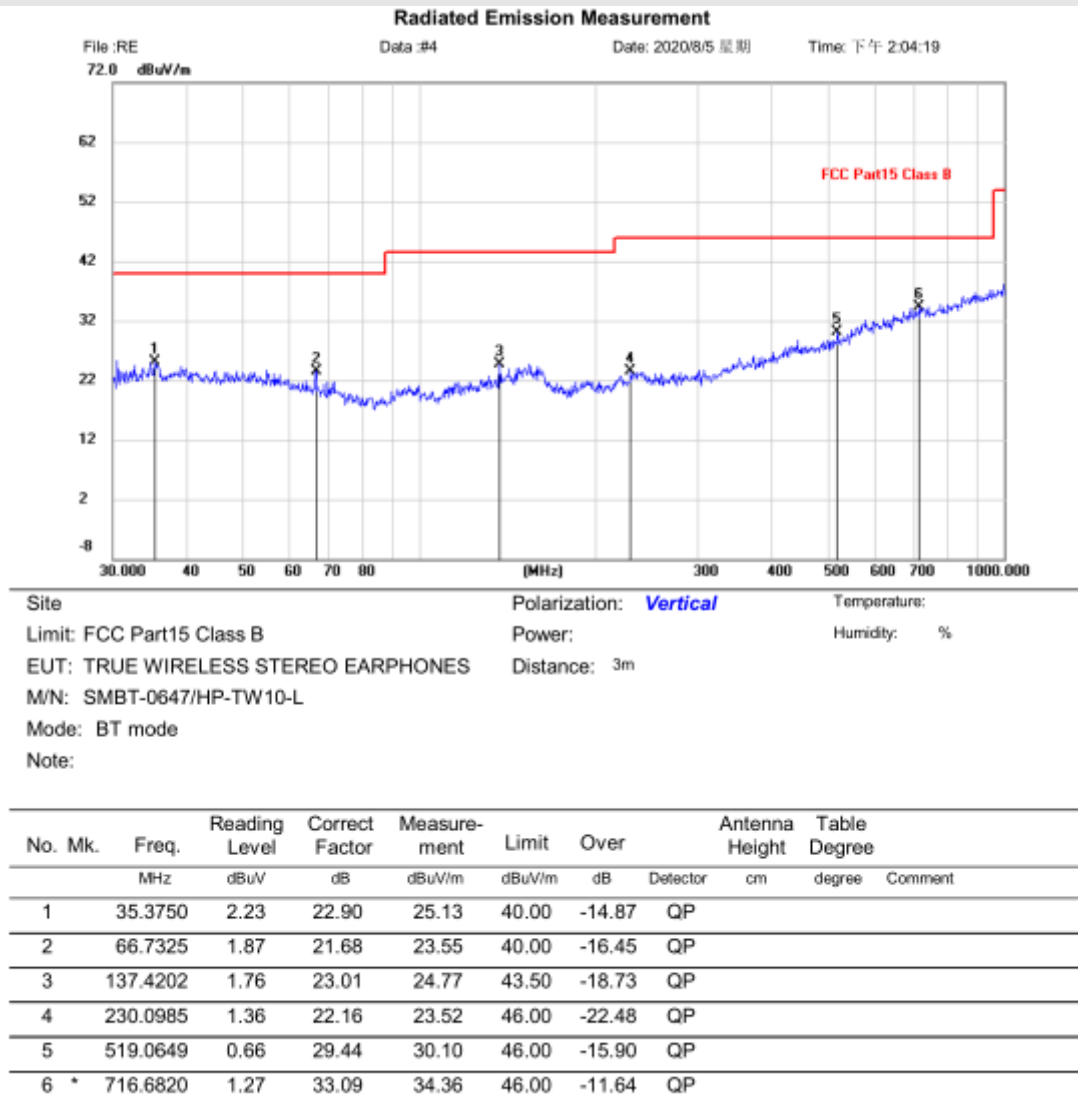
[TestMode: TX mode (SE) below 1G]; [Polarity: Horizontal]
Power: AC120V/60Hz



Test Result: Pass



[TestMode: TX mode (SE) below 1G]; [Polarity: Vertical]
Power: AC120V/60Hz



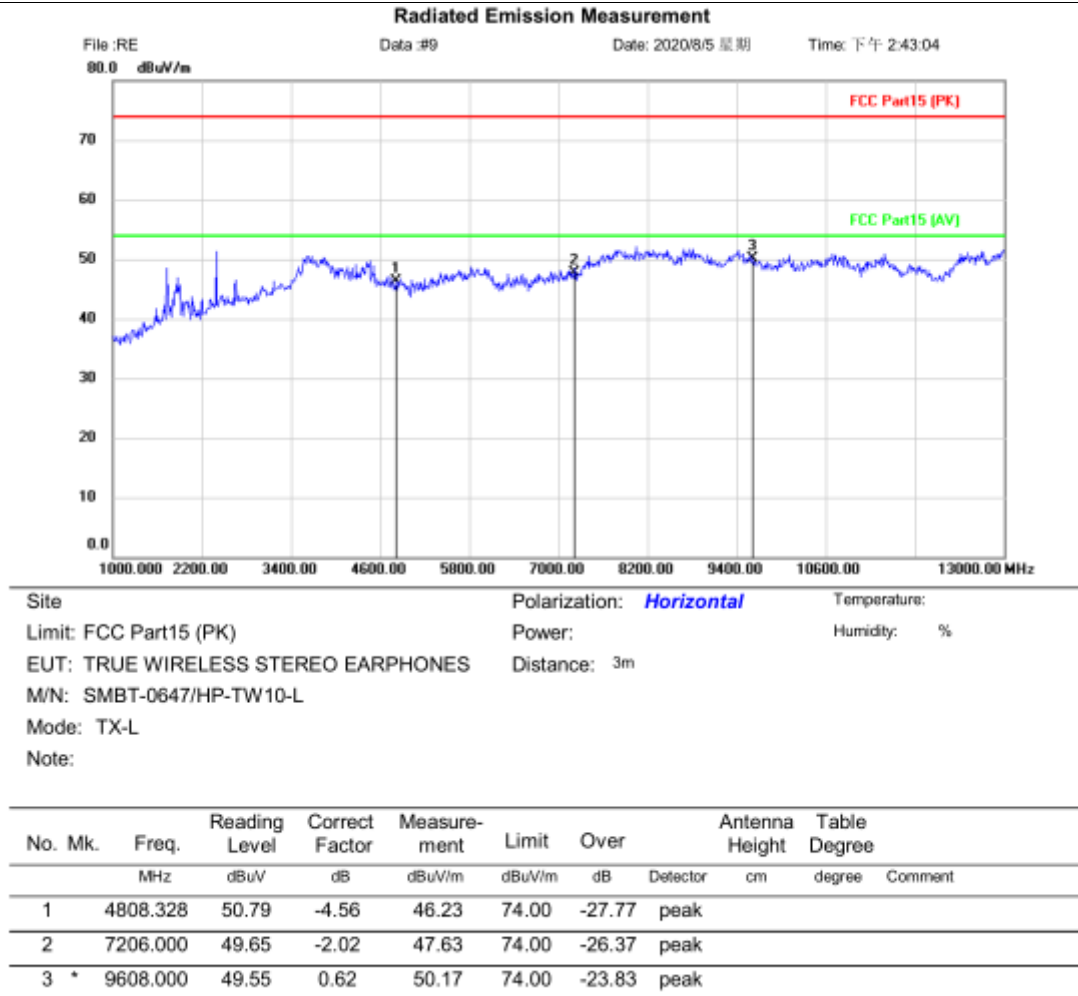
Test Result: Pass

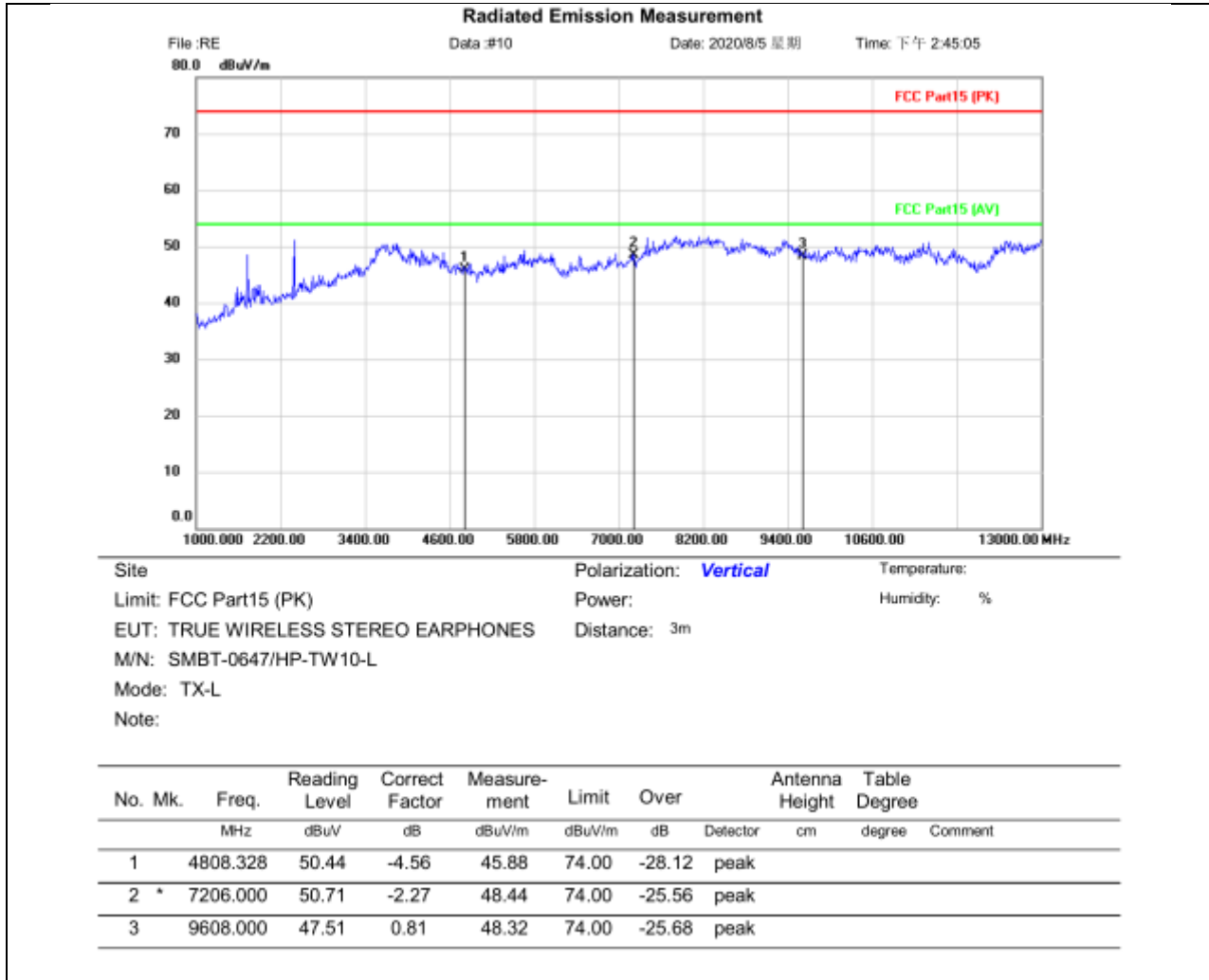


[TestMode: Pi/4QPSK]

Remark: During the test, pre-scan the GFSK, Pi/4QPSK modulation, and found the Pi/4QPSK modulation which it is worse case.

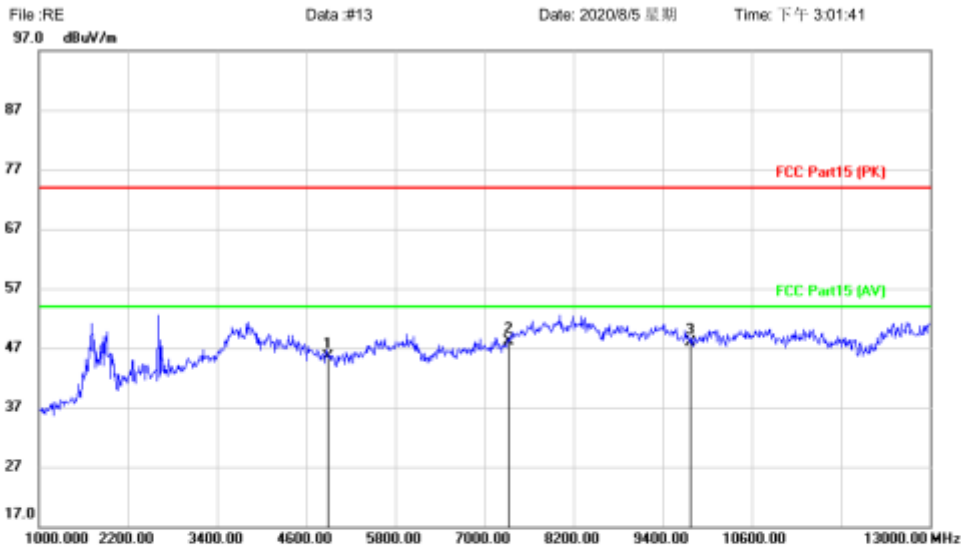
Test channel:lowest





Test channel: Middle

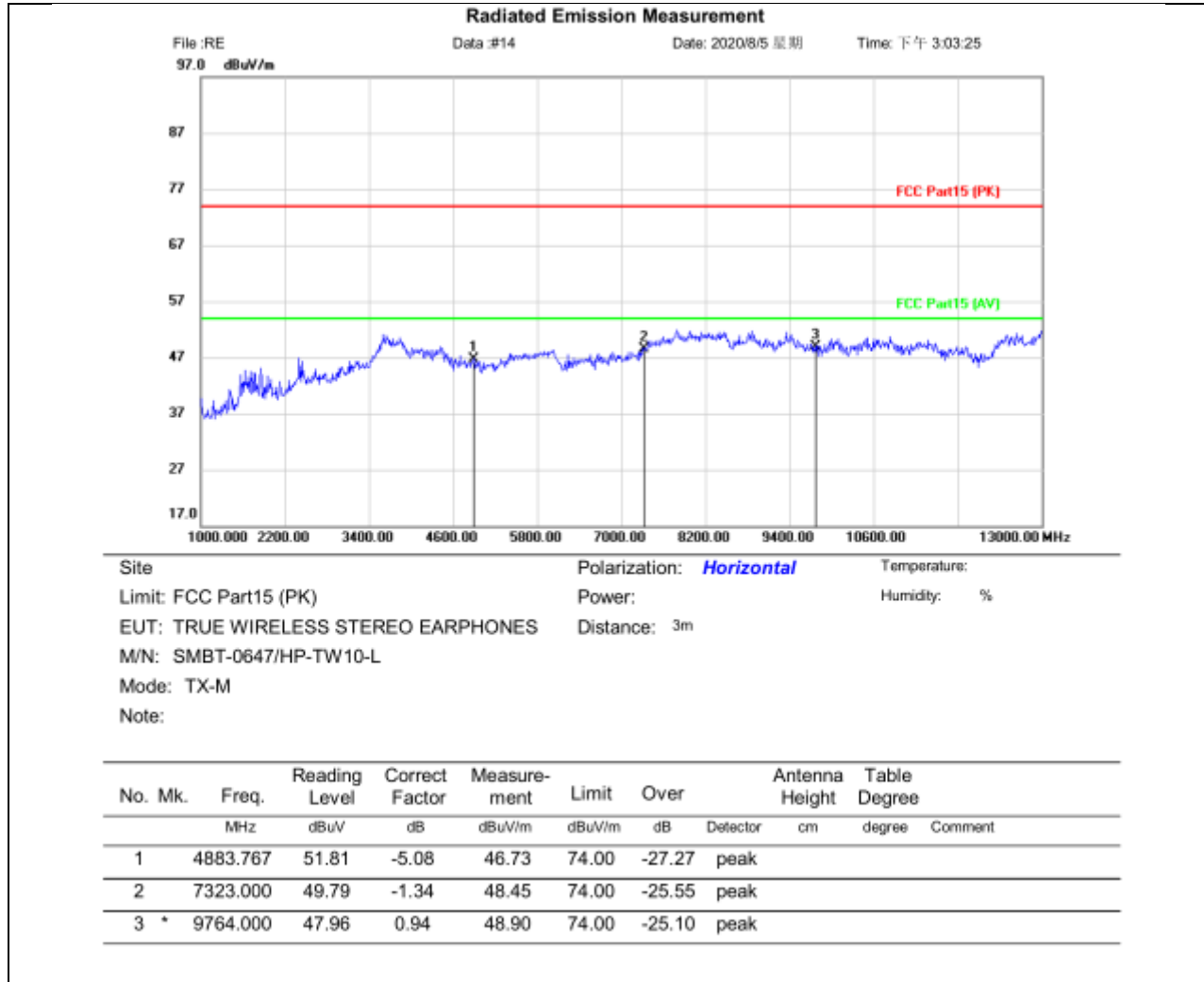
Radiated Emission Measurement



Site Polarization: **Vertical** Temperature:
Limit: FCC Part15 (PK) Power: Humidity: %
EUT: TRUE WIRELESS STEREO EARPHONES Distance: 3m
M/N: SMBT-0647/HP-TW10-L
Mode: TX-M
Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		4883.767	50.63	-5.08	45.55	74.00	-28.45	peak			
2	*	7323.000	49.56	-1.48	48.08	74.00	-25.92	peak			
3		9764.000	47.00	0.91	47.91	74.00	-26.09	peak			





Test channel: Highest

Radiated Emission Measurement

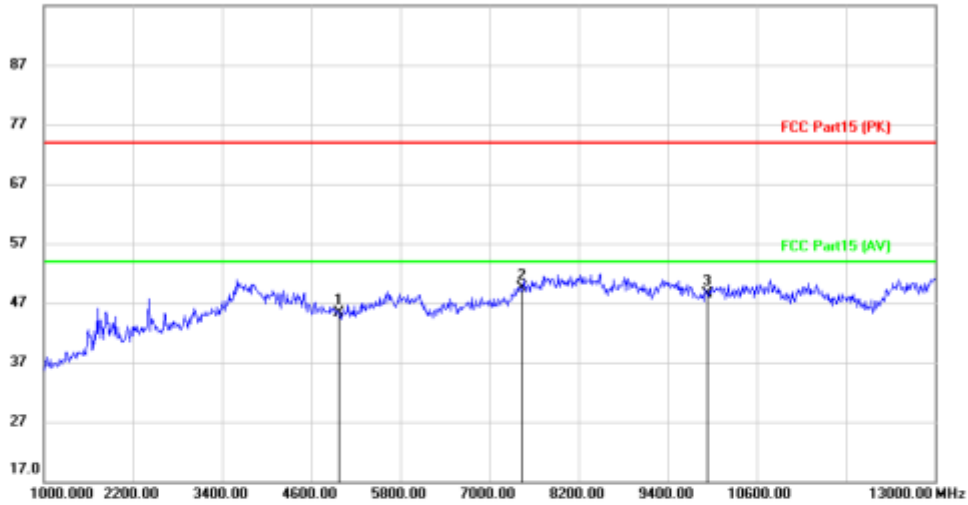
File : RE

Data : #15

Date: 2020/8/5 星期

Time: 下午 3:10:24

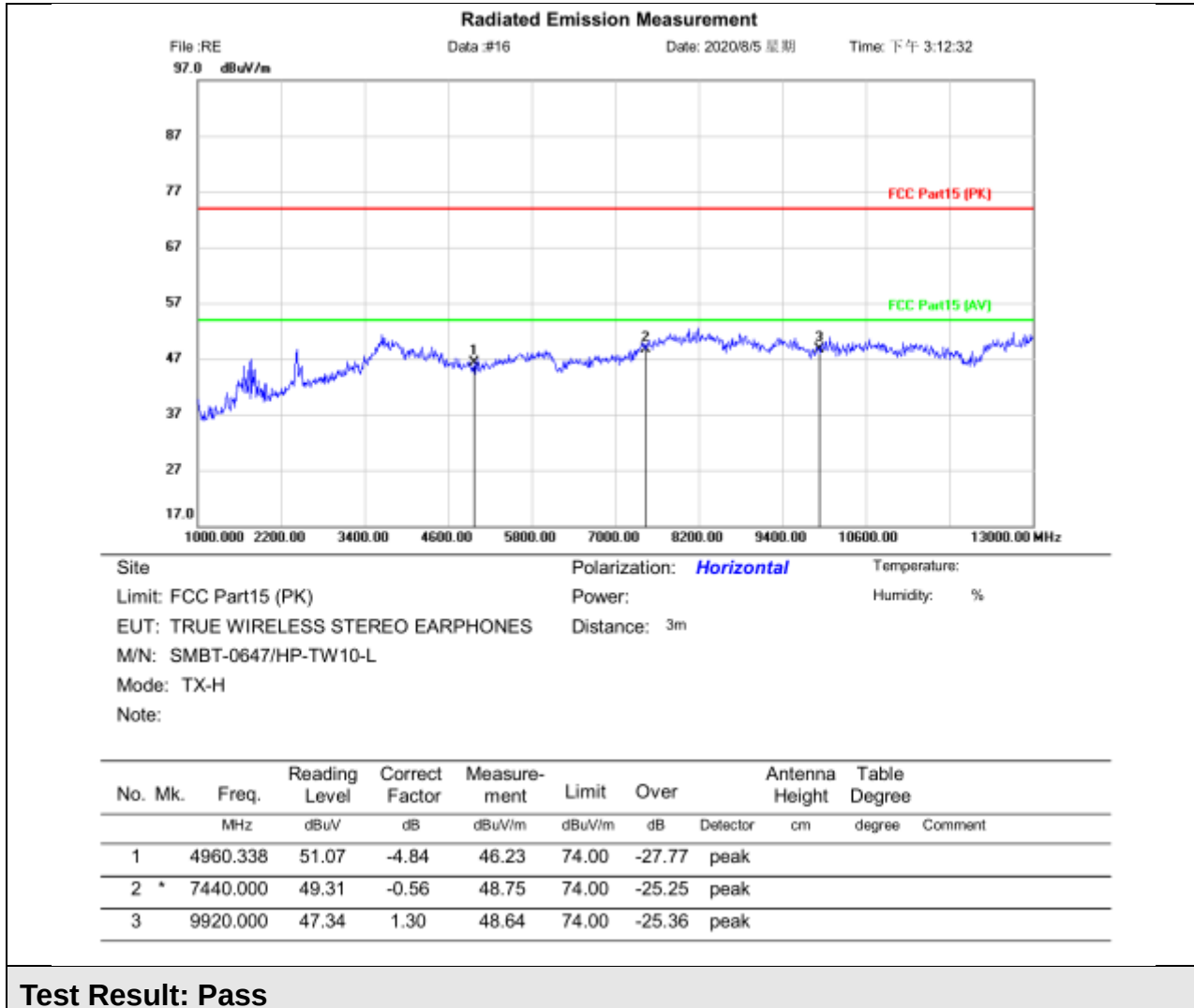
97.0 dBuV/m



Site: Polarization: **Vertical** Temperature:
Limit: FCC Part15 (PK) Power: Humidity: %
EUT: TRUE WIRELESS STEREO EARPHONES Distance: 3m
M/N: SMBT-0647/HP-TW10-L
Mode: TX-H
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		4960.338	50.08	-4.84	45.24	74.00	-28.76	peak		
2	*	7440.000	50.64	-1.07	49.57	74.00	-24.43	peak		
3		9920.000	47.08	1.42	48.50	74.00	-25.50	peak		





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	Jozu
Temperature	25℃
Humidity	55%

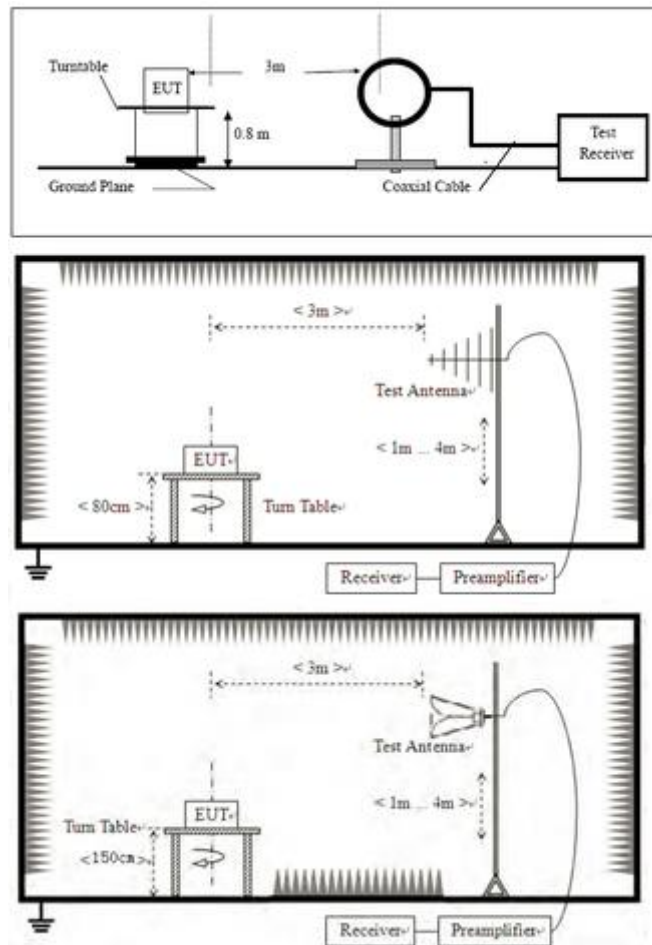
LIMITS

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.



BLOCK DIAGRAM OF TEST SETUP



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: $\text{Level} = \text{Read Level} + \text{Cable Loss} + \text{Antenna Factor} - \text{Preamp Factor}$

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.

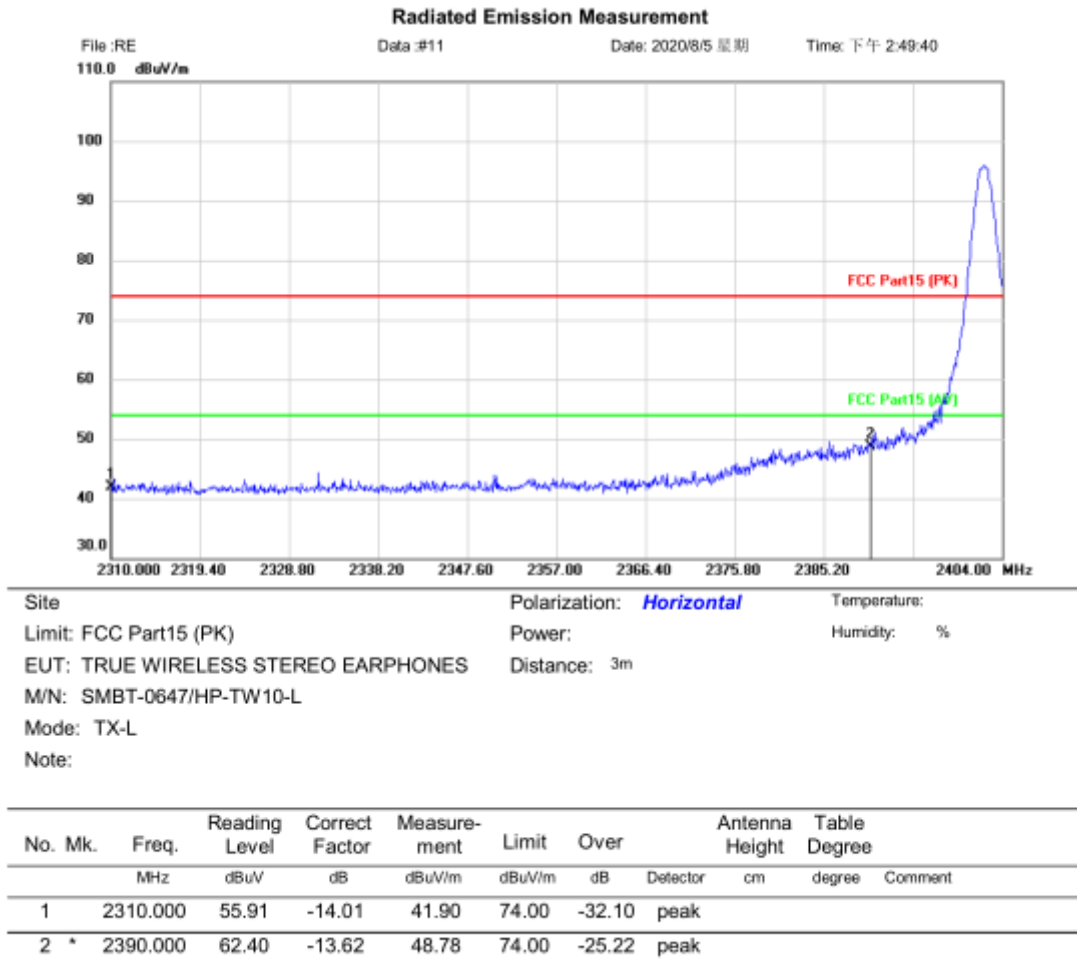
BlueAsia

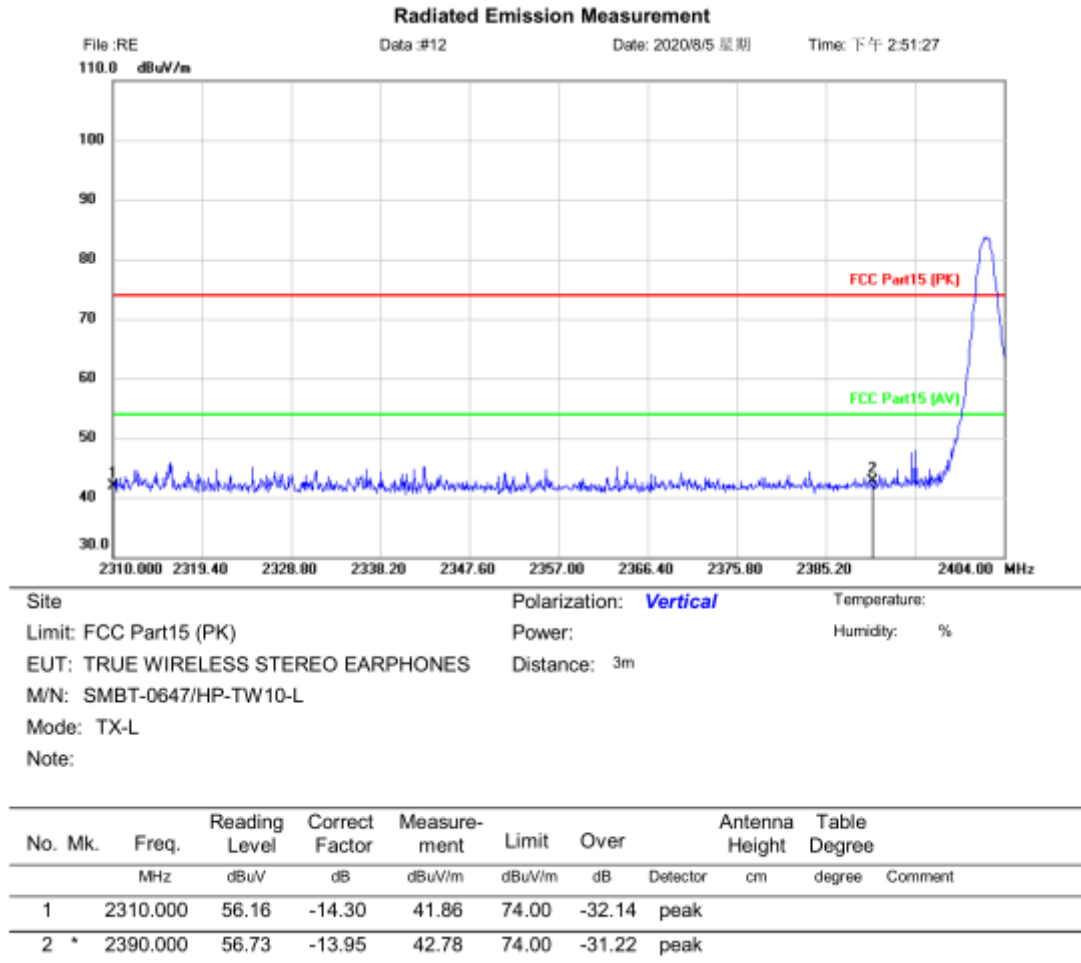


TEST DATA

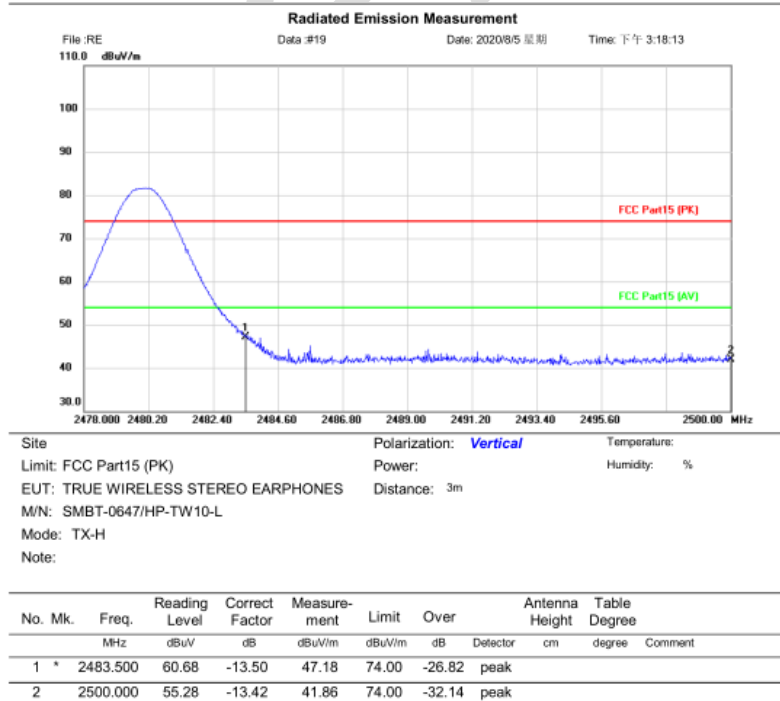
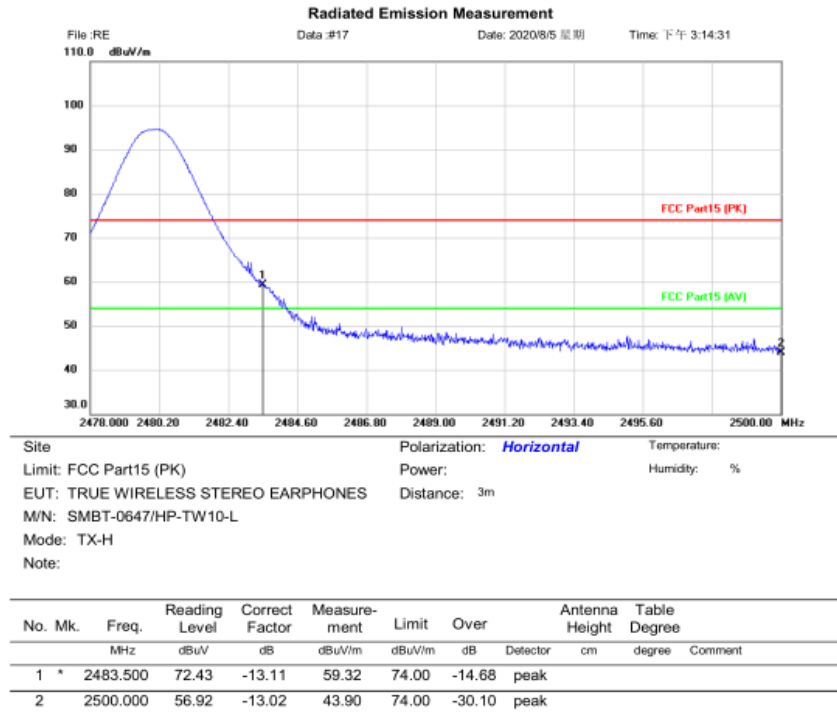
Remark: During the test, pre-scan the GFSK, Pi/4QPSK modulation, and found the Pi/4QPSK modulation which it is worse case.

Lowest channel Peak Value

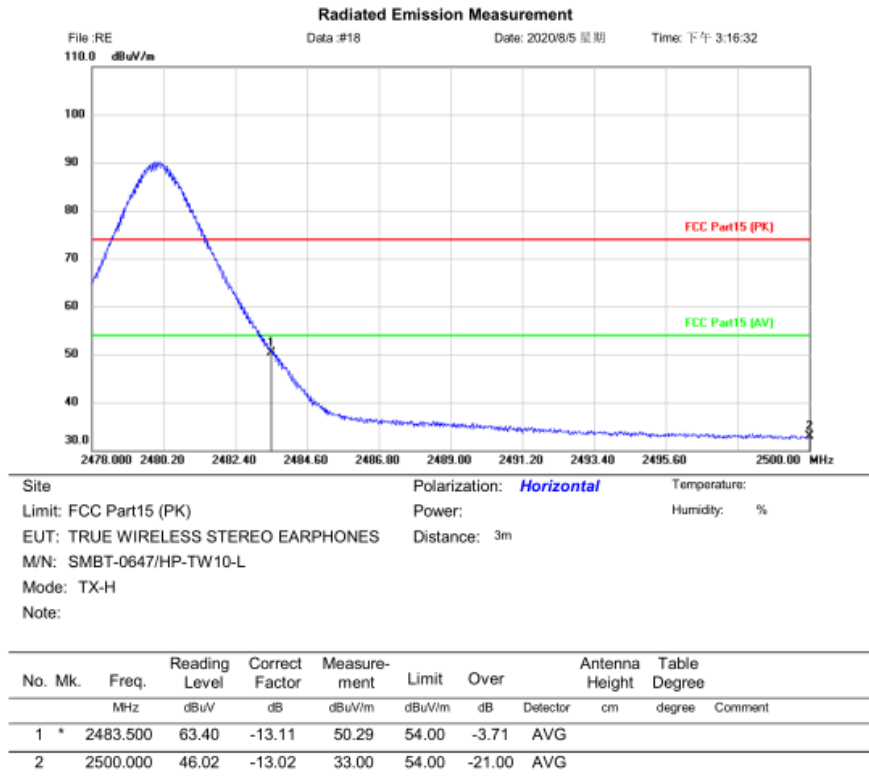




Highest channel Peak Value



AVG Value



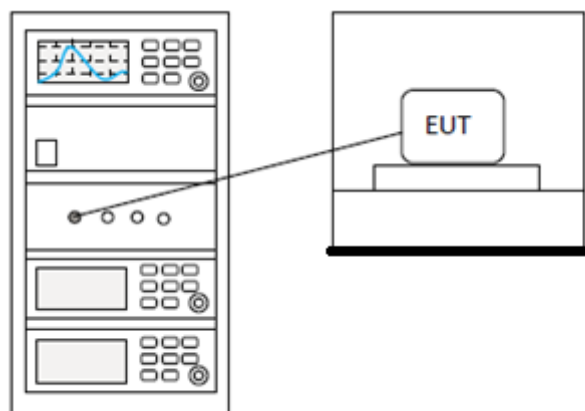
CONDUCTED BAND EDGES MEASUREMENT

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	Jozu
Temperature	25℃
Humidity	60%

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)).
---------------	--

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia



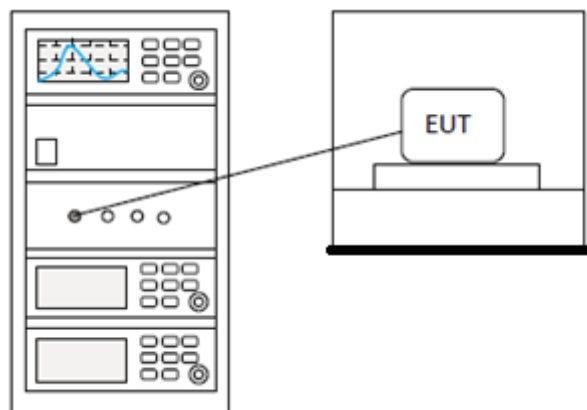
DWELL TIME

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.4
Test Mode (Pre-Scan)	TX_non-Hop mode
Test Mode (Final Test)	TX_non-Hop mode
Tester	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia



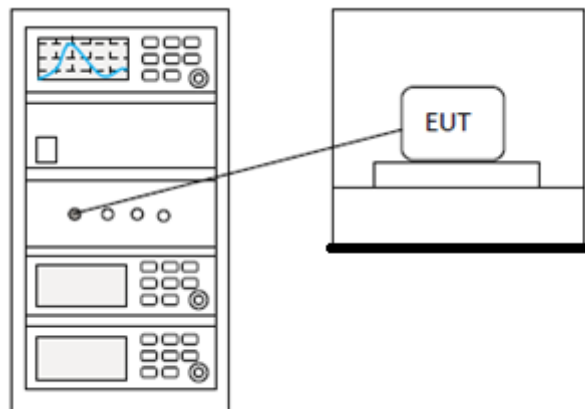
HOPPING CHANNEL NUMBER

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.3
Test Mode (Pre-Scan)	TX_non-Hop mode
Test Mode (Final Test)	TX_non-Hop mode
Tester	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



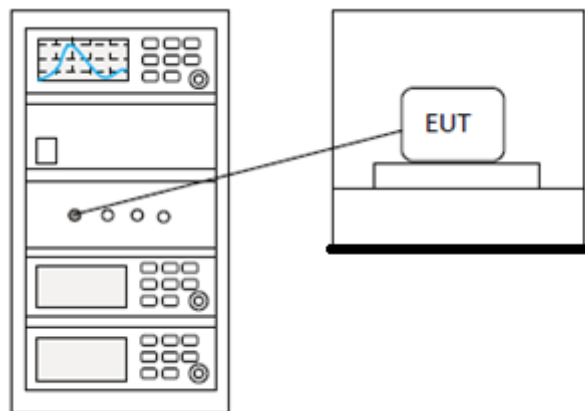
CARRIER FREQUENCIES SEPARATION

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.2
Test Mode (Pre-Scan)	TX_non-Hop mode
Test Mode (Final Test)	TX_non-Hop mode
Tester	Jozu
Temperature	25°C
Humidity	60%

LIMITS

Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W
---------------	--

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

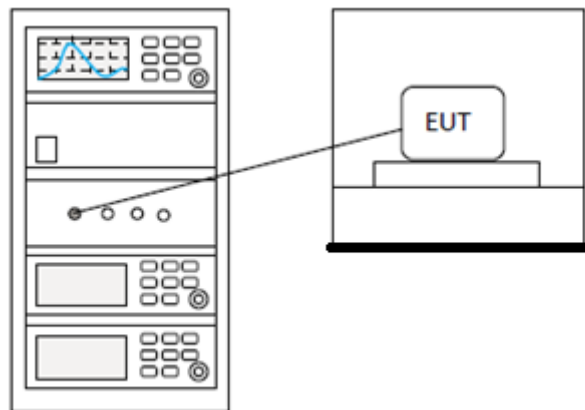
Pass: Please Refer To Appendix: Appendix1 For Details



20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.7
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Jozu
Temperature	25℃
Humidity	60%

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details



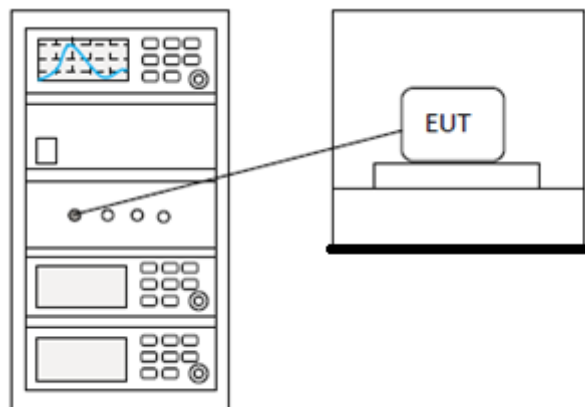
CONDUCTED PEAK OUTPUT POWER

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	Jozu
Temperature	25℃
Humidity	60%

LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥ 50 hopping channels
	0.25 for $25 \leq \text{hopping channels} < 50$
	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

BLOCK DIAGRAM OF TEST SETUP



TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

BlueAsia

