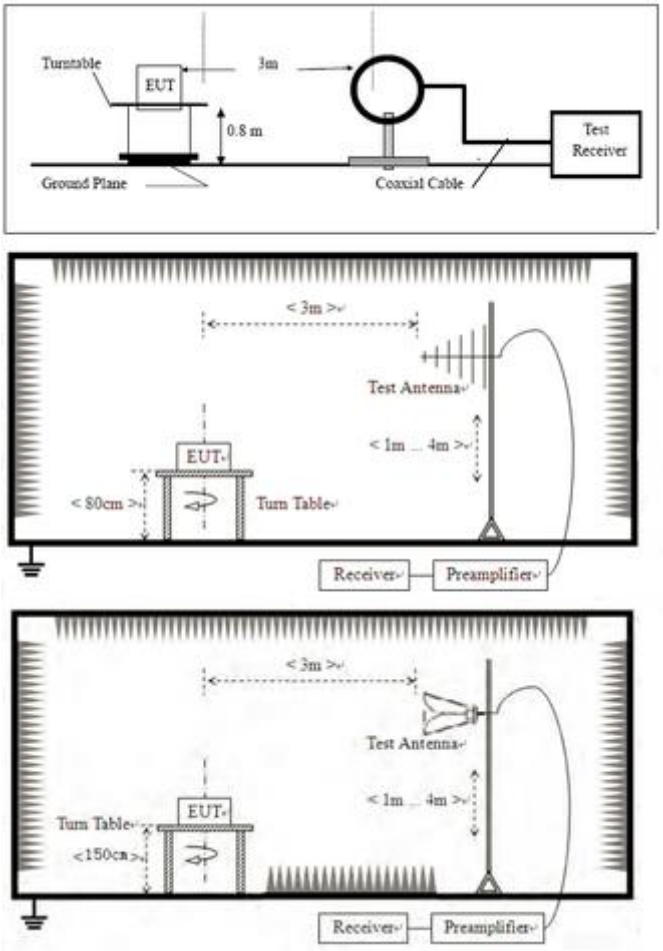
BLOCK DIAGRAM OF TEST SETUP



PROCEDURE

a. 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.
b. 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.
c. 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.
d. 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.
e. 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.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. 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 ¨C Preamplifier Factor
3) Scan from 9kHz to 25GHz, the disturbance above 18GHz 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.

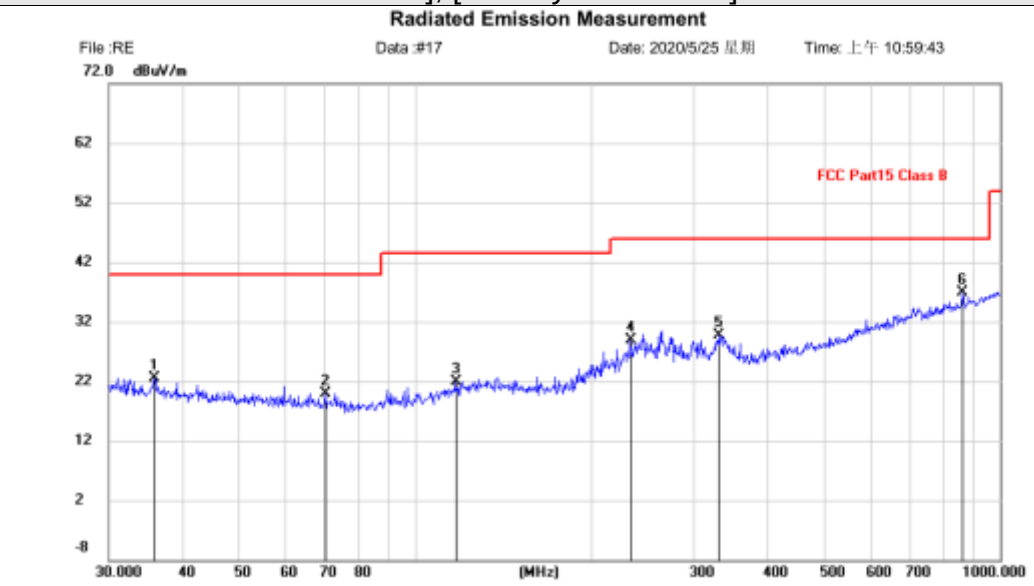
TEST DATA

During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.

[TestMode: TX mode with modulation]						
Test channel:lowest						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Correct factor	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4804.00	42.45	2.38	44.83	74	-29.17	Vertical
7206.00	44.12	2.17	46.29	74	-27.71	Vertical
9608.00	41.77	2.06	43.83	74	-30.17	Vertical
12010.00	*			74		Vertical
14412.00	*			74		Vertical
4804.00	41.29	2.38	43.67	74	-30.33	Horizontal
7206.00	42.68	2.17	44.85	74	-29.15	Horizontal
9608.00	41.87	2.06	43.93	74	-30.07	Horizontal
12010.00	*			74		Horizontal
14412.00	*			74		Horizontal
Test channel:Middle						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Correct factor	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4882.00	40.91	0.17	41.08	74	-32.92	Vertical
7323.00	42.24	1.43	43.67	74	-30.33	Vertical
9764.00	40.76	1.26	42.02	74	-31.98	Vertical
12205.00	*			74		Vertical
14646.00	*			74		Vertical
4882.00	40.64	0.17	40.81	74	-33.19	Horizontal
7323.00	42.27	1.43	43.7	74	-30.3	Horizontal
9764.00	41.11	1.26	42.37	74	-31.63	Horizontal
12205.00	*			74		Horizontal
14646.00	*			74		Horizontal
Test channel:Highest						
Peak value:						
Frequency	Read Level	Correct	Level	Limit Line	Over Limit	Polarizatio

(MHz)	(dBuV)	factor	(dBuV/m)	(dBuV/m)	(dB)	n
4960.00	41.06	1.04	42.1	74	-31.9	Vertical
7440.00	43.85	2.59	46.44	74	-27.56	Vertical
9920.00	40.47	2.74	43.21	74	-30.79	Vertical
12400.00	*			74		Vertical
14880.00	*			74		Vertical
4960.00	40.66	1.04	41.7	74	-32.3	Horizontal
7440.00	43.36	2.59	45.95	74	-28.05	Horizontal
9920.00	41.48	2.74	44.22	74	-29.78	Horizontal
12400.00	*			74		Horizontal
14880.00	*			74		Horizontal
Test Result: Pass						

[TestMode: TX mode with modulation]; [Polarity: Horizontal]



Site
Limit: FCC Part15 Class B
EUT: Haylou Wireless Earbuds
M/N: Haylou-T16
Mode: BT mode
Note:

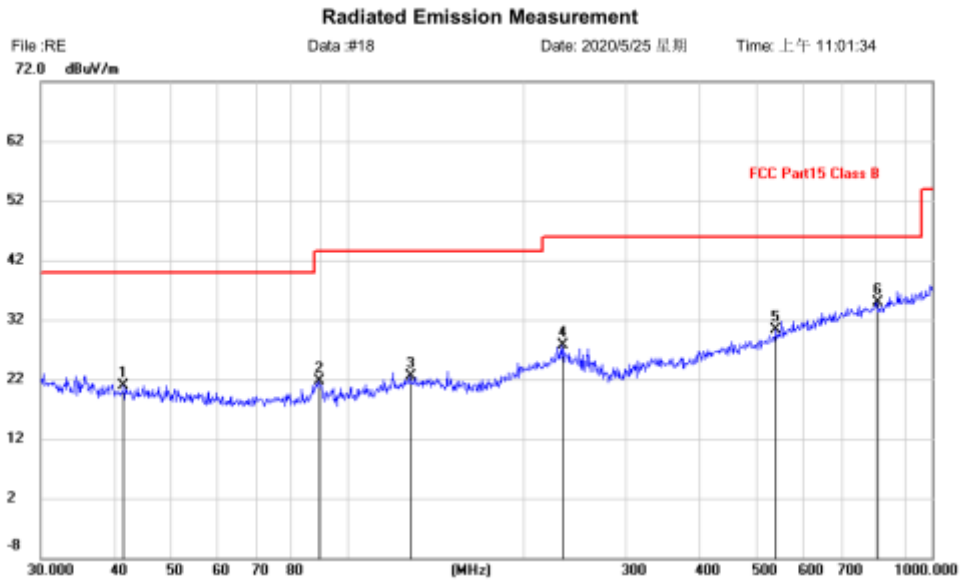
Polarization: *Horizontal*
Power:
Distance:

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		35.8746	-0.96	23.38	22.42	40.00	-17.58	QP			
2		70.3365	-1.22	21.11	19.89	40.00	-20.11	QP			
3		117.3603	-0.46	22.43	21.97	43.50	-21.53	QP			
4		233.3487	6.33	22.54	28.87	46.00	-17.13	QP			
5		331.3546	4.86	24.82	29.68	46.00	-16.32	QP			
6	*	863.0562	2.00	34.88	36.88	46.00	-9.12	QP			

Test Result: Pass

[TestMode: TX mode with modulation]; [Polarity: Vertical]



Site
Limit: FCC Part15 Class B
EUT: Haylou Wireless Earbuds
M/N: Haylou-T16
Mode: BT mode
Note:

Polarization: *Vertical*
Power:
Distance:

Temperature:
Humidity: %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		41.5670	-3.41	24.32	20.91	40.00	-19.09	QP			
2		89.2764	2.13	19.54	21.67	43.50	-21.83	QP			
3		128.1130	-0.50	22.93	22.43	43.50	-21.07	QP			
4		233.3487	5.22	22.54	27.76	46.00	-18.24	QP			
5		541.3725	0.29	29.92	30.21	46.00	-15.79	QP			
6	*	804.6028	0.57	34.31	34.88	46.00	-11.12	QP			

Test Result: Pass

RADIATED EMISSIONS WHICH FALL IN THE RESTRICTED BANDS

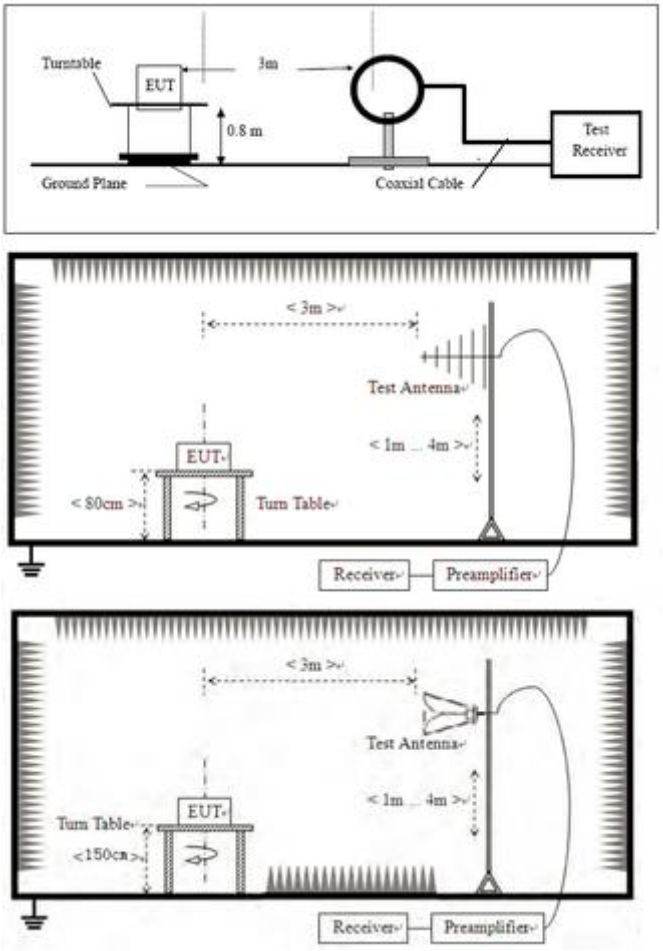
Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX mode with modulation
Test Mode (Final Test)	TX mode with modulation
Tester	Jozu
Temperature	23℃
Humidity	58%

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

a. 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.
b. 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.
c. 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.
d. 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.
e. 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.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. 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.

TEST DATA

During the test, pre-scan the GFSK, Pi/4QPSK, 8-DPSK modulation, and found the GFSK modulation which it is worse case.

[TestMode: TX mode with modulation]						
Test channel:lowest						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Correct factor	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	44.26	-4.2	40.06	74	-33.94	Horizontal
2390	47.95	-3.88	44.07	74	-29.93	Horizontal
2310	44.99	-4.49	40.5	74	-33.5	Vertical
2390	48.65	-4.21	44.44	74	-29.56	Vertical
Average value:						
Frequency (MHz)	Read Level (dBuV)	Correct factor(dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310	33.08	-4.2	28.88	54	-25.12	Horizontal
2390	33.48	-3.88	29.6	54	-24.4	Horizontal
2310	34.14	-4.49	29.65	54	-24.35	Vertical
2390	34.32	-4.21	30.11	54	-23.89	Vertical
Test channel:Highest						
Peak value:						
Frequency (MHz)	Read Level (dBuV)	Correct factor	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	45.24	-3.38	41.86	74	-32.14	Horizontal
2500	50.07	-3.3	46.77	74	-27.23	Horizontal
2483.5	45.41	-3.77	41.64	74	-32.36	Vertical
2500	52.61	-3.7	48.91	74	-25.09	Vertical
Average value:						
Frequency (MHz)	Read Level (dBuV)	Correct factor(dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.5	41.26	-3.38	37.88	54	-16.12	Horizontal
2500	33.84	-3.3	30.54	54	-23.46	Horizontal
2483.5	42.44	-3.77	38.67	54	-15.33	Vertical
2500	42.75	-3.7	39.05	54	-14.95	Vertical

Test Result: Fail

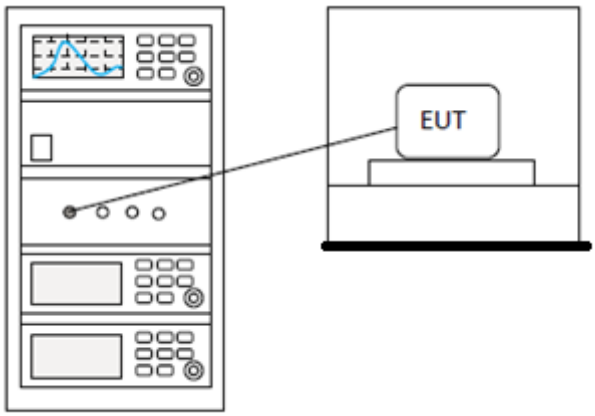
CONDUCTED BAND EDGES MEASUREMENT

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 mode with modulation
Test Mode (Final Test)	TX mode with modulation
Tester	Jozu
Temperature	24℃
Humidity	56%

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

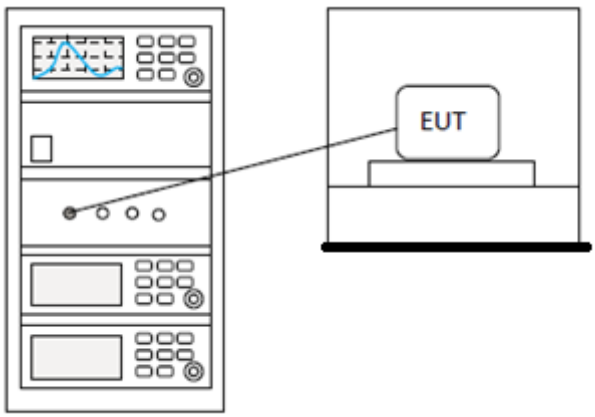
DWELL TIME

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 mode with modulation
Test Mode (Final Test)	TX mode with modulation
Tester	Jozu
Temperature	24℃
Humidity	56%

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

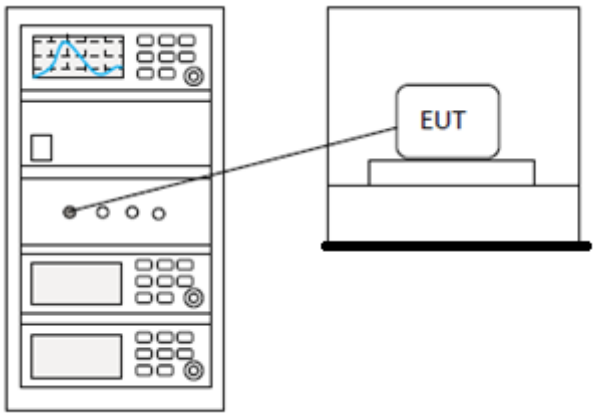
HOPPING CHANNEL NUMBER

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 mode with modulation
Test Mode (Final Test)	TX mode with modulation
Tester	Jozu
Temperature	24℃
Humidity	56%

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

10 APPENDIX

Appendix1

10.1 APPENDIX: 20DBEMISSION BANDWIDTH

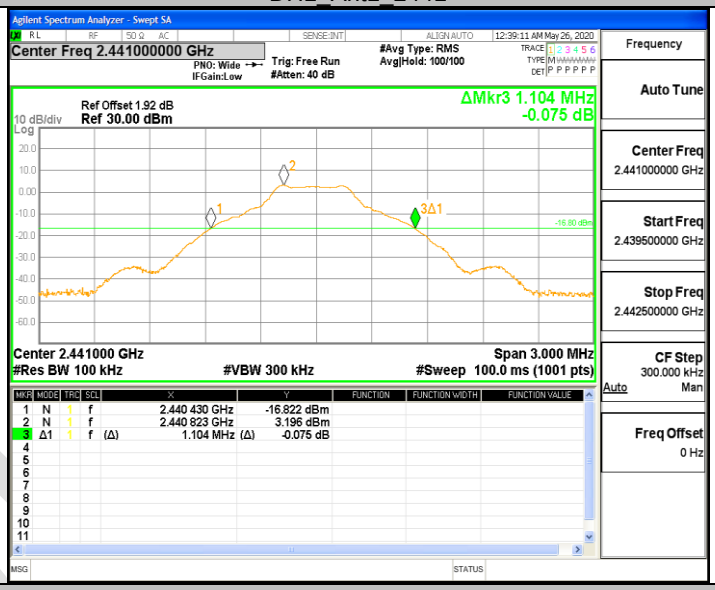
Test Result

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	1.107	2401.430	2402.537	---	PASS
		2441	1.104	2440.430	2441.534	---	PASS
		2480	1.107	2479.427	2480.534	---	PASS
2DH1	Ant1	2402	1.329	2401.310	2402.639	---	PASS
		2441	1.329	2440.310	2441.639	---	PASS
		2480	1.329	2479.310	2480.639	---	PASS
3DH1	Ant1	2402	1.335	2401.307	2402.642	---	PASS
		2441	1.335	2440.307	2441.642	---	PASS
		2480	1.335	2479.307	2480.642	---	PASS

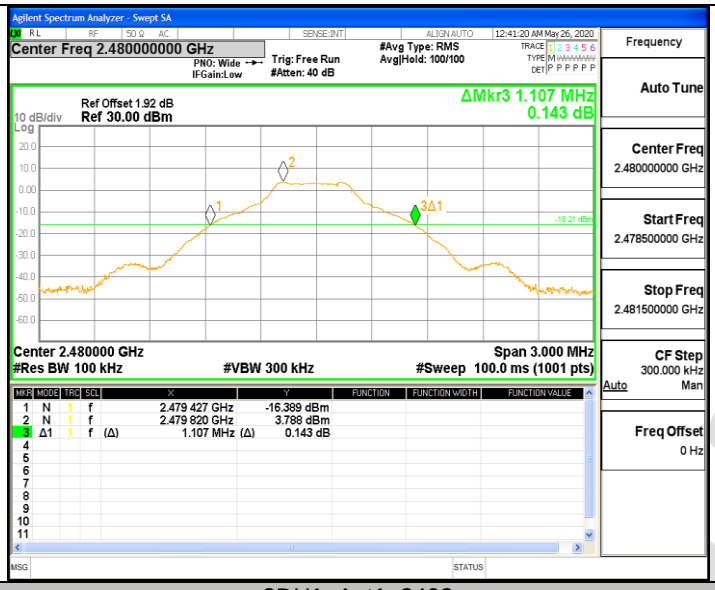
Test Graphs

DH1_Ant1_2402

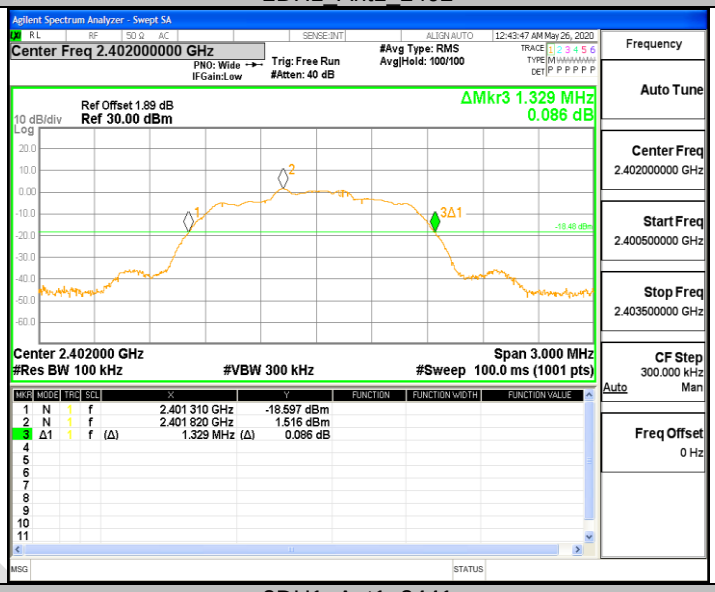
DH1_Ant1_2441



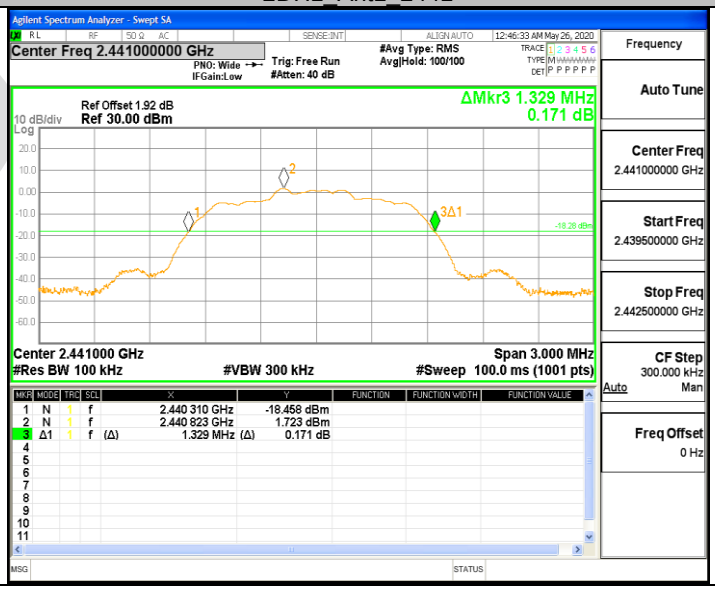
DH1_Ant1_2480



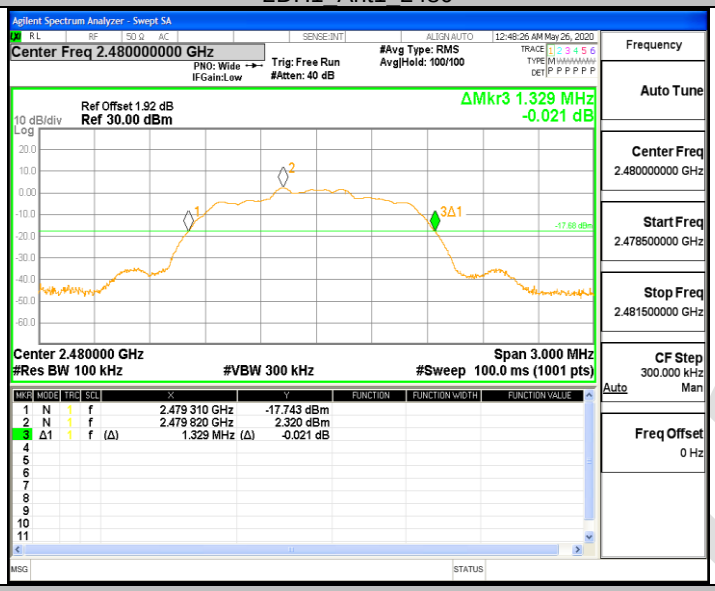
2DH1_Ant1_2402



2DH1_Ant1_2441

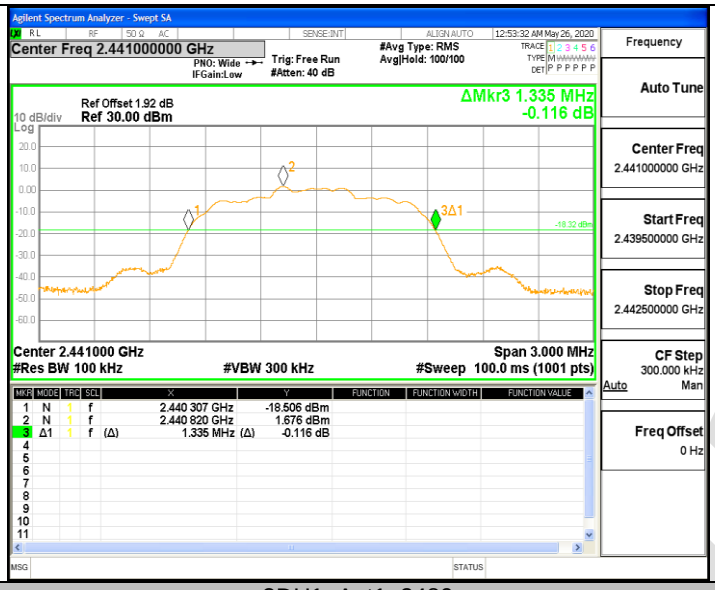


2DH1_Ant1_2480

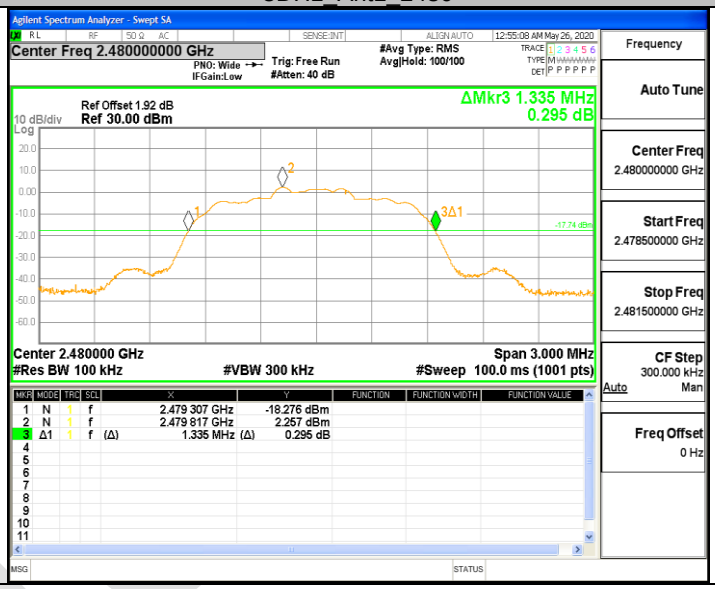


3DH1_Ant1_2402

3DH1_Ant1_2441



3DH1_Ant1_2480



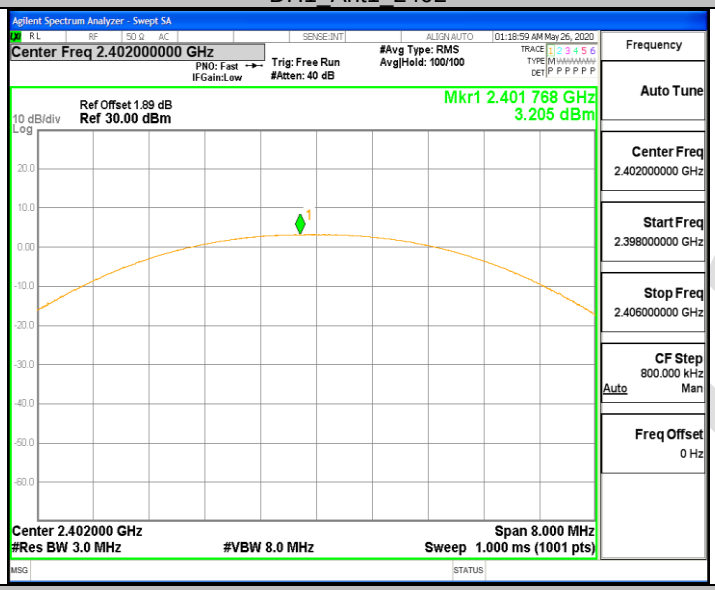
10.2 APPENDIX: MAXIMUM CONDUCTED OUTPUT POWER

Test Result

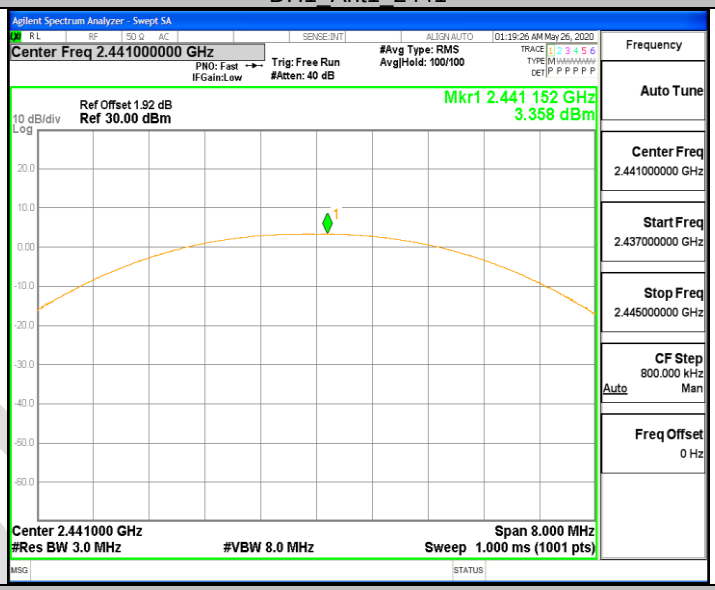
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH1	Ant1	2402	3.21	<=20.97	PASS
		2441	3.36	<=20.97	PASS
		2480	3.96	<=20.97	PASS
2DH1	Ant1	2402	2.67	<=20.97	PASS
		2441	2.81	<=20.97	PASS
		2480	3.41	<=20.97	PASS
3DH1	Ant1	2402	3.04	<=20.97	PASS
		2441	3.11	<=20.97	PASS
		2480	3.85	<=20.97	PASS

Test Graphs

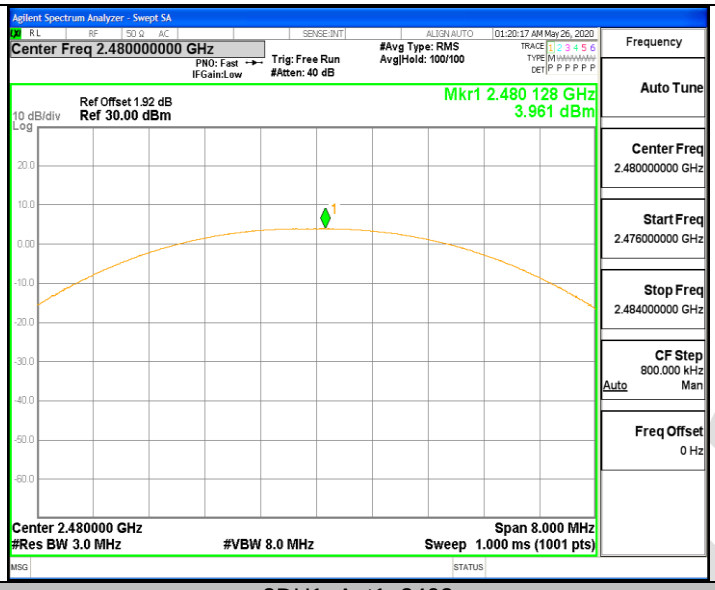
DH1_Ant1_2402



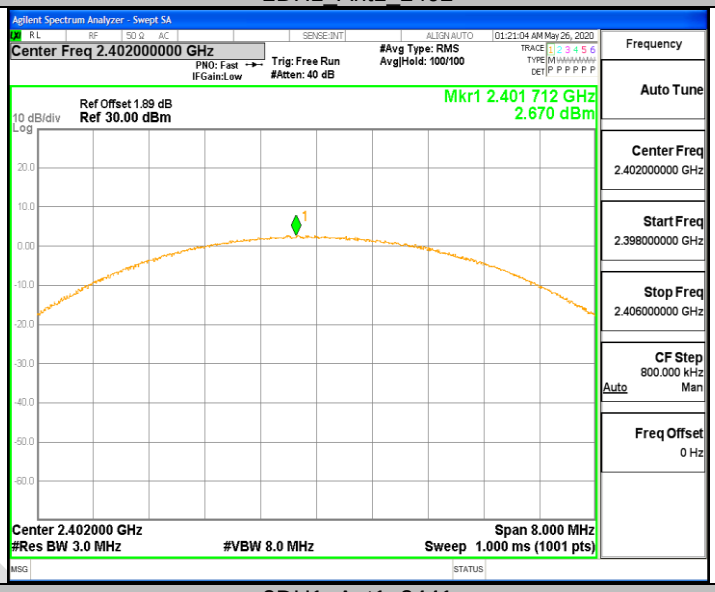
DH1_Ant1_2441



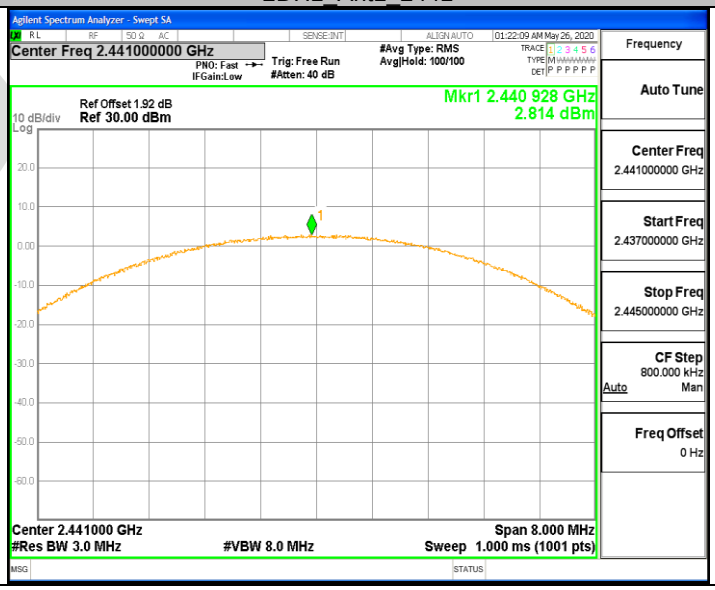
DH1_Ant1_2480



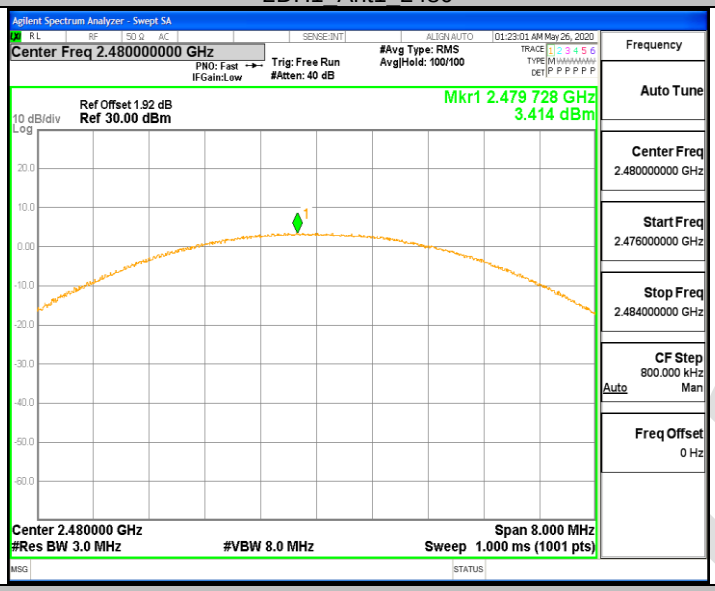
2DH1_Ant1_2402



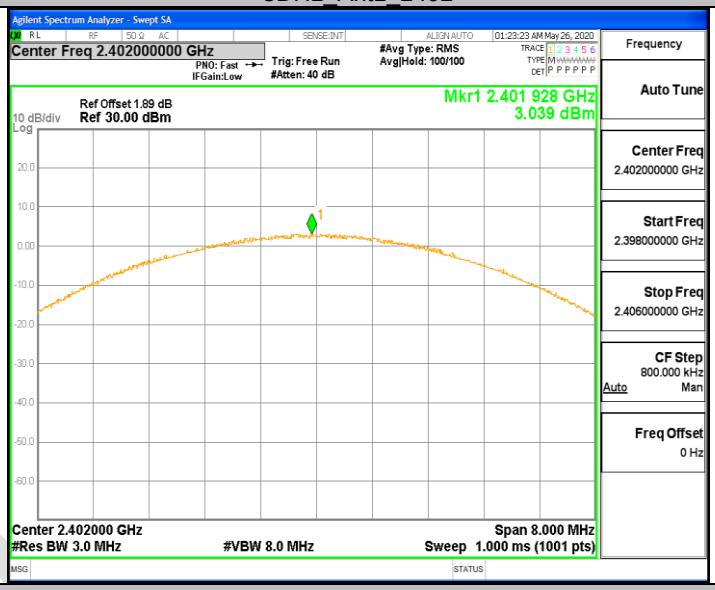
2DH1_Ant1_2441



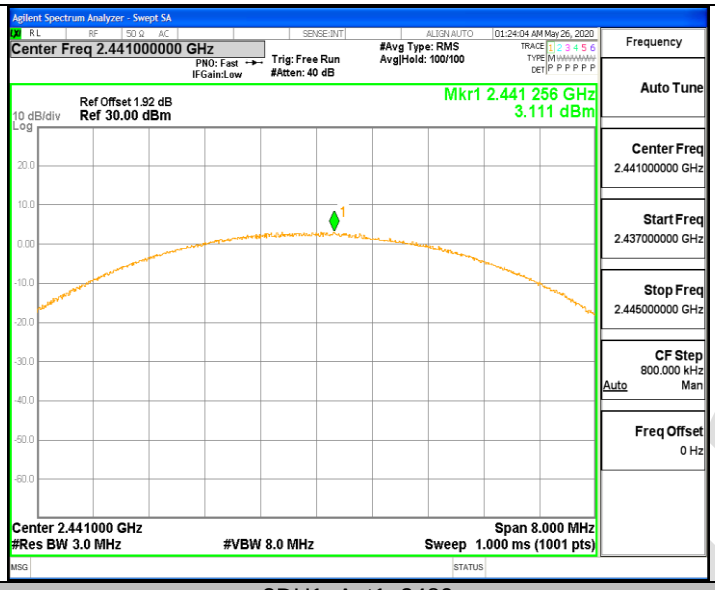
2DH1_Ant1_2480



3DH1_Ant1_2402



3DH1_Ant1_2441



3DH1_Ant1_2480