

### 8. Dwell Time

### 8.1. Block diagram of test setup

Same as section 4.1

#### 8.2. Limits

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 8.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s
- (3) Measure the hopping number and on time of each pulse with spectrum analyzer in zero span set, and calculate dwell time with formula Dwell time = total hops \*pulse's on time.

#### 8.4. Test result

Left side:

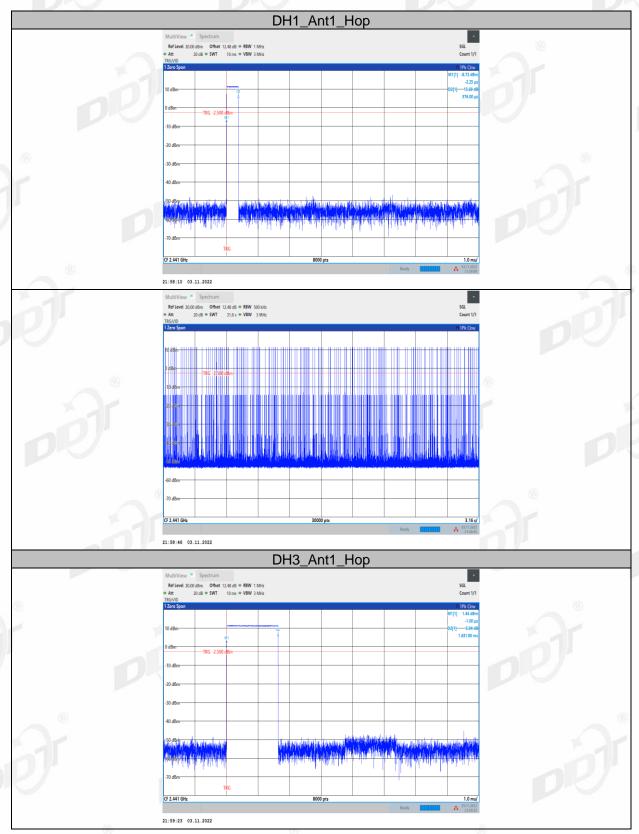
Mode	Dwell time (s)	Pulse's on time (ms)	Total hops	Limit	Verdict
DH1	0.064	0.376	170	<400ms	Pass
DH3	0.181	1.631	111	<400ms	Pass
DH5	0.216	2.880	75	<400ms	Pass
2DH1	0.058	0.385	151	<400ms	Pass
2DH3	0.177	1.638	108	<400ms	Pass
2DH5	0.202	2.885	70	<400ms	Pass
3DH1	0.065	0.385	170	<400ms	Pass
3DH3	0.178	1.635	109	<400ms	Pass
3DH5	0.217	2.887	75	<400ms	Pass
Note: Dwell time	= total hons *pulse	's on time	7		

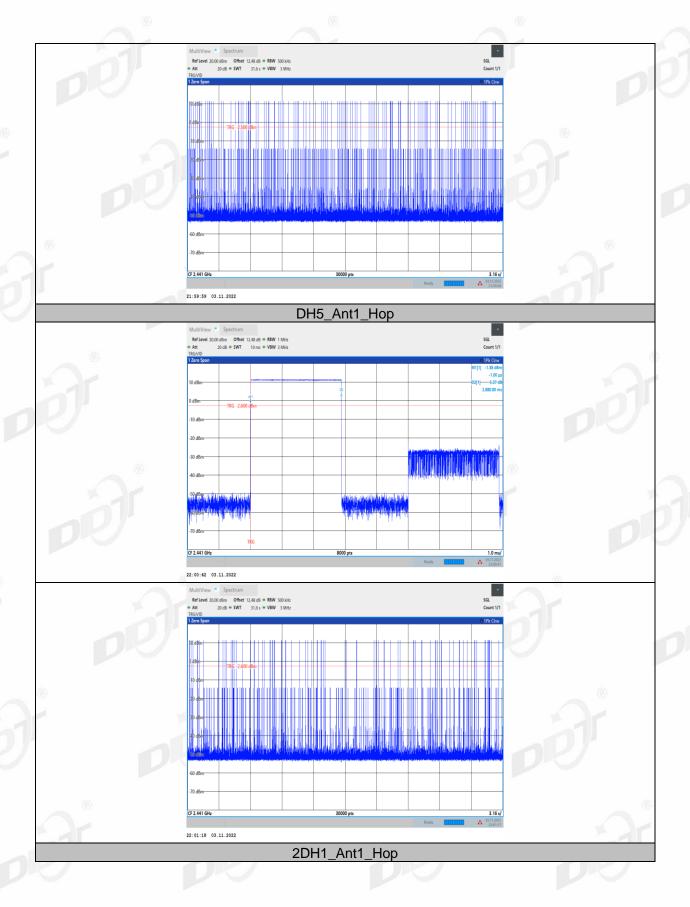
= total nops

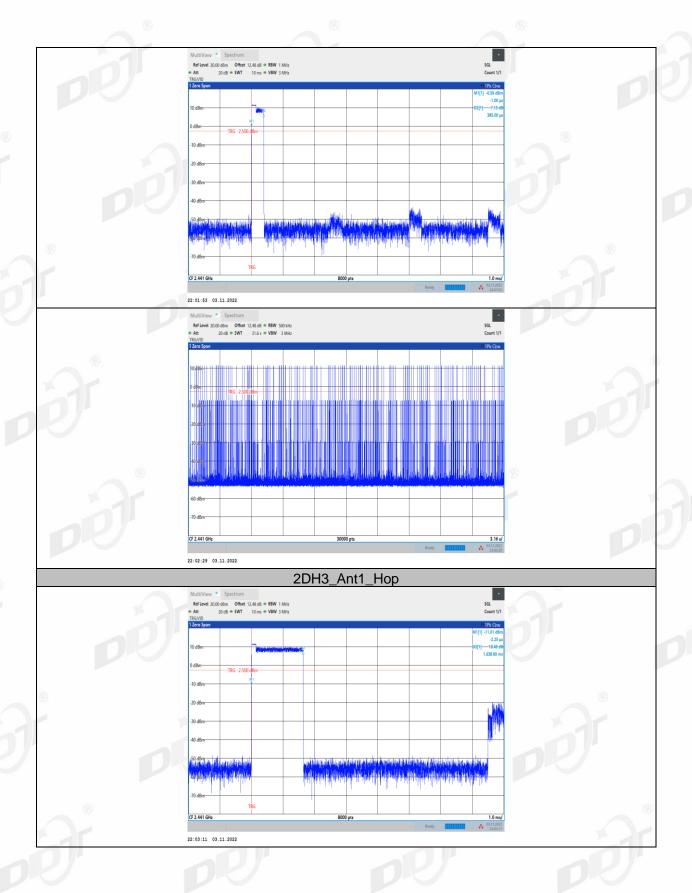
Mode	Dwell time (s)	Pulse's on time (ms)	Total hops	Limit	Verdict
DH1	0.064	0.376	169	<400ms	Pass
DH3	0.162	1.633	99	<400ms	Pass
DH5	0.216	2.880	75	<400ms	Pass
2DH1	0.058	0.386	151	<400ms	Pass
2DH3	0.182	1.638	111	<400ms	Pass
2DH5	0.199	2.885	69	<400ms	Pass
3DH1	0.065	0.385	170	<400ms	Pass
3DH3	3DH3 0.178		109	<400ms	Pass
3DH5	0.277	2.887	96	<400ms	Pass
Note: Dwell time	= total hops *pulse	's on time.			

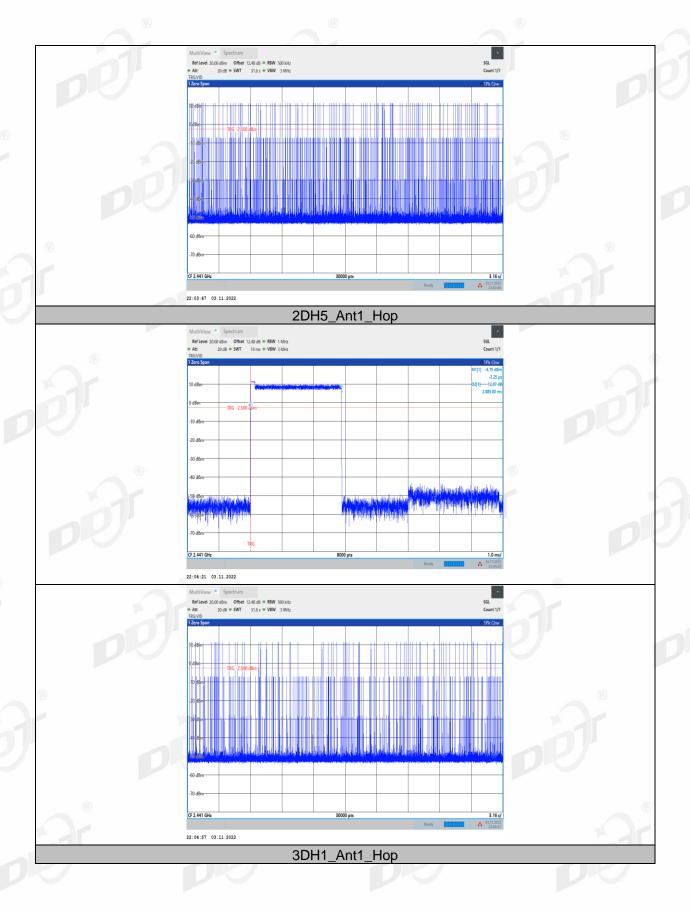
## 8.5. Original test data

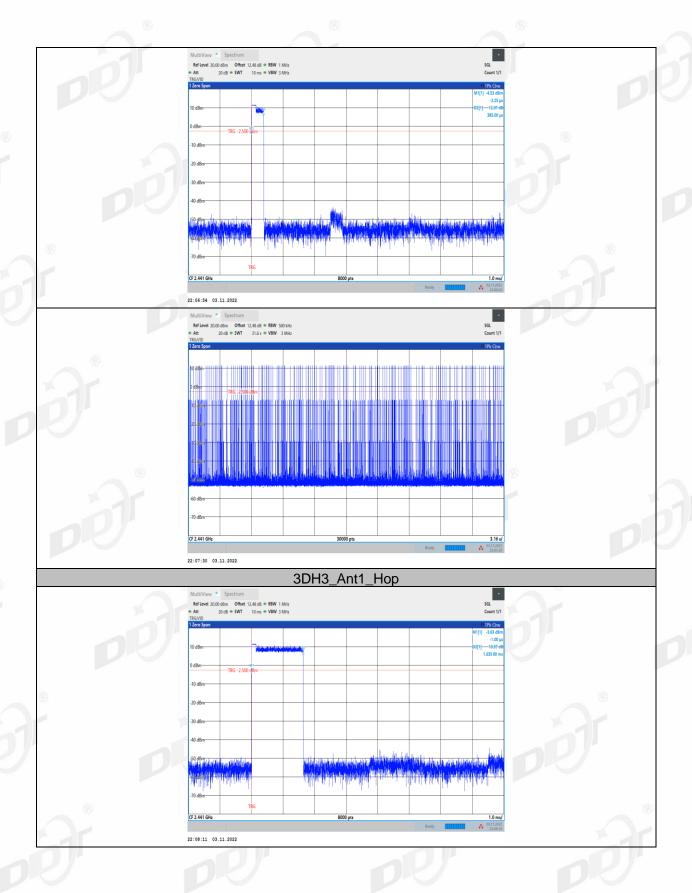
Left side:

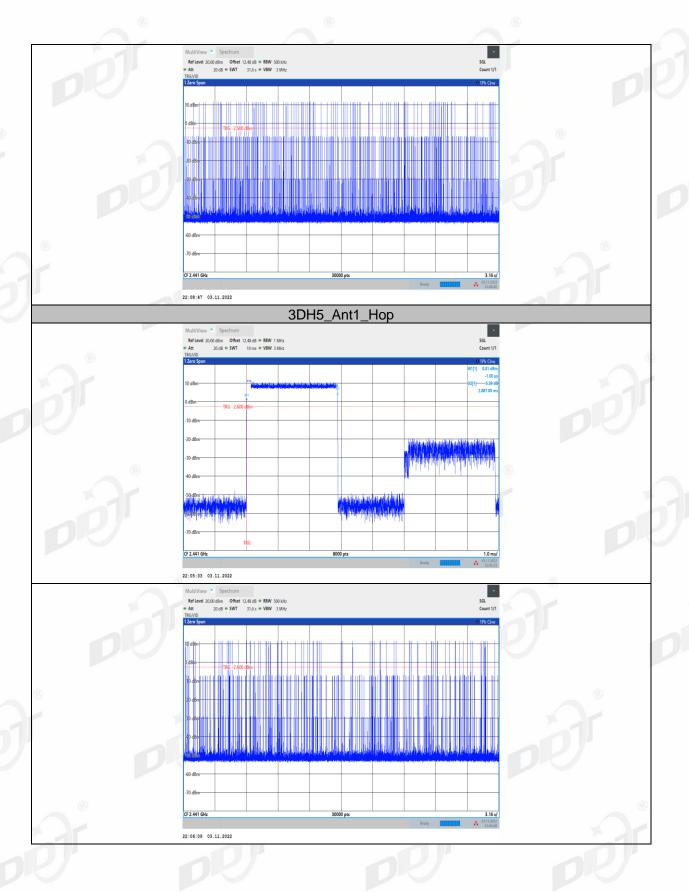


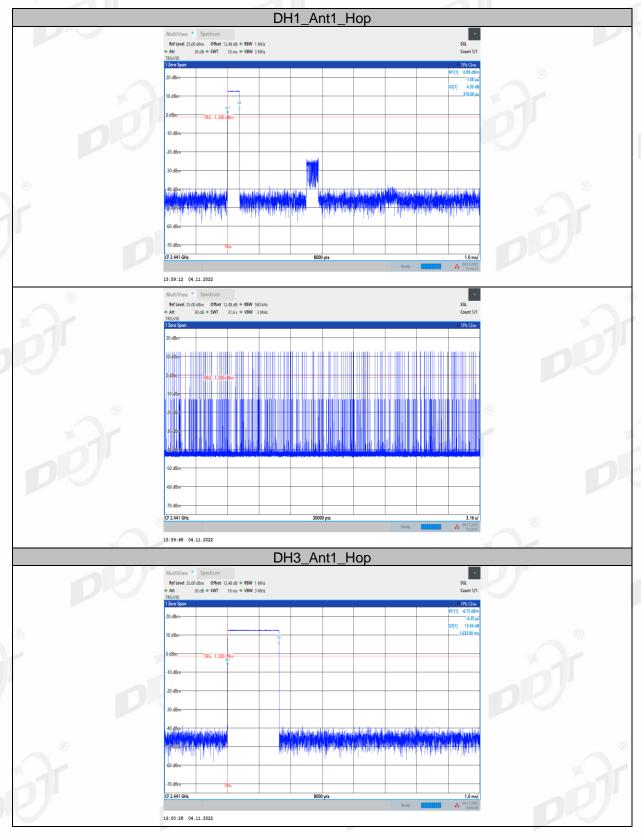


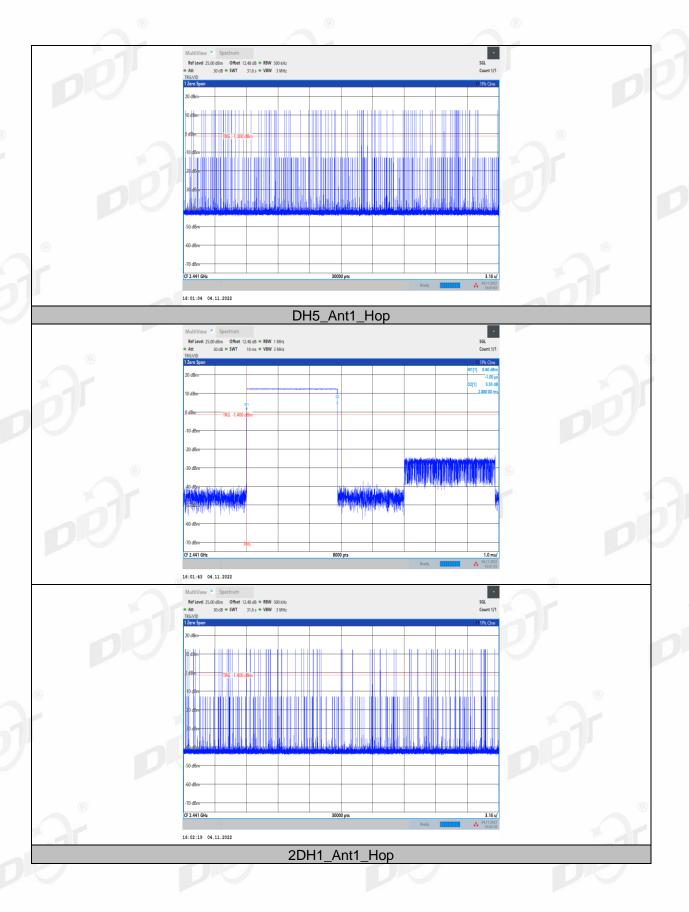


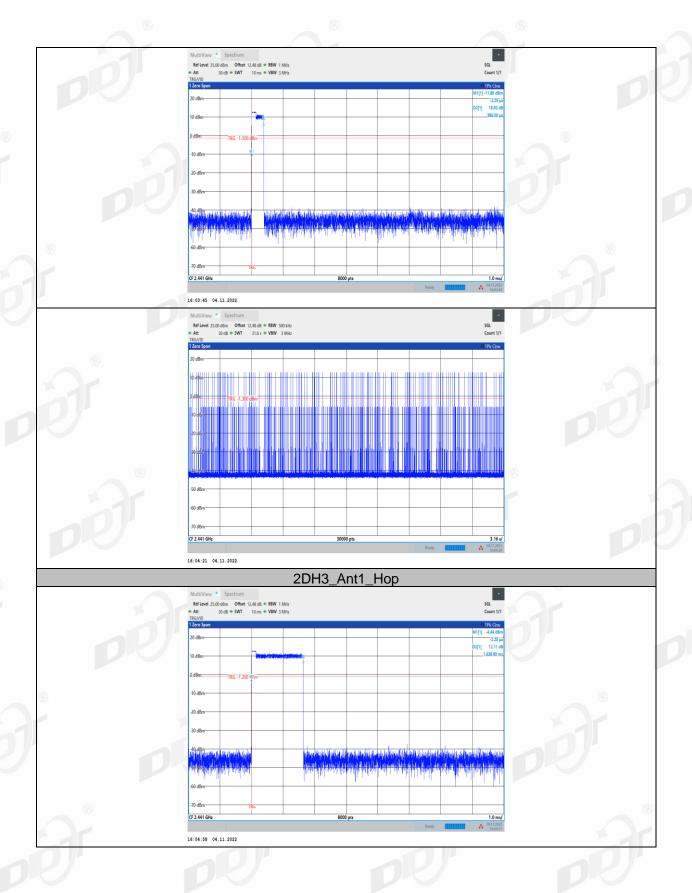


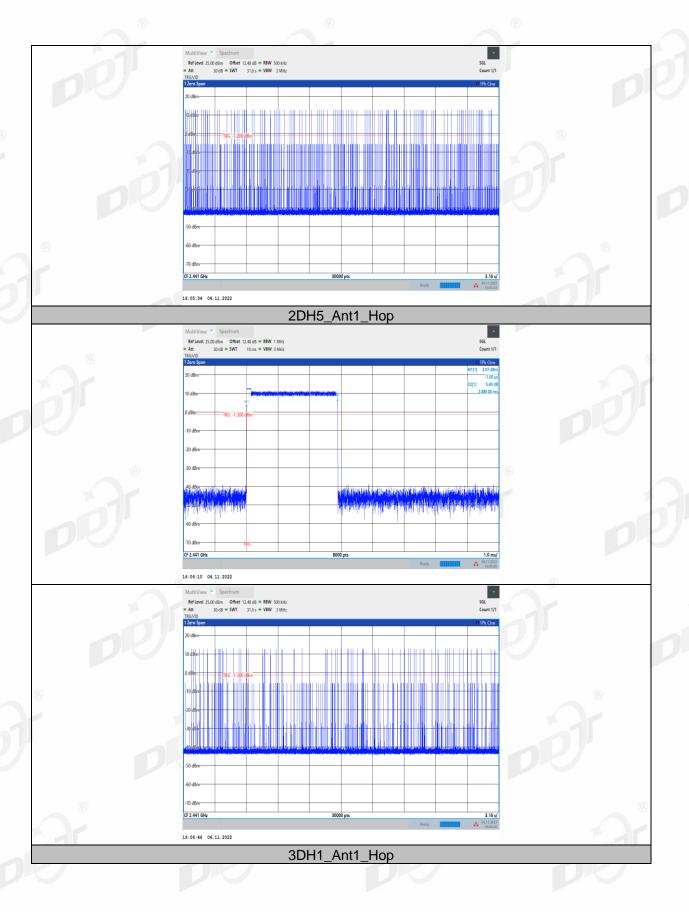


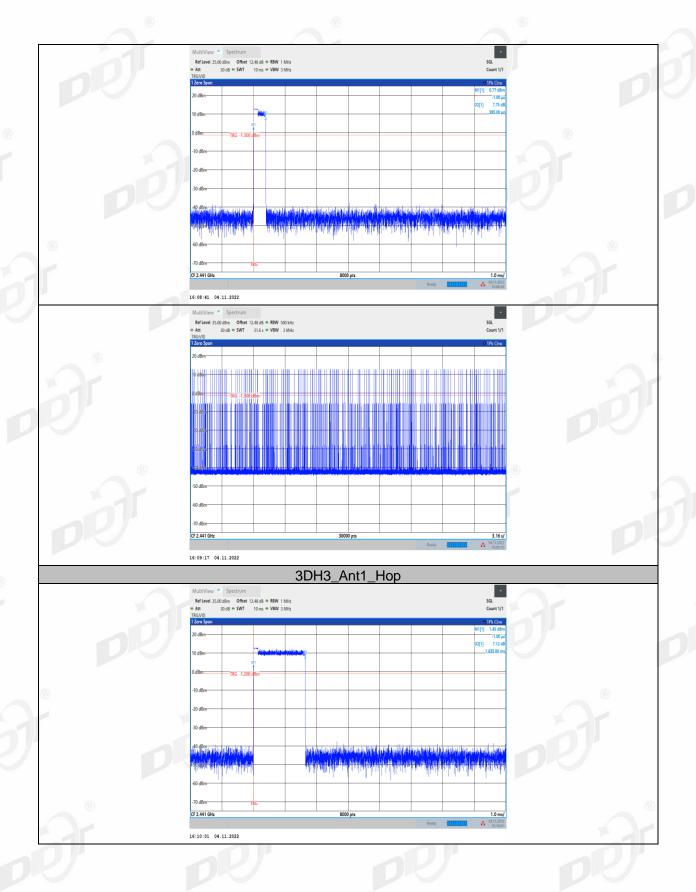


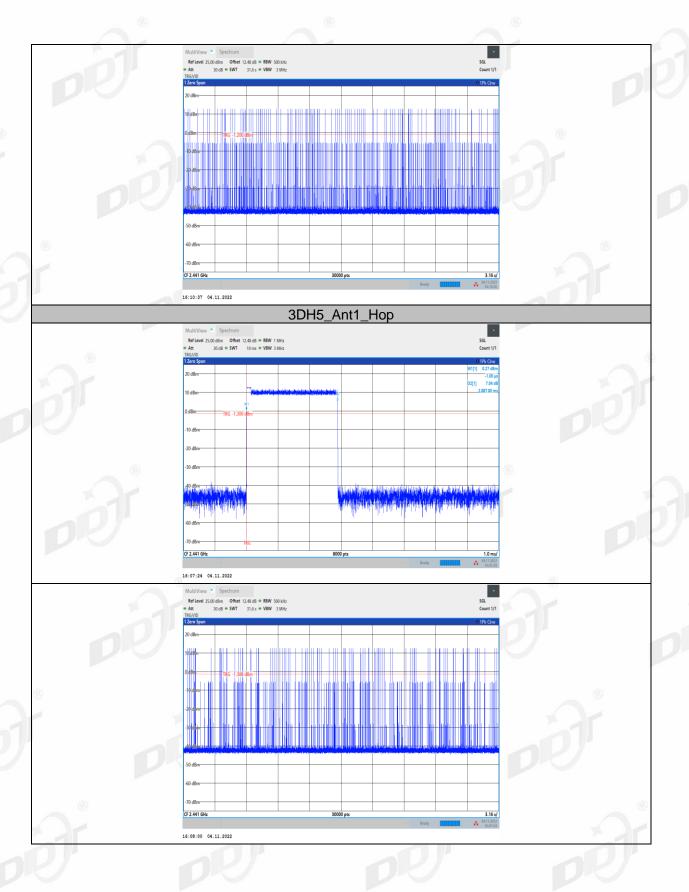












## 9. Band Edge Compliance (Conducted Method)

### 9.1. Block diagram of test setup

Same as section 4.1

#### 9.2. Limit

All restriction band should comply with 15.209, other emission should be at least 20dB below the fundamental.

### 9.3. Test procedure

- (1) Connect EUT's antenna output to spectrum analyzer by RF cable.
- (2) Establish a reference level by using the following procedure:

RBW: 100 kHz

VBW: 300 kHz

Encompass frequency range to

Span be measured

Detector Mode: Peak
Sweep time: auto

Trace mode Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

#### 9.4. Test result

Mode	Freq. (MHz)	Verdict		
	Hopping off 2402	Pass		
GFSK	Hopping off 2480	Rass Rass		
	Hopping on	Pass		
	Hopping off 2402	Pass		
π/4-DQPSK	Hopping off 2480	Pass		
	Hopping on	Pass		
	Hopping off 2402	Pass		
8DPSK	Hopping off 2480	® Pass		
	Hopping on	Pass		

## 9.5. Original test data

Left side:



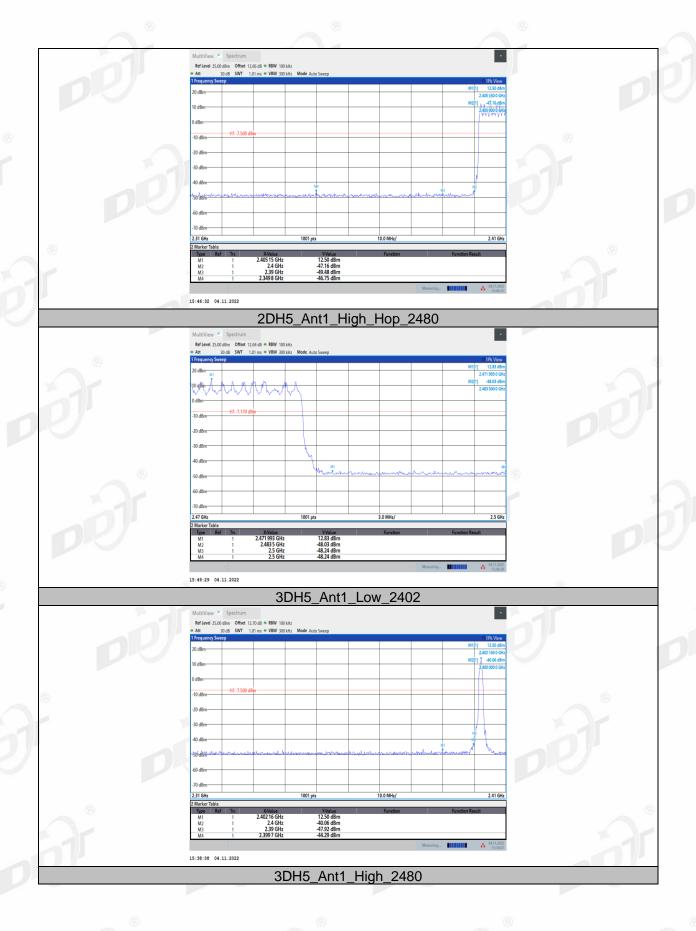


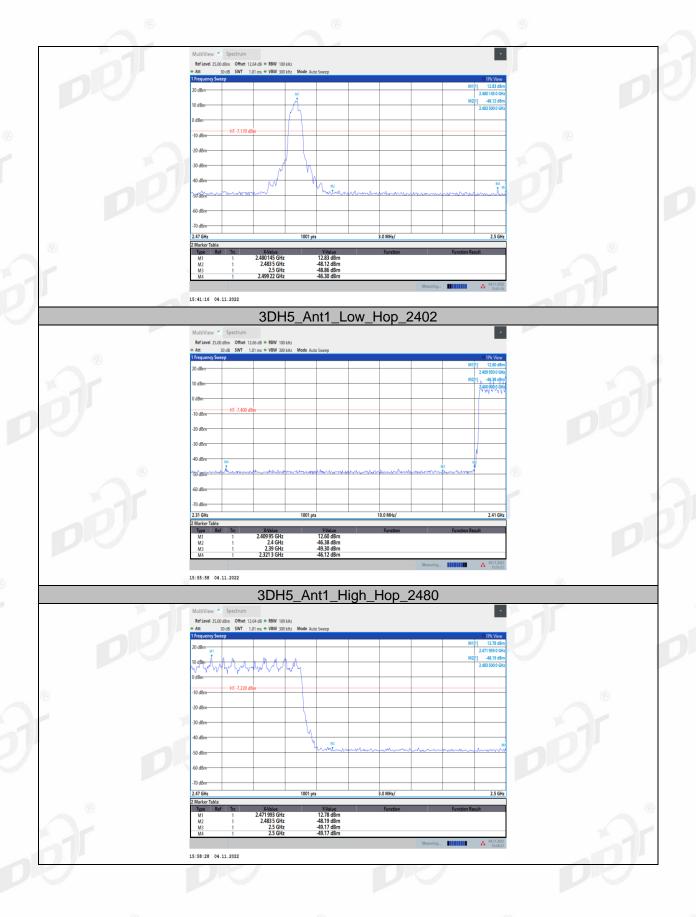








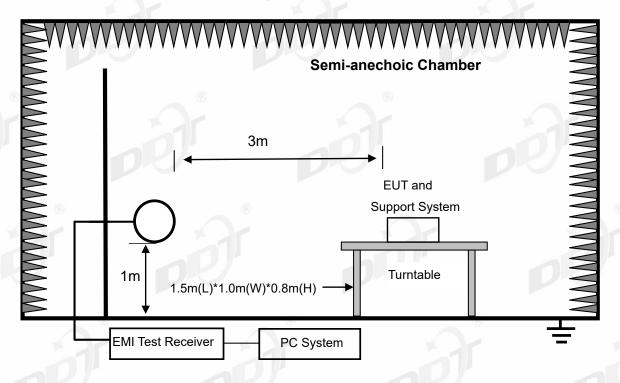




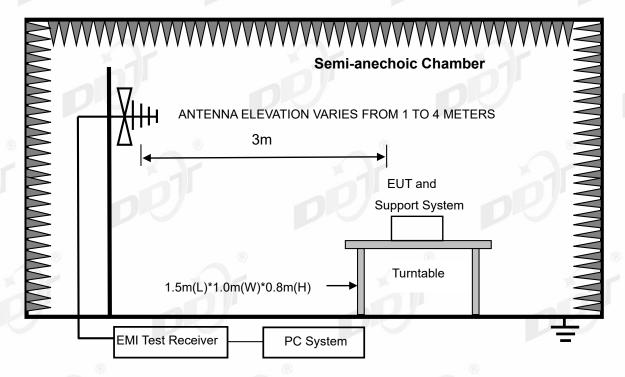
### 10. Radiated Emission

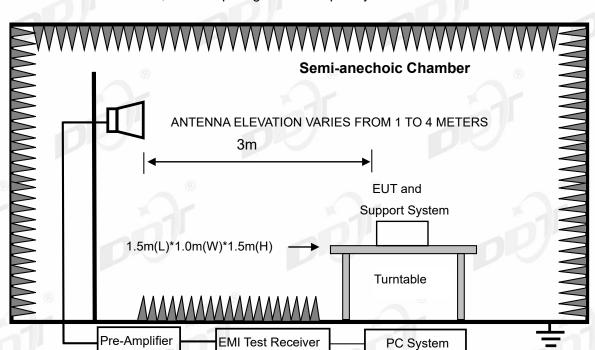
### 10.1. Block diagram of test setup

In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:





In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:

Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

#### 10.2. Limit

(1) FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
aa0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41		AU1	

<sup>&</sup>lt;sup>1</sup>Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>&</sup>lt;sup>2</sup>Above 38.6

RSS-Gen section 8.10 Restricted frequency bands\*

MHz	MHz	MHz	GHz
0.090-0.110	12.51975-12.52025	240-285	3.5-4.4
0.495-0.505	12.57675-12.57725	322-335.4	4.5-5.15
2.1735-2.1905	13.36-13.41	399.9-410	5.35-5.46
3.020-3.026	16.42-16.423	608-614	7.25-7.75
4.125-4.128	16.69475-16.69525	960-1427	8.025-8.5
4.1772&4.17775	16.80425-16.80475	1435-1626.5	9.0-9.2
4.2072&4.20775	25.5-25.67	1645.5-1646.5	9.3-9.5
5.677-5.683	37.5-38.25	1660-1710	10.6-12.7
6.215-6.218	9 73-74.6	1718.8-1722.2	13.25-13.4
6.26775-6.26825	74.8-75.2	2200-2300	14.47-14.5
6.31175-6.31225	108-138	2310-2390	15.35-16.2
8.291-8.294	149.9-150.05	2483.5-2500	17.7-21.4
8.362-8.366	156.52475-156.52525	2655-2900	22.01-23.12
8.37625-8.38675	156.7-156.9	3260-3267	23.6-24.0
8.41425-8.41475	162.0125-167.17	3332-3339	31.2-31.8
12.29-12.293	167.72-173.2	3345.8-3358	36.43-36.5
			Above 38.6

<sup>\*</sup> Certain frequency bands listed in table and in bands above 38.6 GHz are designated for licence-exempt applications. These frequency bands and the requirements that apply to related devices are set out in the 200 and 300 series of RSSs.

(2) FCC 15.209 Limit & RSS-Gen section 8.9 Limit

2) 1 00 13.203 Lillill & 100 00113	COUCH O.5 EITHE			
FREQUENCY	DISTANCE	FIELD STRENGTHS LIMIT		
MHz	Meters	μV/m	dB(μV)/m	
0.009 ~ 0.490	300	2400/F(kHz)	67.6-20log(F)	
0.490 ~ 1.705	30	24000/F(kHz)	87.6-20log(F)	
1.705 ~ 30.0	30	30	29.54	
30 ~ 88	3	100	40.0	
88 ~ 216	3	150	43.5	
216 ~ 960	3	200	46.0	
960 ~ 1000	3	500	54.0	
Above 1000	3	74.0 dB(μV)/m 54.0 dB(μV)/m		

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz and above 1000 MHz, radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30 MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

 $Limit_{3m}(dBuV/m) = Limit_{30m}(dBuV/m) + 40Log(30m/3m)$ 

#### (3) Limit for this EUT

The emissions appearing within 15.205 restricted frequency bands shall not exceed the limits

shown in 15.209, and the emissions appearing within RSS-Gen section 8.10 Restricted frequency bands shall not exceed the limits shown in RSS-Gen section 8.9, all the other emissions shall be at least 20 dB below the fundamental emissions or comply with 15.209 limits and RSS-Gen section 8.9 limits.

#### 10.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a fully-anechoic chamber for above 1G.
- (2) Test antenna was located 3 m from the EUT on an adjustable mast, and the antenna used as below table.

Test frequency range Test antenna used		Test antenna distance
9 kHz - 30 MHz	Active Loop antenna	3 m
30 MHz - 1 GHz Trilog Broadband Antenna		3 m
1 GHz - 18 GHz	Double Ridged Horn Antenna	3 m
× 41	(1 GHz - 18 GHz)	
18 GHz - 40 GHz	Horn Antenna	1 m
	(18 GHz - 40 GHz)	

According ANSI C63.10:2013 clause 6.4.6 and 6.5.3, for measurements below 30 MHz, Antenna was located 3 m from EUT, the loop antenna was positioned in three antenna orientations (parallel, perpendicular, and round-parallel), for each measurement antenna alignment, the EUT shall be rotated through 0° to 360° on a turntable, and the lowest height of the magnetic antenna shall be 1 m above the ground. For measurement above 30 MHz, the trilog Broadband Antenna or Horn Antenna was located 3 m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

- (3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9 kHz to 25 GHz:
- (a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1 m to 4 m (Except loop antenna, it's fixed 1 m above ground.)
  - (b) Change work frequency or channel of device if practicable.
  - (c) Change modulation type of device if practicable.
  - (d) Change power supply range from 85% to 115% of the rated supply voltage
- (e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9 kHz to 25 GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 18 GHz to 25 GHz, so below

final test was performed with frequency range from 9 kHz to 18 GHz.

- (4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipment and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.
- (5) The emissions from 9 kHz to 1 GHz were measured based on CISPR QP detector except for the frequency bands 9 - 90 kHz, 110 - 490 kHz, for emissions from 9 kHz - 90 kHz,110 kHz -490 kHz and above 1 GHz were measured based on average detector, for emissions above 1 GHz, peak emissions also be measured and need comply with Peak limit.
- (6) The emissions from 9 kHz to 1 GHz, QP or average values were measured with EMI receiver with below RBW.

Frequency band	RBW
9 kHz - 150 kHz	200 Hz
150 kHz - 30 MHz	9 kHz
30 MHz - 1 GHz	120 kHz

- (7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1 MHz, VBW is set at 3 MHz for Peak measure; According ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure.
- (8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

#### 10.4. Test result

Pass. (See below detailed test result)

All the emissions except fundamental emission from 9 kHz to 25 GHz were comply with 15.209 limits and RSS-Gen section 8.9 limits.

Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz and 18 GHz to 25 GHz, so the final test was performed with frequency range from 30 MHz to 18 GHz and recorded in below.

Note2: 30 MHz ~ 25 GHz: (Scan with GFSK,  $\pi$ /4-DQPSK and 8DPSK, the worst case is Right side 8DPSK Mode)

Note3: For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in Right side 8DPSK, Tx 2480 MHz mode.

Note4: For emission above 1GHz that over the limit are fundamental.

## Radiated Emission test (below 1 GHz)

# **TR-4-E-009 Radiated Emission Test Result**

Test Date: 2022-11-04 Tested By: James Gan

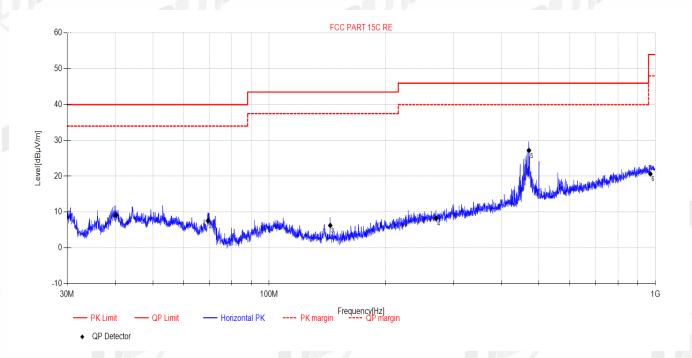
EUT: BLUETOOTH HEADSET Model Number: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22°C;Humi:55.1%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC BELOW 1G\20221104-221116\_H

Memo:



Final	Data List							
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	40.10	28.56	-19.42	9.14	40.00	30.86	QP	Horizontal
2	69.44	30.08	-22.53	7.55	40.00	32.45	QP	Horizontal
3	143.99	29.53	-23.26	6.27	43.50	37.23	QP	Horizontal
4	270.64	25.69	-17.41	8.28	46.00	37.72	QP	Horizontal
5	470.92	40.33	-13.13	27.20	46.00	18.80	QP	Horizontal
6	970.98	24.78	-4.11	20.67	54.00	33.33	QP	Horizontal

Note: 1. Result Level = Read Level + Factor

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Test Date: 2022-11-04 Tested By: James Gan

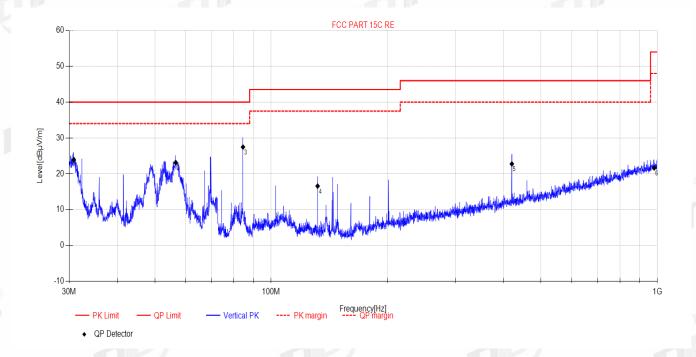
EUT: BLUETOOTH HEADSET Model Number: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22°C;Humi:55.1%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC BELOW 1G\20221104-221206\_V

Memo:



Final	Data List							150
NO.	Freq. [MHz]	Reading [dBµV/m]	Factor [dB]	Result [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	30.83	45.3	-21.39	23.91	40.00	16.09	QP	Vertical
2	56.63	41.98	-18.91	23.07	40.00	16.93	QP	Vertical
3	84.57	50.69	-23.23	27.46	40.00	12.54	QP	Vertical
4	132.00	39.6	-23.04	16.56	43.50	26.94	QP	Vertical
5	420.06	36.66	-13.91	22.75	46.00	23.25	QP	Vertical
6	981.25	25.47	-3.86	21.61	54.00	32.39	QP	Vertical

Note: 1. Result Level = Read Level + Factor

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

### Radiated Emission test (above 1 GHz)

# **TR-4-E-009 Radiated Emission Test Result**

Test Date: 2022-11-04 Tested By: James Gan

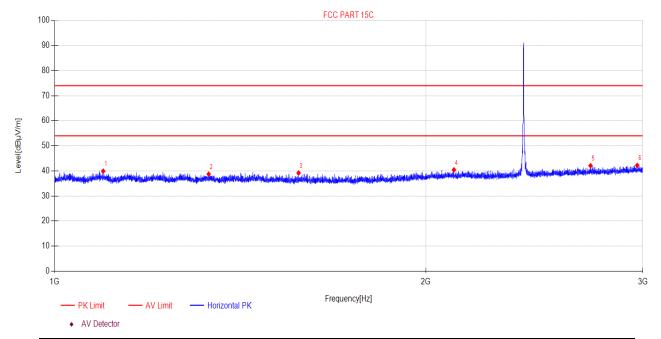
**EUT**: BLUETOOTH HEADSET **Model Number**: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22.2°C;Humi:56.7%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC ABOVE 1G\1

Memo: DH5 2402



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity		
1	1094.98	50.86	-10.94	39.92	74.00	34.08	PK	Horizontal		
2	1333.35	49.79	-11.06	38.73	74.00	35.27	PK	Horizontal		
3	1577.21	50.66	-11.48	39.18	74.00	34.82	PK	Horizontal		
4	2108.07	50.54	-10.12	40.42	74.00	33.58	PK	Horizontal		
5	2720.88	50.91	-8.81	42.10	74.00	31.90	PK	Horizontal		
6	2968.86	50.15	-7.93	42.22	74.00	31.78	PK	Horizontal		

- 1. Level = Reading + Factor.
- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

Test Date: 2022-11-04 Tested By: James Gan

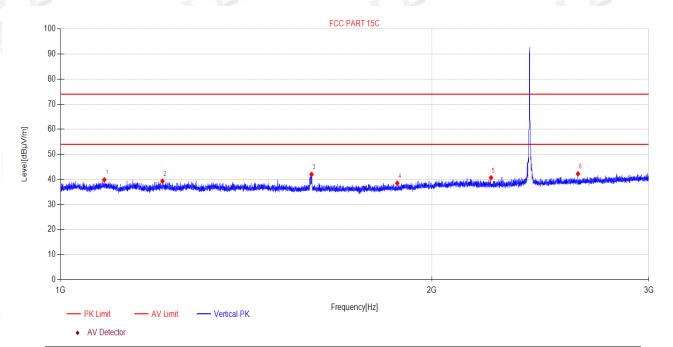
EUT: BLUETOOTH HEADSET Model Number: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22.2°C;Humi:56.7%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC ABOVE 1G\2

Memo: DH5 2402



Suspected Data List										
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity		
1	1085.04	50.79	-10.93	39.86	74.00	34.14	PK	Vertical		
2	1209.43	50.24	-10.92	39.32	74.00	34.68	PK	Vertical		
3	1597.79	53.50	-11.49	42.01	74.00	31.99	PK	Vertical		
4	1875.33	49.88	-11.39	38.49	74.00	35.51	PK	Vertical		
5	2233.96	50.61	-9.94	40.67	74.00	33.33	PK	Vertical		
6	2628.34	51.25	-9.00	42.25	74.00	31.75	PK	Vertical		

- 1. Level = Reading + Factor.
- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

Test Date: 2022-11-04 Tested By: James Gan

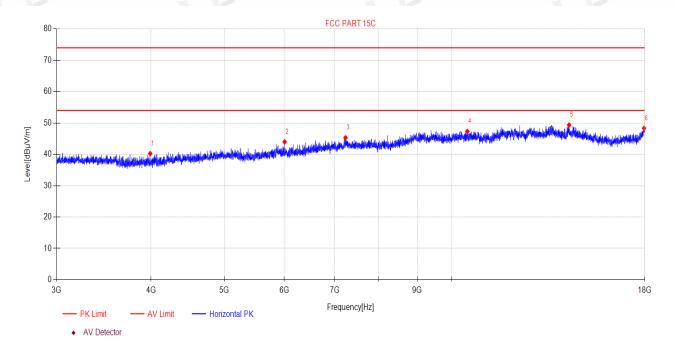
EUT: BLUETOOTH HEADSET Model Number: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22.2°C;Humi:56.7%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC ABOVE 1G\3

Memo: DH5 2402



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	3988.73	47.73	-7.47	40.26	74.00	33.74	PK	Horizontal
2	6007.62	47.09	-3.10	43.99	74.00	30.01	PK	Horizontal
3	7231.58	46.01	-0.70	45.31	74.00	28.69	PK	Horizontal
4	10482.14	44.55	2.79	47.34	74.00	26.66	PK	Horizontal
5	14290.80	43.16	6.21	49.37	74.00	24.63	PK	Horizontal
6	17954.91	39.89	8.42	48.31	74.00	25.69	PK	Horizontal

#### Note

- 1. Level = Reading + Factor.
- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

Test Date: 2022-11-04 Tested By: James Gan

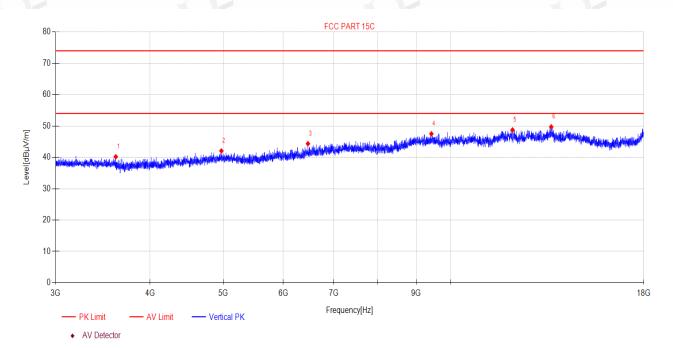
EUT: BLUETOOTH HEADSET Model Number: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22.2°C;Humi:56.7%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC ABOVE 1G\4

Memo: DH5 2402



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	3602.80	48.44	-8.25	40.19	74.00	33.81	PK	Vertical
2	4970.30	46.96	-4.90	42.06	74.00	31.94	PK	Vertical
3	6470.16	46.64	-2.28	44.36	74.00	29.64	PK	Vertical
4	9423.94	44.80	2.71	47.51	74.00	26.49	PK	Vertical
5	12065.04	43.69	5.07	48.76	74.00	25.24	PK	Vertical
6	13574.57	43.98	5.76	49.74	74.00	24.26	PK	Vertical

- 1. Level = Reading + Factor.
- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.

Test Date: 2022-11-04 Tested By: James Gan

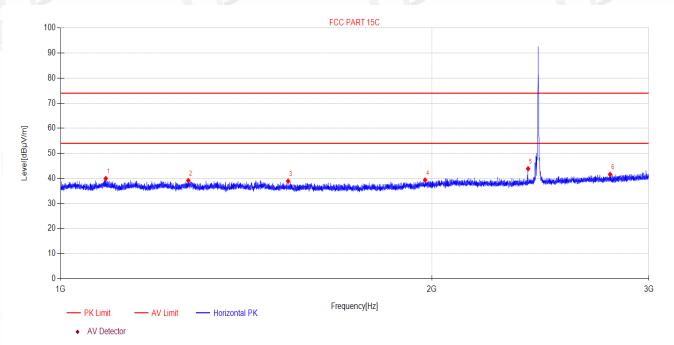
**EUT**: BLUETOOTH HEADSET **Model Number**: TOUR PRO 2

Test Mode: Tx mode Power Supply: Battery

Condition: Temp:22.2°C;Humi:56.7%;Press:100.3kPa Test Site: DDT 3# Chamber

File Path: d:\ts\2022 report data\Q22092806-2E TOUR PRO2\FCC ABOVE 1G\5

Memo: DH5 2441



Suspected Data List								
NO.	Freq. [MHz]	Reading [dBµV]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Detector	Polarity
1	1087.91	50.88	-10.93	39.95	74.00	34.05	PK	Horizontal
2	1269.19	50.07	-10.94	39.13	74.00	34.87	PK	Horizontal
3	1529.44	50.30	-11.39	38.91	74.00	35.09	PK	Horizontal
4	1975.34	50.19	-10.82	39.37	74.00	34.63	PK	Horizontal
5	2394.30	53.58	-9.71	43.87	74.00	30.13	PK	Horizontal
6	2790.50	50.26	-8.66	41.60	74.00	32.40	PK	Horizontal

- 1. Level = Reading + Factor.
- 2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
- 3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.