

### 5.3 TEST DATA

**Pass: Please Refer To Appendix: For Details**

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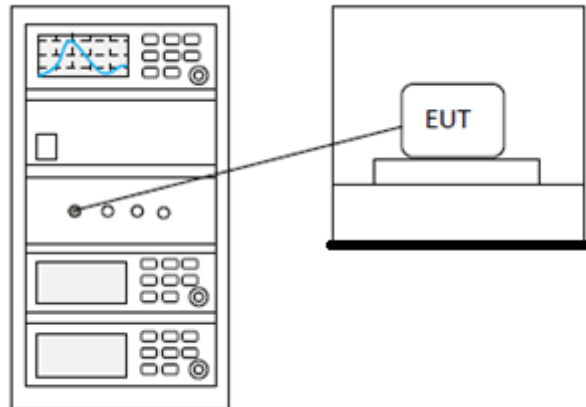
## 6 HOPPING CHANNEL NUMBER

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
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25°C
Humidity	55%

### 6.1 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

### 6.2 BLOCK DIAGRAM OF TEST SETUP



### 6.3 TEST DATA

**Pass: Please Refer To Appendix: For Details**

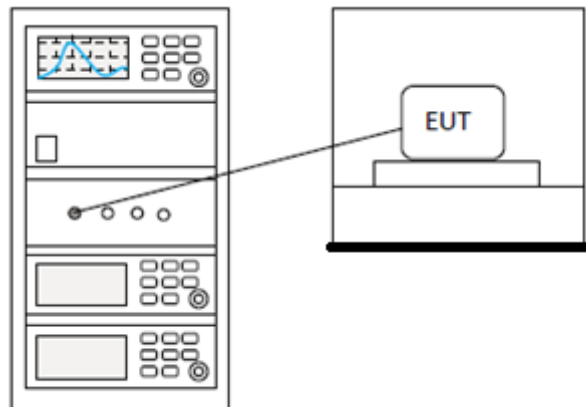
## 7 CARRIER FREQUENCIES SEPARATION

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
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25°C
Humidity	55%

### 7.1 LIMITS

<b>Limit:</b>	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W
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### 7.2 BLOCK DIAGRAM OF TEST SETUP



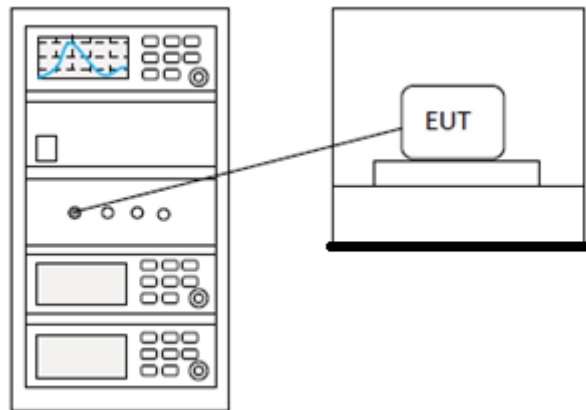
### 7.3 TEST DATA

<b>Pass: Please Refer To Appendix: For Details</b>
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## 8 20DB BANDWIDTH

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.9
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX
Tester	Ben
Temperature	25°C
Humidity	55%

### 8.1 BLOCK DIAGRAM OF TEST SETUP



### 8.2 TEST DATA

**Pass: Please Refer To Appendix: For Details**

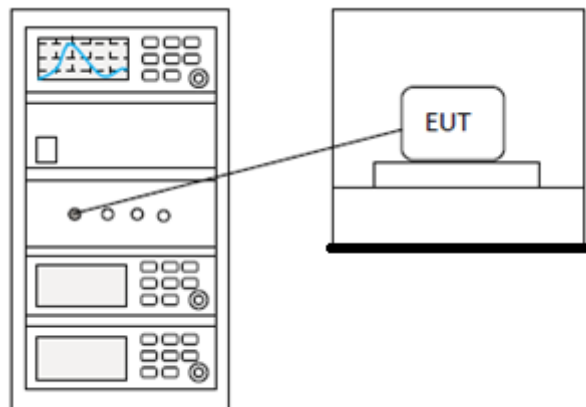
## 9 CONDUCTED PEAK OUTPUT POWER

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	Ben
Temperature	25°C
Humidity	55%

### 9.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for $\geq 50$ hopping channels
	0.25 for $25 \leq$ hopping channels $< 50$
	1 for digital modulation
2400-2483.5	1 for $\geq 75$ 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

### 9.2 BLOCK DIAGRAM OF TEST SETUP



### 9.3 TEST DATA

**Pass: Please Refer To Appendix: For Details**

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## 10 ANTENNA REQUIREMENT

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

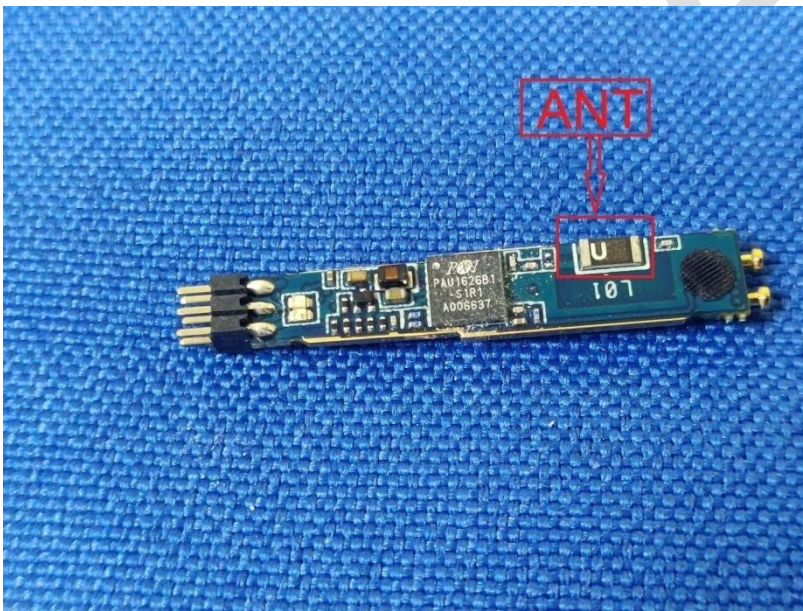
### 10.1 CONCLUSION

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 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 2.5dBi.



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

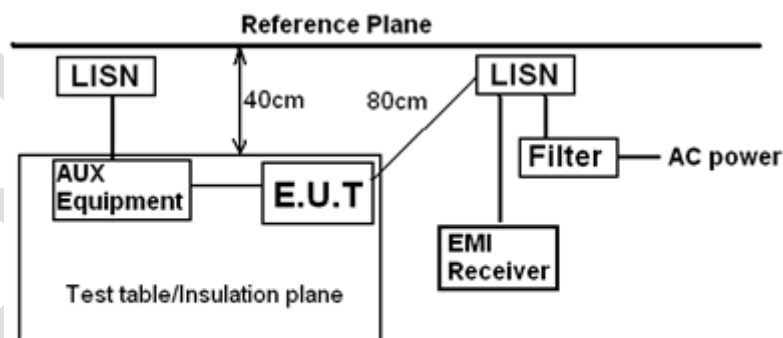
<b>Test Standard</b>	47 CFR Part 15, Subpart C 15.247
<b>Test Method</b>	ANSI C63.10 (2013) Section 6.2
<b>Test Mode (Pre-Scan)</b>	TX
<b>Test Mode (Final Test)</b>	TX
<b>Tester</b>	Ben
<b>Temperature</b>	25°C
<b>Humidity</b>	55%

### 11.1 LIMITS

Frequency of emission(MHz)	Conducted limit(dB $\mu$ 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.

### 11.2 BLOCK DIAGRAM OF TEST SETUP



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

### 11.3 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/50 $\mu$ H + 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.

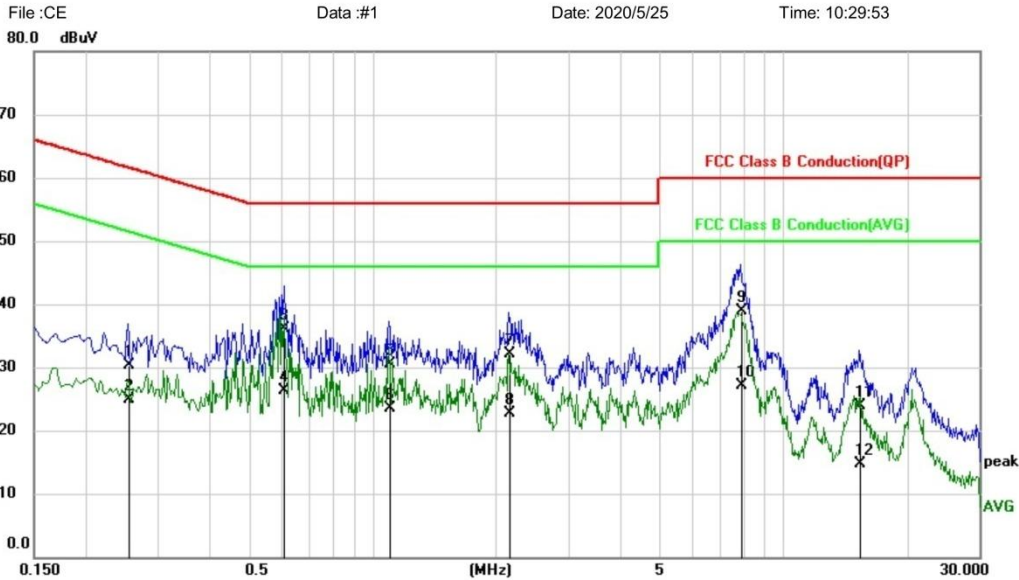
Remark: LISN=Read Level+ Cable Loss+ LISN Factor

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### 11.4 TEST DATA

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

#### Conducted Emission Measurement



File :CE  
Data :#1  
Date: 2020/5/25  
Time: 10:29:53

Site  
Limit: FCC Class B Conduction(QP)  
EUT: TWS Bluetooth earphones  
M/N: In2011  
Mode: BT mode  
Note:

Phase: **L1**  
Power:  
Temperature: 26  
Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV	dBuV	dB		
1		0.2540	20.30	9.94	30.24	61.63	-31.39	QP	
2		0.2540	14.98	9.94	24.92	51.63	-26.71	AVG	
3		0.6100	26.36	9.73	36.09	56.00	-19.91	QP	
4	*	0.6100	16.55	9.73	26.28	46.00	-19.72	AVG	
5		1.0980	20.71	9.85	30.56	56.00	-25.44	QP	
6		1.0980	13.70	9.85	23.55	46.00	-22.45	AVG	
7		2.1460	22.20	9.82	32.02	56.00	-23.98	QP	
8		2.1460	12.92	9.82	22.74	46.00	-23.26	AVG	
9		7.8620	29.10	9.87	38.97	60.00	-21.03	QP	
10		7.8620	17.18	9.87	27.05	50.00	-22.95	AVG	
11		15.3540	13.98	9.97	23.95	60.00	-36.05	QP	
12		15.3540	4.76	9.97	14.73	50.00	-35.27	AVG	

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

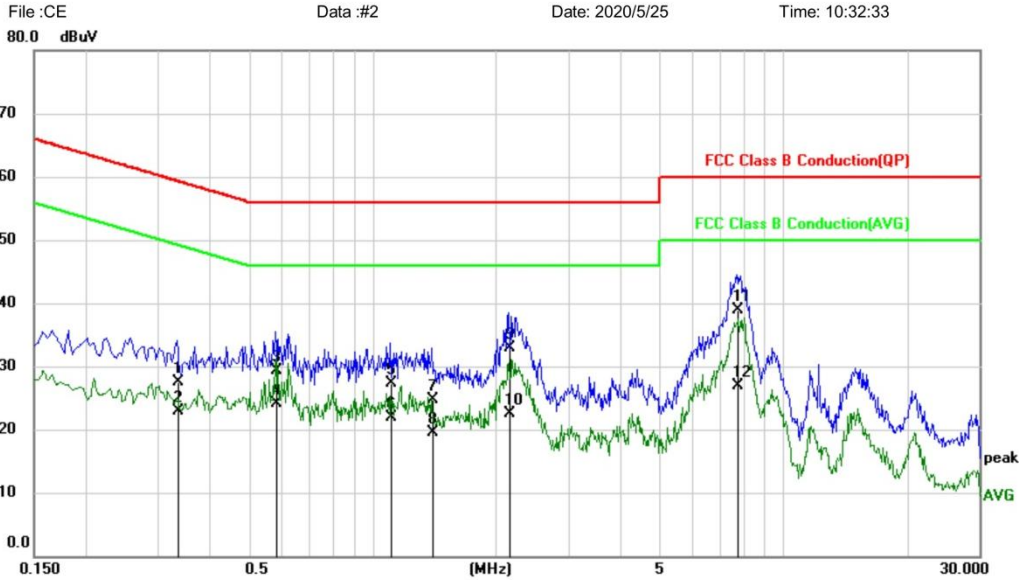
(Reference Only)

**Test Result: Pass**

[TestMode: TX]; [Line: Nutral]

Power:AC120V/60Hz

**Conducted Emission Measurement**



File :CE Data :#2 Date: 2020/5/25 Time: 10:32:33  
 Site Phase: **N** Temperature: 26  
 Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %  
 EUT: TWS Bluetooth earphones  
 M/N: In2011  
 Mode: BT mode  
 Note:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.3339	17.76	9.77	27.53	59.35	-31.82	QP	
2	0.3339	13.04	9.77	22.81	49.35	-26.54	AVG	
3	0.5820	19.63	9.74	29.37	56.00	-26.63	QP	
4	0.5820	14.30	9.74	24.04	46.00	-21.96	AVG	
5	1.1060	17.44	9.81	27.25	56.00	-28.75	QP	
6	1.1060	12.07	9.81	21.88	46.00	-24.12	AVG	
7	1.3980	14.80	9.83	24.63	56.00	-31.37	QP	
8	1.3980	9.66	9.83	19.49	46.00	-26.51	AVG	
9	2.1540	23.12	9.86	32.98	56.00	-23.02	QP	
10	2.1540	12.71	9.86	22.57	46.00	-23.43	AVG	
11 *	7.7100	29.10	9.86	38.96	60.00	-21.04	QP	
12	7.7100	17.13	9.86	26.99	50.00	-23.01	AVG	

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

(Reference Only)

**Test Result: Pass**

## 12 APPENDIX

### 12.1 APPENDIX:20DB EMISSION BANDWIDTH

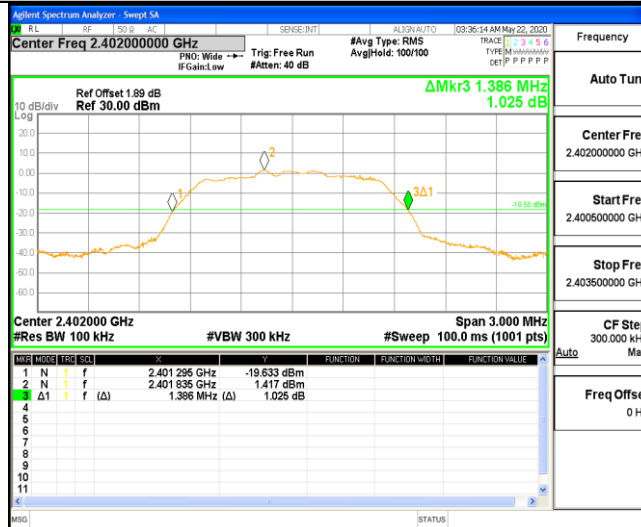
#### Test Result

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	1.119	2401.433	2402.552	---	PASS
		2441	1.116	2440.433	2441.549	---	PASS
		2480	1.116	2479.433	2480.549	---	PASS
2DH1	Ant1	2402	1.386	2401.295	2402.681	---	PASS
		2441	1.377	2440.304	2441.681	---	PASS
		2480	1.380	2479.301	2480.681	---	PASS
3DH1	Ant1	2402	1.383	2401.301	2402.684	---	PASS
		2441	1.386	2440.298	2441.684	---	PASS
		2480	1.389	2479.298	2480.687	---	PASS

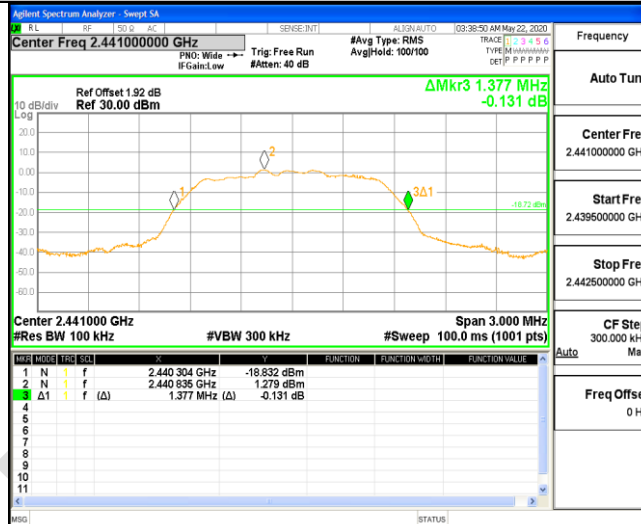
### Test Graphs



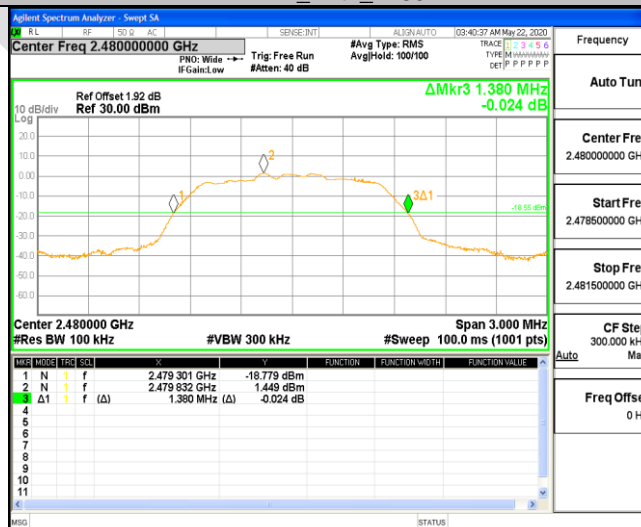
2DH1\_Ant1\_2402



2DH1\_Ant1\_2441



2DH1\_Ant1\_2480





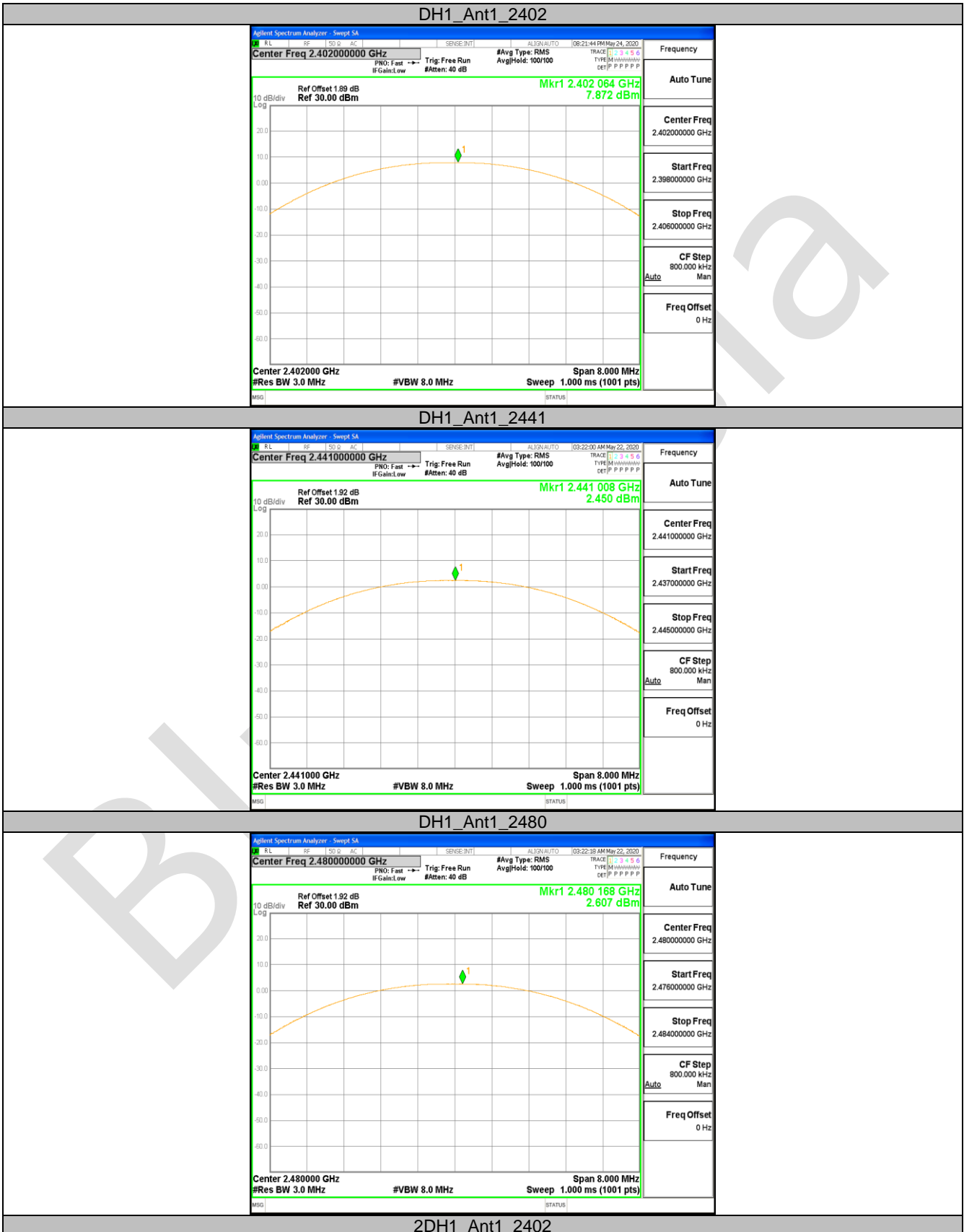
## 12.2 APPENDIX:MAXIMUM CONDUCTED OUTPUT POWER

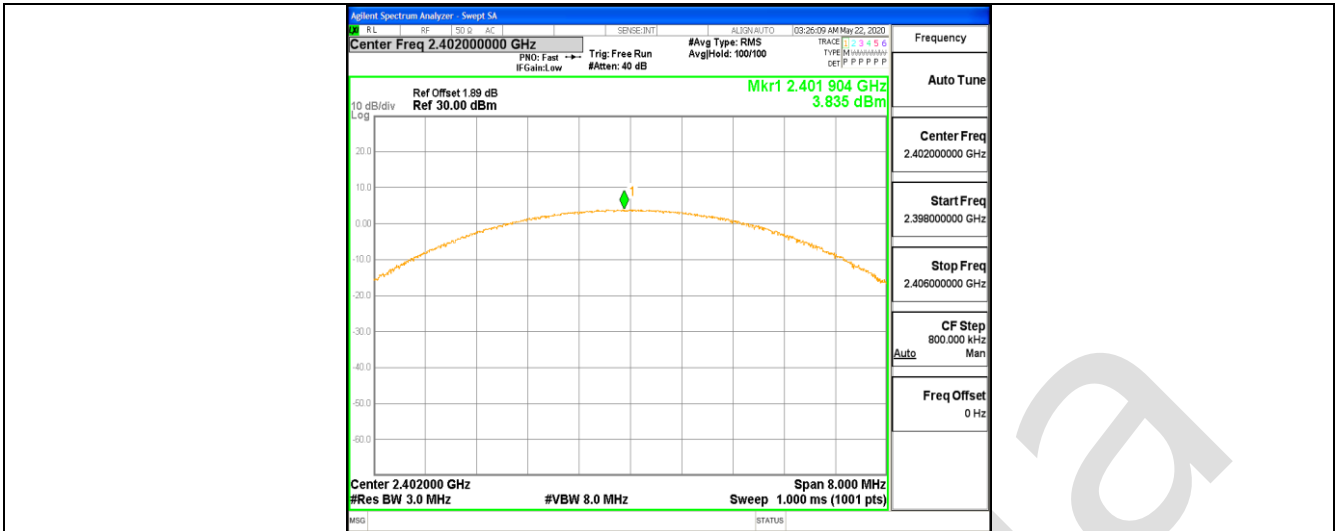
### Test Result

TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH1	Ant1	2402	7.87	<=30	PASS
		2441	2.45	<=30	PASS
		2480	2.61	<=30	PASS
2DH1	Ant1	2402	3.84	<=30	PASS
		2441	3.68	<=30	PASS
		2480	3.84	<=30	PASS
3DH1	Ant1	2402	4.36	<=30	PASS
		2441	4.13	<=30	PASS
		2480	4.42	<=30	PASS

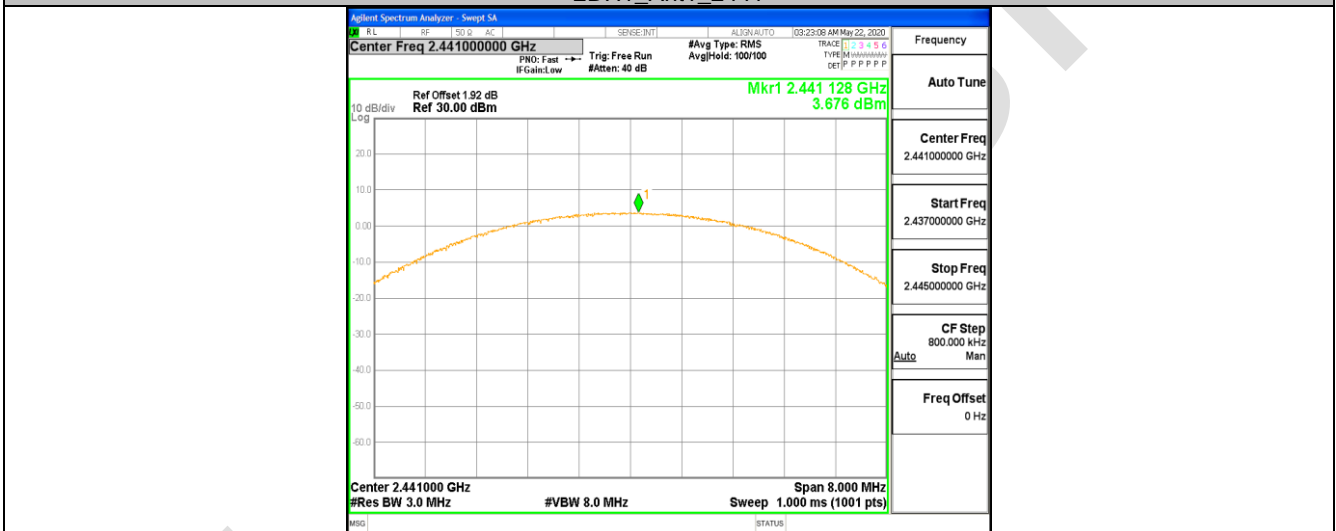


### Test Graphs

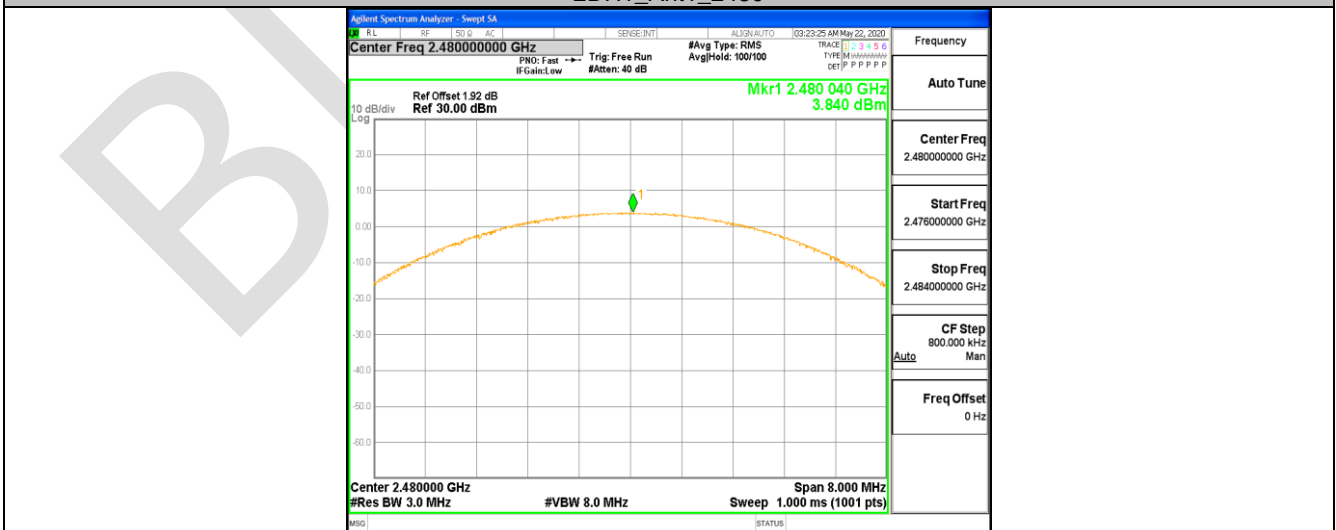




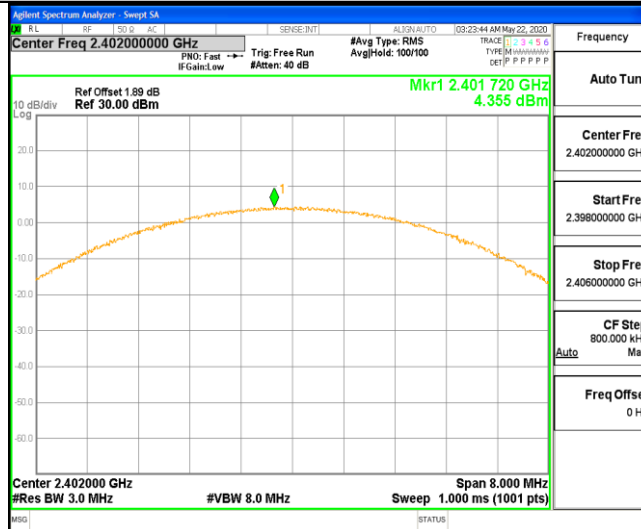
2DH1\_Ant1\_2441



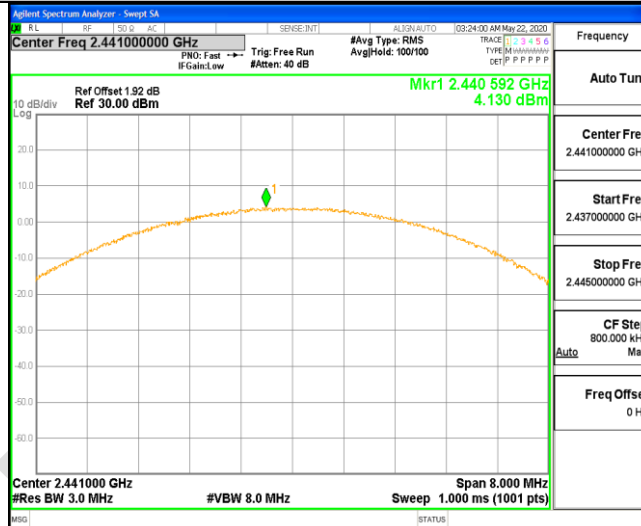
2DH1\_Ant1\_2480



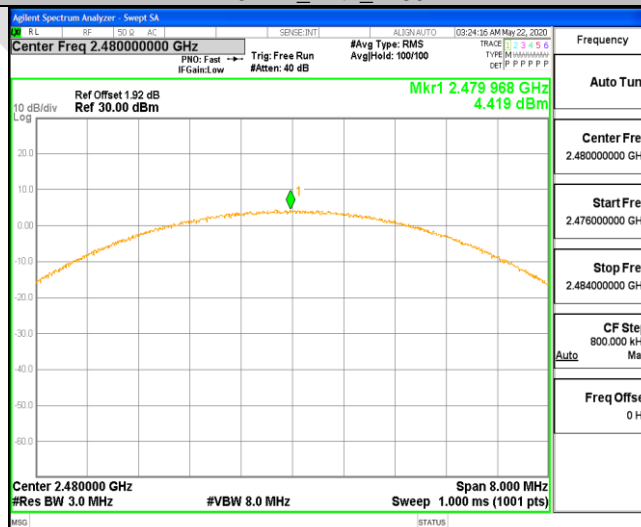
3DH1\_Ant1\_2402



3DH1\_Ant1\_2441



3DH1\_Ant1\_2480



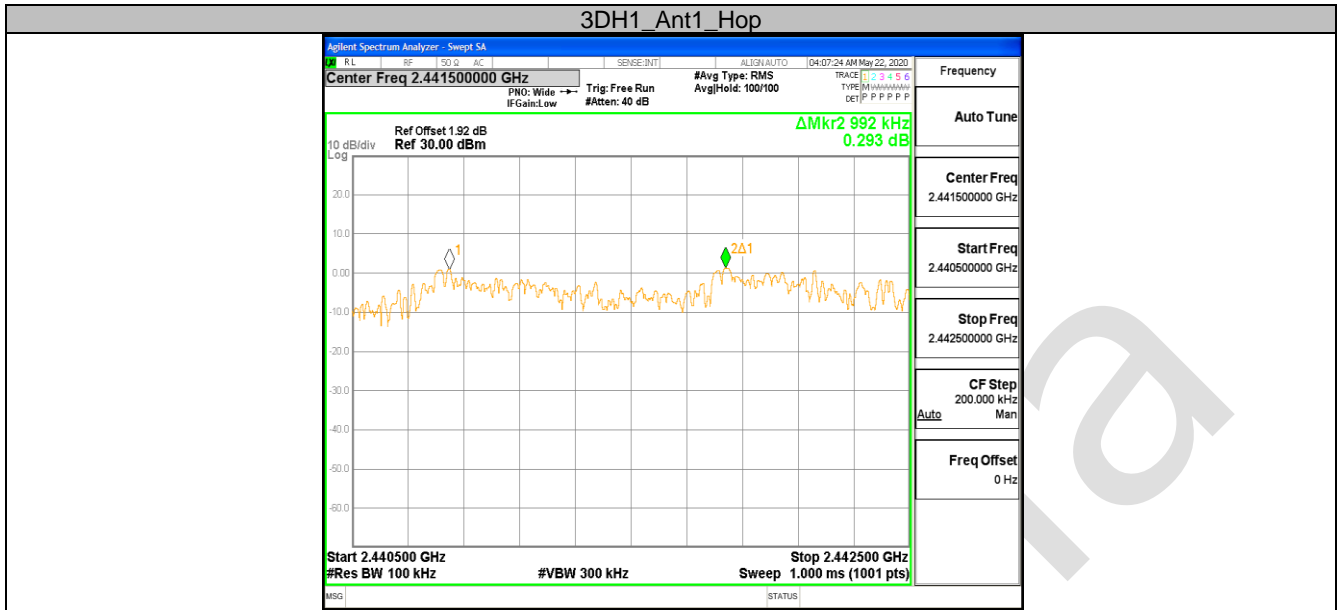
### 12.3 APPENDIX:CARRIER FREQUENCY SEPARATION

#### Test Result

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH1	Ant1	Hop	1.02	$\geq 0.746$	PASS
2DH1	Ant1	Hop	1.012	$\geq 0.924$	PASS
3DH1	Ant1	Hop	0.992	$\geq 0.926$	PASS

#### Test Graphs





## 12.4 APPENDIX:TIME OF OCCUPANCY

### Test Result

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.40	320	0.128	<=0.4	PASS
DH3	Ant1	Hop	1.67	160	0.267	<=0.4	PASS
DH5	Ant1	Hop	2.89	106.67	0.308	<=0.4	PASS

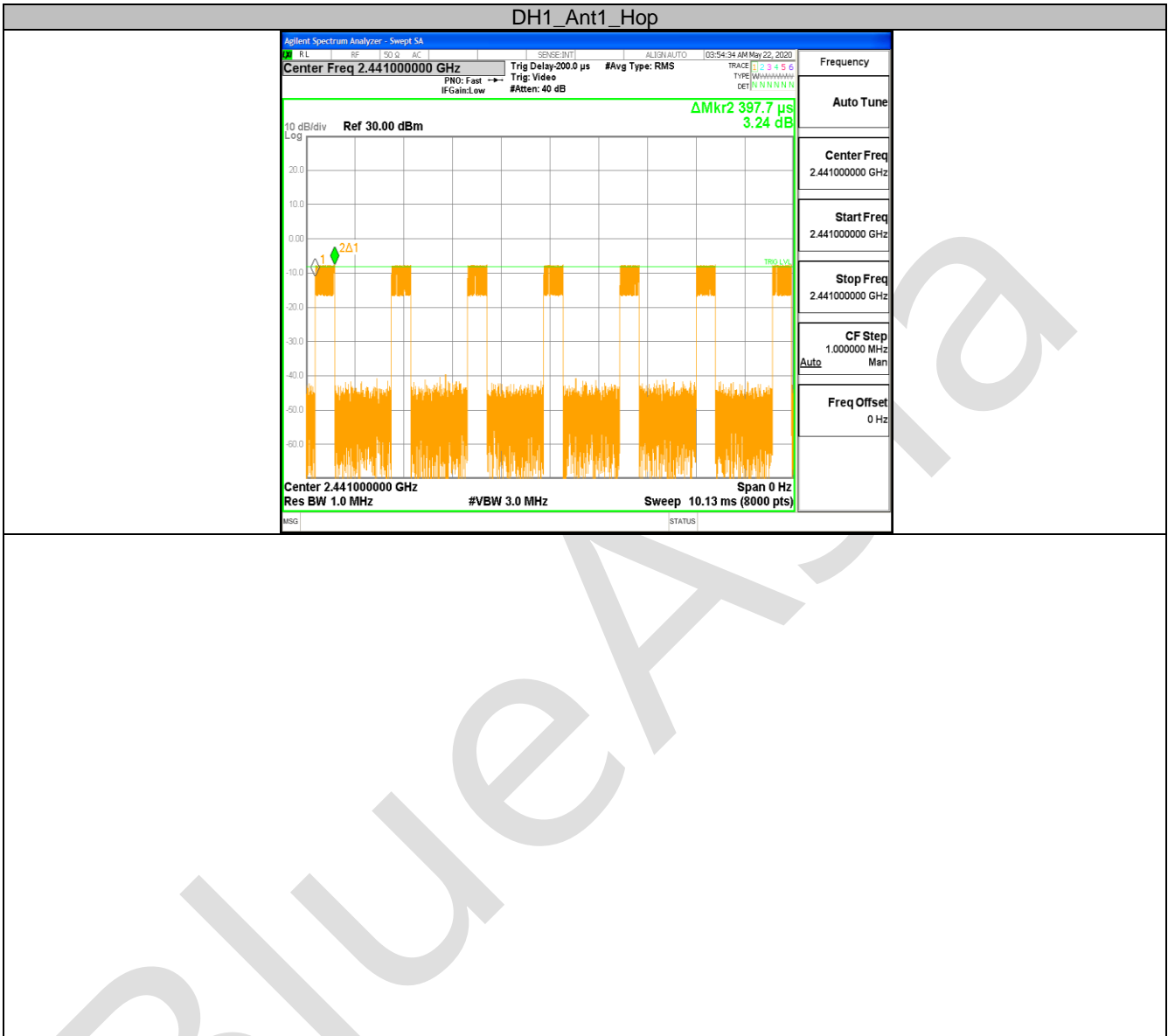
NOTE:

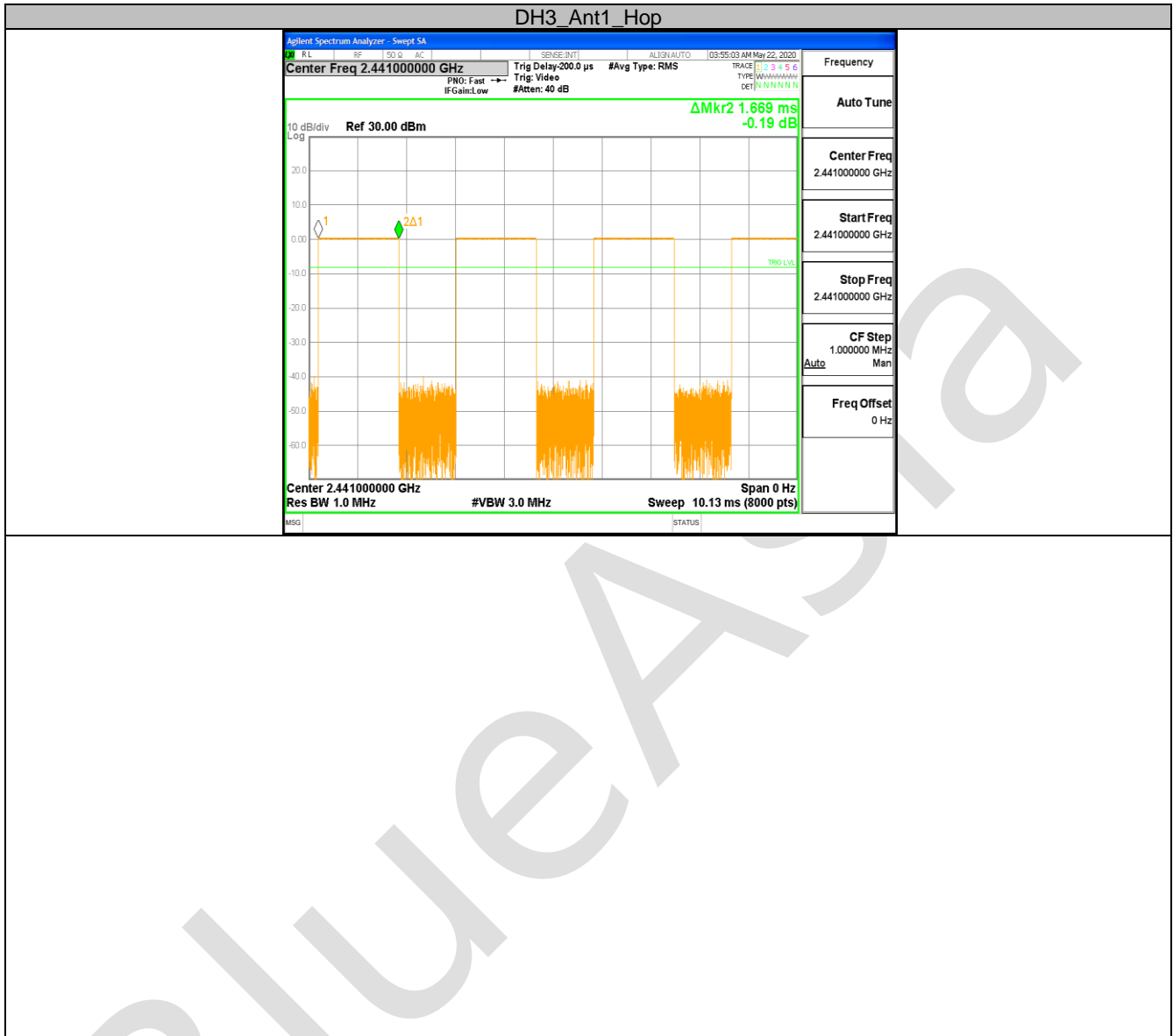
DwellTime(DH1)= Pluse width\*(1600/2/79)\*31.6

DwellTime(DH3)= Pluse width\*(1600/4/79)\*31.6

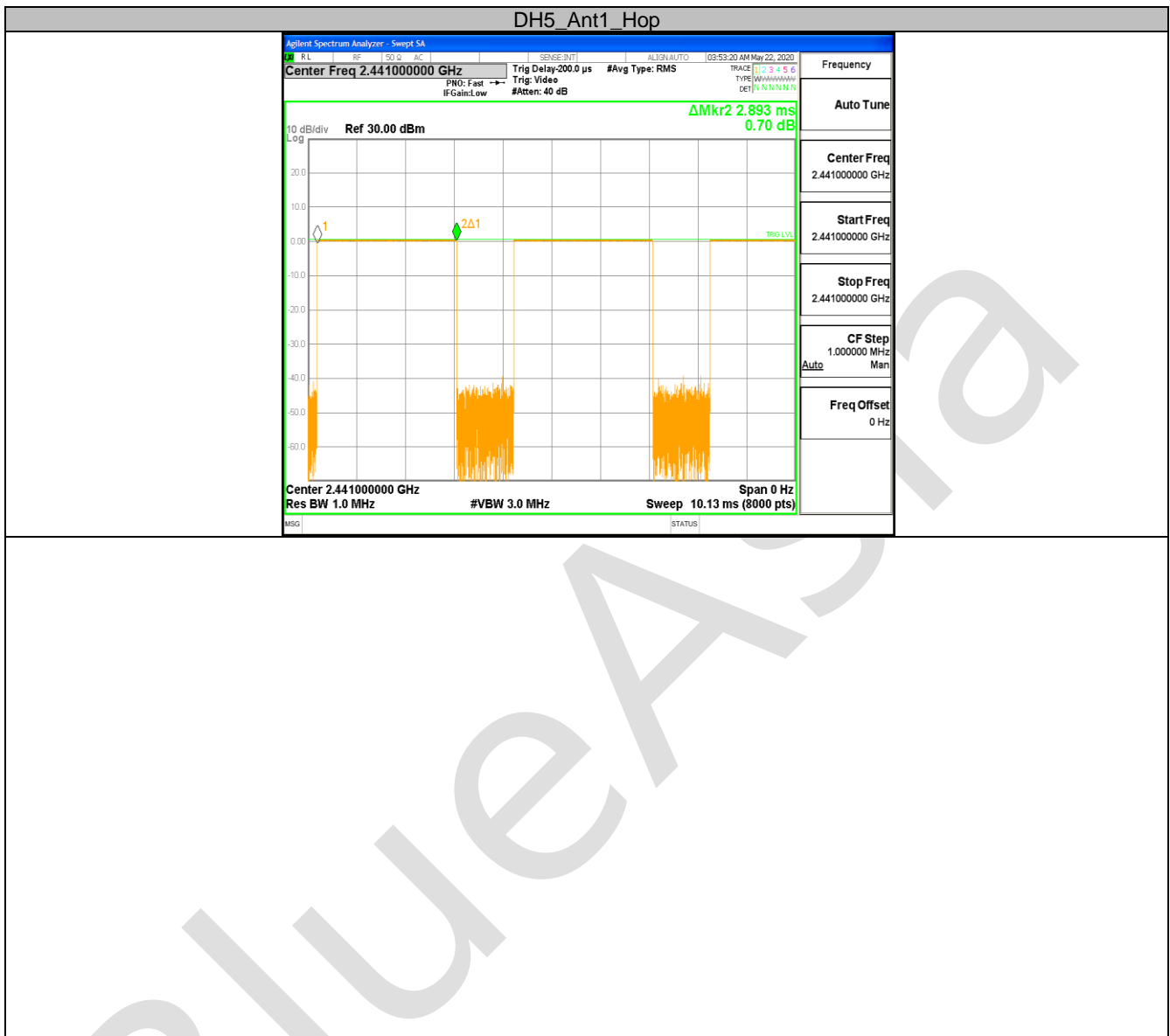
DwellTime(DH5)= Pluse width\*(1600/6/79)\*31.6

### Test Graphs









## 12.5 APPENDIX:NUMBER OF HOPPING CHANNELS

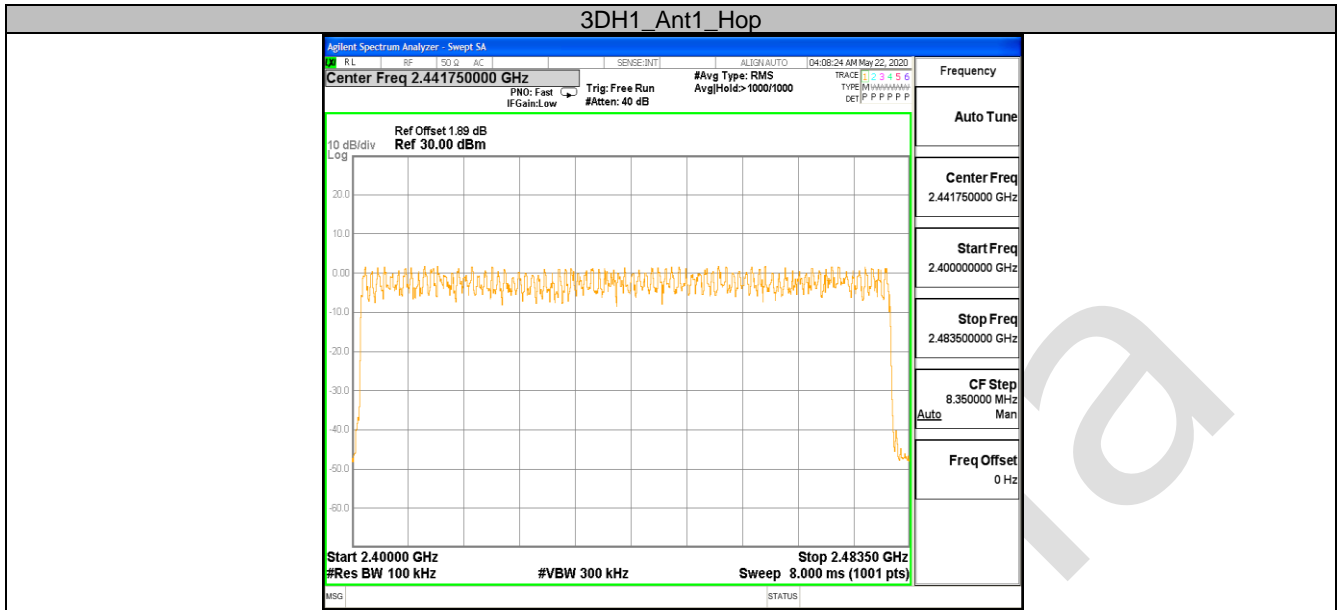
### Test Result

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH1	Ant1	Hop	79	$\geq 15$	PASS
2DH1	Ant1	Hop	79	$\geq 15$	PASS
3DH1	Ant1	Hop	79	$\geq 15$	PASS

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### Test Graphs





## 12.6 APPENDIX: BAND EDGE MEASUREMENTS

### Test Result

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	2402	2.47	-56.26	<=-17.53	PASS
		High	2480	2.53	-55.49	<=-17.47	PASS
		Low	Hop_2402	2.05	-42.83	-17.95	PASS
		High	Hop_2480	2.44	-54.94	-17.56	PASS
2DH1	Ant1	Low	2402	1.36	-55.26	<=-18.65	PASS
		High	2480	1.40	-54.24	<=-18.6	PASS
		Low	Hop_2402	0.73	-54.63	-19.27	PASS
		High	Hop_2480	1.44	-53.43	-18.56	PASS
3DH1	Ant1	Low	2402	1.35	-55.03	<=-18.65	PASS
		High	2480	1.41	-54.28	<=-18.59	PASS
		Low	Hop_2402	0.91	-55.03	-19.09	PASS
		High	Hop_2480	1.53	-54.76	-18.47	PASS

### Test Graphs

