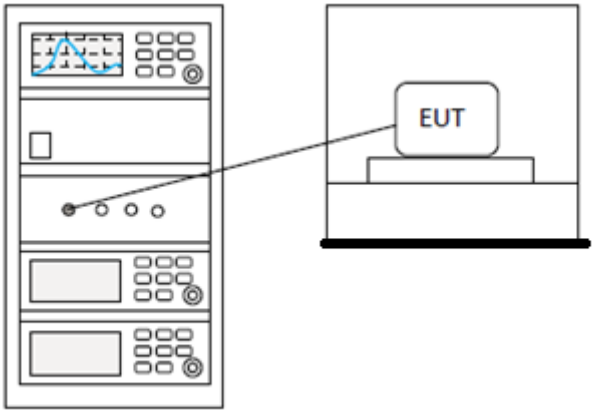
8 20DB BANDWIDTH

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℃
Humidity	55%

8.1 BLOCK DIAGRAM OF TEST SETUP



8.2 TEST DATA

Pass: Please Refer To Appendix: For Details

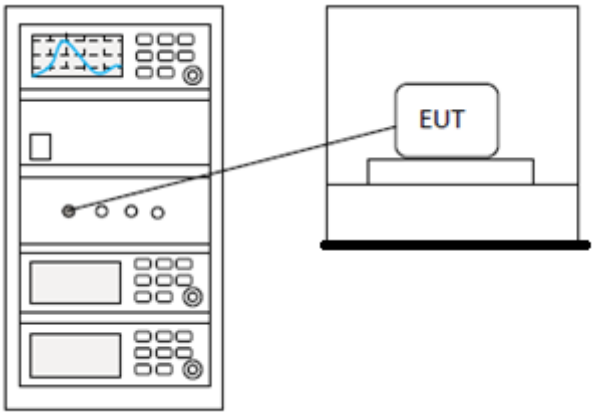
9 CONDUCTED PEAK OUTPUT POWER

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℃
Humidity	55%

9.1 LIMITS

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ 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

9.2 BLOCK DIAGRAM OF TEST SETUP



9.3 TEST DATA

Pass: Please Refer To Appendix: For Details

10 ANTENNA REQUIREMENT

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

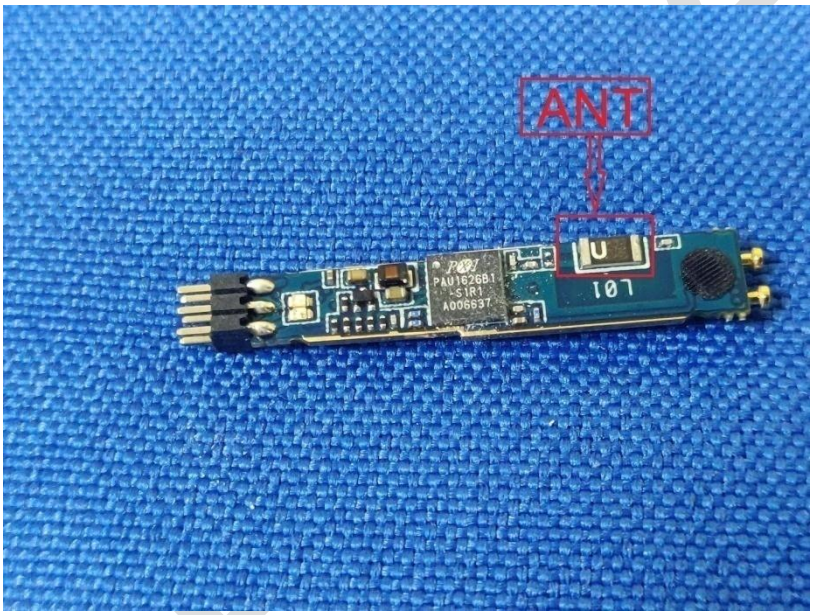
10.1 CONCLUSION

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

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.5dBi.



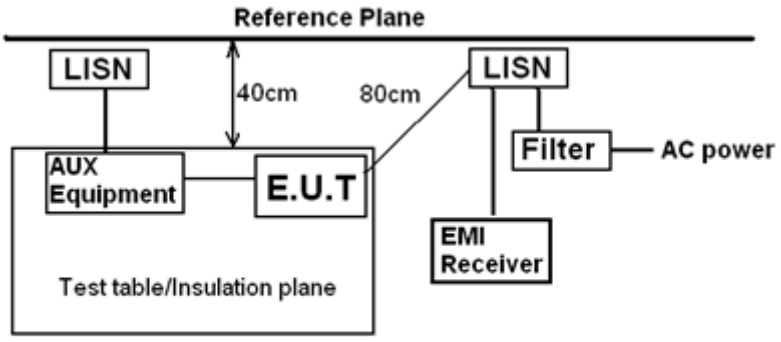
11 CONDUCTED EMISSIONS AT AC POWER LINE (150KHZ-30MHZ)

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

11.1 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.		

11.2 BLOCK DIAGRAM OF TEST SETUP



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

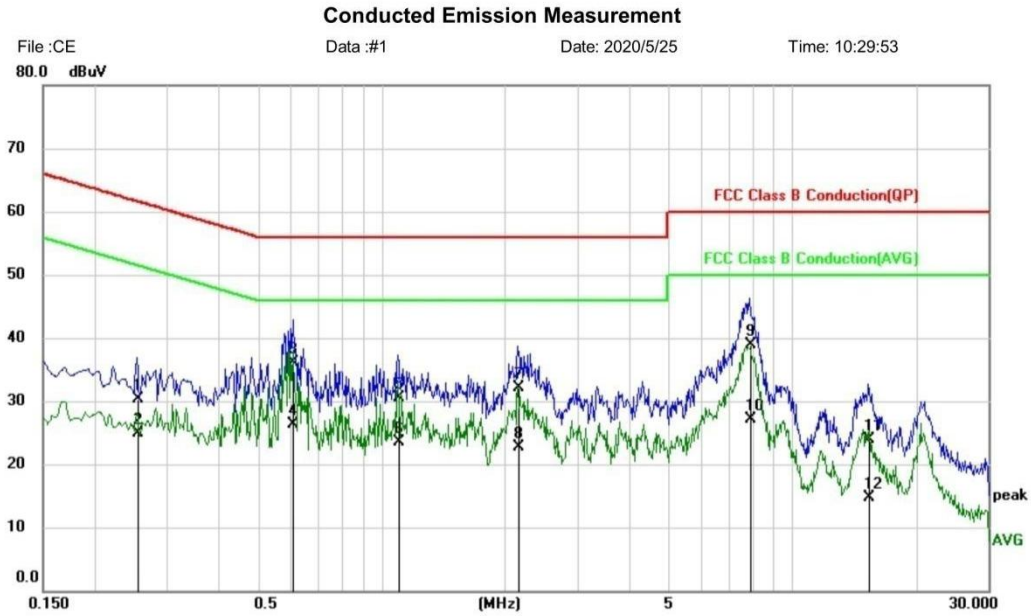
11.3 PROCEDURE

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?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

11.4 TEST DATA

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



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	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
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	

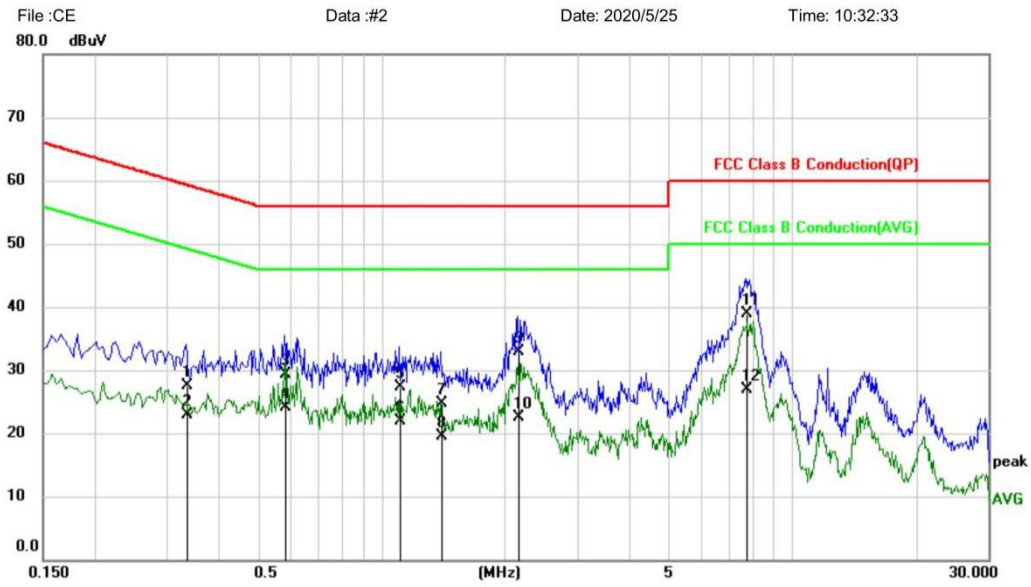
*:Maximum data x:Over limit !:over margin 〈Reference Only

Test Result: Pass

[TestMode: TX]; [Line: Neutral]

Power:AC120V/60Hz

Conducted Emission Measurement



Site

Limit: FCC Class B Conduction(QP)

EUT: TWS Bluetooth earphones

M/N: In2011

Mode: BT mode

Note:

Phase: N

Power:

Temperature: 26

Humidity: 60 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	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

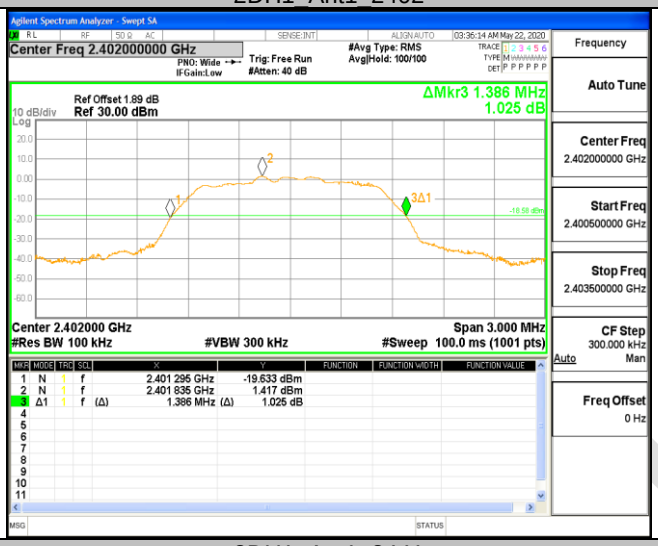
TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH1	Ant1	2402	1.119	2401.433	2402.552	---	PASS
		2441	1.116	2440.433	2441.549	---	PASS
		2480	1.116	2479.433	2480.549	---	PASS
2DH1	Ant1	2402	1.386	2401.295	2402.681	---	PASS
		2441	1.377	2440.304	2441.681	---	PASS
		2480	1.380	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

DH1_Ant1_2402

DH1_Ant1_2441

DH1_Ant1_2480

2DH1_Ant1_2402

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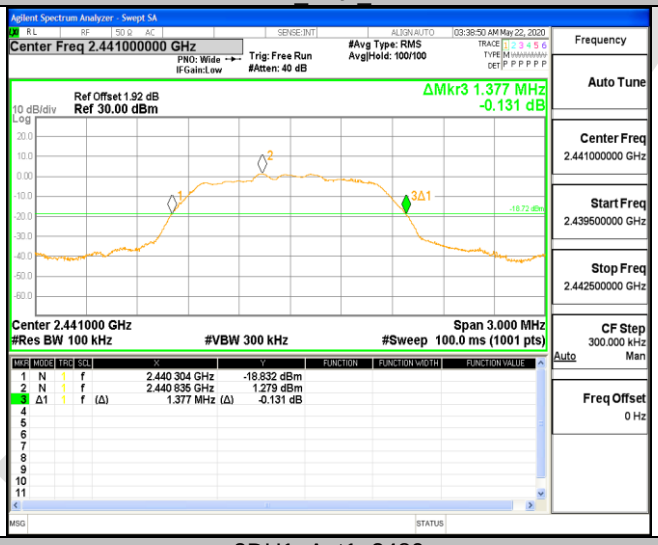
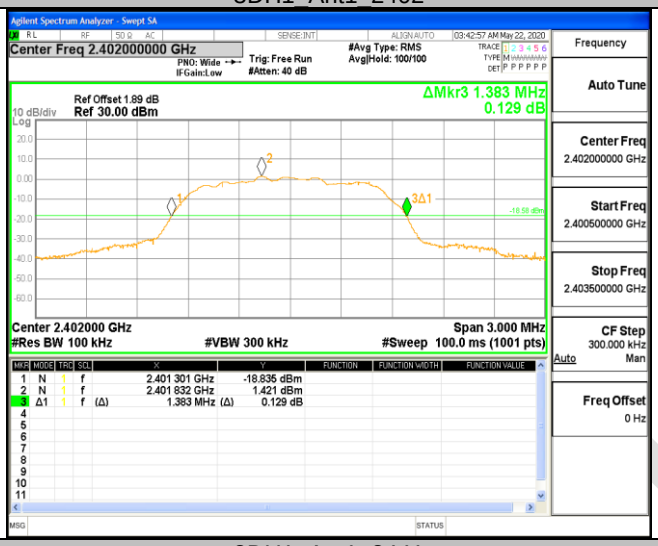
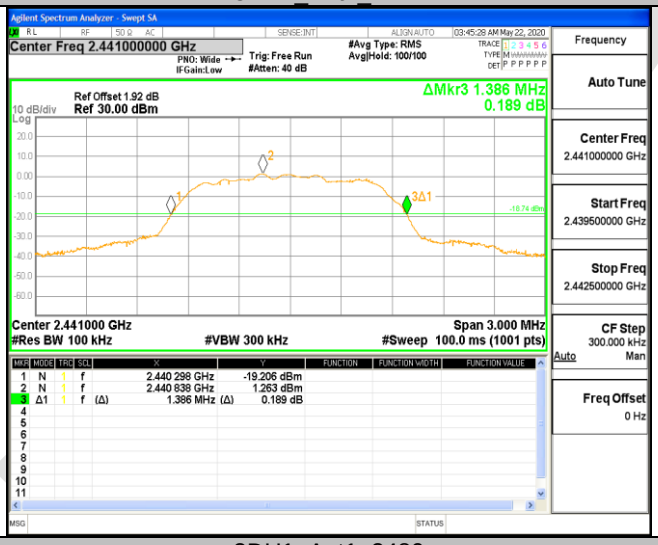

2DH1_Ant1_2480


3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480

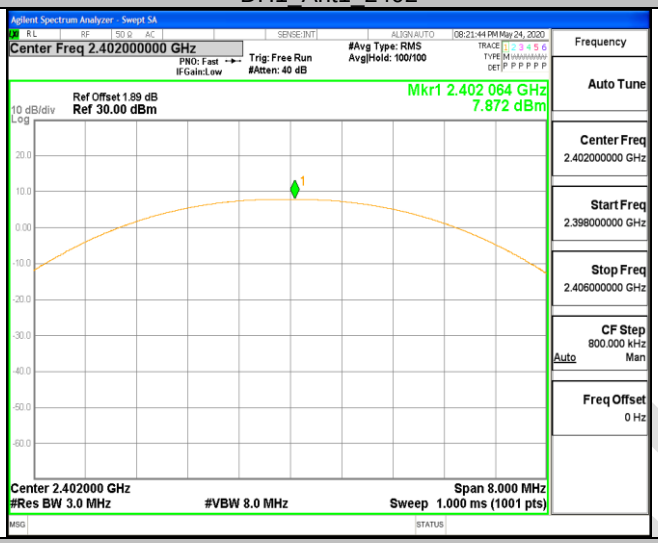

12.2 APPENDIX:MAXIMUM CONDUCTED OUTPUT POWER

Test Result

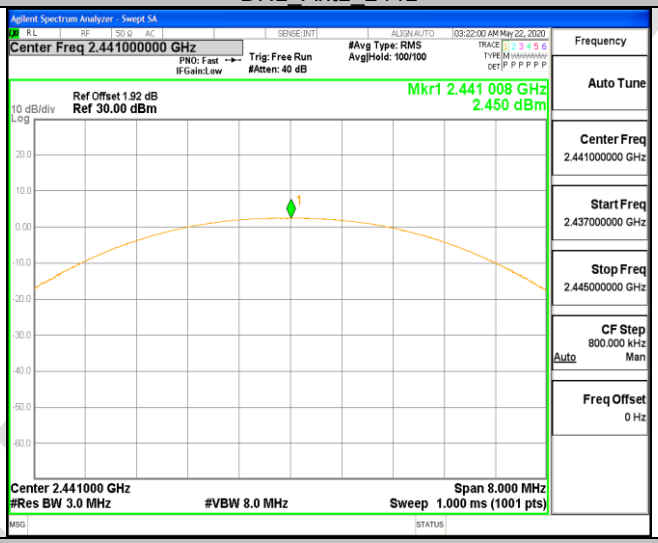
TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
DH1	Ant1	2402	7.87	<=30	PASS
		2441	2.45	<=30	PASS
		2480	2.61	<=30	PASS
2DH1	Ant1	2402	3.84	<=30	PASS
		2441	3.68	<=30	PASS
		2480	3.84	<=30	PASS
3DH1	Ant1	2402	4.36	<=30	PASS
		2441	4.13	<=30	PASS
		2480	4.42	<=30	PASS

Test Graphs

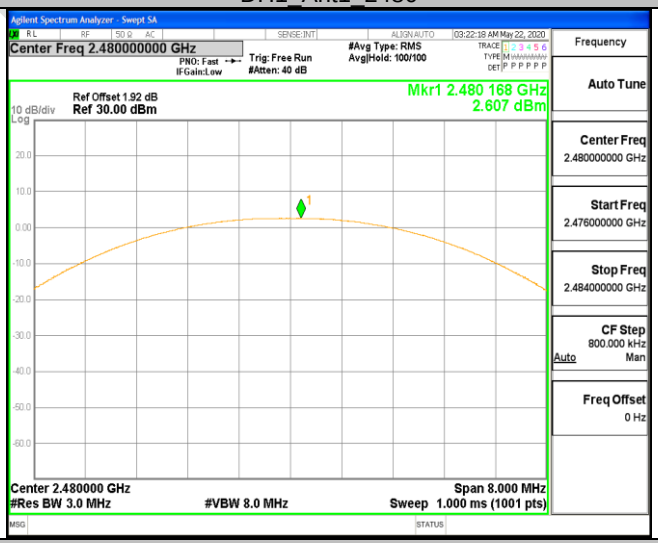
DH1_Ant1_2402



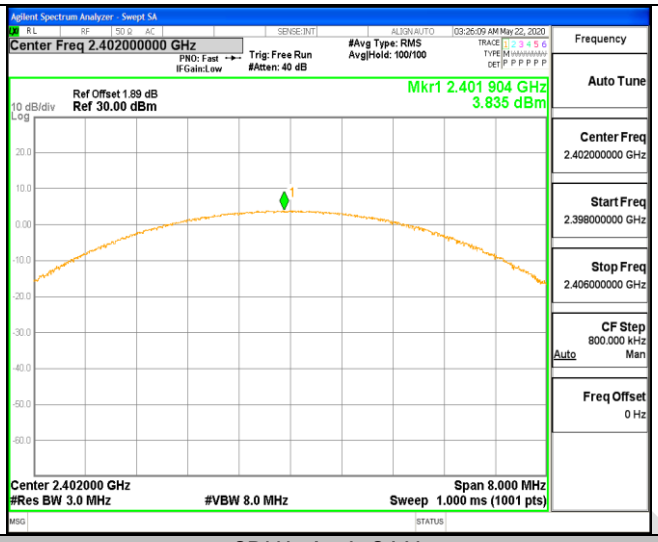
DH1_Ant1_2441



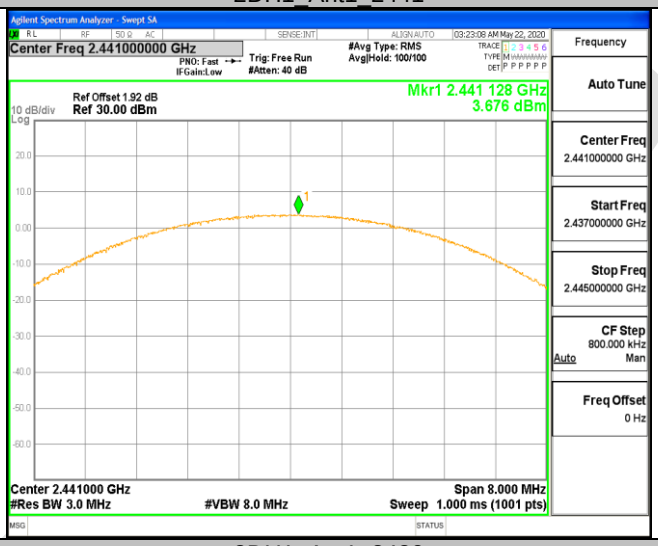
DH1_Ant1_2480



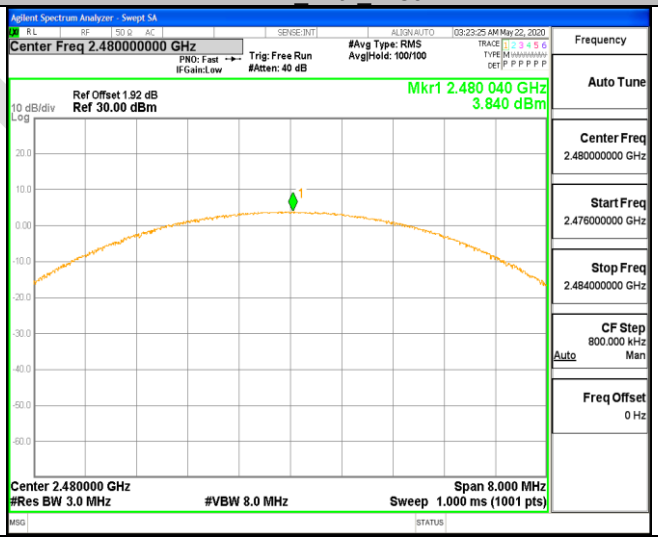
2DH1_Ant1_2402

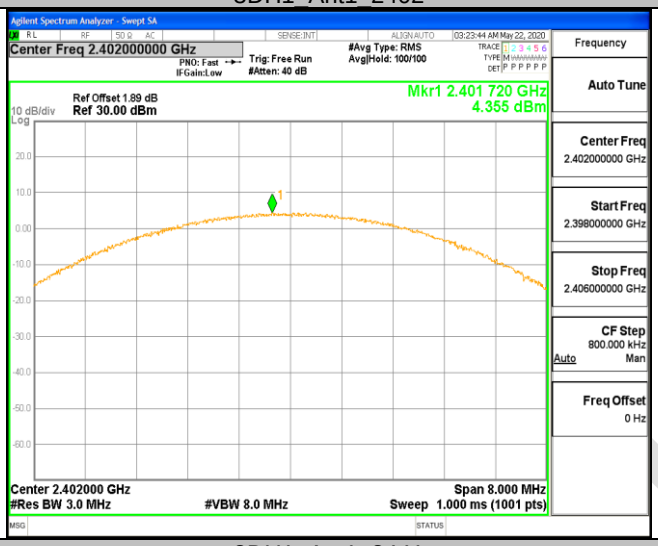
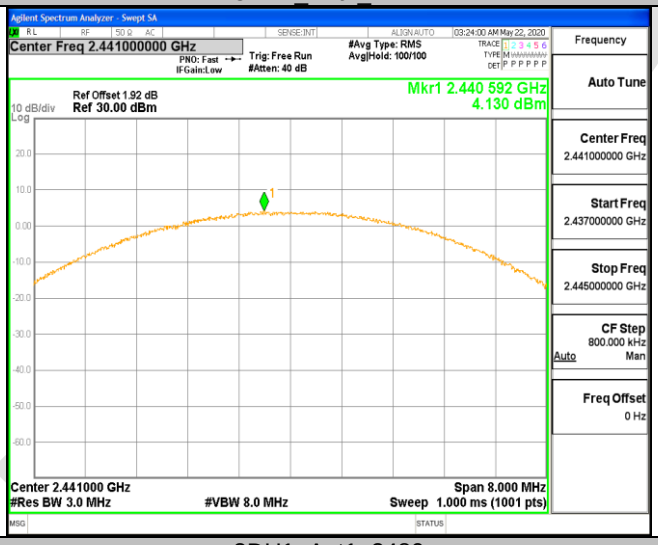
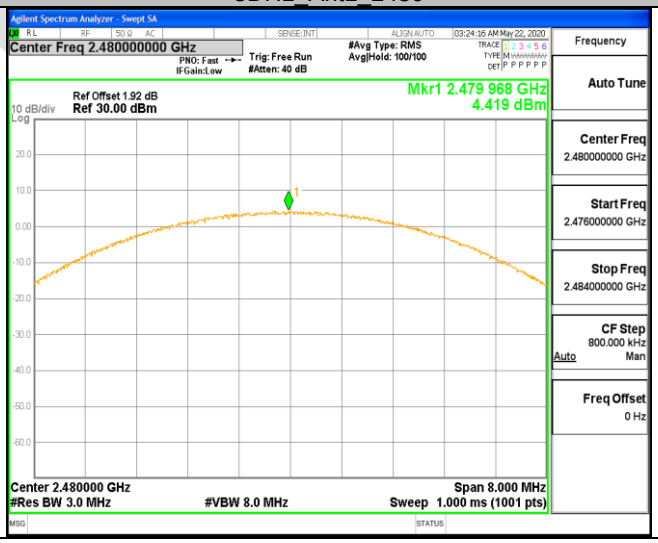


2DH1_Ant1_2441



2DH1_Ant1_2480



3DH1_Ant1_2402

3DH1_Ant1_2441

3DH1_Ant1_2480


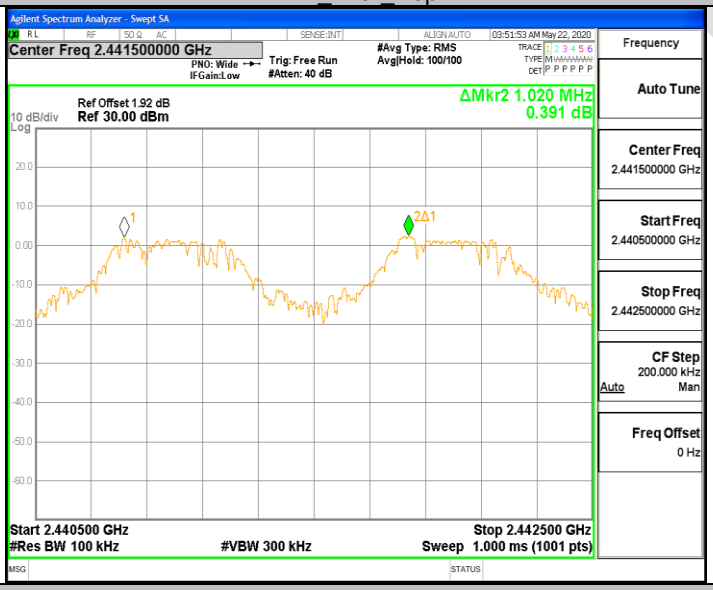
12.3 APPENDIX:CARRIER FREQUENCY SEPARATION

Test Result

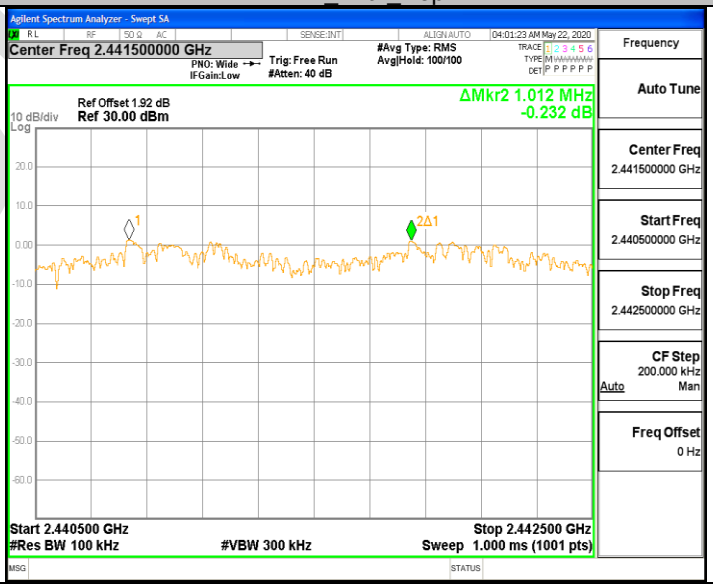
TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH1	Ant1	Hop	1.02	>=0.746	PASS
2DH1	Ant1	Hop	1.012	>=0.924	PASS
3DH1	Ant1	Hop	0.992	>=0.926	PASS

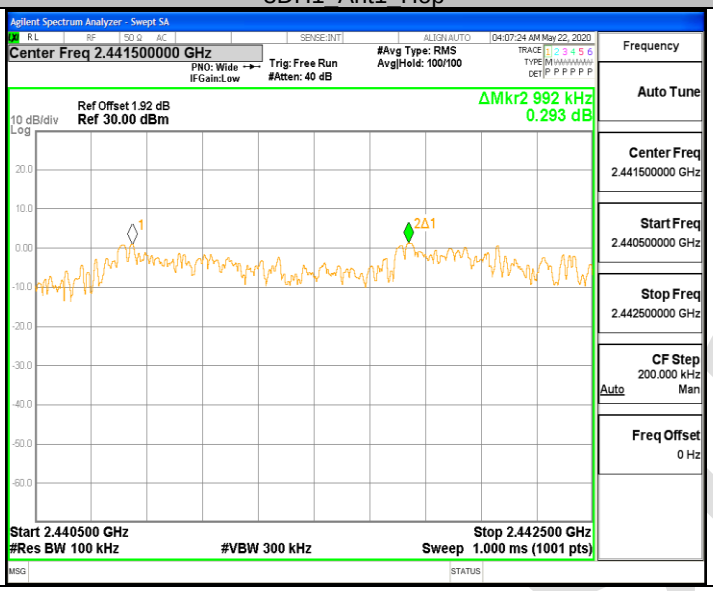
Test Graphs

DH1_Ant1_Hop



2DH1_Ant1_Hop



3DH1_Ant1_Hop


12.4 APPENDIX:TIME OF OCCUPANCY

Test Result

Frequency	Packet	BurstWidth[ms]	Dwell time(ms)	Limit(ms)	Result
2441MHz	DH1/2-DH1/3-DH1	0.40	128.000	400	Pass
2441MHz	DH3/2-DH3/3-DH3	1.67	267.200	400	Pass
2441MHz	DH5/2-DH5/3-DH5	2.89	308.267	400	Pass

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: 2441MHz as blow

DH1/2-DH1/3-DH1 time slot=0.40 (ms)*(1600/ (2*79))*31.6=128.000ms

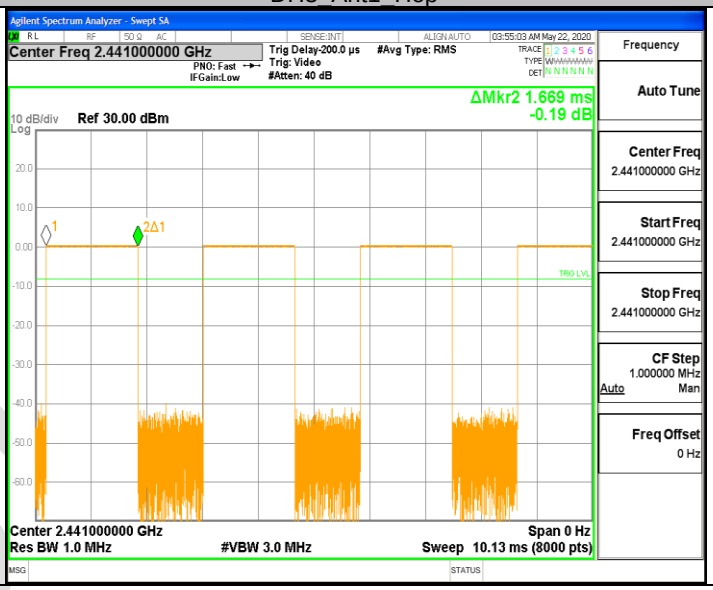
DH3/2-DH3/3-DH3 time slot=1.67 (ms)*(1600/ (4*79))*31.6=267.200ms

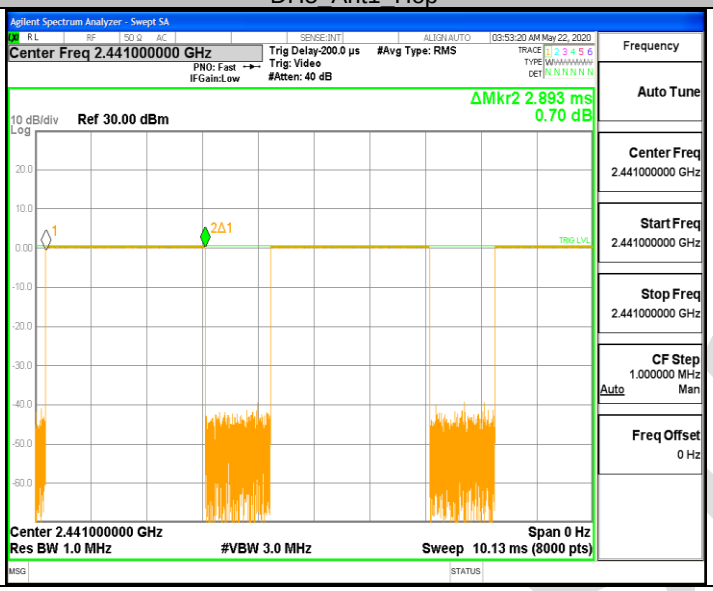
DH5/2-DH5/3-DH5 time slot=2.89 (ms)*(1600/ (6*79))*31.6=308.267ms

Test Graphs

DH1_Ant1_Hop

DH3_Ant1_Hop



DH5_Ant1_Hop


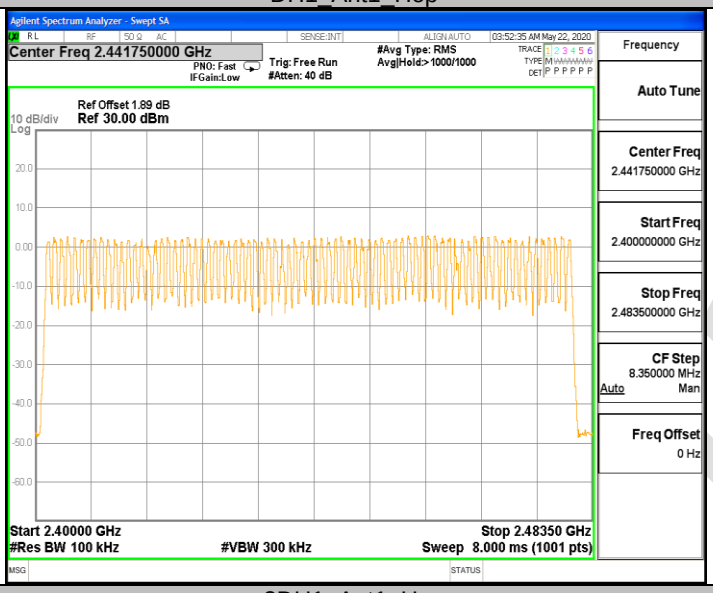
12.5 APPENDIX:NUMBER OF HOPPING CHANNELS

Test Result

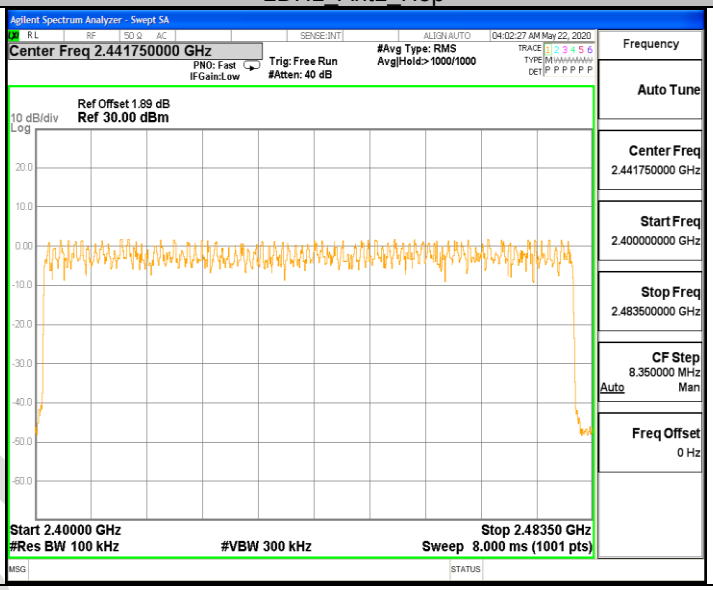
TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH1	Ant1	Hop	79	>=15	PASS
2DH1	Ant1	Hop	79	>=15	PASS
3DH1	Ant1	Hop	79	>=15	PASS

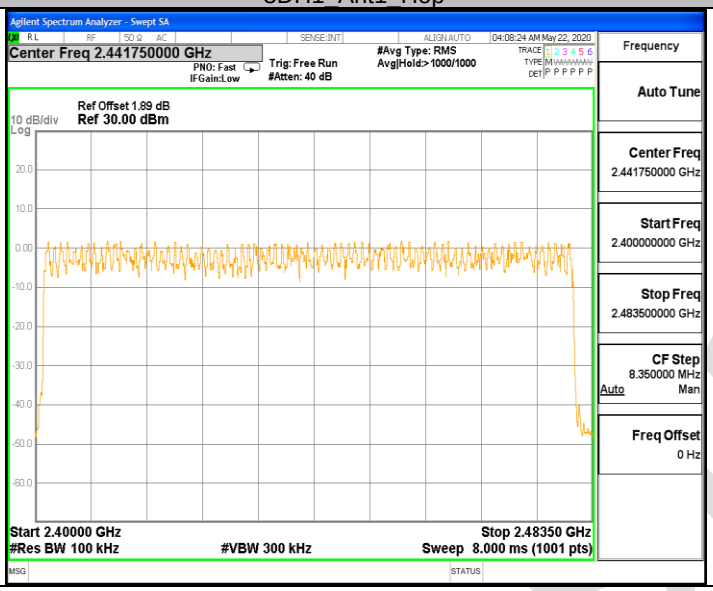
Test Graphs

DH1_Ant1_Hop



2DH1_Ant1_Hop



3DH1_Ant1_Hop


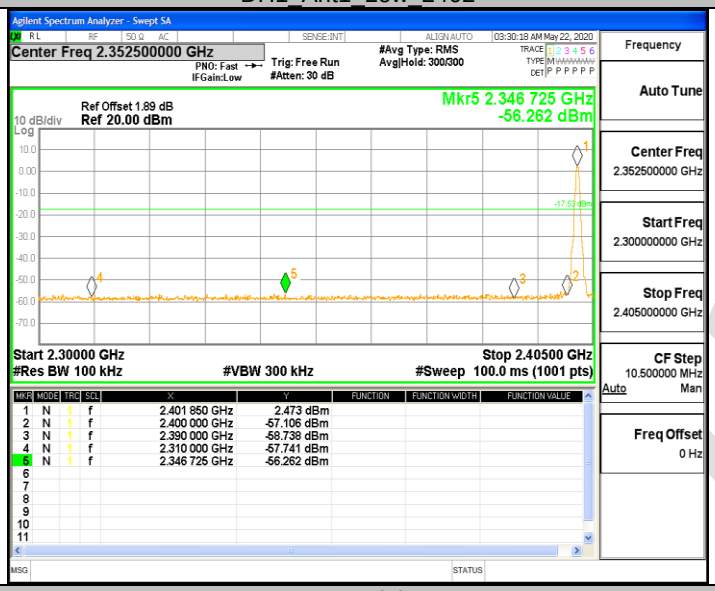
12.6 APPENDIX:BAND EDGE MEASUREMENTS

Test Result

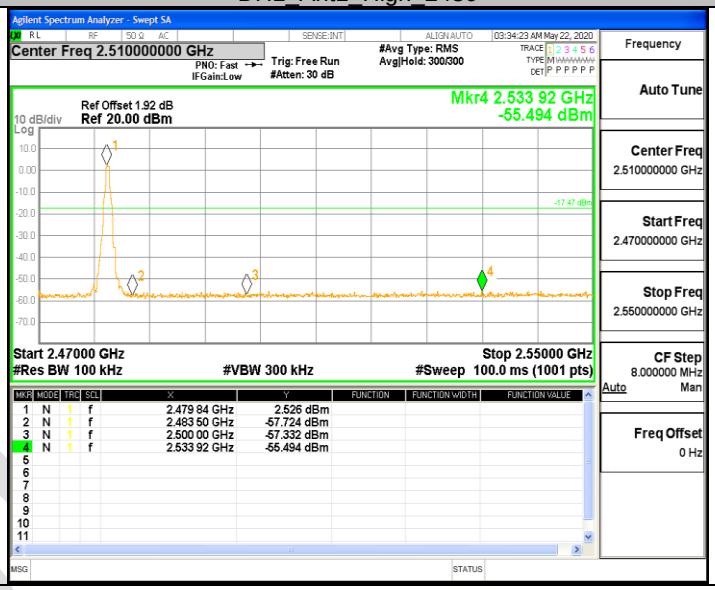
TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	Low	2402	2.47	-56.26	<=-17.53	PASS
		High	2480	2.53	-55.49	<=-17.47	PASS
		Low	Hop_2402	2.05	-42.83	-17.95	PASS
		High	Hop_2480	2.44	-54.94	-17.56	PASS
2DH1	Ant1	Low	2402	1.36	-55.26	<=-18.65	PASS
		High	2480	1.40	-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

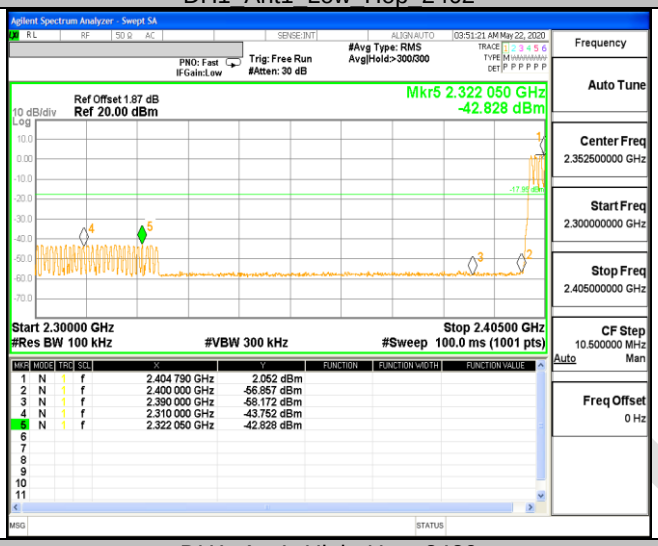
DH1_Ant1_Low_2402



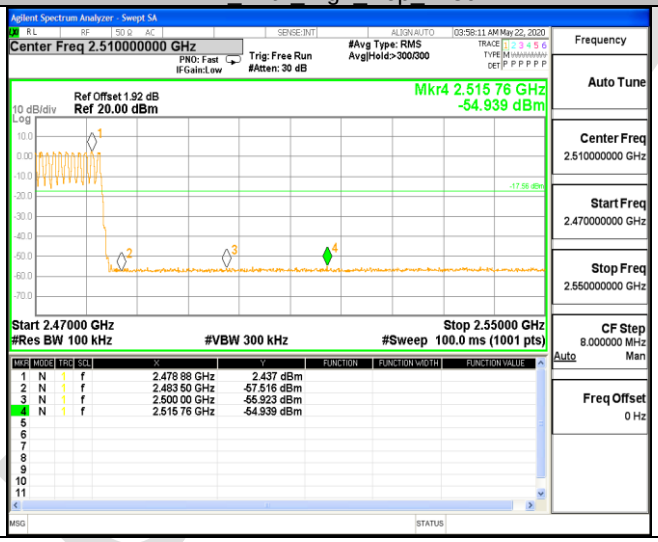
DH1_Ant1_High_2480



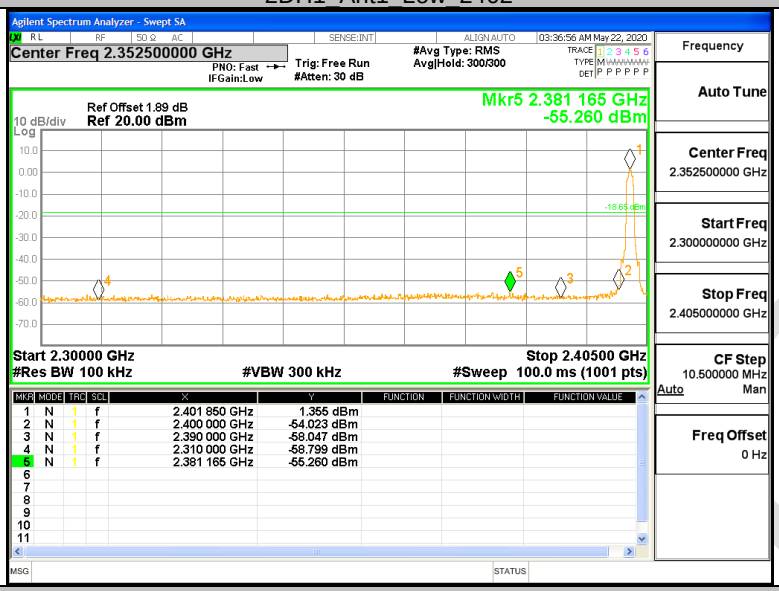
DH1_Ant1_Low_Hop_2402



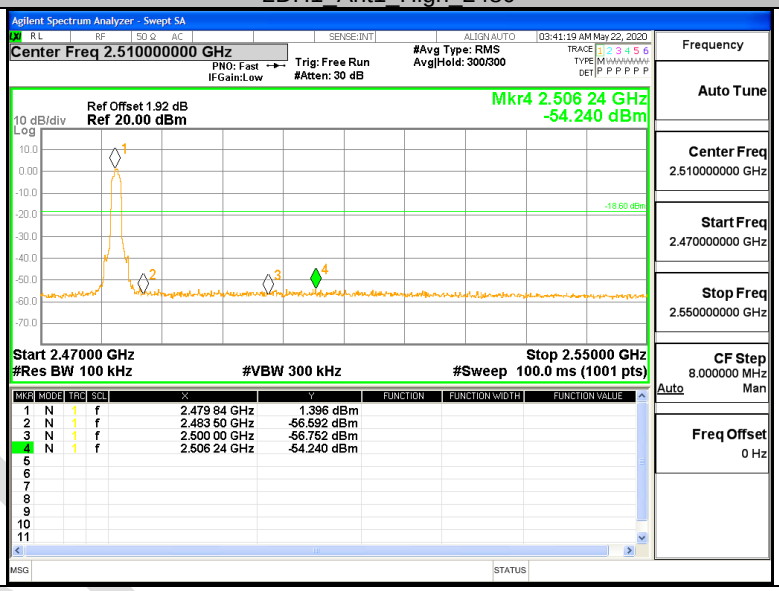
DH1_Ant1_High_Hop_2480



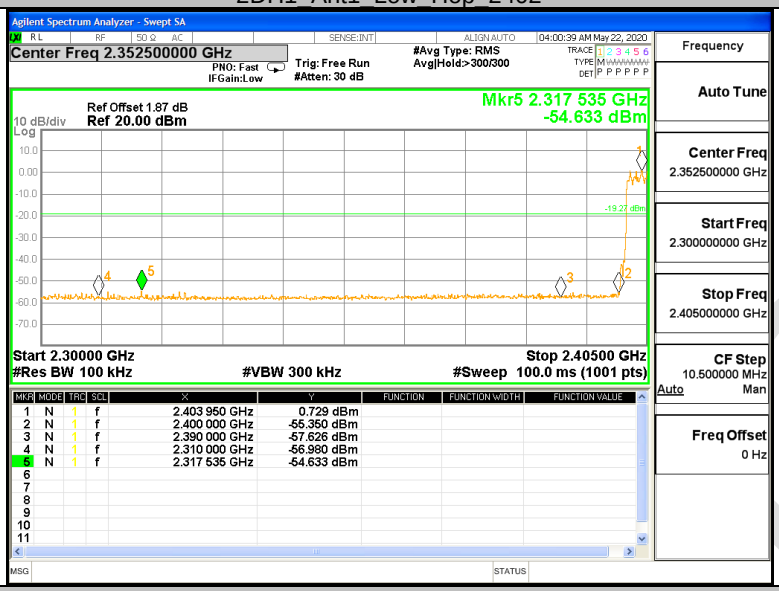
2DH1_Ant1_Low_2402



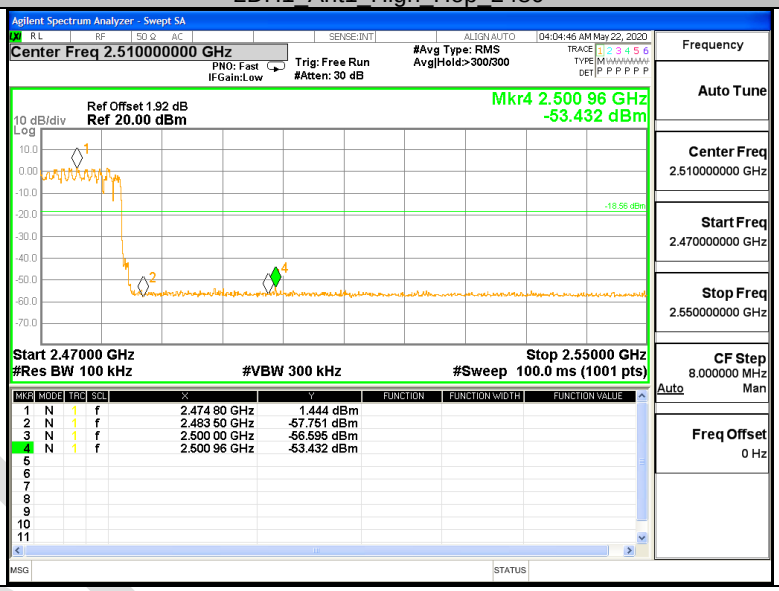
2DH1_Ant1_High_2480

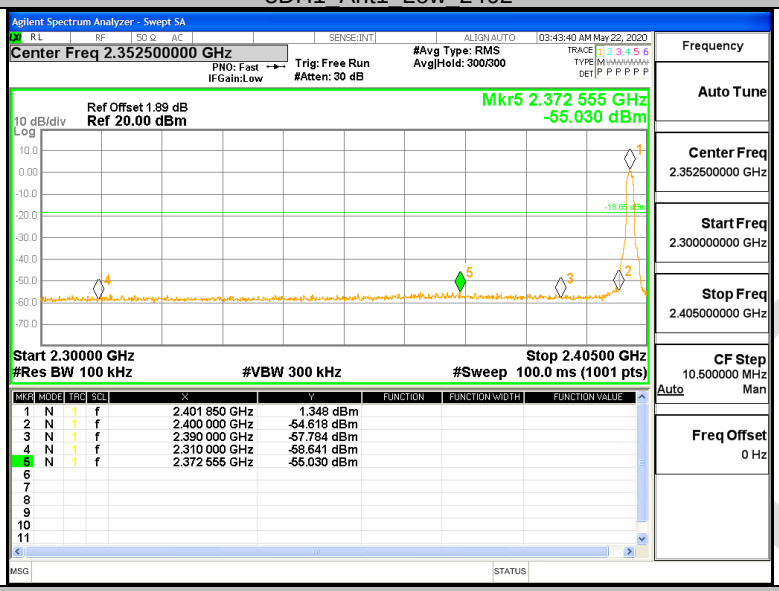


2DH1_Ant1_Low_Hop_2402



2DH1_Ant1_High_Hop_2480



3DH1_Ant1_Low_2402

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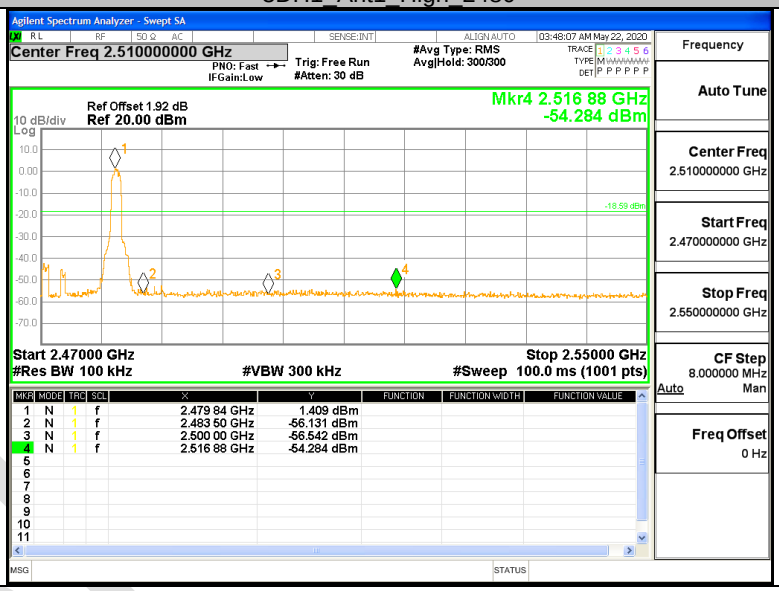
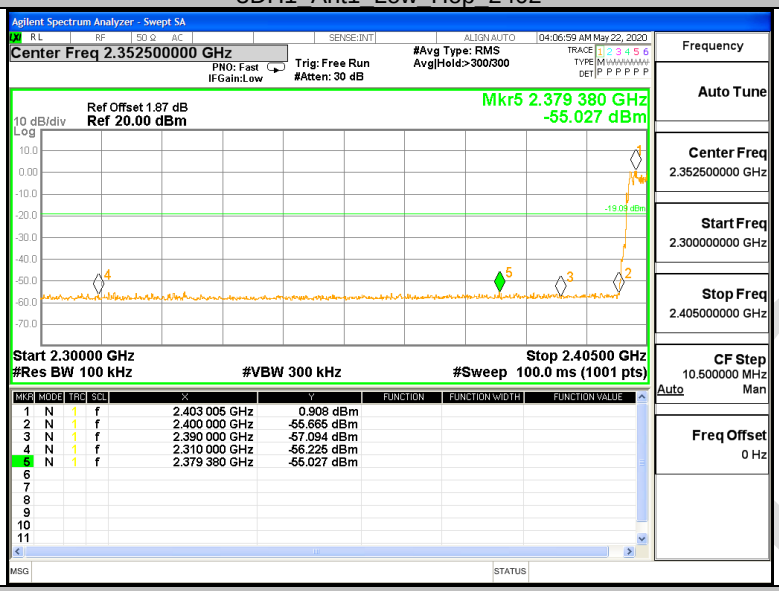


3DH1_Ant1_Low_Hop_2402



3DH1_Ant1_High_Hop_2480

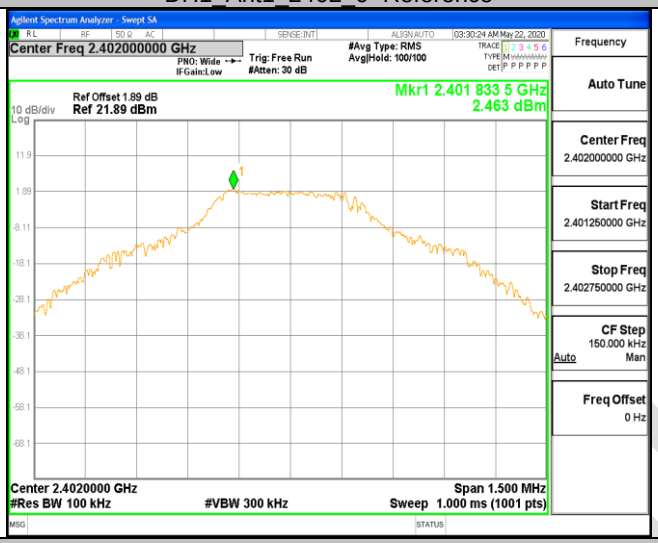
12.7 APPENDIX:CONDUCTEDSPURIOUSEMISSION

Test Result

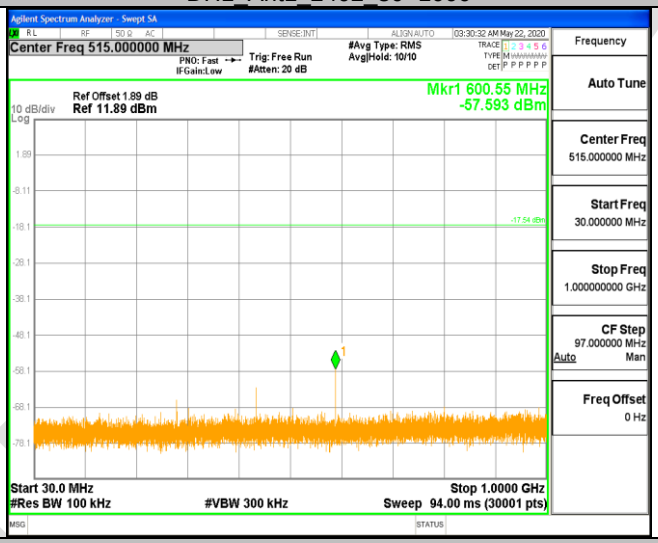
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH1	Ant1	2402	Reference	2.46	2.46	---	PASS
			30~1000	30~1000	-57.593	<=-17.537	PASS
			1000~26500	1000~26500	-42.651	<=-17.537	PASS
		2441	Reference	2.03	2.03	---	PASS
			30~1000	30~1000	-57.808	<=-17.973	PASS
			1000~26500	1000~26500	-41.391	<=-17.973	PASS
		2480	Reference	2.53	2.53	---	PASS
			30~1000	30~1000	-56.752	<=-17.473	PASS
			1000~26500	1000~26500	-41.991	<=-17.473	PASS
2DH1	Ant1	2402	Reference	1.18	1.18	---	PASS
			30~1000	30~1000	-64.496	<=-18.817	PASS
			1000~26500	1000~26500	-42.781	<=-18.817	PASS
		2441	Reference	0.50	0.50	---	PASS
			30~1000	30~1000	-63.261	<=-19.5	PASS
			1000~26500	1000~26500	-44.151	<=-19.5	PASS
		2480	Reference	1.36	1.36	---	PASS
			30~1000	30~1000	-61.829	<=-18.639	PASS
			1000~26500	1000~26500	-43.535	<=-18.639	PASS
3DH1	Ant1	2402	Reference	1.19	1.19	---	PASS
			30~1000	30~1000	-64.459	<=-18.813	PASS
			1000~26500	1000~26500	-42.998	<=-18.813	PASS
		2441	Reference	1.09	1.09	---	PASS
			30~1000	30~1000	-67.856	<=-18.906	PASS
			1000~26500	1000~26500	-41.595	<=-18.906	PASS
		2480	Reference	1.39	1.39	---	PASS
			30~1000	30~1000	-68.378	<=-18.607	PASS
			1000~26500	1000~26500	-42.663	<=-18.607	PASS

Test Graphs

DH1_Ant1_2402_0~Reference



DH1_Ant1_2402_30~1000



DH1_Ant1_2402_1000~26500