



Spectrum Research & Testing Lab., Inc.

No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

TEST REPORT

Reference No.: A23080102

Report No.: FCCA23080102-B0

FCC ID : 2AZ3ICC180W

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Date: Aug. 21, 2023

Product Name: Projector
Brand Name: HP
Model No.: CC180W
Series Model: ---
Applicant: GT Technology Chongqing Limited
3-1, No, 20 Qixin Road Yanjia Street Changshou District
Chongqing
Date of Receipt: Aug. 01, 2023
Finished date of Test: Aug. 01, 2023 ~ Aug. 18, 2023
Applicable Standards: 47 CFR Part 15, Subpart C, 15.247
ANSI C63.10: 2013
FCC publication KDB 558074 D01 15.247 Meas Guidance
v05r02 Apr 02, 2019

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Tested By : Jimmy Ho (Auth) , Date: 8/21/2023
(Jimmy Tseng)

Approved By : Johnson Ho , Date: 8/21/2023
(Johnson Ho, Director)



 Spectrum Research & Testing Lab., Inc. No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)	TEST REPORT	Reference No.: A23080102 Report No.: FCCA23080102-B0 FCC ID : 2AZ3ICC180W Page: 2 of 80 Date: Aug. 21, 2023
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Revisions History

Report No.	Issue Date	Revisions
FCCA23080102-B0	Aug. 21, 2023	Initial issue.

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1. DOCUMENT POLICY AND TEST STATEMENT

1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- FCC Registered Test Site Number : TW1016

1.2 TEST STATEMENT

- This random test report is for FCC's market spot check action by FCC ID: **2AZ3ICC180W** project, applied only to the specific samples tested under conditions.
- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- DC power source from DC adapter: 15V = 3A

1.3 EUT MODIFICATION

- No modification in SRT Lab.

1.4 DECISION RULE

- To make sure the testing report(s) meet the requirement of ISO/IEC 17025:2017 standard and meet chapter 7.1 (Review of Requests, Tenders and Contracts), chapter 7.4 (Handling of Test or Calibration Items), chapter 7.8.2 (Reporting of Results – Common Requirement for Reports (Test, Calibration or Sampling)), This decision rule will be the base of adjustment (include the disclaimer scope) from SRT LAB.
- After communicate between SRT LAB. and clients /applicants and get the agreement, SRT LAB. will do the adjustment. According to this decision rule, SRT LAB. Manager(s) will do the Pass or Fail adjustment. (But one thing need to be concerned is, not every assessing rule suits all declaration of conformity assessing actions, it should be ruled depends on product's feature, test standard, technical regulation, test results, and also acceptance of risk of both sides.)
- This report according to the “description of applied standards and statements of conformity” on the report, as the decision rule.

1.5 REPORTING STATEMENTS OF CONFORMITY

Base on ISO/IEC 17025, the statements of conformity requirement of testing results.

- ☐ It does not need to provide the statements of conformity.
- ☒ It need to provide the statements of conformity and
 - ☒ Use CISPR 16-4, ISO/IEC Guide 98-3, IEC Guide 115, ETSI ETR 028 speciation and it does not need to provide additional uncertainty of the testing results or data on the report(s).
 - ☐ It need to provide additional uncertainty of the testing results or data on the report(s).

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2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Projector
MODEL NO.	CC180W
BRAND NAME	HP
POWER SUPPLY	I/P: 100-240V~, 1.4A MAX, 50-60Hz O/P: 15.0V = 3.0A, 45.0W or 12.0V = 3.0A or 9.0V = 3.0A or 5.0V = 3.0A, 15.0W
CABLE	N/A
FREQUENCY BAND	2400 ~ 2483.5 MHz
CARRIER FREQUENCY	2402 ~ 2480 MHz
NUMBER OF CHANNEL	79
RATED RF OUTPUT POWER	5.37 dBm (3.4435 mW)
MODULATION TYPE	GFSK, $\pi/4$ -DQPSK, 8-DPSK
BIT RATE OF TRANSMITTER	1 Mbps, 2 Mbps, 3Mbps
ANTENNA TYPE	integrated Antenna
ANTENNA GAIN	1.87 dBi

Brief description of the function/specification of the DUT

For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

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2.3 DESCRIPTION OF TEST MODE

The EUT in BR/EDR mode has 79 channels and the modulations are GFSK, $\pi/4$ -DQPSK, and 8-DPSK.

Use the software in TX test mode is "FCC_assist_1.0.2.2".

After pre-test in chamber and evaluate:

1. GFSK and 8-DPSK was the worst modulation, so use of GFSK and 8-DPSK for the final test mode.
2. Choose lowest, middle and highest channels for final test.
3. Three axis (X, Y and Z axis) are evaluated in chamber, the X axis is the worst in test.

Test Mode		Frequency	Radiated Emission
1	TX1	2402 MHz	✓
2	TX2	2441 MHz	✓
3	TX3	2480 MHz	✓
4	Standby	N/A	N/A
5	Link	N/A	✓

NOTE:

1. Below 1 GHz were pre-tested in chamber and chosen the worst case for conducted and radiated emission test.
2. Above 1 GHz were tested individually.

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2.4 EUT OPERATING CONDITION

1. Setup the EUT and all peripheral devices.
2. Turn on the power of all equipment and EUT.
3. Transfer board between PC and EUT. Into engineering & Standby mode.

2.5 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.10:2013. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

NO	DEVICE	BRAND	MODEL #	FCC ID/DOC	CABLE
1	PC	ASUS	M32AA1	DoC	1.8m unshielded power cable.
2	LCD Monitor	DELL	U2311Hb	DoC	1.8m unshielded power cable. 1.5m shielded data cable.
3	Mouse	ASUS	MOBTUO	DoC	1.5m unshielded data cable.
4	Keyboard	ASUS	AW211	DoC	1.5m unshielded data cable
5	Printer	HP	C8995A	DoC	1.5m unshielded power cable. 1.5m shielded data cable.
6	USB 2.0 HDD	Terasys	F-12U	DoC	1.5m shielded data cable.
7	USB Transfer board	NA	USB TO TTL	NA	NA
8	RF cable	NA	HLW 6154-013011	NA	NA
9	Bandpass Filter	NA	NF2400-2500MHz	NA	NA

NOTE: For the actual test configuration, please refer to the photos of testing.

2.6 CHANNEL AND FREQUENCY TABLE

Channel (CH)	Frequency (MHz)	Channel (CH)	Frequency (MHz)	Channel (CH)	Frequency (MHz)	Channel (CH)	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461		

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3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a wireless product. According to the specifications provided by the applicant, it must comply with the requirements of the following standards:

- 47 CFR Part 15, Subpart C, 15.247
- ANSI C63.10: 2013
- FCC publication KDB 558074 D01 15.247 Meas Guidance v05r02 Apr 02, 2019

All tests have been performed and recorded as the above standards.

3.1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

STANDARD SECTION	TEST TYPE AND LIMIT RESULTS	RESULTS
15.207	AC Power Line Conducted Emission	PASS
15.247(d) 15.205(a) 15.209(a)	Transmitter Radiated Emissions Limit: Table 15.209	PASS
15.247(a)	20dB Bandwidth	PASS
15.247(a)	Maximum Peak Conducted Output Power	PASS
15.247(d)	Band Edge Measurement:	PASS
15.247(a)	Time of occupancy (Dwell Time) Limit : greater than 0.4 seconds	PASS
15.247(a)(b)	Quantity of hopping channel test Limit : 75 non-overlapping hopping channels	PASS
15.247(a)	Channel separation test Limit : minimum of 25 kHz or the 20 dB bandwidth	PASS

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4. CONDUCTED EMISSION TEST

4.1 LIMIT

Frequency (MHz)	Class A (dBμV)		Class B (dBμV)	
	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.50 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2 TEST EQUIPMENT

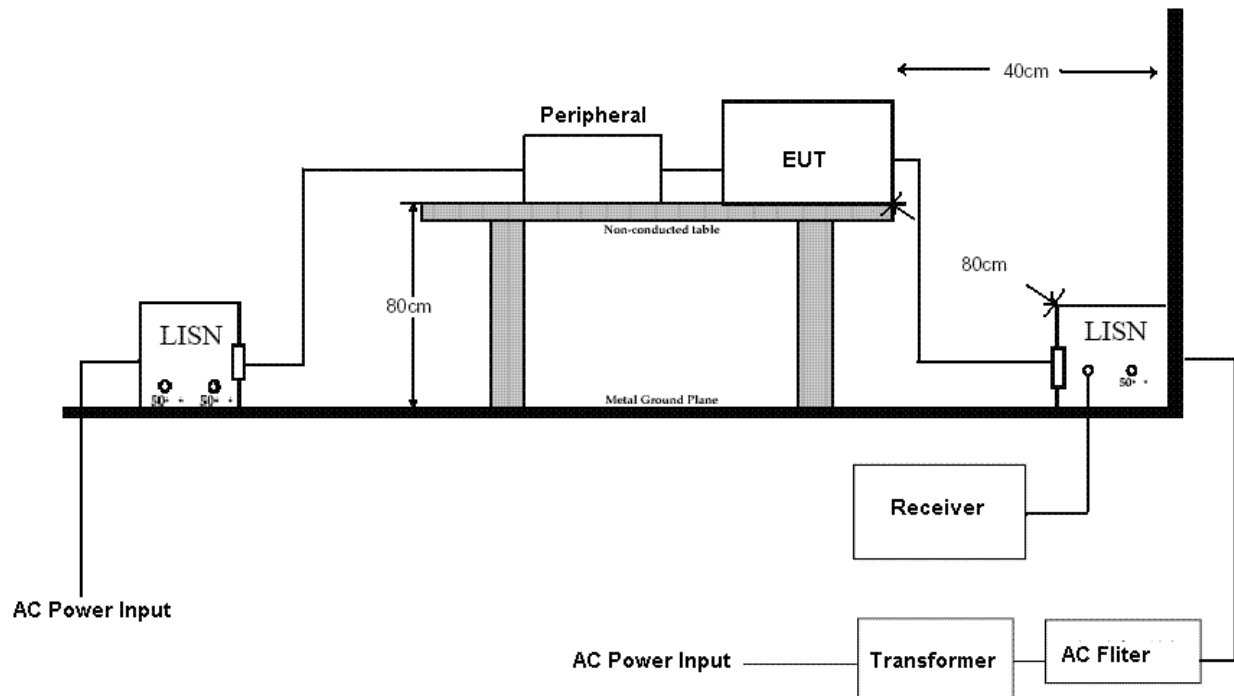
The following test equipment was used for the test:

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center	Final Test be Used
EMI TEST RECEIVER	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	APR. 26, 2024 ETC	■
LISN	50 μH, 50 ohm	SOLAR	9252-50-R-24-BNC / 951315	FEB. 22, 2024 ETC	■
LISN	50 μH, 50 ohm	SCHWARZBECK	NSLK 8127/ 8127-808	MAR. 08, 2024 ETC	■
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	11593A/ L1TEQU005	FEB. 14, 2024 ETC	■
50Ω BNC TYPE TERMINATOR	50 ohm	N/A	B00-CD-357 / L1TEQU009	JUL. 14, 2024 ETC	■
COAXIAL CABLE	5 m	HUBER+ SUHNER	RG214/U(5m) / L1TCAB013	JUN. 23, 2024 ETC	■
FILTER	2 LINE, 30 A	FIL.COIL	FC-943 / 771	NCR	■
GROUND PLANE	2 m (H) x 3 m (W)	SRT	N/A	NCR	■
GROUND PLANE	2.5 m (H) x 3 m (W)	SRT	N/A	NCR	■
PULSE LIMITER	9 kHz ~ 30 MHz Insertion Loss= 10dB±0.3dB	ROHDE & SCHWARZ	ESH3-Z2 / L1TTES010	FEB. 16, 2024 ETC	■
THERMO-HYGRO	15 – 40 °C,	TOP	20-A / 6644	MAR. 01, 2024 ETC	■
MEASUREMENT SOFTEARE	N/A	EZ-EMC	SRT-03A1	NCR	■

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.



4.3 TEST SETUP



NOTE:

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).
2. For the actual test configuration, please refer to the photos of testing.

4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.10:2013 and EN 55022. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50 μ H as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.



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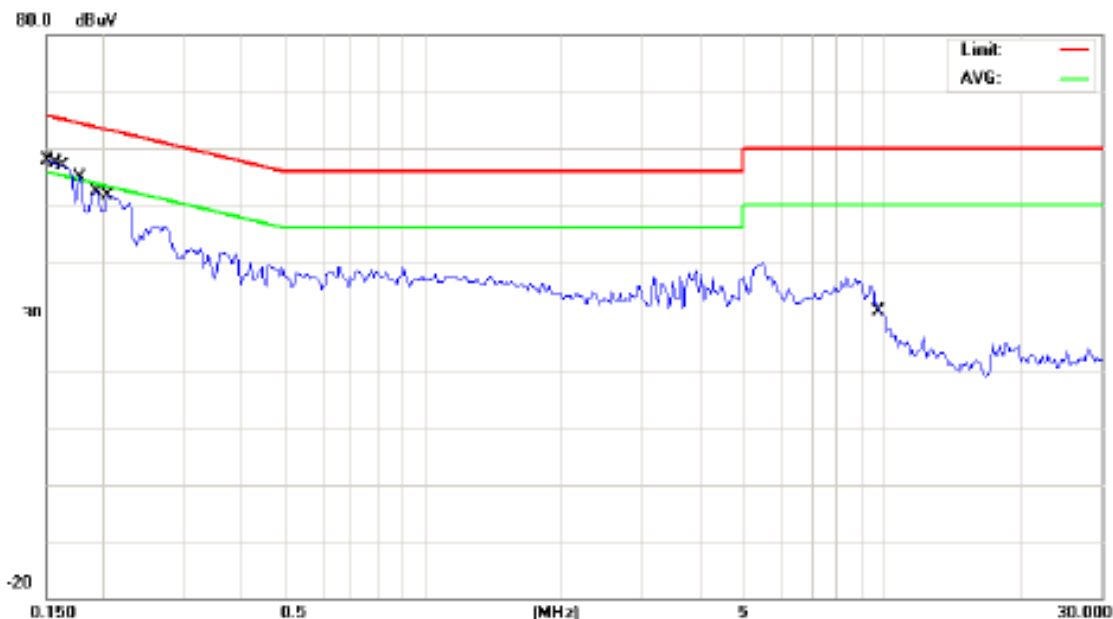
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4.5 TEST RESULT

Temperature: 28 °C Humidity: 81 %RH
Frequency Range: 0.15 – 30 MHz Tested Mode: Link
Receiver Detector: Q.P. and AV. Tested Date: Aug. 10, 2023

Power Line Measured : Line



Mk.	No.	Frequency (MHz)	Reading (dBUV)	Corrected factor(dB)	Result (dBUV)	Limit (dBUV)	Margin (dB)	Detector	Comment
	1	0.1500	54.89	-0.05	54.84	66.00	-11.16	QP	
	2	0.1500	39.99	-0.05	39.94	56.00	-16.06	AVG	
*	3	0.1582	54.67	-0.04	54.63	65.56	-10.93	QP	
	4	0.1582	40.84	-0.04	40.80	55.56	-14.76	AVG	
	5	0.1656	52.73	-0.04	52.69	65.18	-12.49	QP	
	6	0.1656	36.65	-0.04	36.61	55.18	-18.57	AVG	
	7	0.1773	46.98	-0.04	46.94	64.61	-17.67	QP	
	8	0.1773	29.44	-0.04	29.40	54.61	-25.21	AVG	
	9	0.1930	44.88	-0.04	44.84	63.91	-19.07	QP	
	10	0.1930	29.59	-0.04	29.55	53.91	-24.36	AVG	
	11	0.2047	48.32	-0.04	48.28	63.42	-15.14	QP	
	12	0.2047	33.60	-0.04	33.56	53.42	-19.86	AVG	
	13	10.0000	26.12	0.28	26.40	60.00	-33.60	QP	
	14	10.0000	20.93	0.28	21.21	50.00	-28.79	AVG	

- NOTE:**
1. Measurement uncertainty is 2.92 dB
 2. Emission level = Reading value + Correction factor
 3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
 4. Margin value = Emission level - Limit
 5. The emission of other frequencies was very low against the limit.
 6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.



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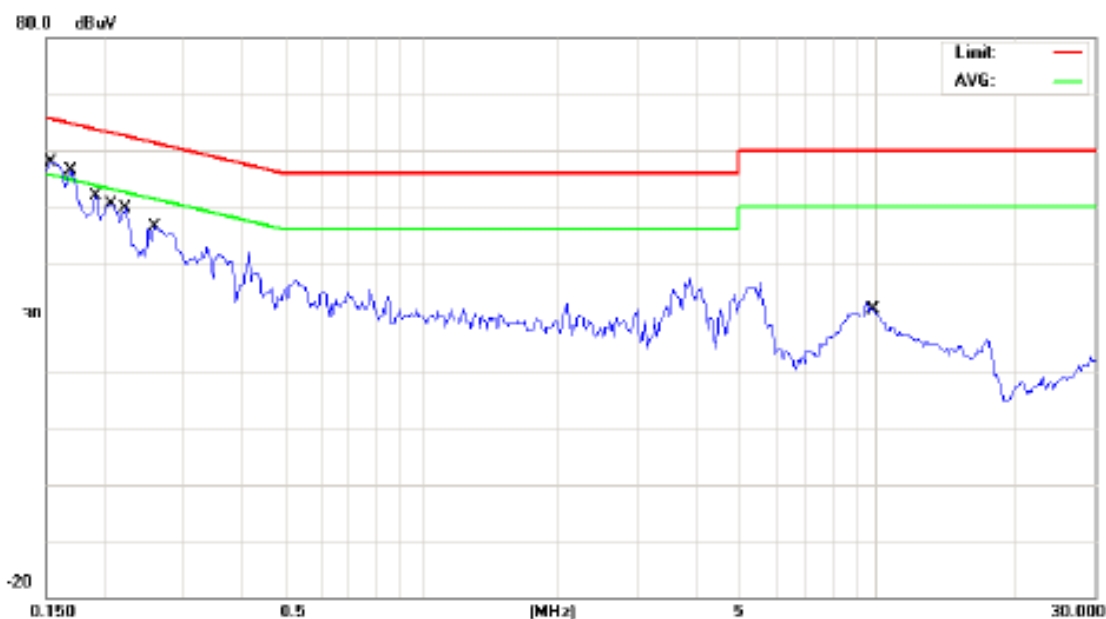
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Temperature: 28 °C Humidity: 81 %RH
Frequency Range: 0.15 – 30 MHz Tested Mode: Link
Receiver Detector: Q.P. and AV. Tested Date: Aug. 10, 2023

Power Line Measured : Neutral



Mk.	No.	Frequency (MHz)	Reading (dBuV)	Corrected factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Comment
	1	0.1539	55.05	-0.08	54.97	65.79	-10.82	QP	
	2	0.1539	40.66	-0.08	40.58	55.79	-15.21	AVG	
*	3	0.1557	55.15	-0.08	55.07	65.69	-10.62	QP	
	4	0.1557	40.75	-0.08	40.67	55.69	-15.02	AVG	
	5	0.1695	50.70	-0.08	50.62	64.98	-14.36	QP	
	6	0.1695	34.32	-0.08	34.24	54.98	-20.74	AVG	
	7	0.1930	44.84	-0.08	44.76	63.91	-19.15	QP	
	8	0.1930	28.69	-0.08	28.61	53.91	-25.30	AVG	
	9	0.2086	48.34	-0.08	48.26	63.26	-15.00	QP	
	10	0.2086	35.07	-0.08	34.99	53.26	-18.27	AVG	
	11	0.2242	44.40	-0.08	44.32	62.66	-18.34	QP	
	12	0.2242	32.76	-0.08	32.68	52.66	-19.98	AVG	
	13	0.2594	44.02	-0.08	43.94	61.45	-17.51	QP	
	14	0.2594	31.29	-0.08	31.21	51.45	-20.24	AVG	
	15	10.0000	26.75	0.25	27.00	60.00	-33.00	QP	
	16	10.0000	21.71	0.25	21.96	50.00	-28.04	AVG	

- NOTE:**
1. Measurement uncertainty is 2.92 dB
 2. Emission level = Reading value + Correction factor
 3. Correction Factor = Cable loss + Insertion loss of LISN
Difference of Pulse Limiter Factor between EMI Test Receiver corrected 10dB insertion loss.
 4. Margin value = Emission level - Limit
 5. The emission of other frequencies was very low against the limit.
 6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

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5. RADIATED EMISSION TEST

5.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

FREQUENCY (MHz)	FIELD STRENGTH (microvolts/meter)	DISTANCE (m)	FIELD STRENGTH (dBμV/m)
0.009 - 0.490	2400/F(kHz)	300	67.6-20log(kHz)
0.490 - 1.705	24000/F(kHz)	30	87.6-20log(kHz)
1.705 - 30	30	30	30
30 - 88	100	3	40.0
88 - 216	150	3	43.5
216 - 960	200	3	46.0
≥ 960	500	3	54.0

NOTE:

1. 30 dBuV (in 30m) = 70 dBuV (in 3m).
2. In the emission tables above , the tighter limit applies at the band edges.
3. Distance refers to the distance between measuring instrument, antenna, and the closest point of any part of the device or system.

FCC Part 15, Section 15.35(b) limit of radiated emission for frequency above 1000 MHz

FREQUENCY (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

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5.2 TEST EQUIPMENT

Below 1 GHz The following test equipment was used during the radiated emission test:

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center	Final Test be Used
EMI Test Receiver	9 kHz ~ 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 100376	APR. 26, 2024 ETC	■
Biconical Antenna	30 MHz ~ 200 MHz	EMCO	3108 / 2380	MAY. 01, 2024 ETC	■
Log Periodic Antenna	200 MHz ~ 1 GHz	EMCO	3146 / 9002-2686	MAY. 01, 2024 ETC	■
Open Area Test Site	3 ~ 10 M Measurement	SRT	A02 / SRT002	MAR. 07, 2024 SRT	■
Coaxial Cable	9 kHz ~ 1 GHz	TIMES	LMR-400(30m) / L1TCAB014	SEP. 08, 2023 ETC	■
Coaxial Cable	9 kHz ~ 1 GHz	Time	LMR-400 (#2m) / L1TCAB012	MAR. 20, 2024 ETC	■
Filter	2 LINE, 30 A	FIL.COIL	FC-943 / 869	NCR	■
CDN	0.15 MHz ~ 300 MHz	LUTHI	CDN L-801 M2/M3 / 2790	JUN. 10, 2024 ETC	□
Pre-Amplifier	0.1 MHz ~ 1.3 GHz	HP	8447D / 2944A06746	APR. 19, 2024 ETC	■
Thermo-Hygro	15 ~ 40°C, 0 ~ 100% RH	TOP	20-A / 9326	MAR. 26, 2024 ETC	■

NOTE: The Open Area Test Site (SRT-1) is registered by FCC with No. 90957

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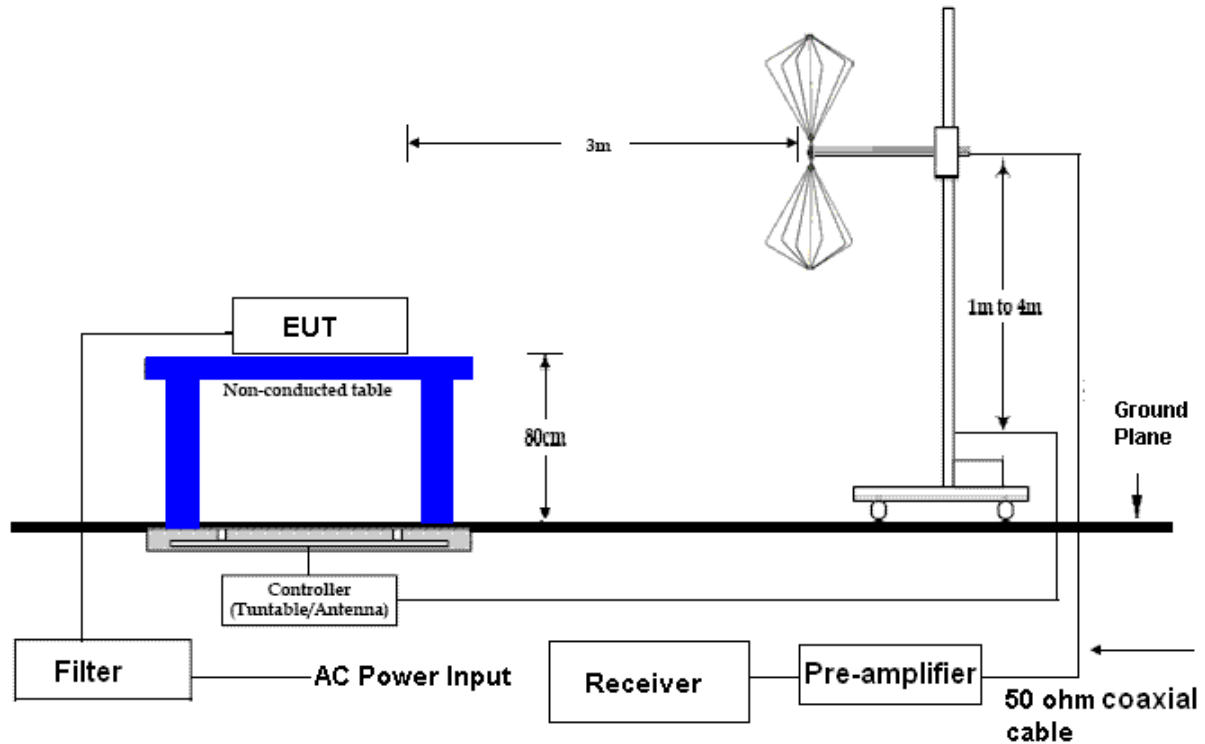
Above 1 GHz The following test equipment was used during the radiated emission test:

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center	Final Test be Used
EXA Signal Analyzer	10Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC	■
Pre-Amplifier	1 GHz ~ 26.5 GHz	AGILENT	8449B / 3008A01995	MAR. 06, 2024 ETC	■
Horn Antenna	1 GHz ~ 18 GHz	EMCO	3115 / 9602-4681	FEB. 23, 2024 ETC	■
Horn Antenna	18 ~ 40 GHz	ETS-LINDGREN	3116 / 2567	MAY.13, 2024 ETC	■
Anechoic Chamber	3 M Measurement	SRT	A01 / SRT001	JUN. 22, 2024 SRT	■
RF Cable	Up to 18 GHz 6 m*2	EMCI	EMC107-SM-6000 / 230726	JUN. 14, 2024 ETC	■
RF Cable	Up to 18 GHz 1.5 m	JYEBAO	A30A30-L 142 / EQF-0035(001)	FEB. 16, 2024 ETC	■
K-Type Cable	Up tp 40 GHz 3 m	HUBER+SUHNER	SF102-46/2*11SK252 / MY2611/2	APR. 24, 2024 ETC	■
K-Type Cable	Up to 40 GHz, 1 m	HUBER+SUHNER	SF102/2*11SK252 / MY3331/2	FEB. 13, 2024 ETC	■
Filter	2 Line, 30 A	FIL.COIL	FC-943 / 869	NCR	■
Thermo-Hygro	15 ~ 40 °C, 0 ~ 100% RH	TOP	20-A / 6644	MAR. 01,2024 ETC	■
Measurement Software	N/A	EZ-EMC	SRT-03A1	NCR	■

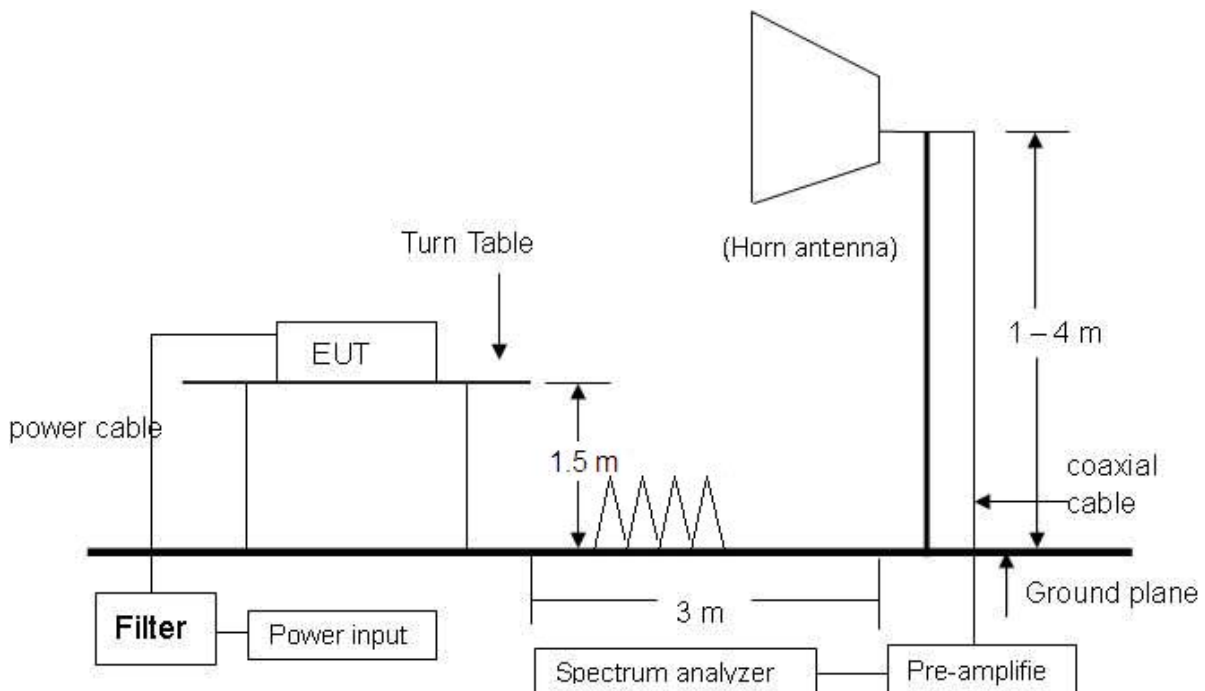


5.3 TEST SET-UP

30 MHz ~ 1 GHz



Above 1 GHz



NOTE: The EUT system was put on a wooden table with 1.5m heights above a ground plane.
For the actual test configuration, please refer to the photos of testing.

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5.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.10:2013 and EN 55022. When the frequency spectrum measured started from 9 kHz to 30 MHz, then use antenna is a loop antenna. The measurements were made at an open area test site with 3 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 9kHz to 30MHz and 30 MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

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5.5 TEST RESULT

Temperature:	27 °C	Humidity:	80 %RH
Frequency Range:	30 MHz ~ 1 GHz	Tested Mode:	Link
Detector Type:	Quasi-peak	IF Bandwidth:	120 kHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 11, 2023

Antenna Polarization : Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ (°)	EL (m)
73.78	2.28	8.70	28.16	51.36	34.19	40.0	-5.81	340	3.86
119.86	2.90	11.40	27.98	44.16	30.48	43.5	-13.02	334	3.72
171.48	3.27	12.50	27.72	42.76	30.81	43.5	-12.69	321	3.56
180.51	3.36	12.90	27.68	42.29	30.87	43.5	-12.63	87	3.53
199.34	3.61	14.40	27.58	47.39	37.81	43.5	-5.69	223	3.48
339.19	5.13	15.28	27.55	40.83	33.69	46.0	-12.31	318	3.04

Antenna Polarization : Vertical

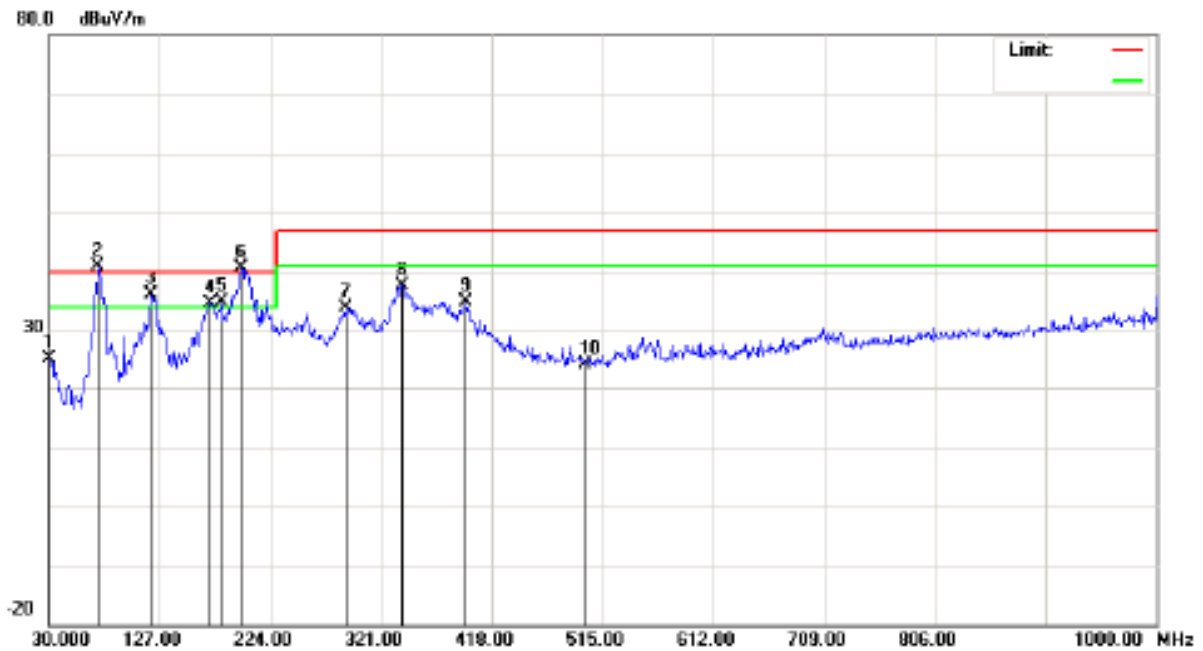
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Pre-Amp (dB)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ (°)	EL (m)
31.43	1.73	14.20	28.30	48.22	35.85	40.0	-4.15	302	1.00
75.06	2.32	8.60	28.15	51.36	34.13	40.0	-5.88	323	1.14
96.13	2.66	8.70	28.08	46.92	30.20	43.5	-13.30	74	1.20
120.93	2.91	11.50	27.97	48.62	35.06	43.5	-8.44	84	1.28
333.76	5.07	15.16	27.51	45.85	38.57	46.0	-7.43	44	1.94
393.25	5.62	16.16	27.91	45.22	39.09	46.0	-6.91	118	2.12

NOTE:

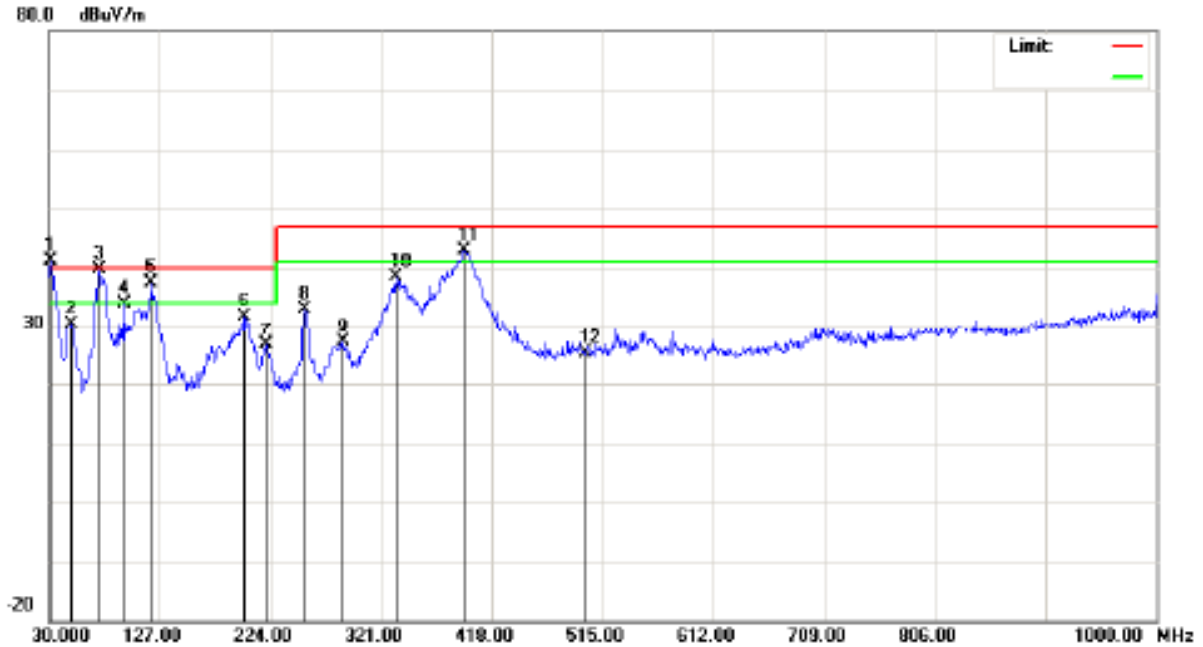
1. Measurement uncertainty is 4.20 dB.
2. "": Measurement does not apply for this frequency.
3. Emission Level = Reading Value + Ant. Factor + Cable Loss – Pre-Amplifier.
4. The field strength of other emission frequencies were very low against the limit.



Antenna Polarization : Horizontal



Antenna Polarization : Vertical





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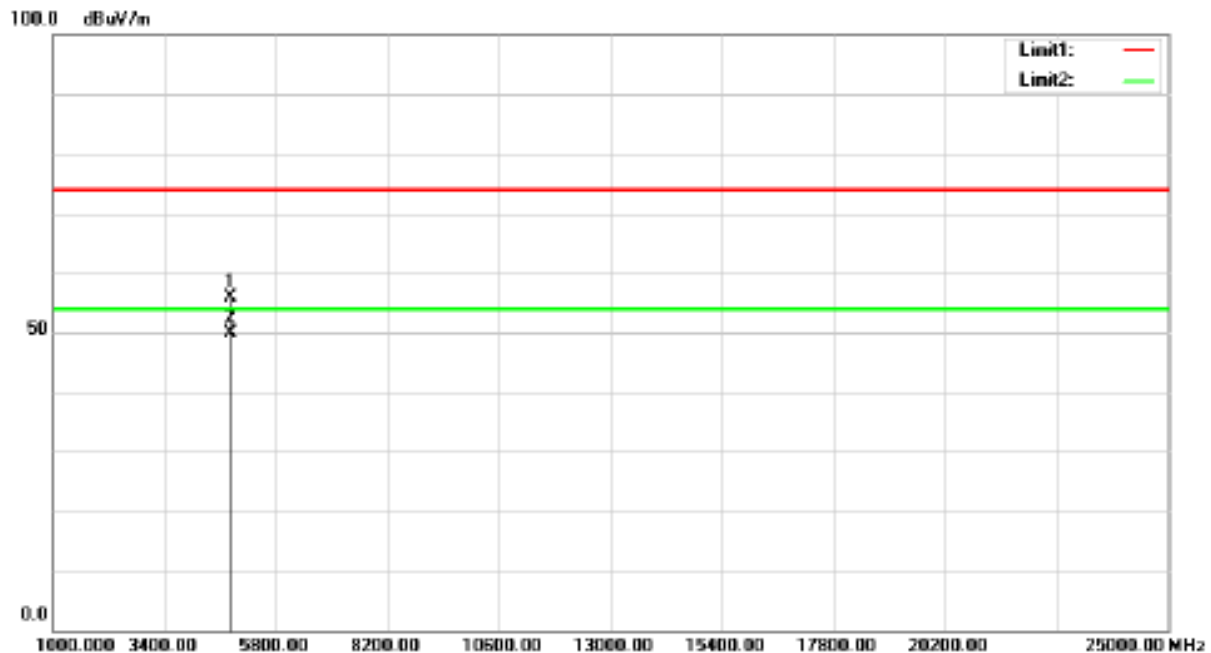
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Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4803.875	49.77	6.07	55.84	74.00	-18.16	peak	
*	2	4803.940	43.82	6.07	49.89	54.00	-4.11	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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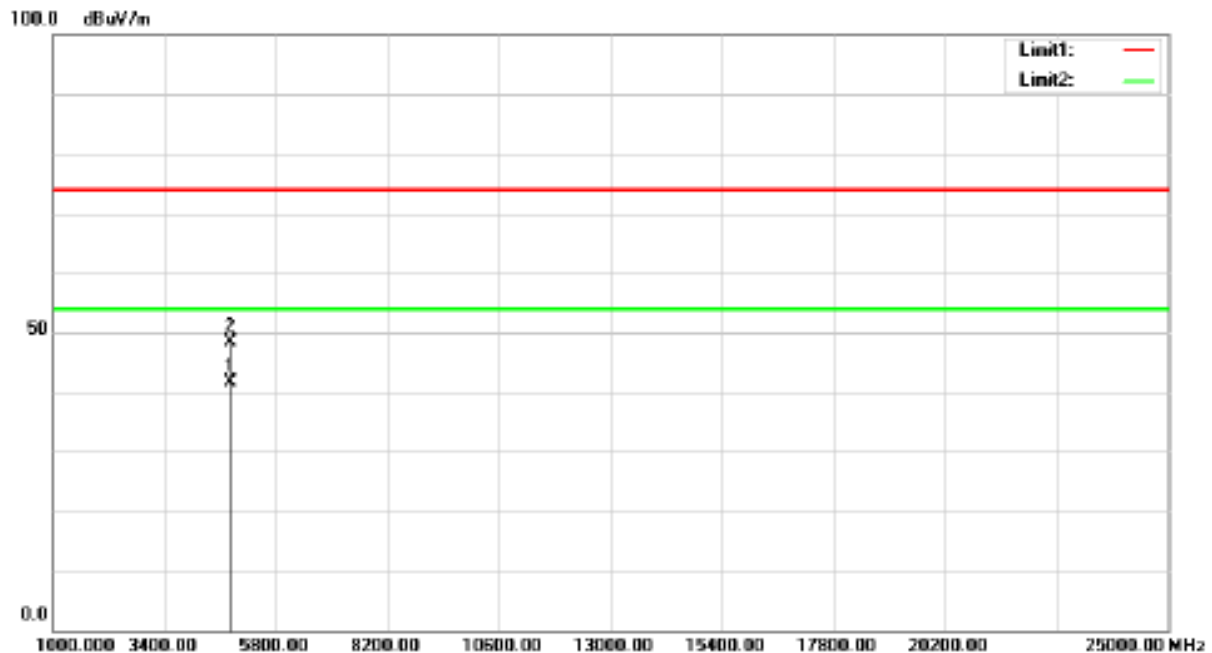
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
*	1	4803.960	35.53	6.07	41.60	54.00	-12.40	AVG	
	2	4804.375	42.25	6.08	48.33	74.00	-25.67	peak	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.

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Reference No.: A23080102

Report No.: FCCA23080102-B0

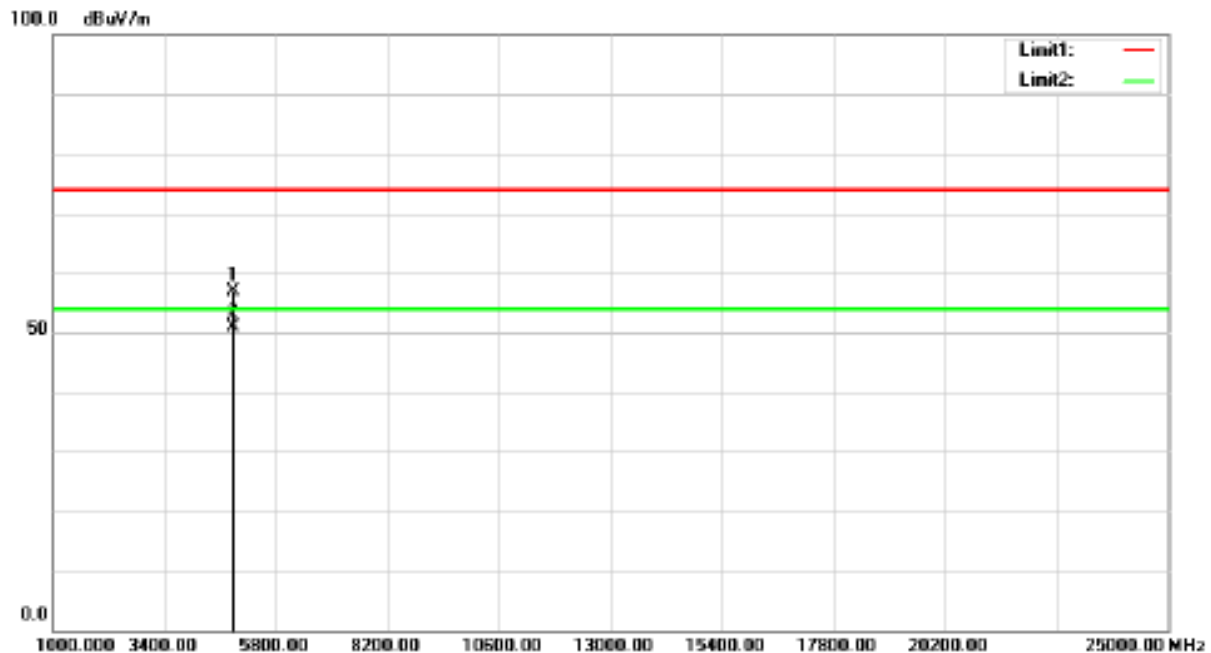
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX2_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4881.770	50.24	6.54	56.78	74.00	-17.22	peak	
*	2	4881.985	44.41	6.54	50.95	54.00	-3.05	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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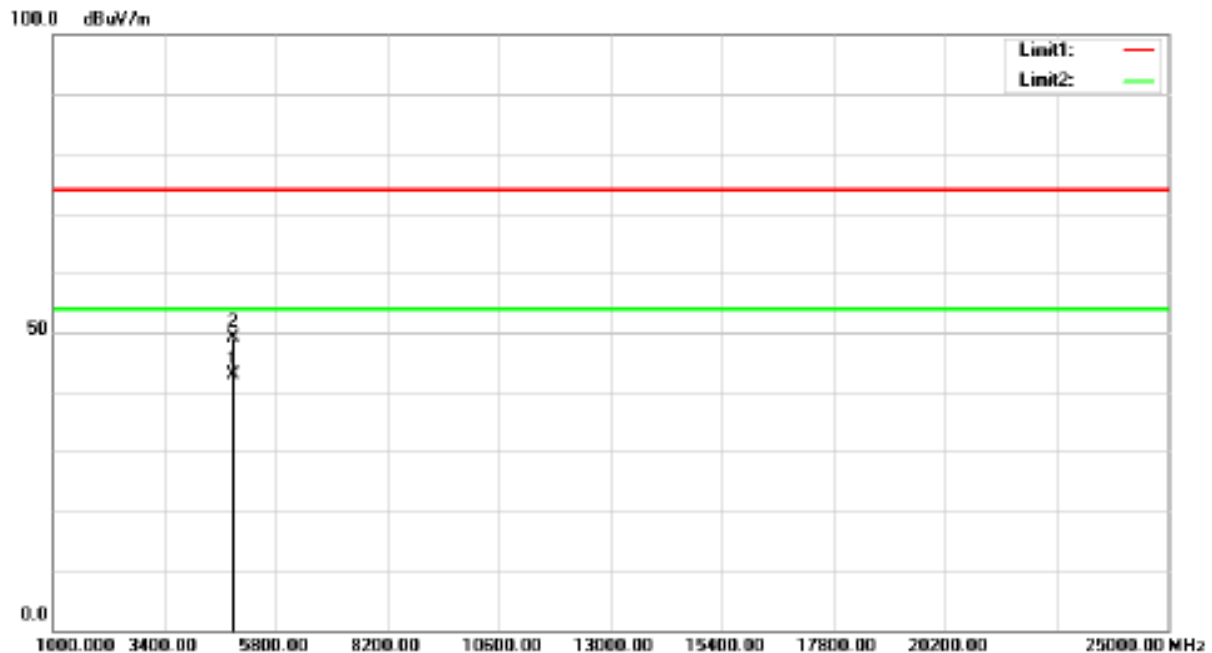
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX2_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
*	1	4881.885	36.30	6.54	42.84	54.00	-11.16	AVG	
	2	4882.690	42.48	6.55	49.03	74.00	-24.97	peak	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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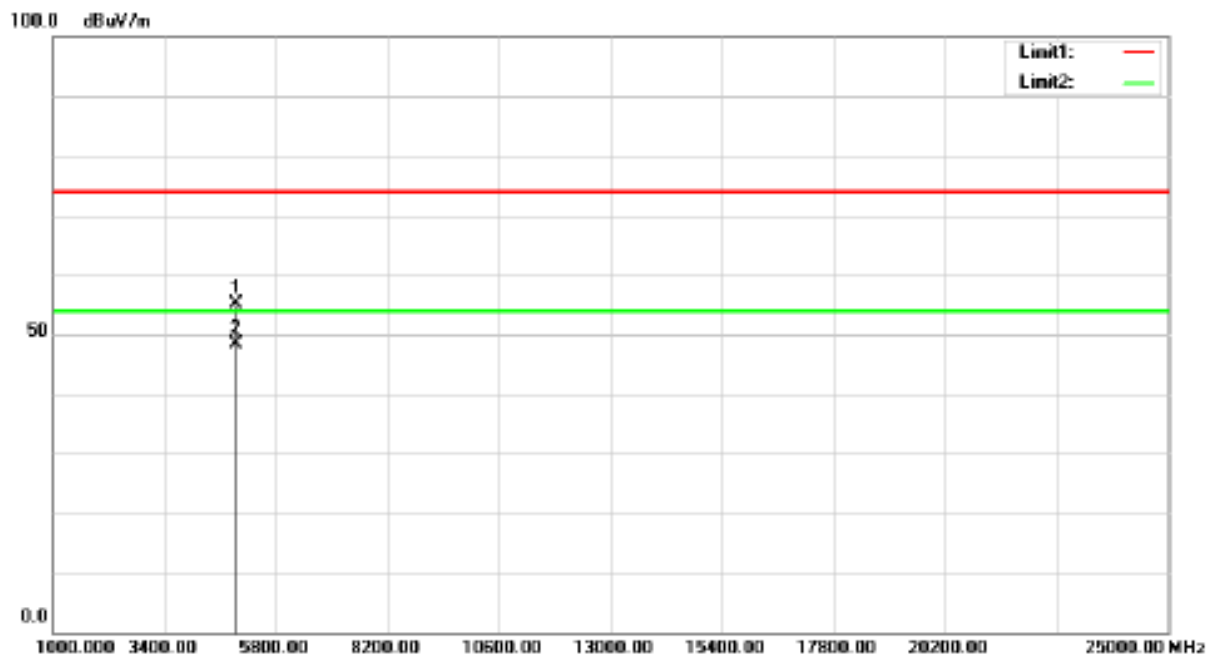
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4959.435	48.23	6.85	55.08	74.00	-18.92	peak	
*	2	4959.895	41.60	6.85	48.45	54.00	-5.55	AVG	

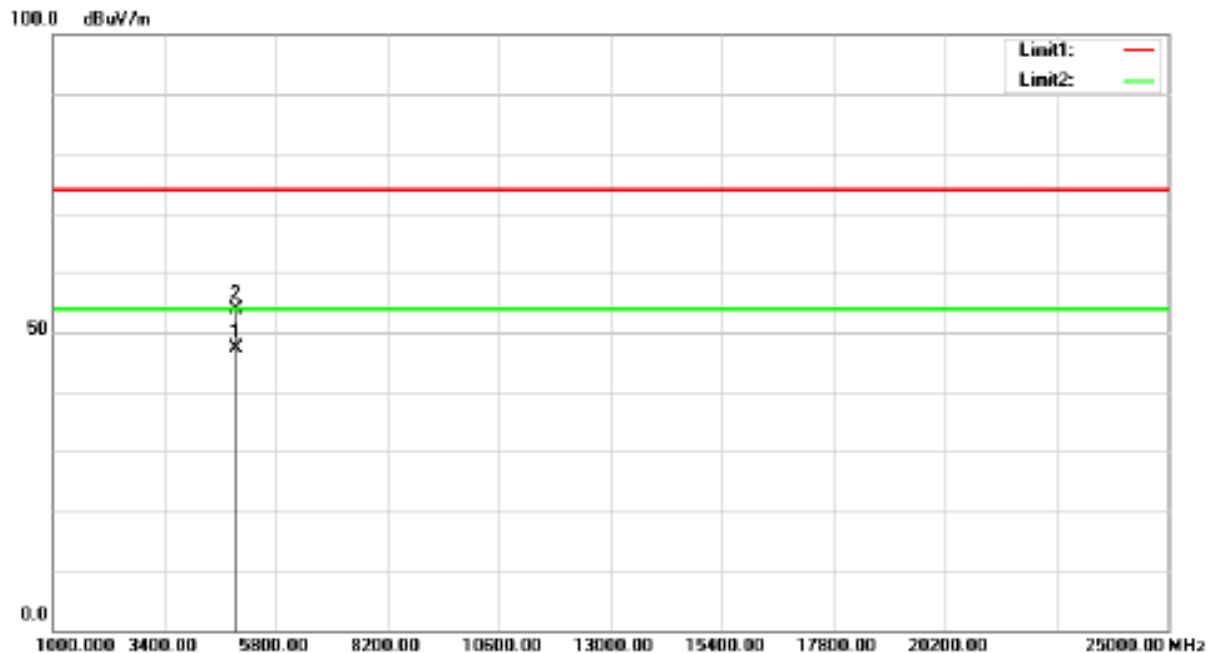
NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
*	1	4959.945	40.49	6.85	47.34	54.00	-6.66	AVG	
	2	4959.960	47.12	6.85	53.97	74.00	-20.03	peak	

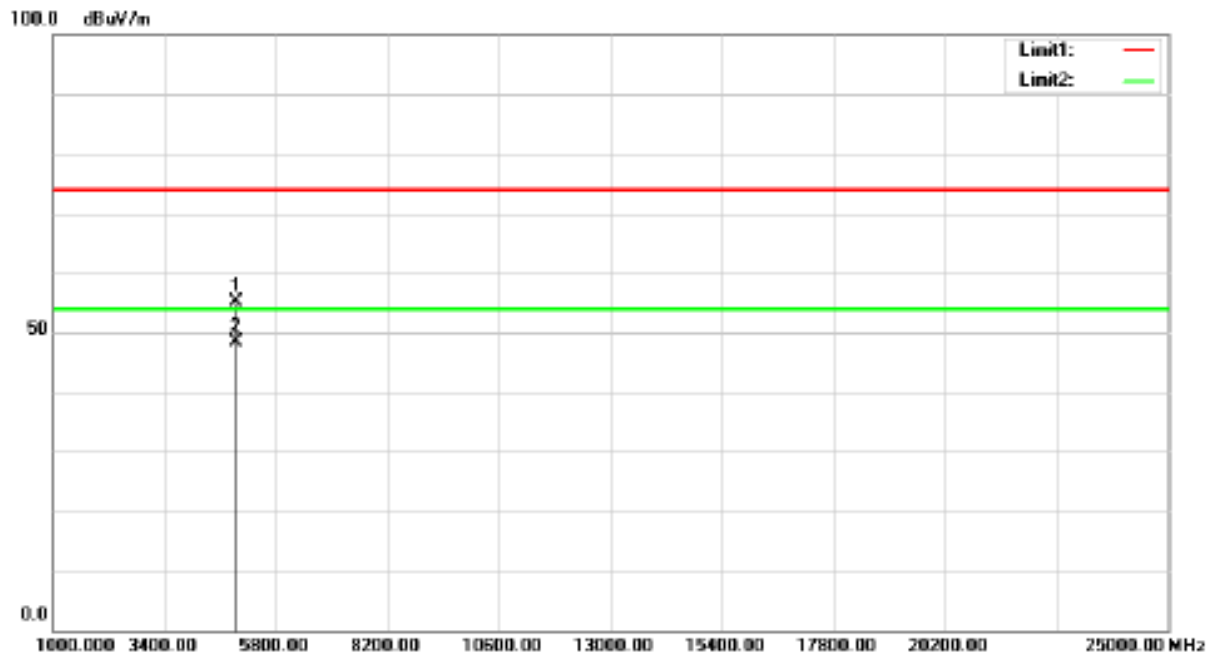
NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4959.610	48.22	6.85	55.07	74.00	-18.93	peak	
*	2	4959.870	41.64	6.85	48.49	54.00	-5.51	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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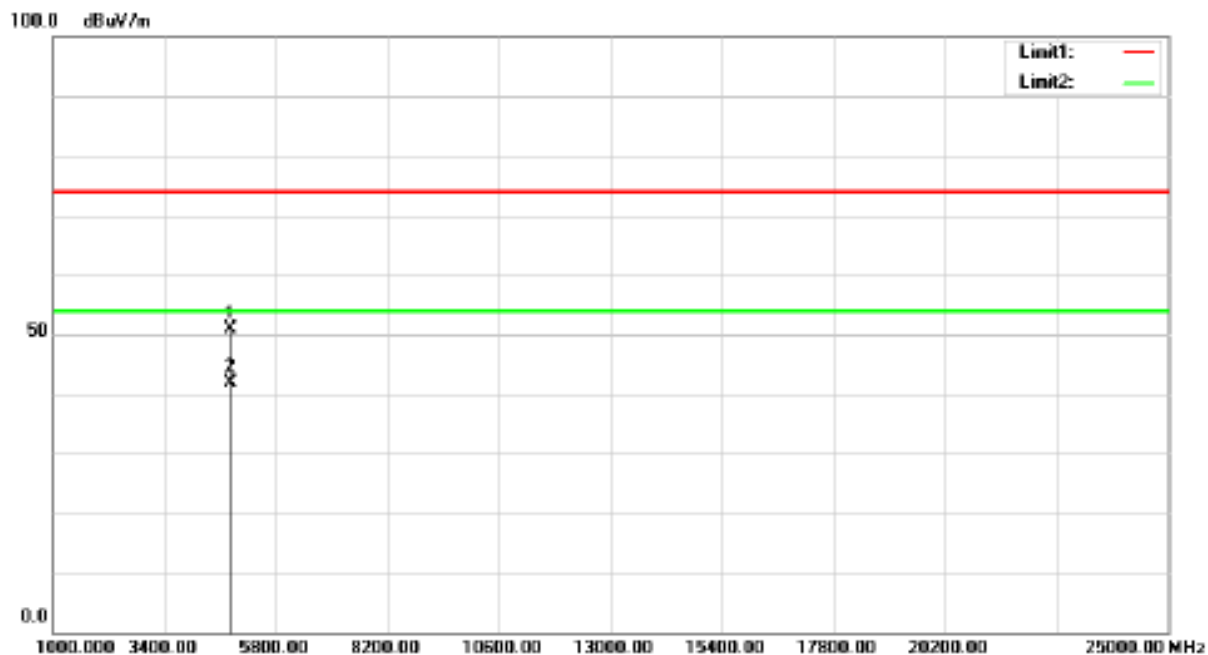
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4803.415	44.71	6.06	50.77	74.00	-23.23	peak	
*	2	4803.960	35.92	6.07	41.99	54.00	-12.01	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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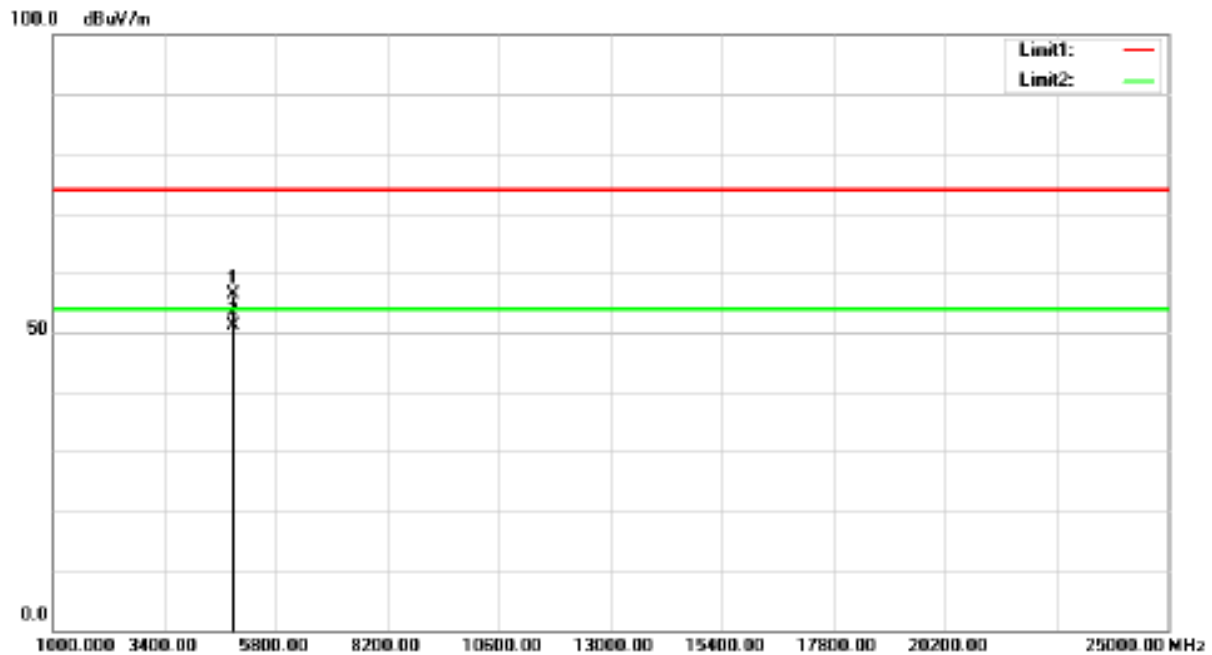
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX2_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4881.535	49.91	6.54	56.45	74.00	-17.55	peak	
*	2	4881.915	44.50	6.54	51.04	54.00	-2.96	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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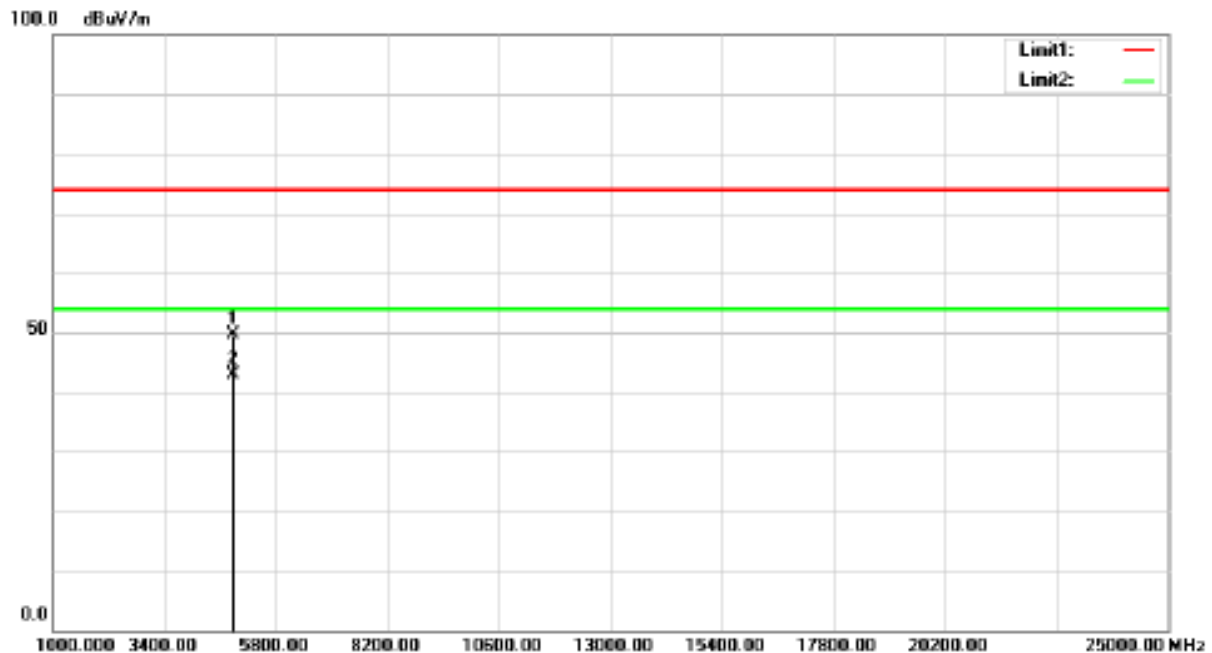
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX2_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4881.635	43.20	6.54	49.74	74.00	-24.26	peak	
*	2	4881.945	36.46	6.54	43.00	54.00	-11.00	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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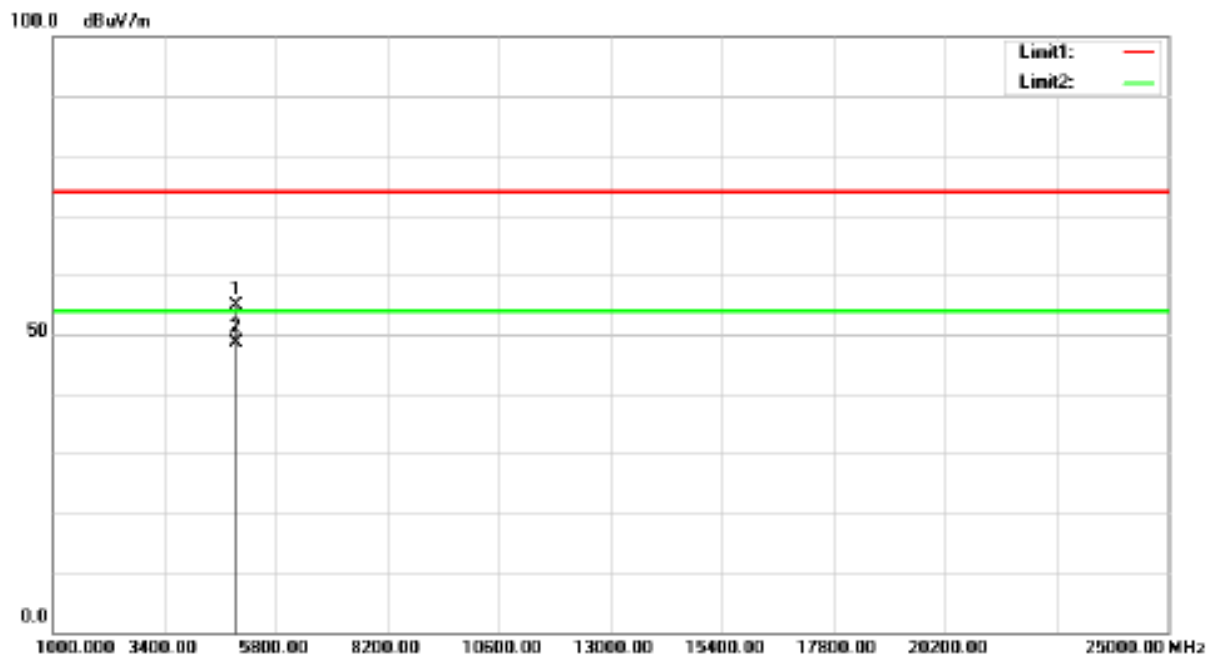
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
	1	4959.775	48.08	6.85	54.93	74.00	-19.07	peak	
*	2	4959.900	41.71	6.85	48.56	54.00	-5.44	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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Reference No.: A23080102

Report No.: FCCA23080102-B0

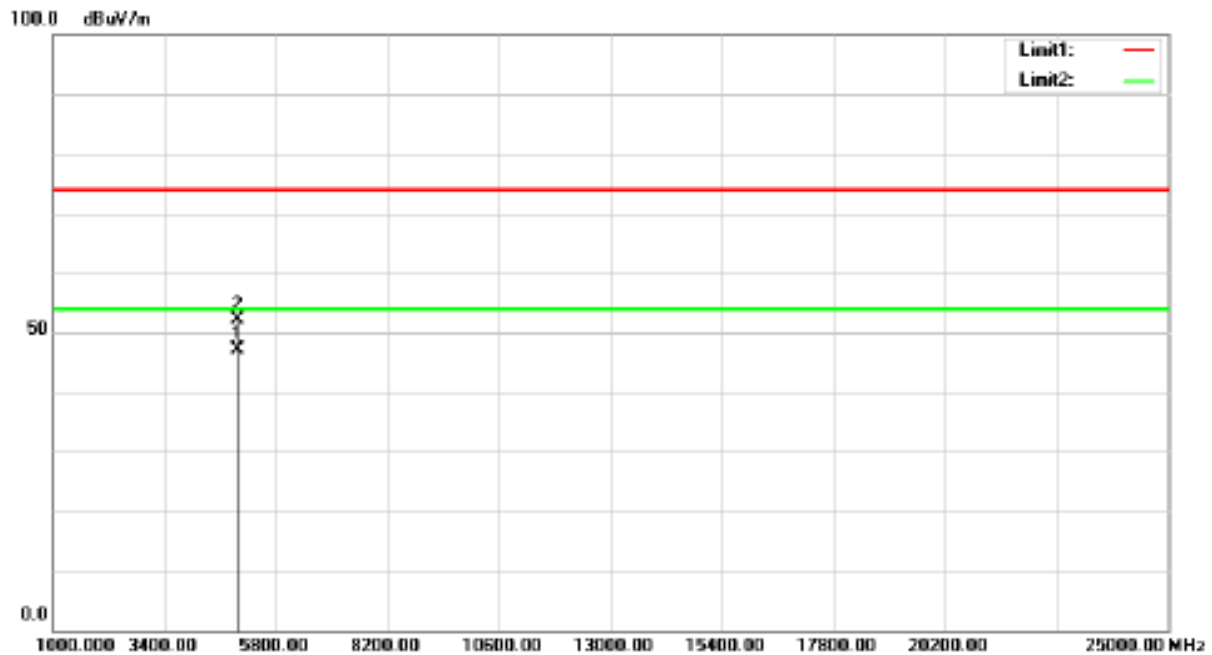
FCC ID : 2AZ3ICC180W

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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



Mk.	No.	Frequency (MHz)	Reading (dBuV/m)	Corrected factor(dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Comment
*	1	4960.015	40.36	6.85	47.21	54.00	-6.79	AVG	
	2	4960.020	45.39	6.85	52.24	74.00	-21.76	peak	

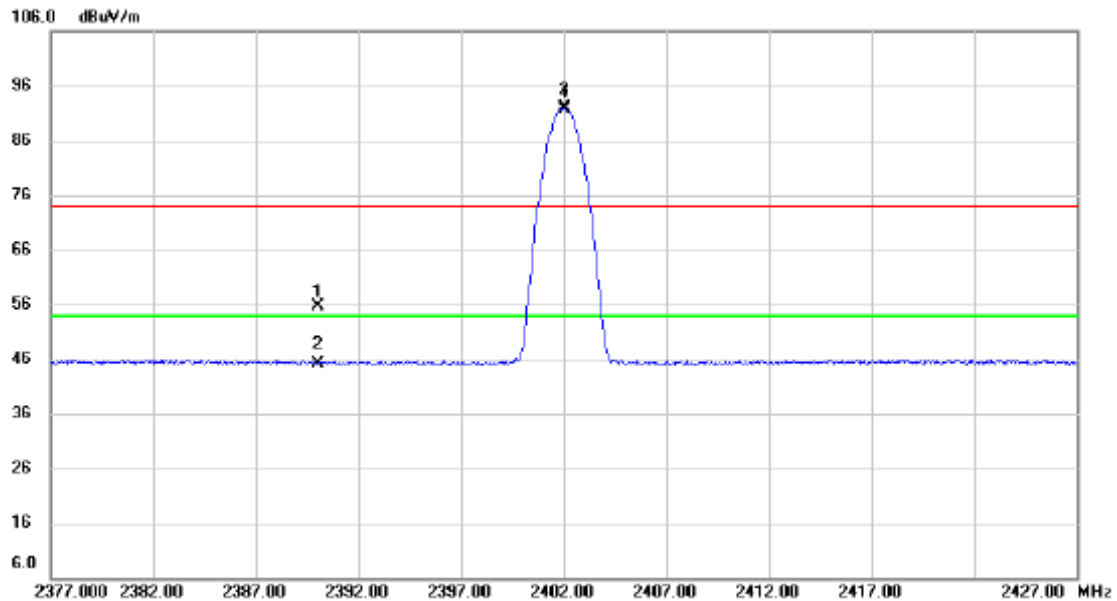
NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	45.40	10.28	55.68	74.00	-18.32	peak	
2		2390.000	34.91	10.28	45.19	54.00	-8.81	AVG	
3	*	2402.000	81.43	10.30	91.73	54.00	37.73	AVG	
4	X	2402.050	81.93	10.30	92.23	74.00	18.23	peak	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



Spectrum Research & Testing Lab., Inc.

No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

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Report No.: FCCA23080102-B0

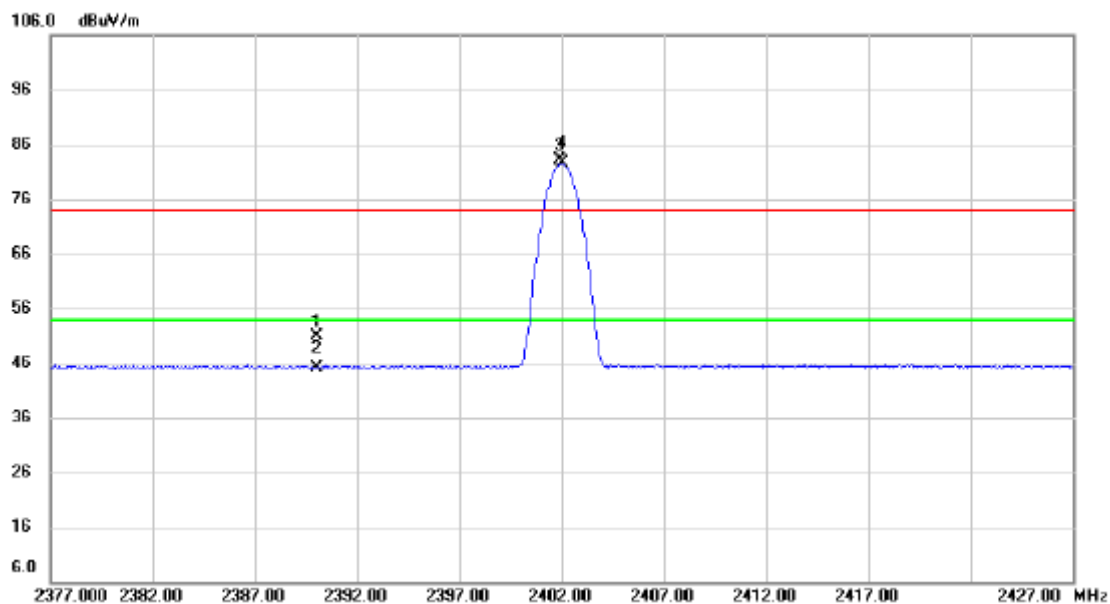
FCC ID : 2AZ3IC180W

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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	40.70	10.28	50.98	74.00	-23.02	peak	
2		2390.000	34.90	10.28	45.18	54.00	-8.82	AVG	
3	X	2401.900	72.72	10.30	83.02	74.00	9.02	peak	
4	*	2402.000	72.37	10.30	82.67	54.00	28.67	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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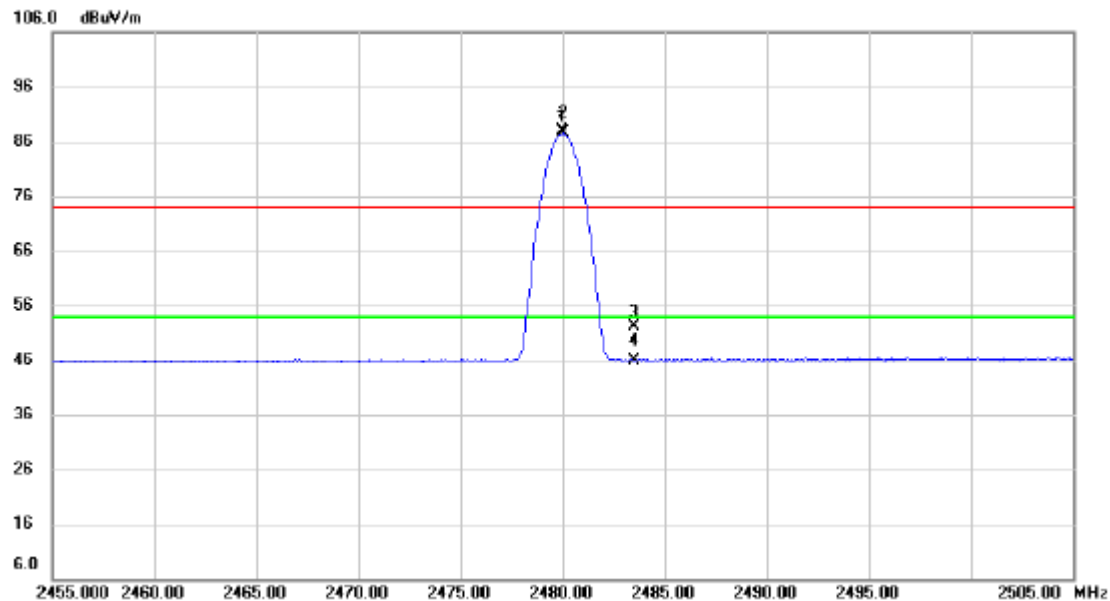
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2479.950	77.11	10.70	87.81	74.00	13.81	peak	
2	*	2480.000	76.84	10.70	87.54	54.00	33.54	AVG	
3		2483.500	41.53	10.72	52.25	74.00	-21.75	peak	
4		2483.500	35.17	10.72	45.89	54.00	-8.11	AVG	

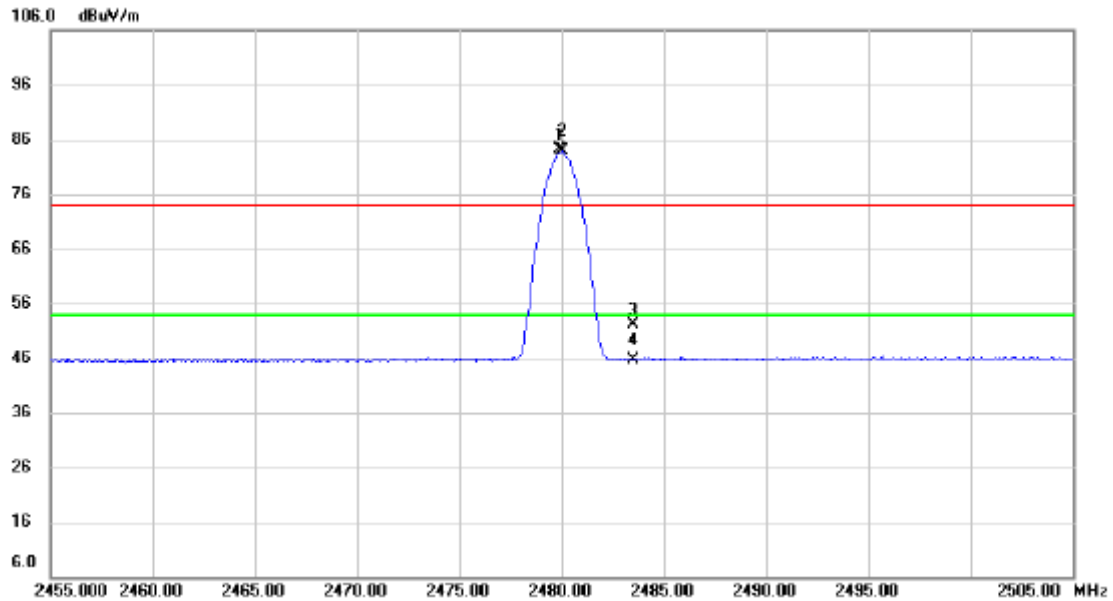
NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_1Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2479.900	73.47	10.70	84.17	74.00	10.17	peak	
2	*	2480.000	73.08	10.70	83.78	54.00	29.78	AVG	
3		2483.500	41.33	10.72	52.05	74.00	-21.95	peak	
4		2483.500	35.00	10.72	45.72	54.00	-8.28	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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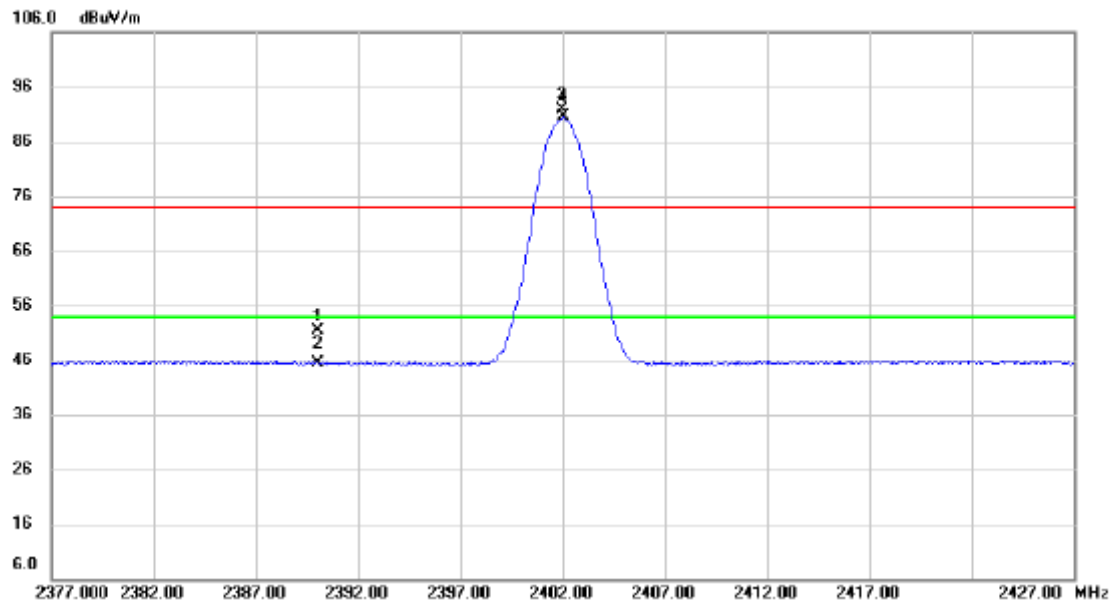
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector Comment
1		2390.000	41.15	10.28	51.43	74.00	-22.57	peak
2		2390.000	35.04	10.28	45.32	54.00	-8.68	AVG
3	X	2401.950	81.64	10.30	91.94	74.00	17.94	peak
4	*	2402.050	80.41	10.30	90.71	54.00	36.71	AVG

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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Report No.: FCCA23080102-B0

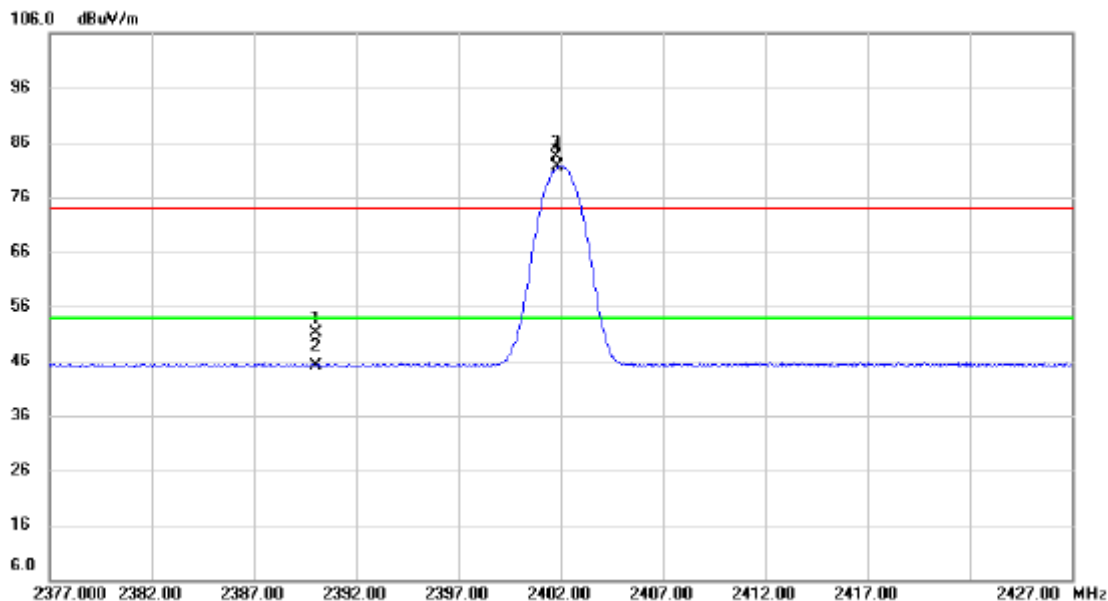
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Date: Aug. 21, 2023

Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX1_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1		2390.000	40.92	10.28	51.20	74.00	-22.80	peak	
2		2390.000	34.89	10.28	45.17	54.00	-8.83	AVG	
3	X	2401.750	73.11	10.30	83.41	74.00	9.41	peak	
4	*	2401.850	71.31	10.30	81.61	54.00	27.61	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



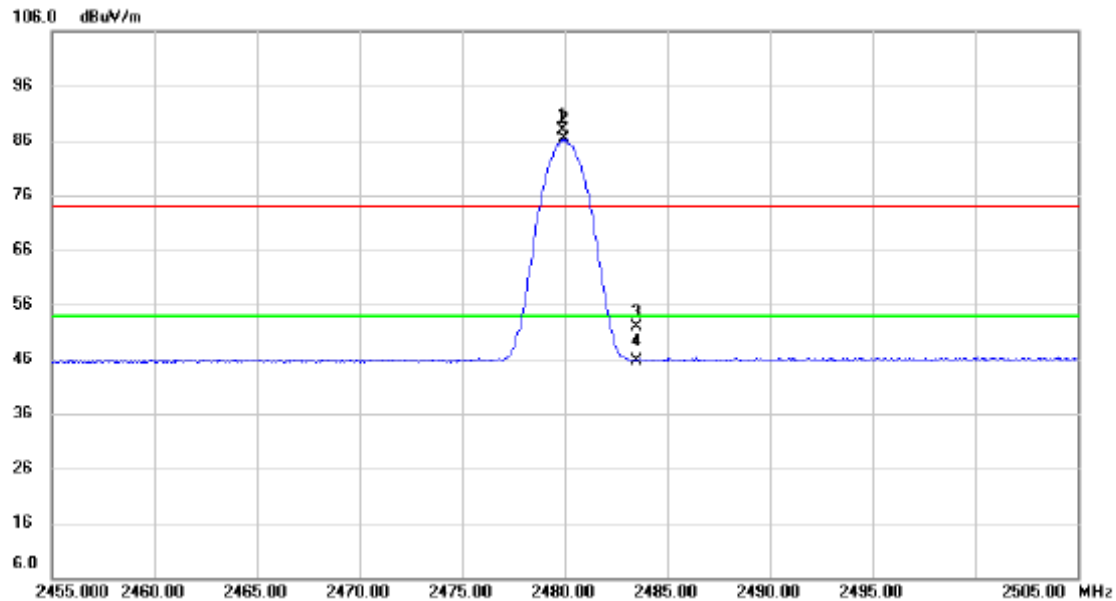
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Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Horizontal



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Comment
1	X	2479.900	77.06	10.70	87.76	74.00	13.76	peak	
2	*	2479.950	75.68	10.70	86.38	54.00	32.38	AVG	
3		2483.500	41.08	10.72	51.80	74.00	-22.20	peak	
4		2483.500	35.01	10.72	45.73	54.00	-8.27	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F):The field strength of fundamental frequency.



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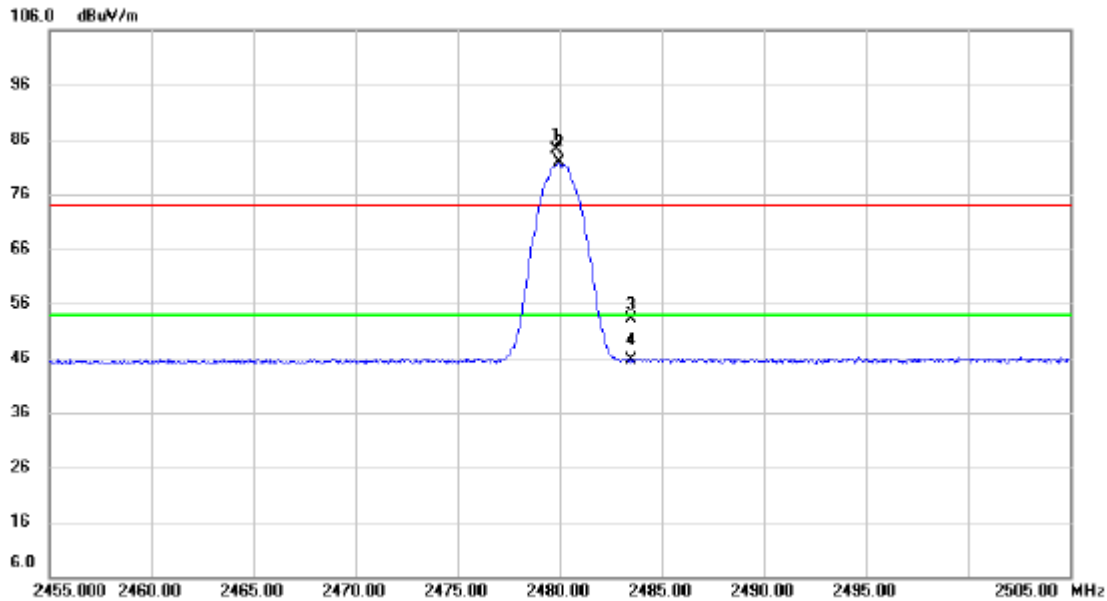
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Temperature:	28 °C	Humidity:	74 %RH
Frequency Range:	1 ~ 25 GHz	Tested Mode:	BT_TX3_3Mbps
Detector Type:	PK. and AV.	IF Bandwidth:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 07, 2023

Antenna Polarization : Vertical



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	X	2479.800	73.45	10.70	84.15	74.00	10.15	peak	
2	*	2479.950	71.14	10.70	81.84	54.00	27.84	AVG	
3		2483.500	42.34	10.72	53.06	74.00	-20.94	peak	
4		2483.500	34.94	10.72	45.66	54.00	-8.34	AVG	

NOTE:

1. Measurement uncertainty is 4.04 dB.
2. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.: Cable Loss and Pre-Amplifier Gain)
3. The field strength of other emission frequencies were very low against the limit.
4. (F): The field strength of fundamental frequency.

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6. 20dB Bandwidth

6.1 LIMIT

FCC Part15, Subpart C Section 15.247(a).

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

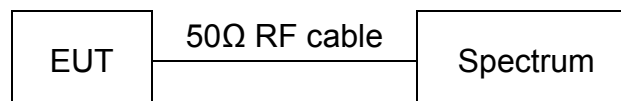
6.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center
EXA Signal Analyzer	10 Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

6.3 TEST SET-UP



6.4 TEST PROCEDURE

The EUT was operated in hopping mode or any specific channel.
 Printed out the test result from the spectrum by hard copy function.

6.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

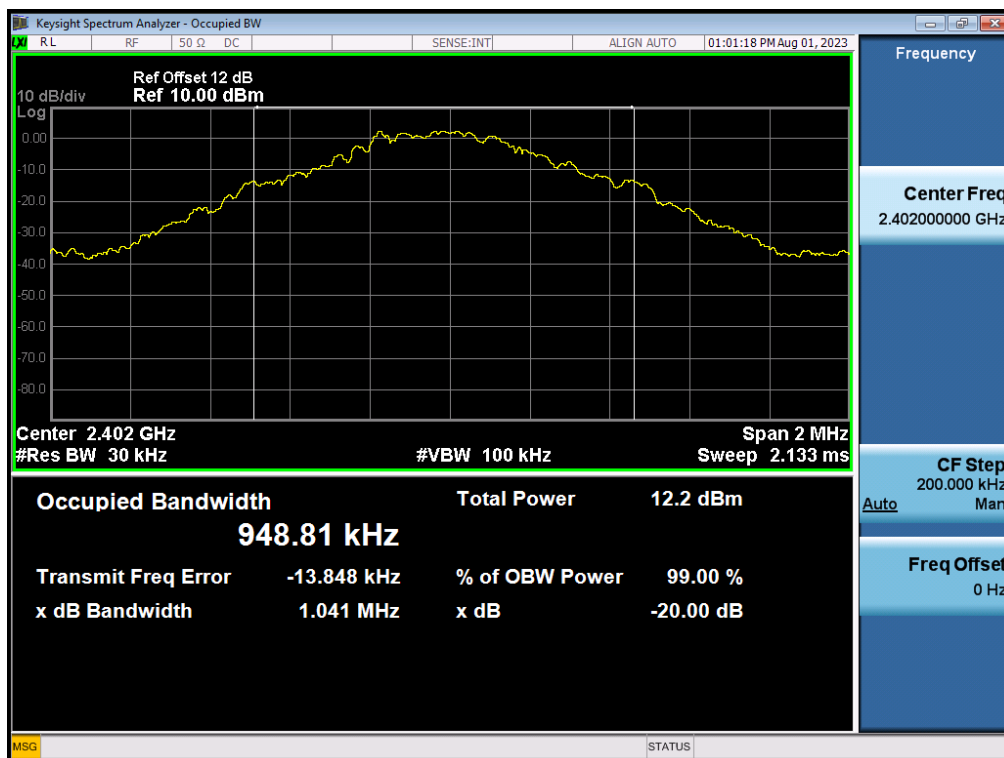
6.6 TEST RESULT

20dB Bandwidth :

Temperature:	28 °C	Humidity:	74 %RH
RBW:	30 kHz	Modulation:	GFSK
Detector:	Peak	VBW:	100 kHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Channel	Frequency (MHz)	20 dB Down Bandwidth (MHz)	BW > 500 kHz
CH00	2402	0.949	PASS
CH39	2441	1.002	PASS
CH78	2480	1.020	PASS

CH00



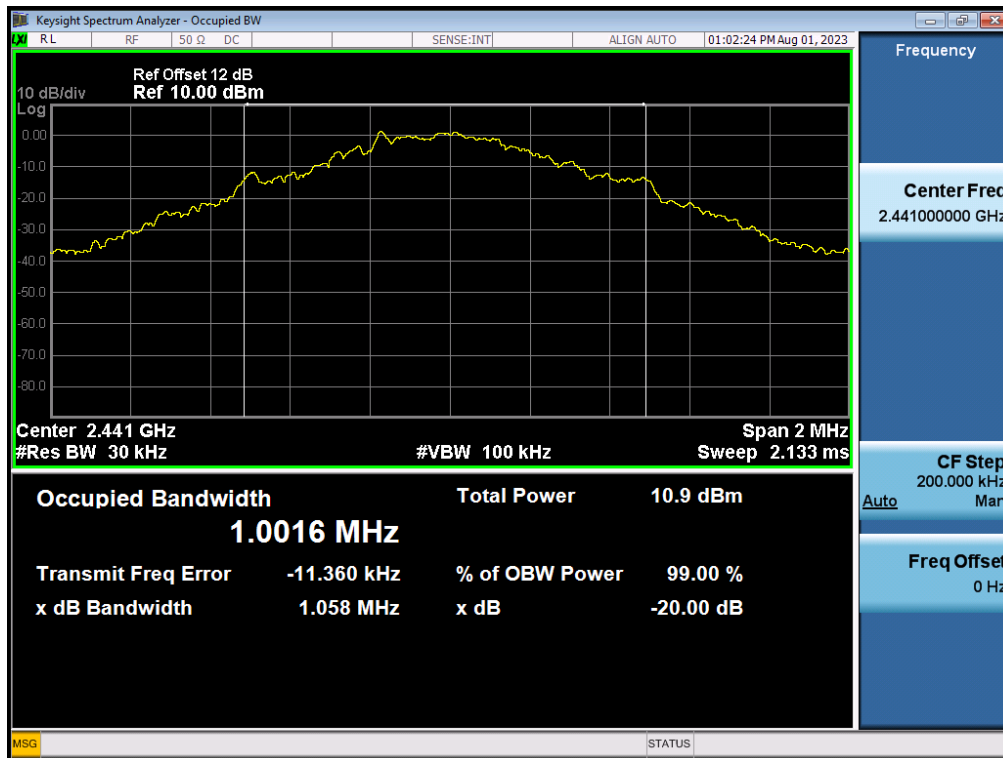


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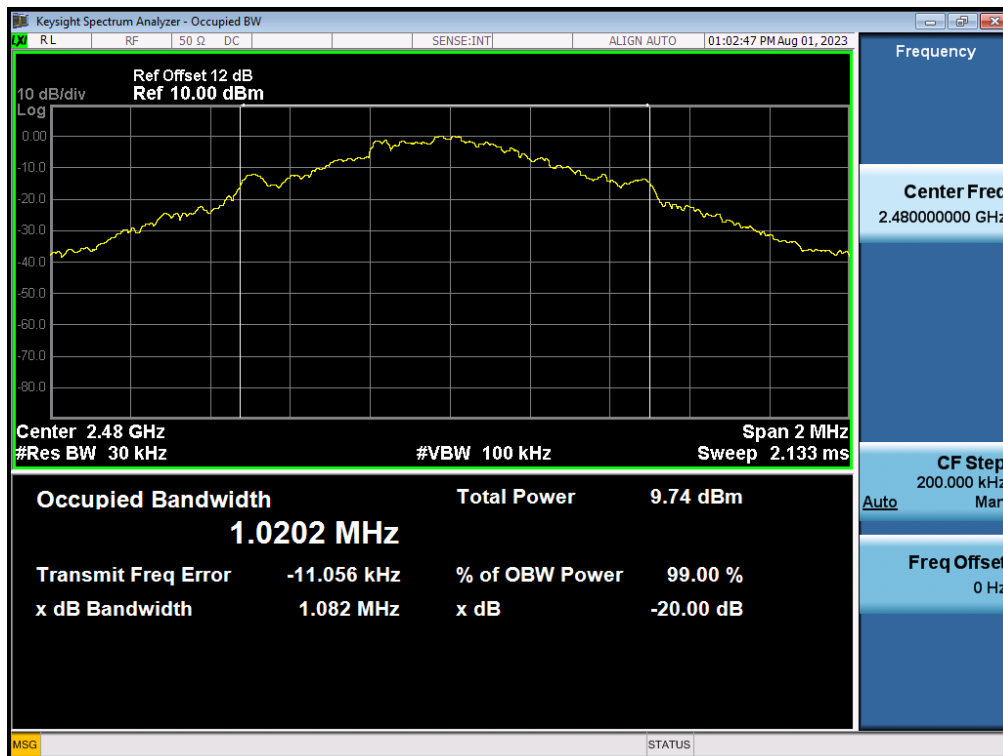
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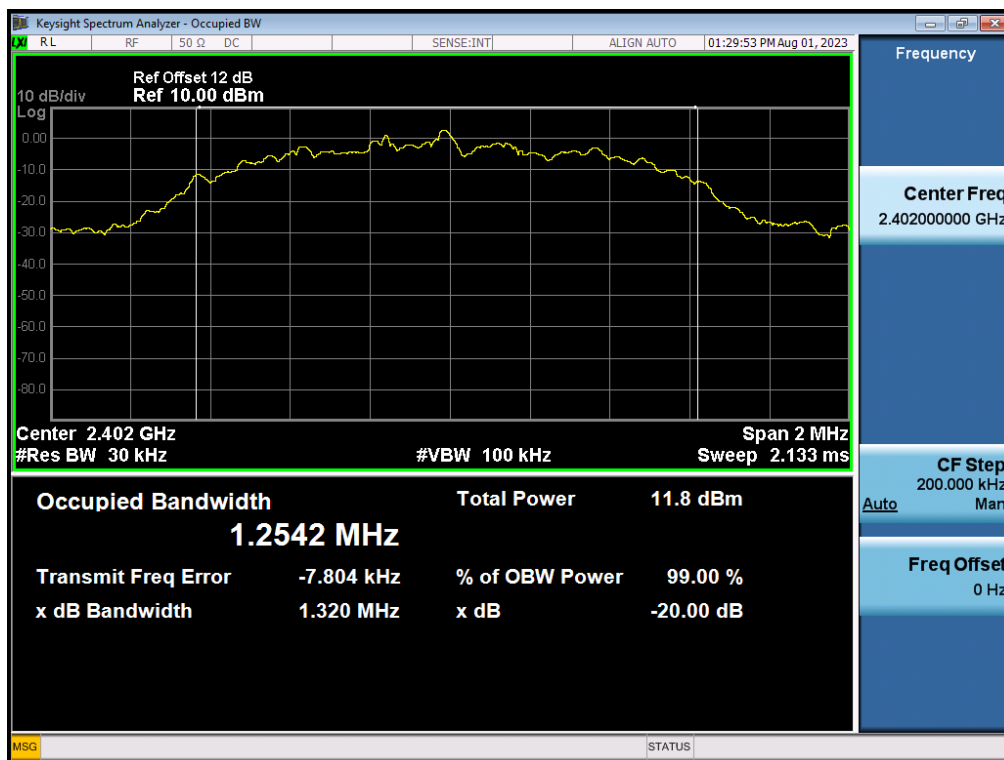


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Temperature:	28 °C	Humidity:	74 %RH
RBW:	30 kHz	Modulation:	8-DPSK
Detector:	Peak	VBW:	100 kHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Channel	Frequency (MHz)	20 dB Down Bandwidth (MHz)	BW > 500 kHz
CH00	2402	1.254	PASS
CH39	2441	1.269	PASS
CH78	2480	1.273	PASS

CH00



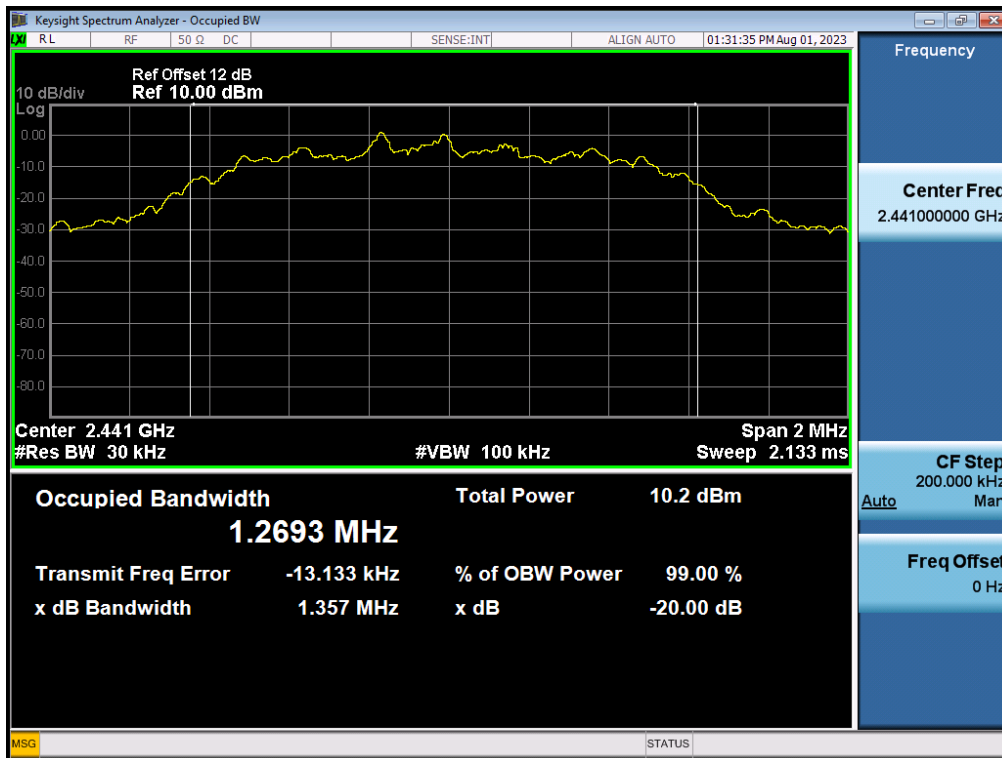


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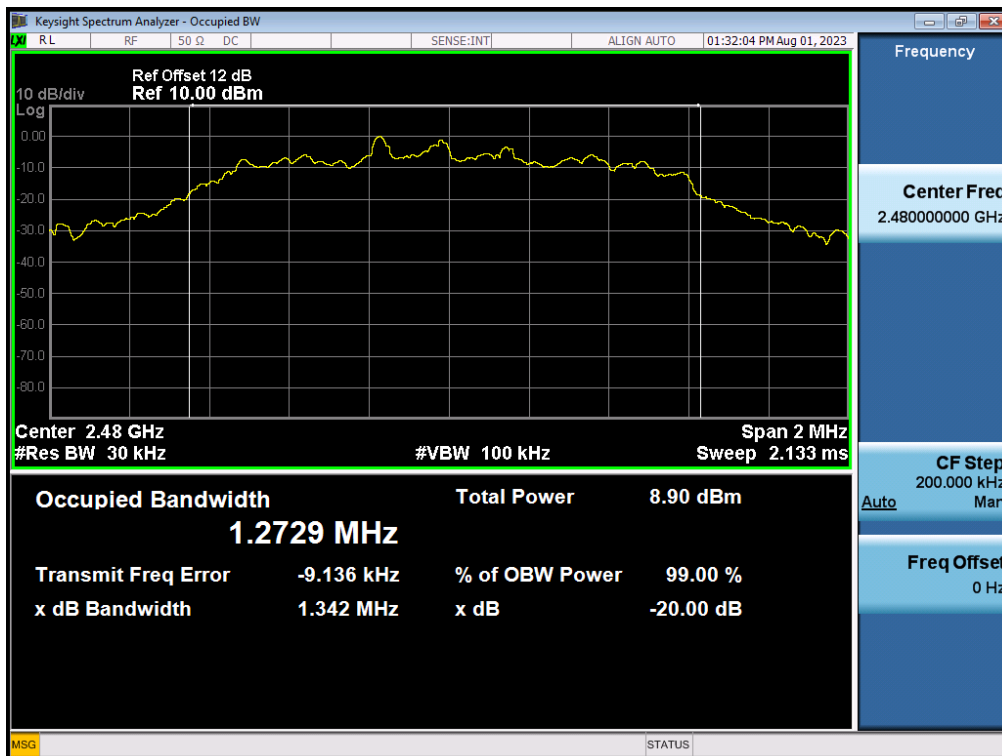
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7. PEAK CONDUCTED OUTPUT POWER TEST

7.1 LIMIT

FCC Part15, Subpart C Section 15.247(a).

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

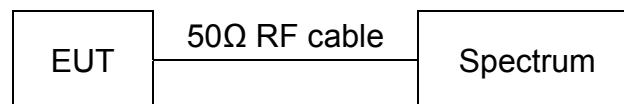
7.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center
EXA Signal Analyzer	10 Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

7.3 TEST SET-UP



7.4 TEST PROCEDURE

The EUT was operating in continuous transmission mode or could control its channel. Printed out the test result from the spectrum by hard copy function.

7.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

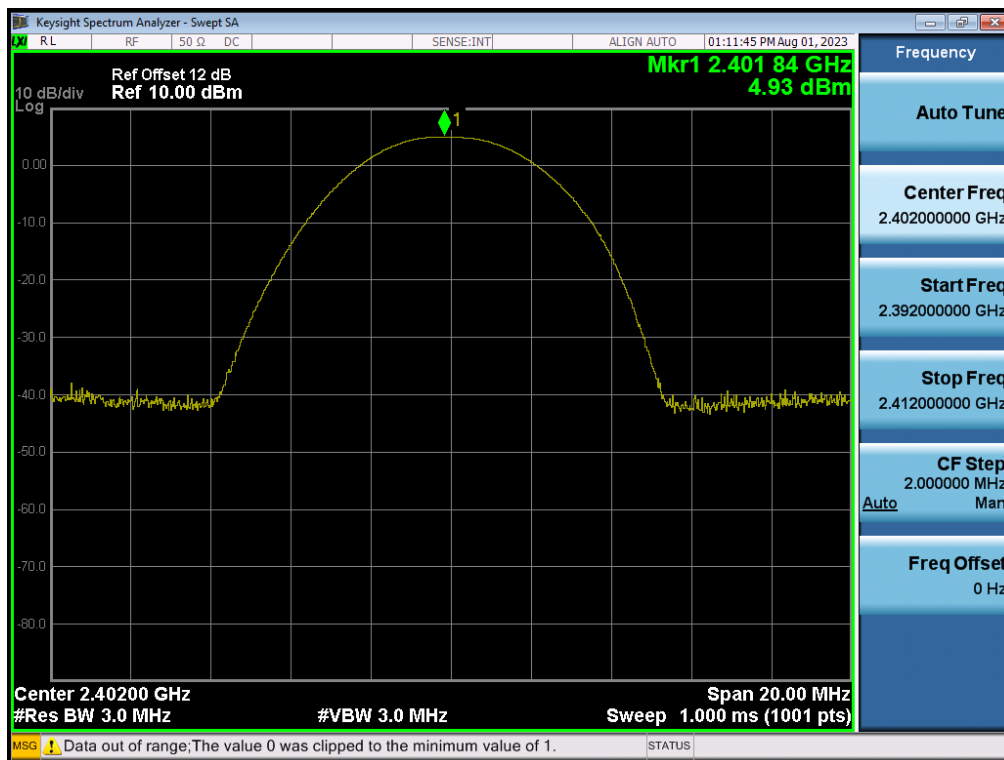
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7.6 TEST RESULT

Temperature:	28 °C	Humidity:	74 %RH
Detector:	Peak	Modulation:	GFSK
RBW:	3 MHz	VBW:	3 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Channel	Frequency (MHz)	Peak Conducted Output Power		Limit (dBm)
		(dBm)	(mW)	
CH00	2402	4.93	3.1117	21
CH39	2441	3.66	2.3227	21
CH78	2480	2.44	1.7539	21

CH00



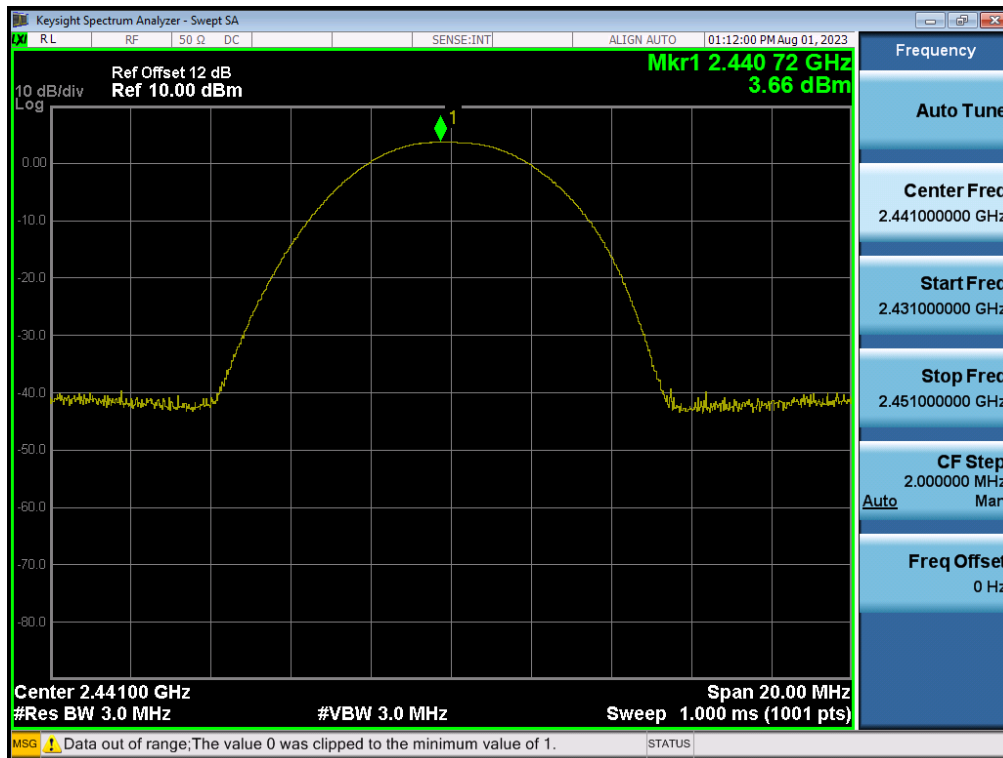


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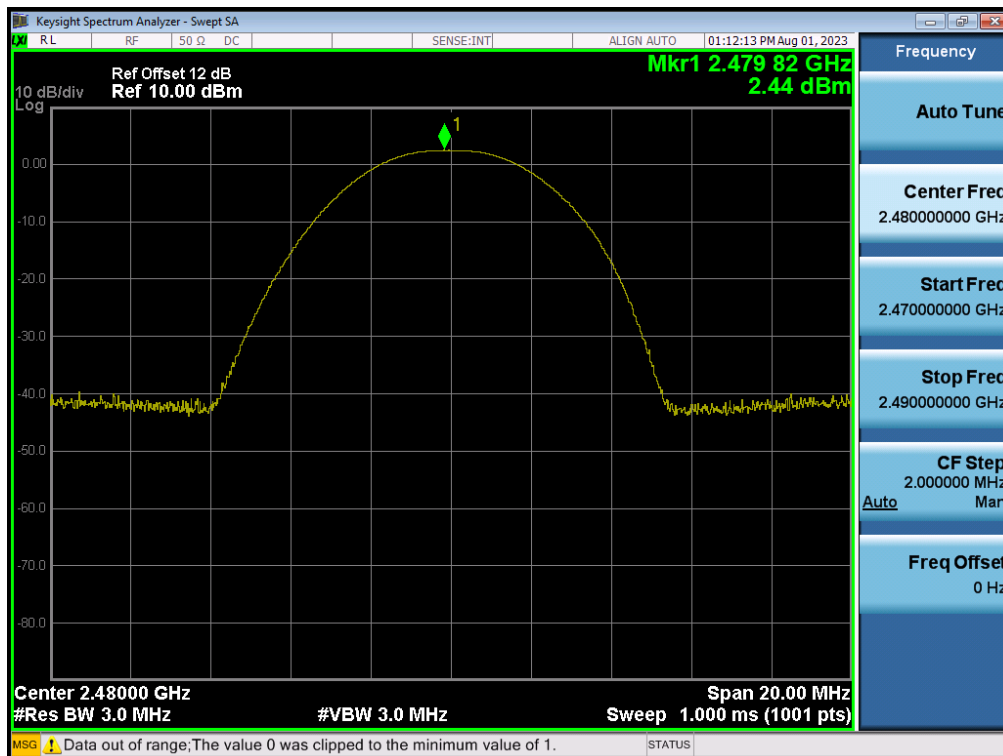
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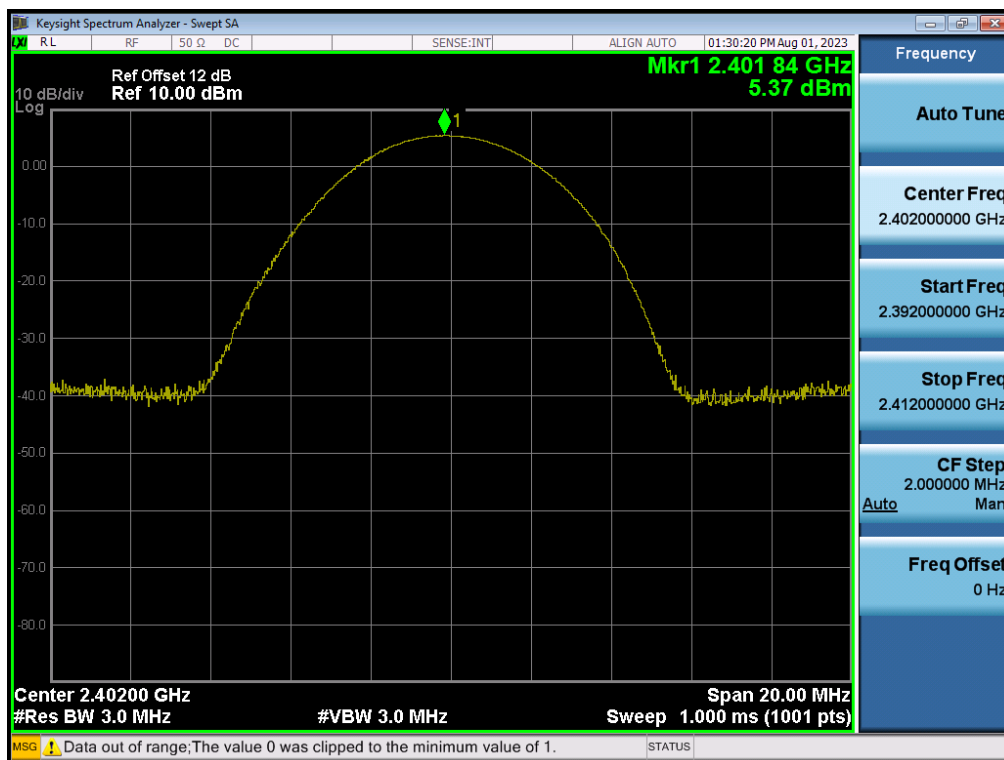


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Temperature:	28 °C	Humidity:	74 %RH
Detector:	Peak	Modulation:	8-DPSK
RBW:	3 MHz	VBW:	3 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Channel	Frequency (MHz)	Peak Conducted Output Power		Limit (dBm)
		(dBm)	(mW)	
CH00	2402	5.37	3.4435	21
CH39	2441	4.32	2.7040	21
CH78	2480	3.42	2.1979	21

CH00



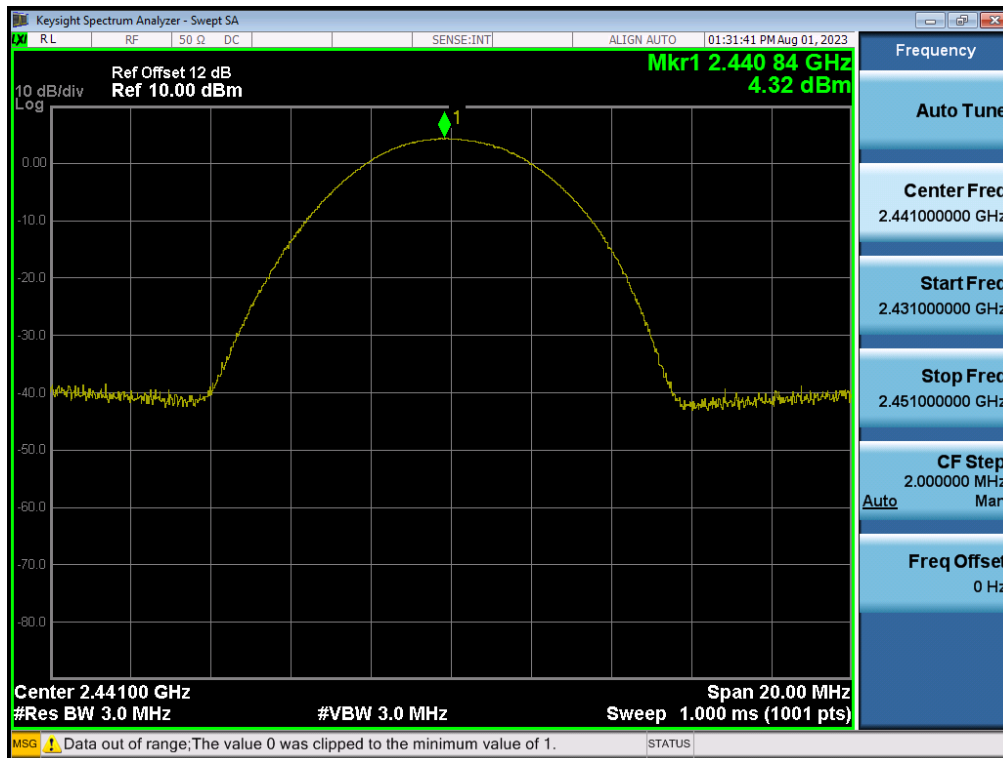


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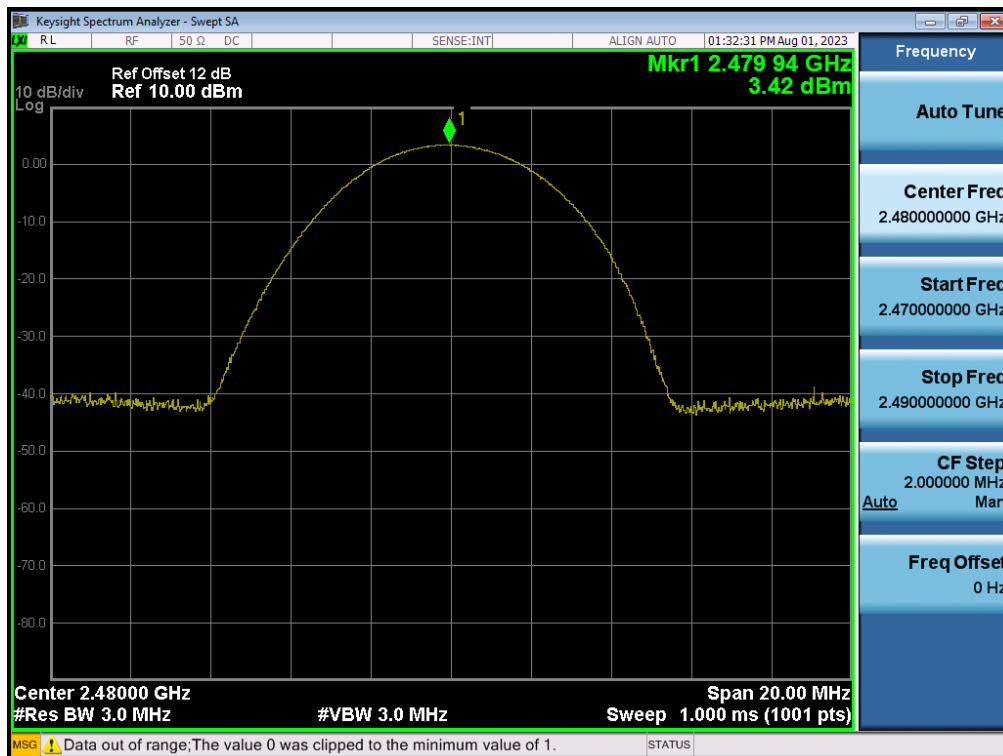
TEST REPORT

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CH39



CH78



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8. BAND EDGE TEST

8.1 LIMIT

FCC Part15, Subpart C Section 15.247(d).

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)).

8.2 TEST EQUIPMENT

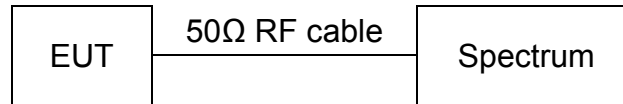
The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center
EXA Signal Analyzer	10 Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC

NOTE : The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

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8.3 TEST SET-UP



8.4 TEST PROCEDURE

The EUT was operating in continuous transmission mode or could control its channel.
 Printed out the test result from the spectrum by hard copy function.

8.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

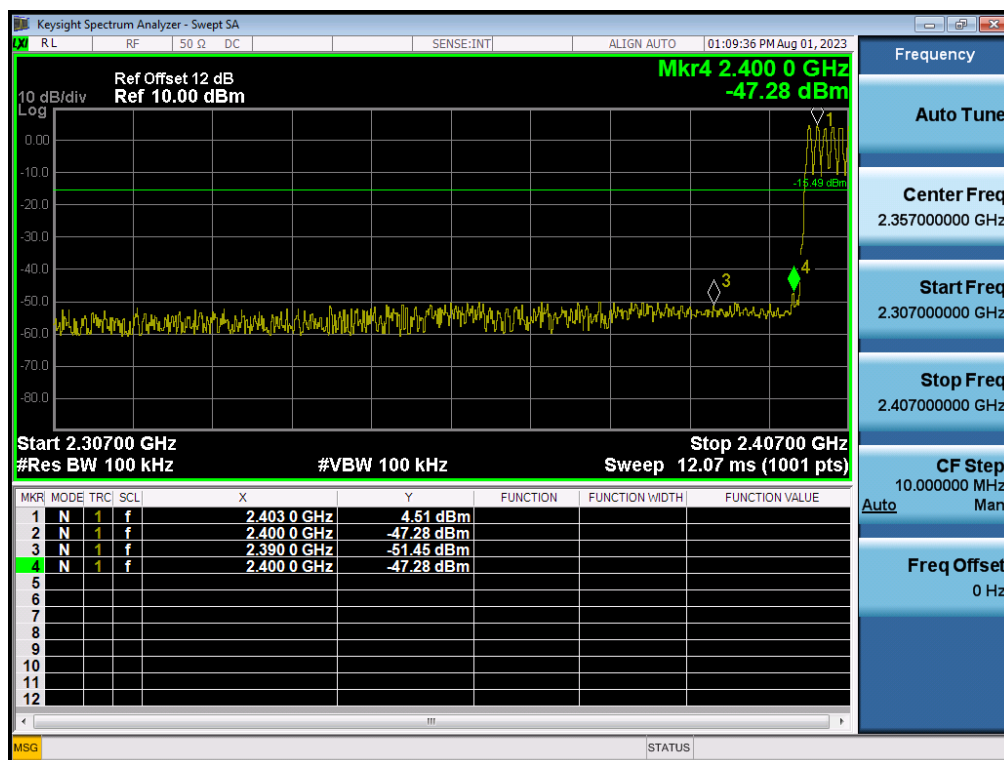
 Spectrum Research & Testing Lab., Inc. No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)	TEST REPORT	Reference No.: A23080102
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8.6 TEST RESULT

Temperature:	<u>28 °C</u>	Humidity:	<u>74 %RH</u>
Detector:	<u>Peak</u>	Test Mode:	<u>Hopping_1Mbps</u>
RBW:	<u>100 kHz</u>	VBW:	<u>100 kHz</u>
Tested By:	<u>Jimmy Tseng</u>	Tested Date:	<u>Aug. 01, 2023</u>

Frequency (MHz)	Peak Power Output (dBm)	Emission Read Value(dBm)	Result of Band Edge (dBc)	Band Edge Limit (dBc)	Resule
2402	4.51	-51.45	55.96	20	PASS
2480	1.92	-54.17	56.09	20	PASS

CH00



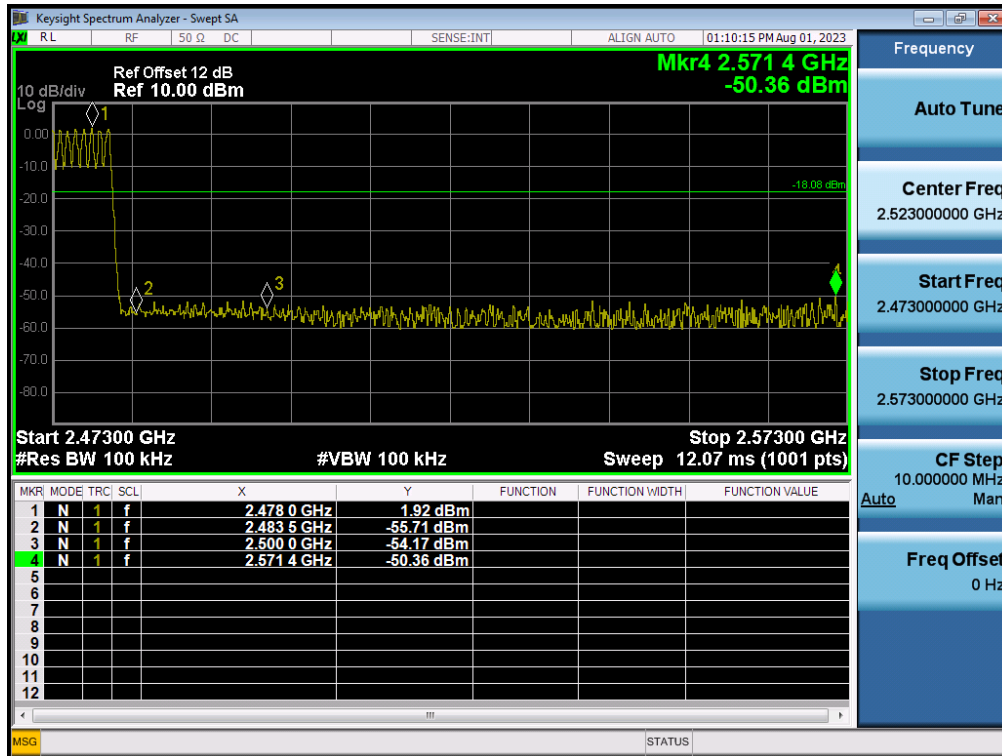


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CH78

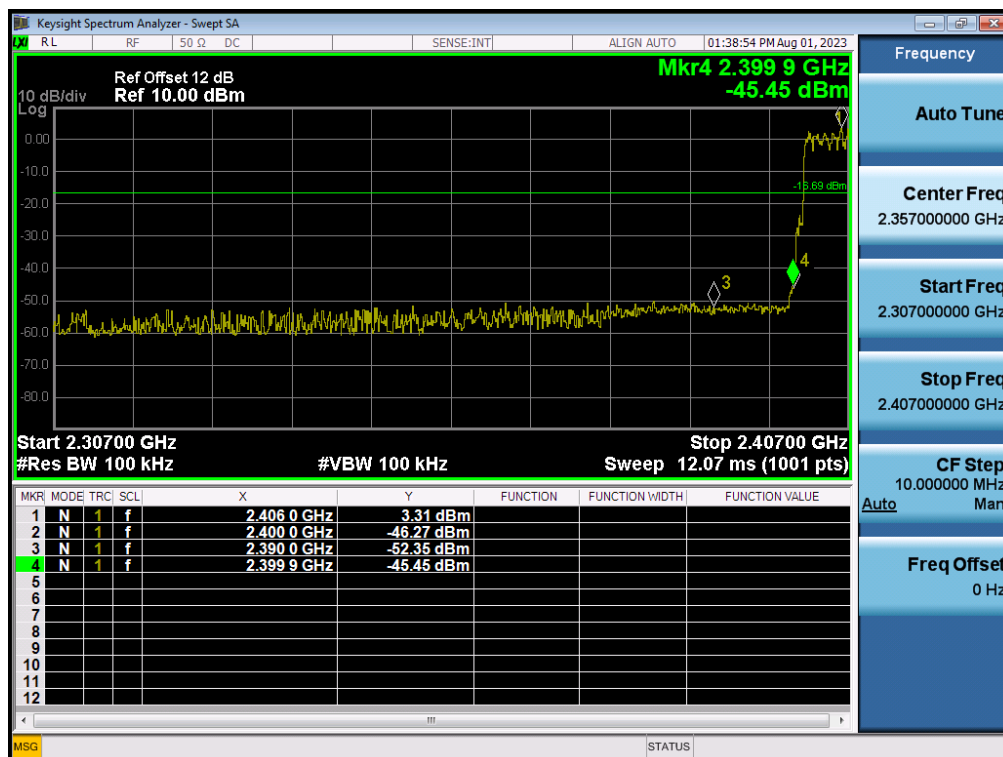


 Spectrum Research & Testing Lab., Inc. No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)	TEST REPORT	Reference No.: A23080102
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Temperature:	<u>28 °C</u>	Humidity:	<u>74 %RH</u>
Detector:	<u>Peak</u>	Test Mode:	<u>Hopping_3Mbps</u>
RBW:	<u>100 kHz</u>	VBW:	<u>100 kHz</u>
Tested By:	<u>Jimmy Tseng</u>	Tested Date:	<u>Aug. 01, 2023</u>

Frequency (MHz)	Peak Power Output (dBm)	Emission Read Value(dBm)	Result of Band Edge (dBc)	Band Edge Limit (dBc)	Resule
2402	3.31	-52.35	55.66	20	PASS
2480	1.37	-55.93	57.30	20	PASS

CH00



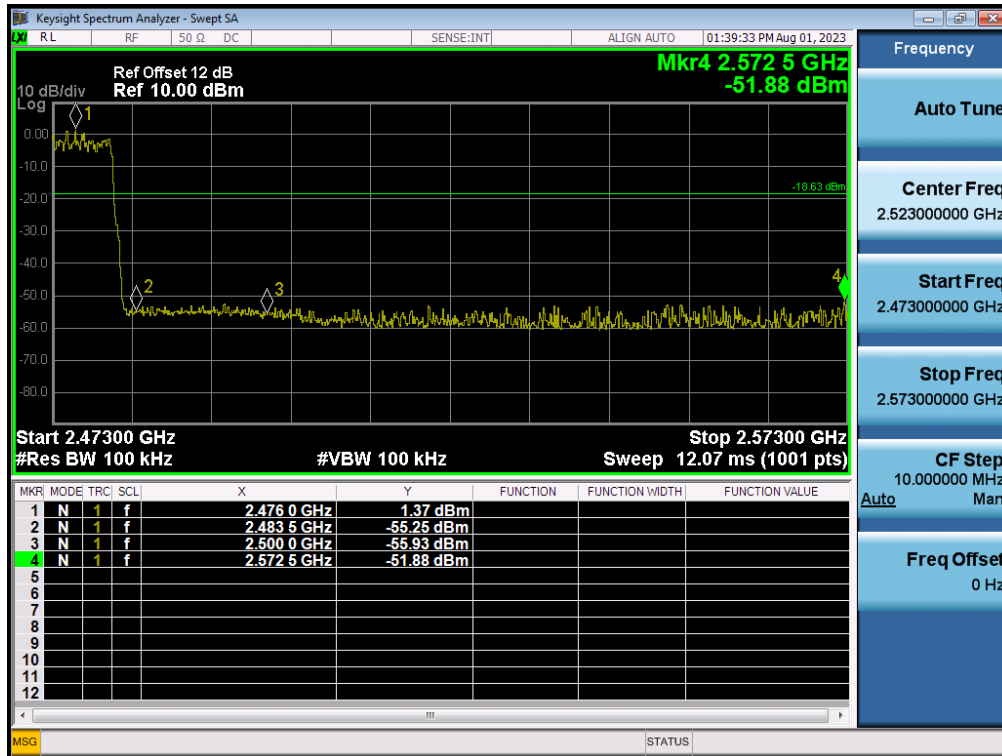


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9. TIME OF OCCUPANCY (Dwell Time)

9.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(iii).

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.

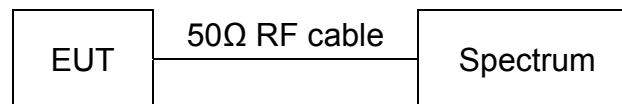
9.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center
EXA Signal Analyzer	10 Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

9.3 TEST SET-UP



9.4 TEST PROCEDURE

The EUT was operating in transmitter mode and could be controlled its channel.
 Printed out the test result from the spectrum by hard copy function.

9.5 EUT OPERATING CONDITION

1. Set the EUT under continuous transmission condition.
2. The EUT was set to the highest available power level.

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9.6 TEST RESULT

Temperature:	28 °C	Humidity:	74 %RH
Spectrum Detector:	PK.	Modulation:	GFSK
RBW:	1 MHz	VBW:	1 MHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Channel	Frequency (MHz)	Pulse Time (ms)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
CH00_DH1	2402	0.375	120.00	400
CH00_DH3	2402	1.630	260.80	400
CH00_DH5	2402	2.880	307.20	400
CH39_DH1	2441	0.375	120.00	400
CH39_DH3	2441	1.640	262.40	400
CH39_DH5	2441	2.880	307.20	400
CH78_DH1	2480	0.375	120.00	400
CH78_DH3	2480	1.640	262.40	400
CH78_DH5	2480	2.880	307.20	400

Note: Dwell Time = 0.4(ms) x 79 = 31.6(s) hopping times of total = 1600/s

CH00_DH1 = 0.375(ms) x (1600 / 2 / 79) x 31.6 = 120.00 (ms)

CH00_DH3 = 1.630(ms) x (1600 / 4 / 79) x 31.6 = 260.80 (ms)

CH00_DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.20 (ms)

CH39_DH1 = 0.375(ms) x (1600 / 2 / 79) x 31.6 = 120.00 (ms)

CH39_DH3 = 1.640(ms) x (1600 / 4 / 79) x 31.6 = 262.40 (ms)

CH39_DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.20 (ms)

CH78_DH1 = 0.375(ms) x (1600 / 2 / 79) x 31.6 = 120.00 (ms)

CH78_DH3 = 1.640(ms) x (1600 / 4 / 79) x 31.6 = 262.40 (ms)

CH78_DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.20 (ms)

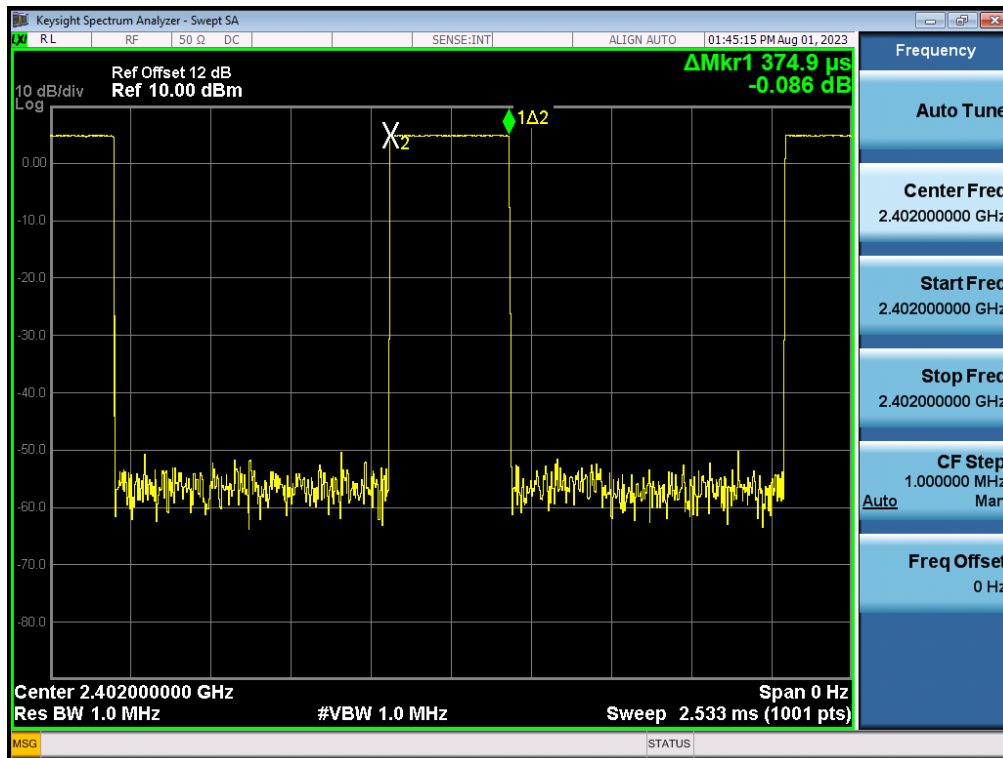


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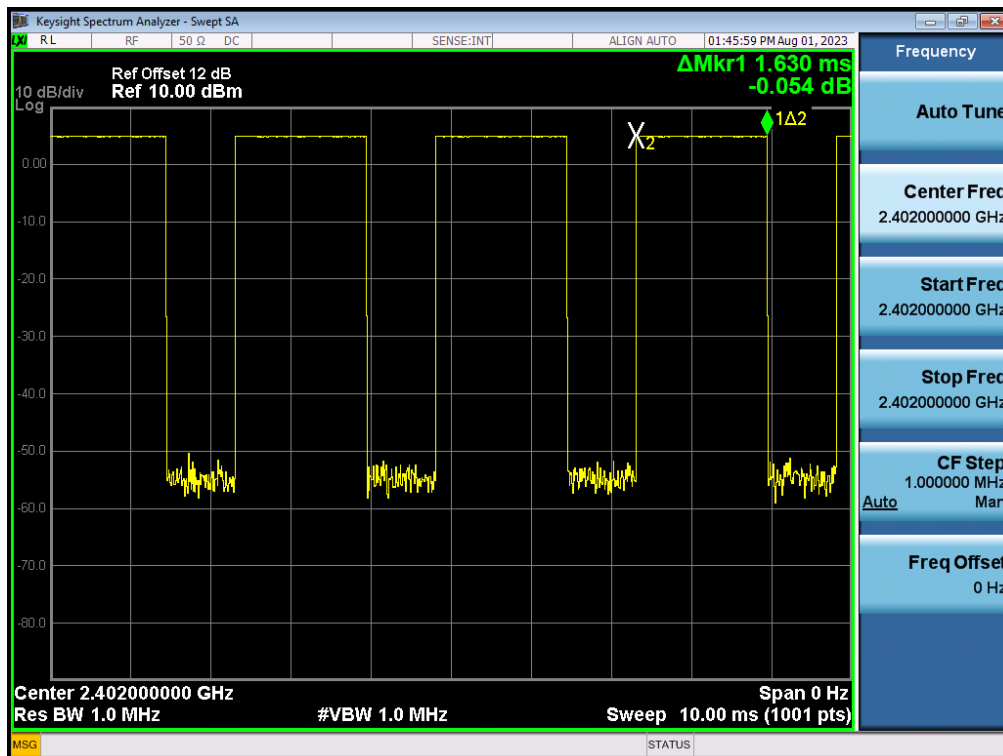
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CH00_DH1 :



CH00_DH3 :



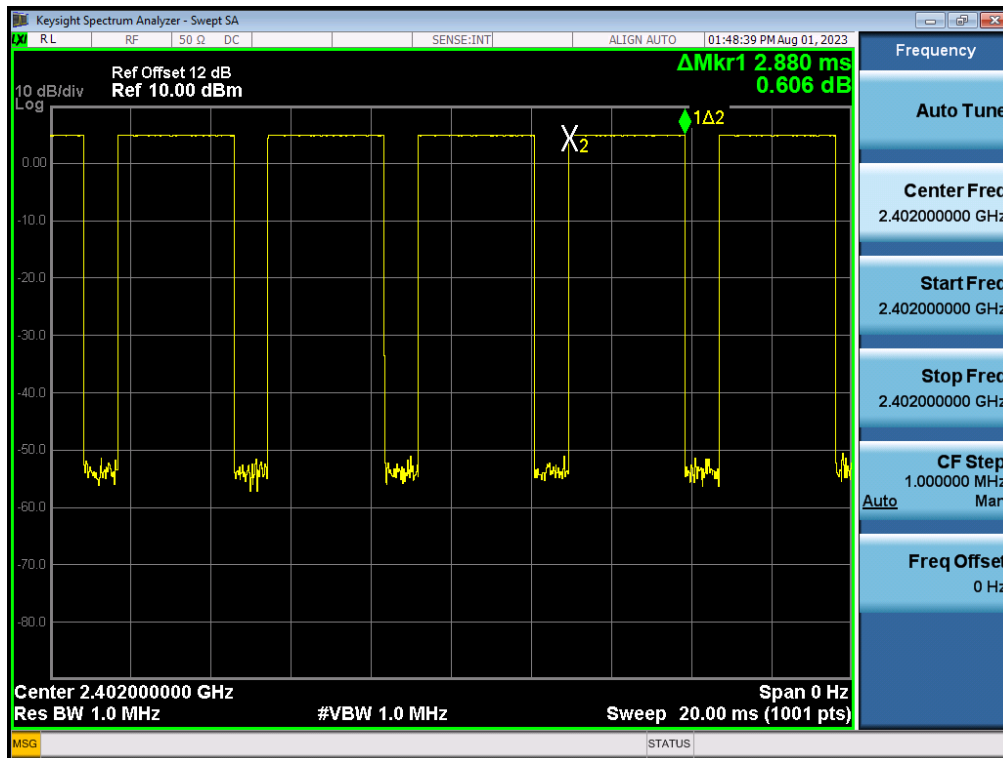


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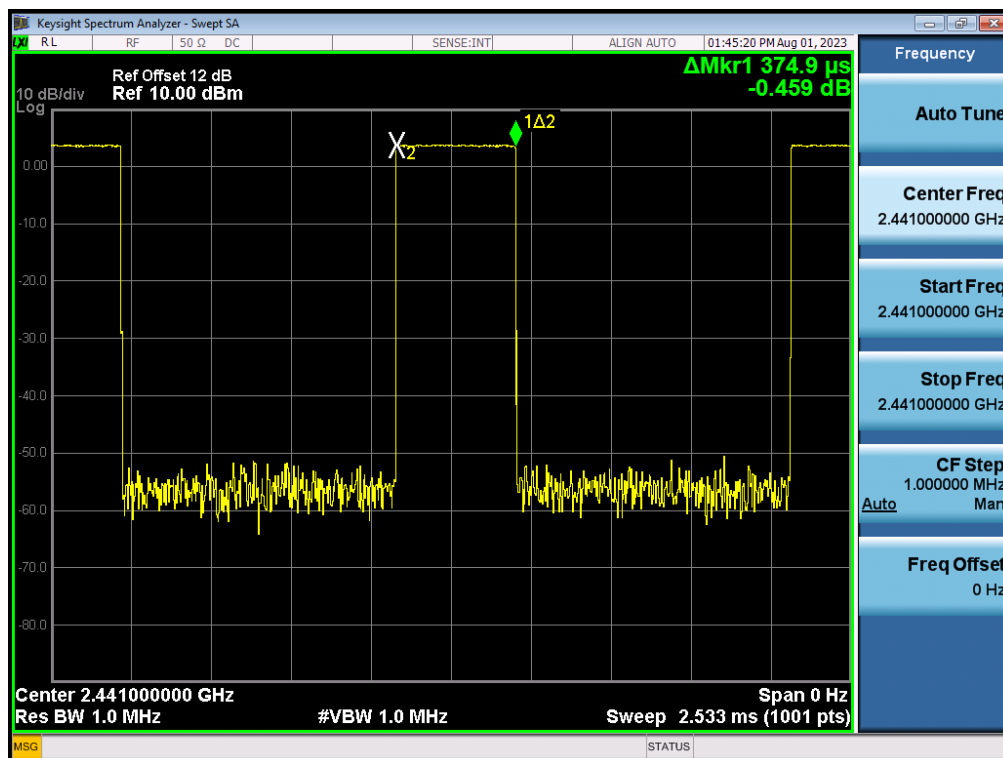
TEST REPORT

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CH00_DH5 :



CH39_DH1 :



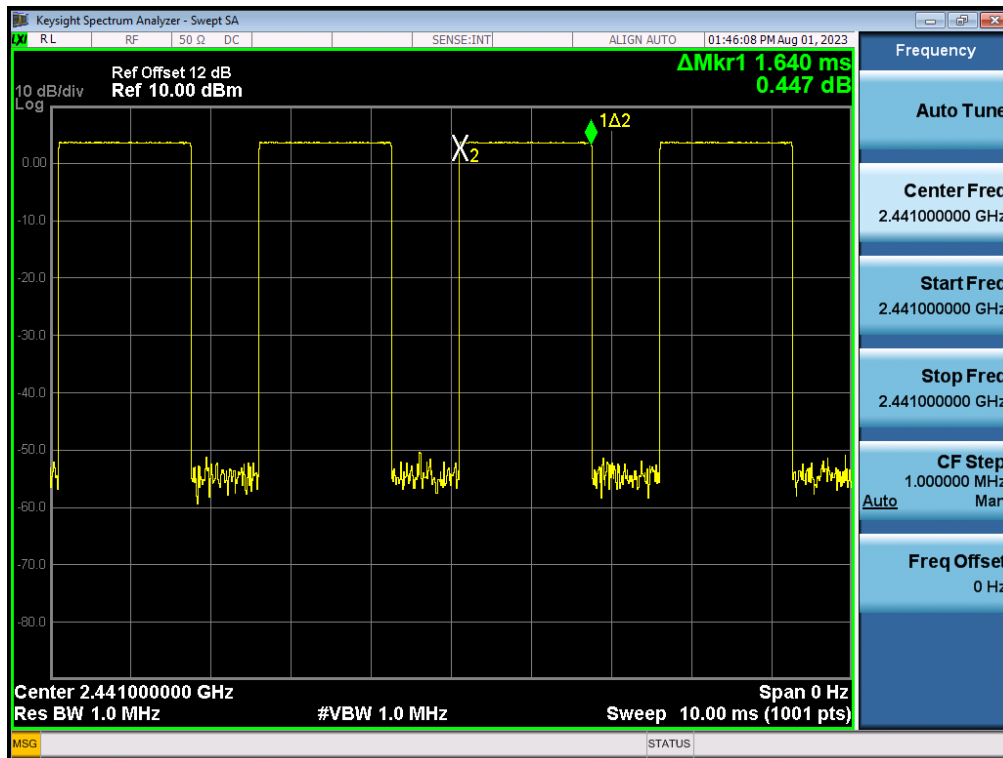


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No.167, Ln. 780, Shan-Tong Rd., Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

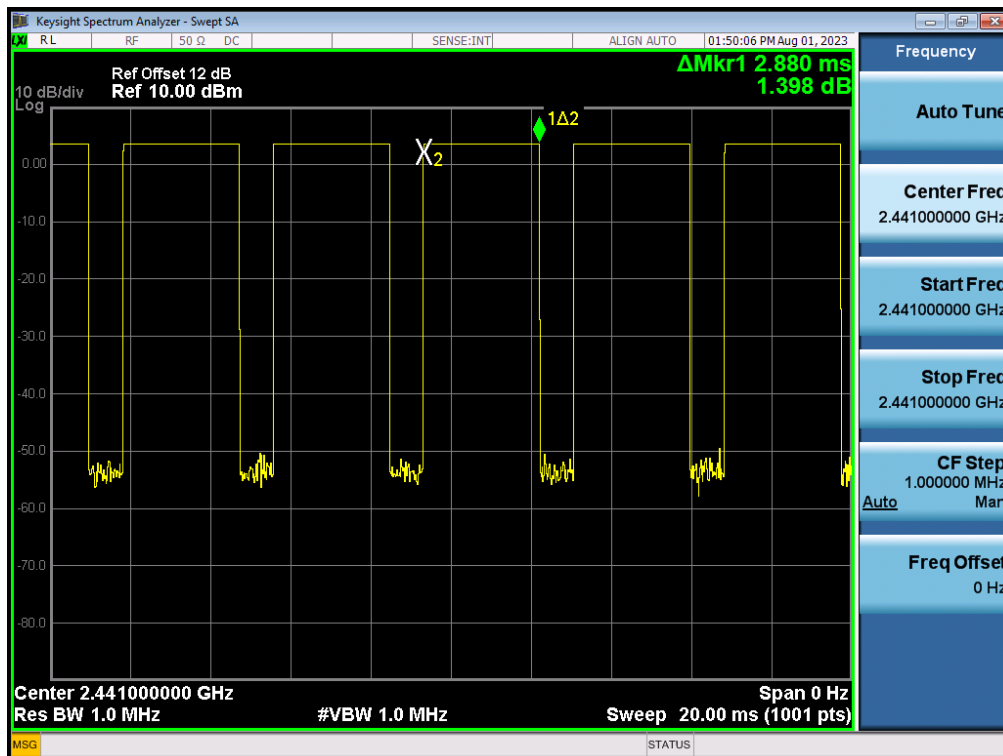
TEST REPORT

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CH39_DH3 :



CH39_DH5 :



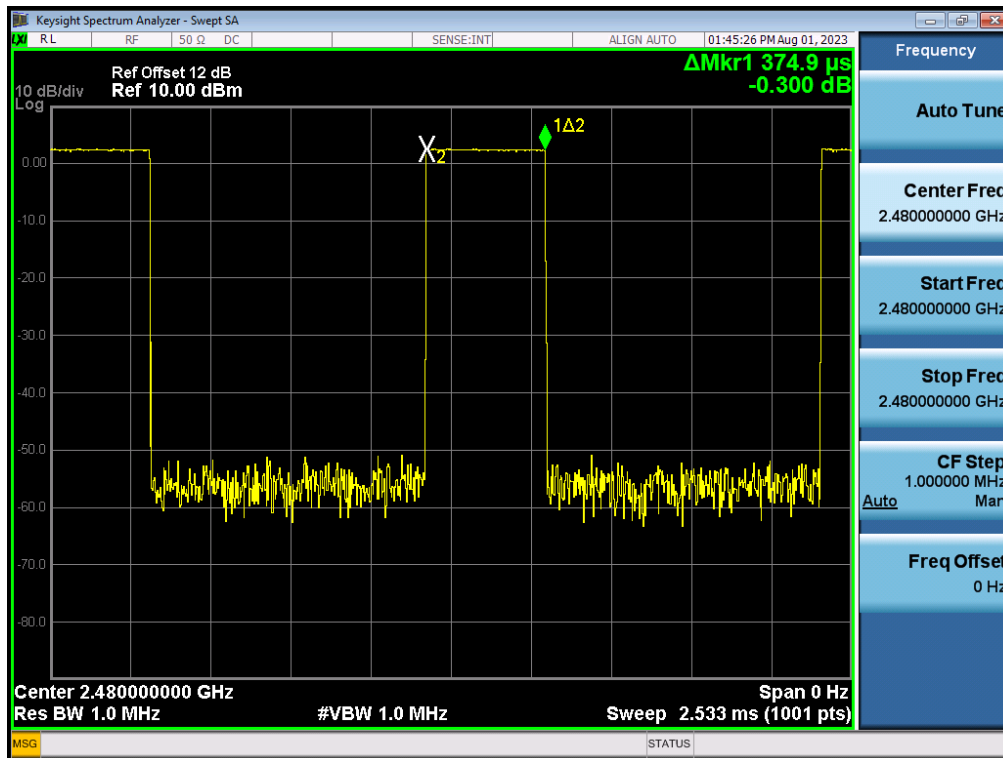


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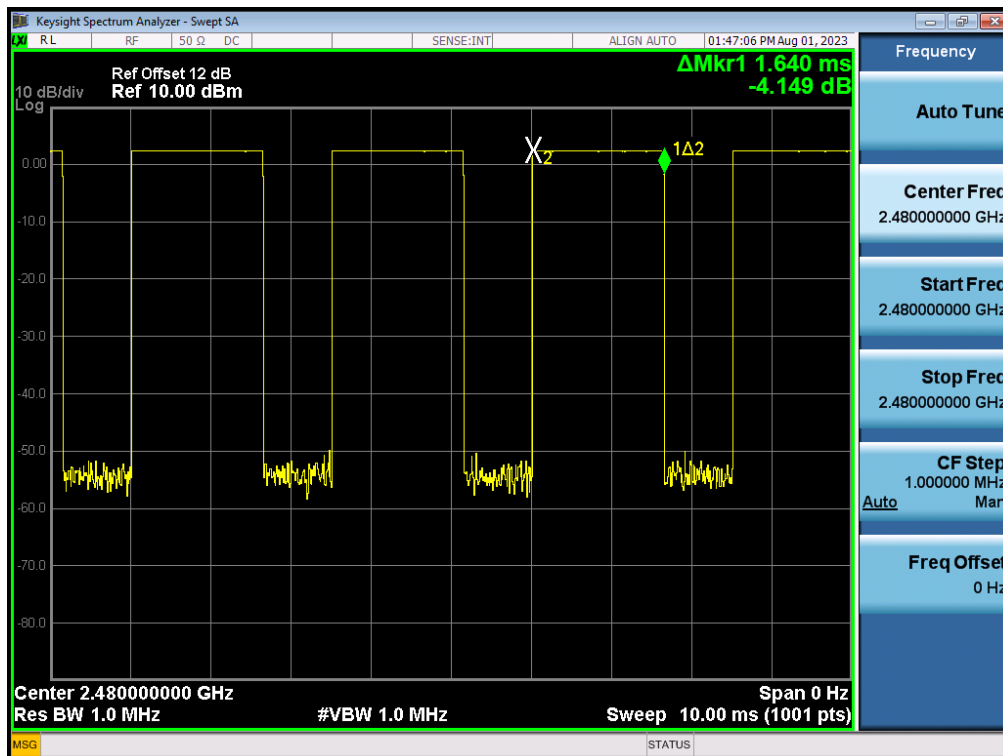
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CH78_DH1 :



CH78_DH3 :





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Keysight Spectrum Analyzer - Swept SA

RL RF 50 Ω DC SENSE:INT ALIGN AUTO 01:50:12 PM Aug 01, 2023

Ref Offset 12 dB
Ref 10.00 dBm

10 dB/div
Log

Δ Mkr1 2.880 ms
-0.016 dB

Center 2.480000000 GHz
Res BW 1.0 MHz
Span 0 Hz
Sweep 20.00 ms (1001 pts)

MSG STATUS

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Temperature:	<u>28 °C</u>	Humidity:	<u>74 %RH</u>
Spectrum Detector:	<u>PK.</u>	Modulation:	<u>8-DPSK</u>
RBW:	<u>1 MHz</u>	VBW:	<u>1 MHz</u>
Tested By:	<u>Jimmy Tseng</u>	Tested Date:	<u>Aug. 01, 2023</u>

Channel	Frequency (MHz)	Pulse Time (ms)	Time of Occupancy (Dwell Time) (ms)	Average Time of Occupancy Limit (ms)
CH00_3DH1	2402	0.375	120.00	400
CH00_3DH3	2402	1.640	262.40	400
CH00_3DH5	2402	2.880	307.20	400
CH39_3DH1	2441	0.375	120.00	400
CH39_3DH3	2441	1.630	260.80	400
CH39_3DH5	2441	2.880	307.20	400
CH78_3DH1	2480	0.375	120.00	400
CH78_3DH3	2480	1.640	262.40	400
CH78_3DH5	2480	2.880	307.20	400

Note: Dwell Time = 0.4(ms) x 79 = 31.6(s) hopping times of total = 1600/s

CH00_3DH1 = 0.375(ms) x (1600 / 2 / 79) x 31.6 = 120.00(ms)
 CH00_3DH3 = 1.640(ms) x (1600 / 4 / 79) x 31.6 = 262.40(ms)
 CH00_3DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.20(ms)

CH39_3DH1 = 0.375(ms) x (1600 / 2 / 79) x 31.6 = 120.00(ms)
 CH39_3DH3 = 1.630(ms) x (1600 / 4 / 79) x 31.6 = 260.80(ms)
 CH39_3DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.20(ms)

CH78_3DH1 = 0.375(ms) x (1600 / 2 / 79) x 31.6 = 120.00(ms)
 CH78_3DH3 = 1.640(ms) x (1600 / 4 / 79) x 31.6 = 262.40(ms)
 CH78_3DH5 = 2.880(ms) x (1600 / 6 / 79) x 31.6 = 307.20(ms)

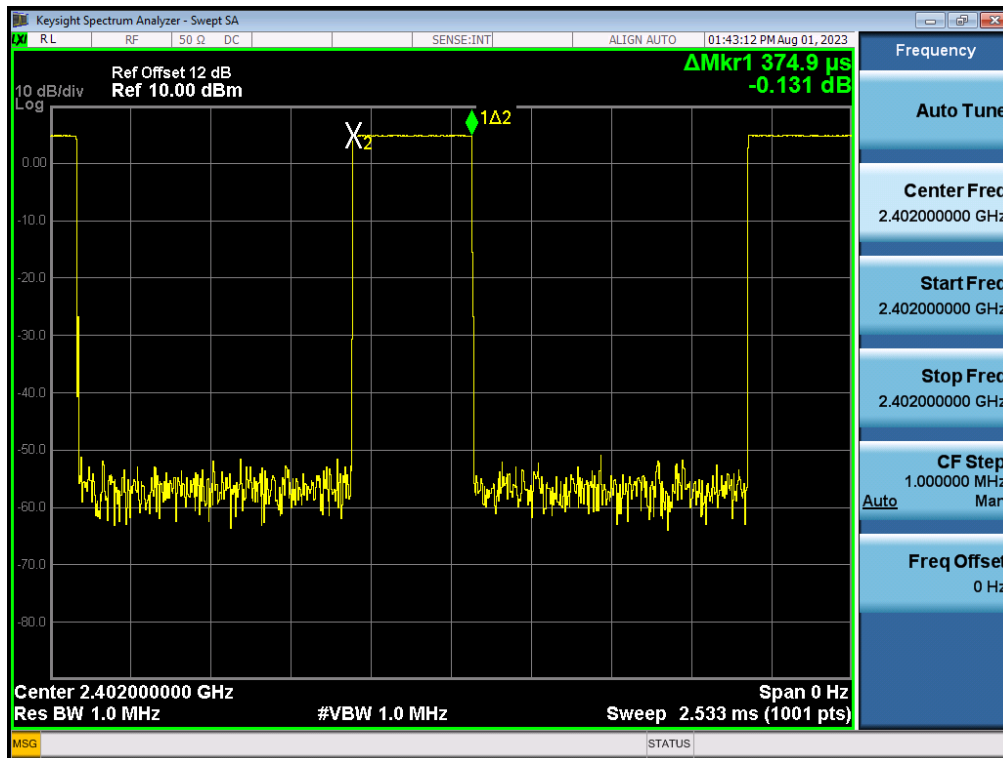


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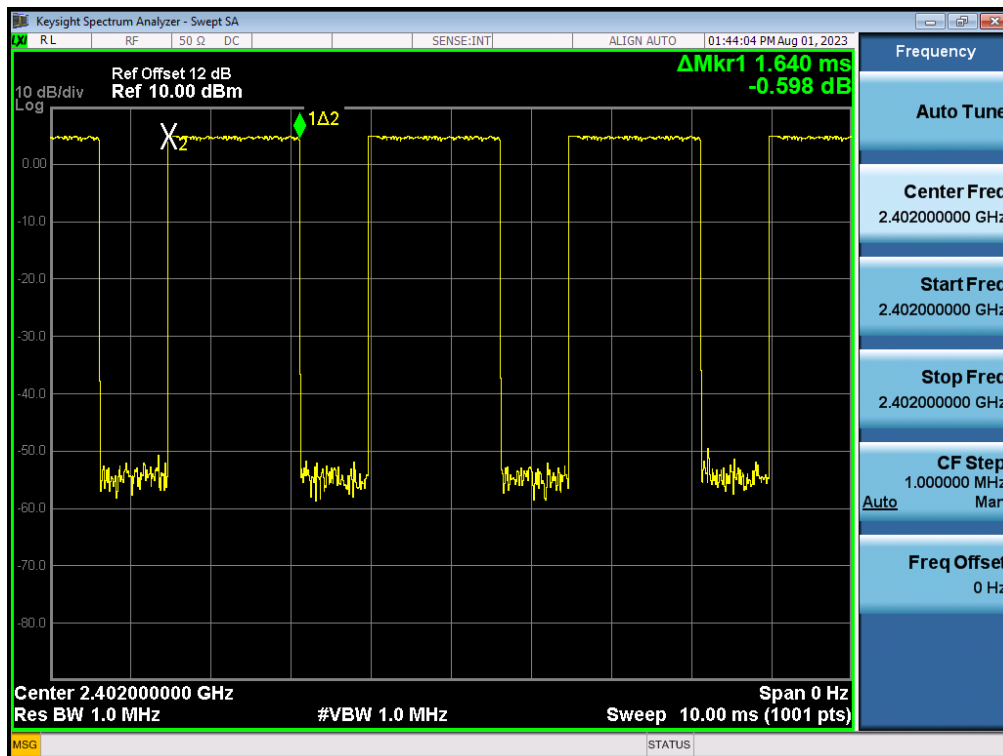
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CH00_3DH1 :



CH00_3DH3 :



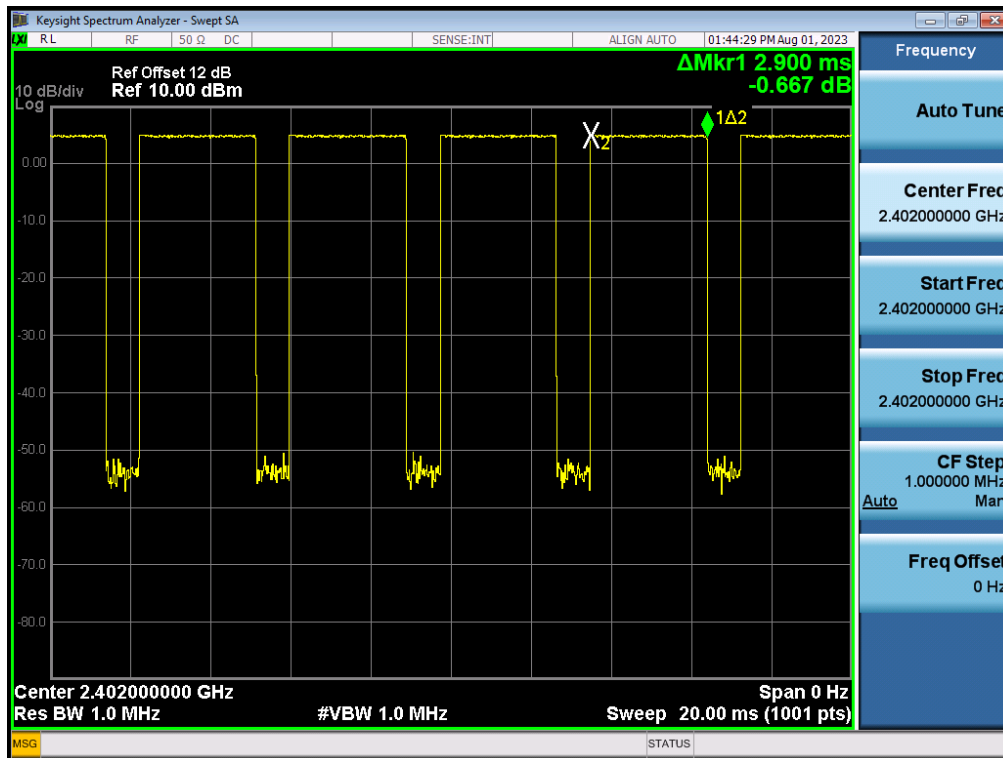


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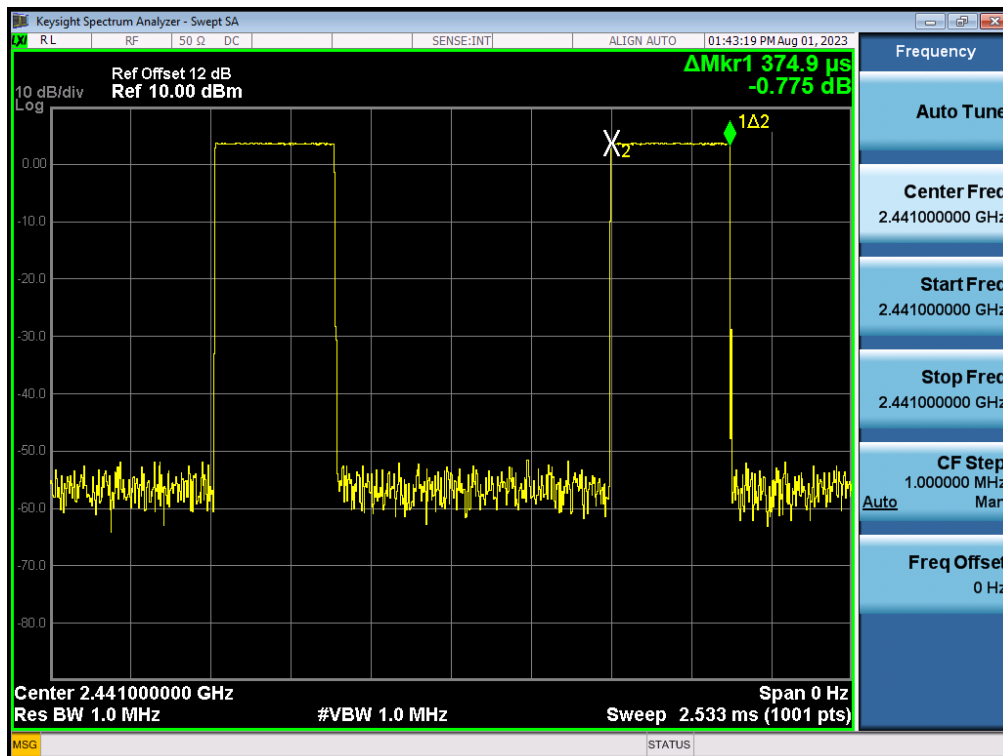
TEST REPORT

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CH00_3DH5 :



CH39_3DH1 :



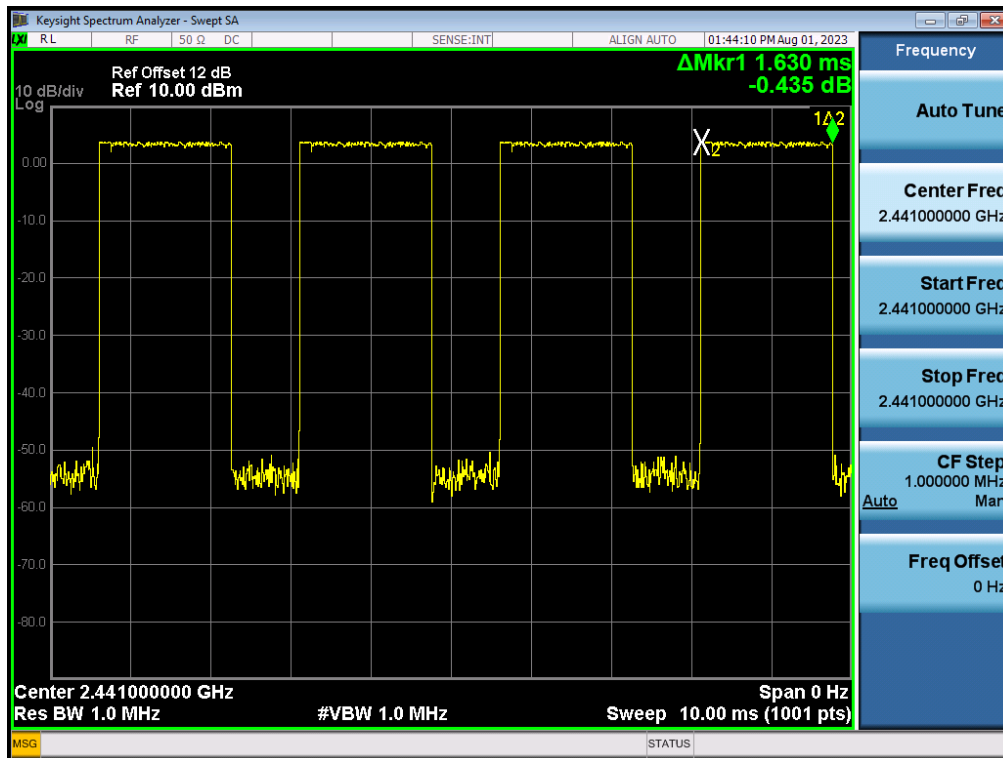


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No.167,Ln. 780, Shan-Tong Rd.,Ling 8, Shan-Tong Li, Chung-Li Dist., Taoyuan City 320, Taiwan (R.O.C.)

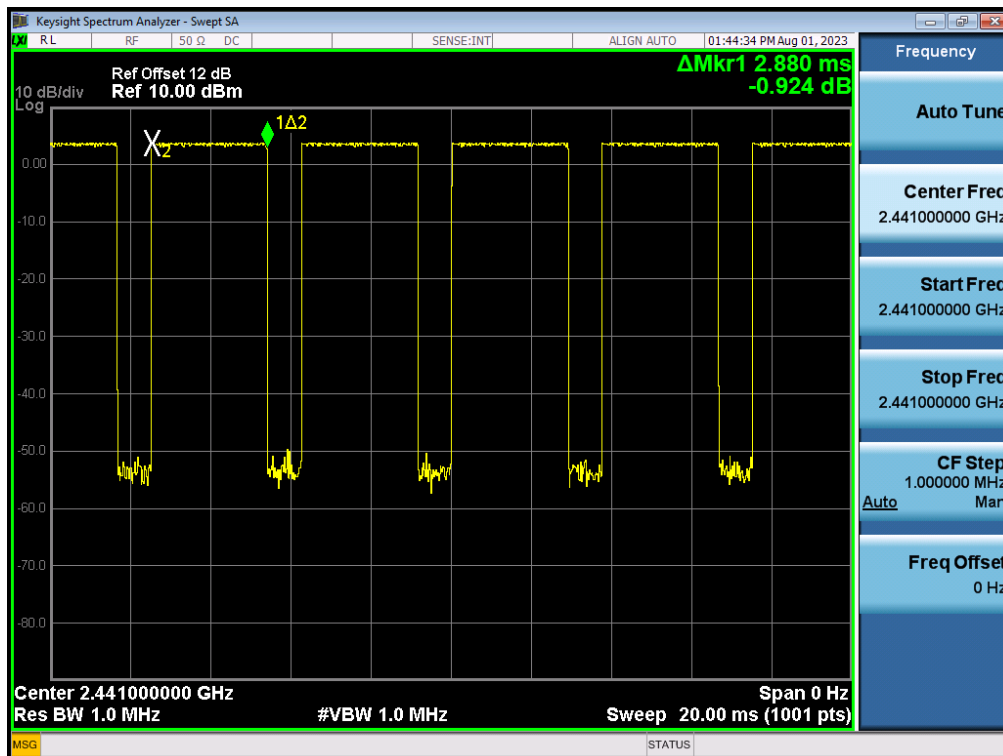
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CH39_3DH3 :



CH39_3DH5 :



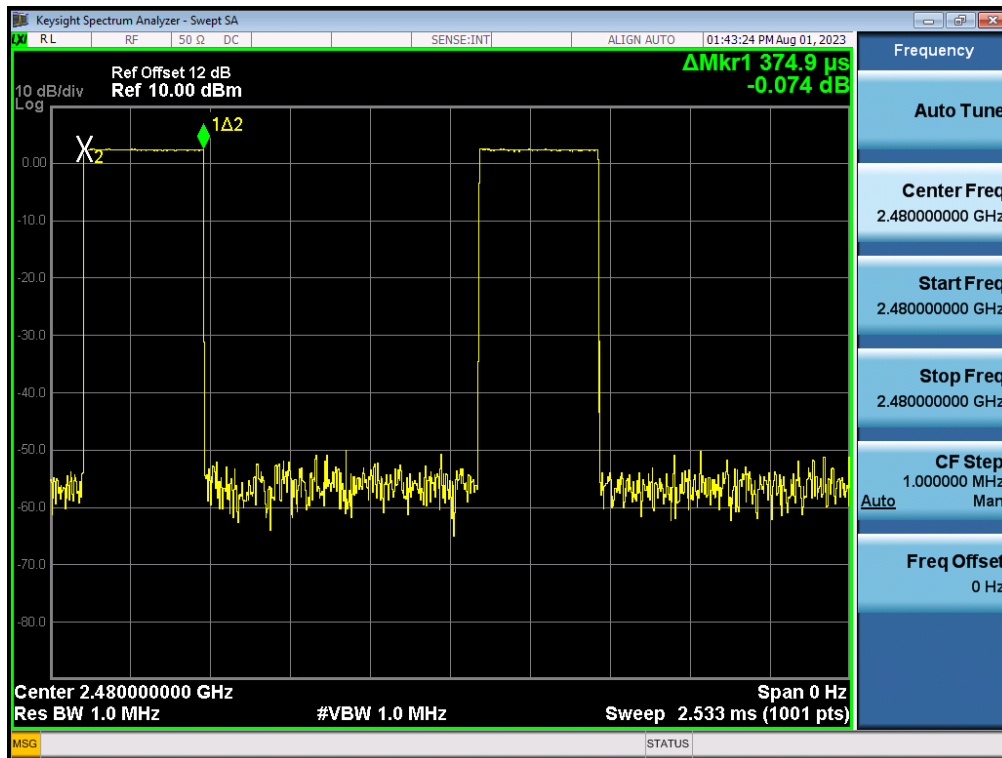


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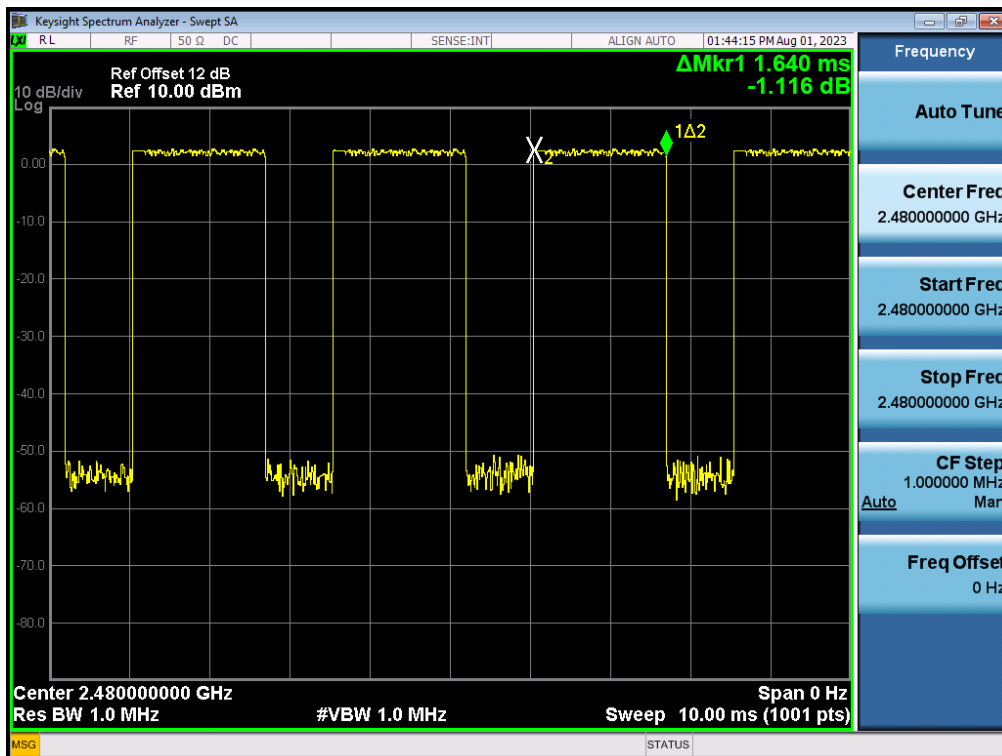
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CH78_3DH1 :



CH78_3DH3 :



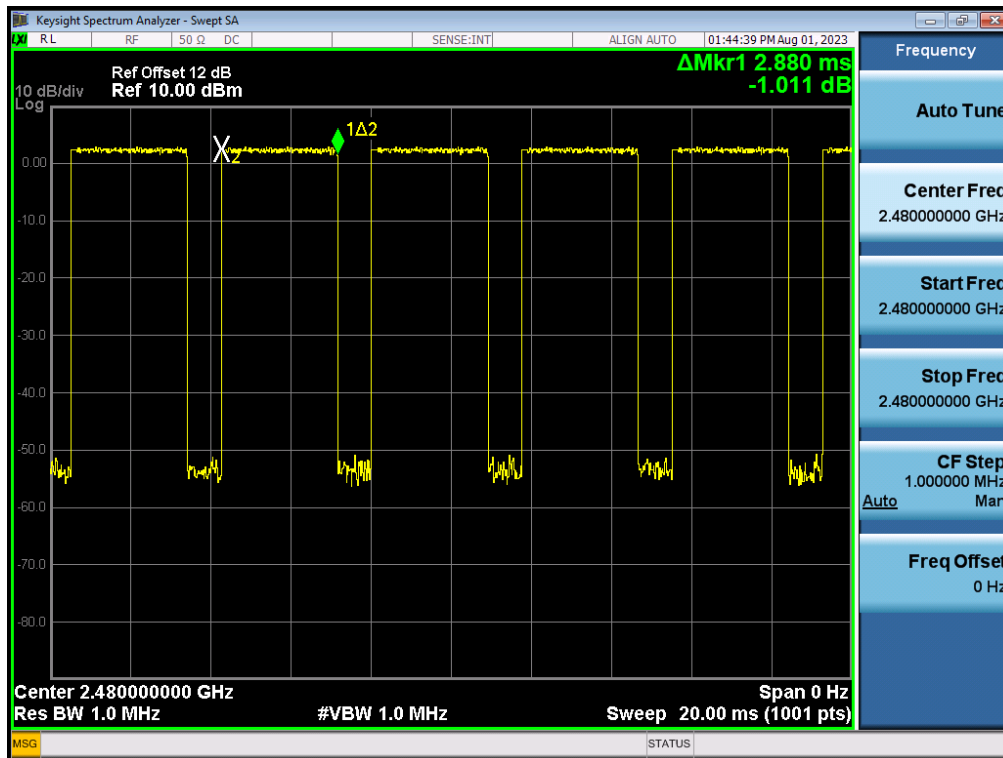


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CH78_3DH5 :



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10. QUANTITY OF HOPPING CHANNEL TEST

10.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(b).

Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

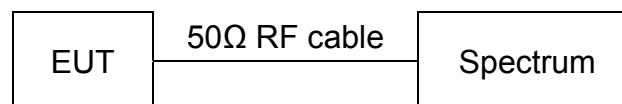
10.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center
EXA Signal Analyzer	10 Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

10.3 TEST SET-UP



10.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.

Printed out the test result from the spectrum by hard copy function.

10.5 EUT OPERATING CONDITION

1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.



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TEST REPORT

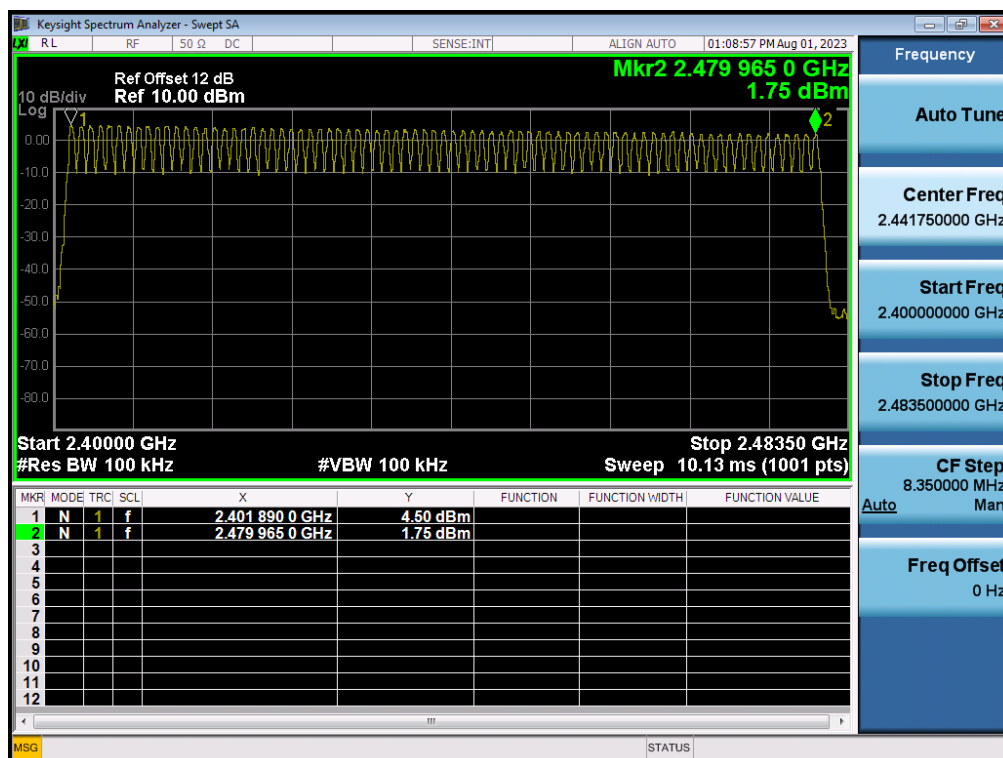
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10.6 TEST RESULT

Temperature:	28 °C	Humidity:	74 %RH
Spectrum Detector:	PK.	Modulation:	GFSK
RBW:	100 kHz	VBW:	100 kHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Hopping Channel Frequency Range (MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402 ~ 2480	79	75

CH00 ~ CH78 :





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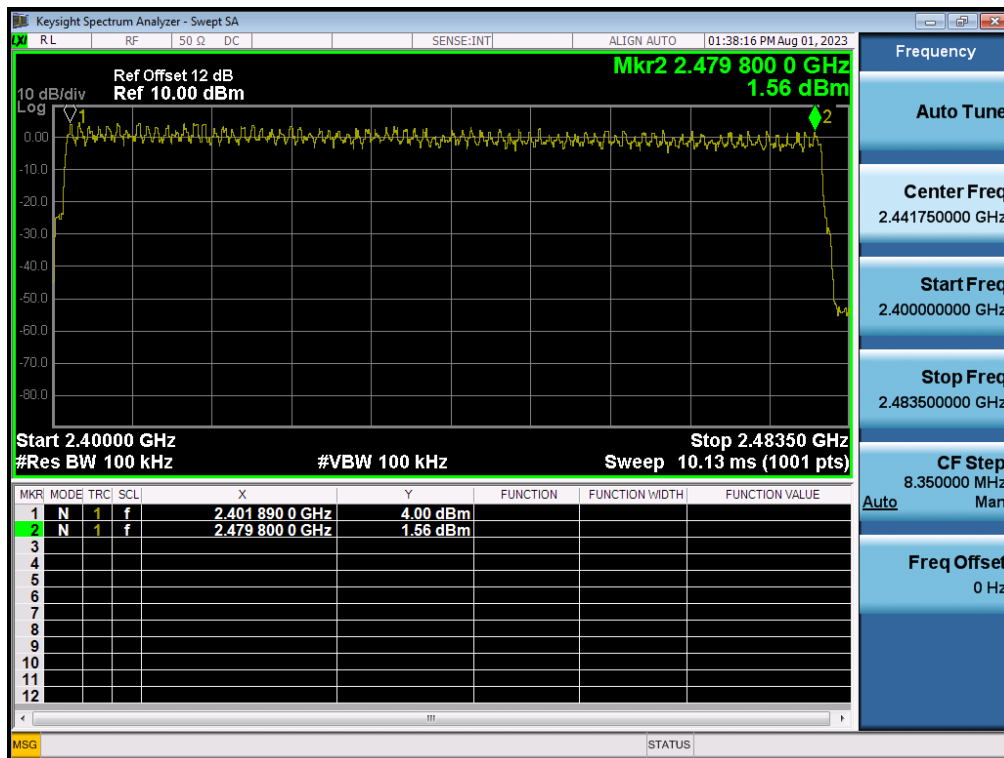
TEST REPORT

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Temperature:	28 °C	Humidity:	74 %RH
Spectrum Detector:	PK.	Modulation:	8-DPSK
RBW:	100 kHz	VBW:	100 kHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Hopping Channel Frequency Range (MHz)	Quantity of Hopping Channel Read Value	Quantity of Hopping Channel Limit
2402 ~ 2480	79	75

CH00 ~ CH78 :



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11. CHANNEL SEPARATION TEST

11.1 LIMIT

FCC Part15, Subpart C Section 15.247(a)(1).

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel

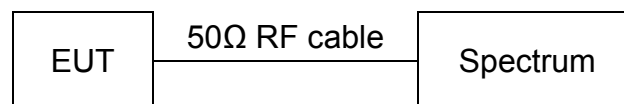
11.2 TEST EQUIPMENT

The following test equipment was used during the test :

Equipment/ Facilities	Specifications	Manufacturer	Model #/ Serial #	Due Date of Cal. & Cal. Center
EXA Signal Analyzer	10 Hz ~ 44 GHz	KEYSIGHT	N9010A / MY56480554	AUG. 24, 2023 ETC

NOTE: The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

11.3 TEST SET-UP



11.4 TEST PROCEDURE

The EUT was operating in hopping mode or could control its channel.

Printed out the test result from the spectrum by hard copy function.

11.5 EUT OPERATING CONDITION

1. Set the EUT under frequency hopping transmission condition.
2. The EUT was set to the highest available power level.

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11.6 TEST RESULT

Temperature:	<u>28 °C</u>	Humidity:	<u>74 %RH</u>
Spectrum Detector:	<u>PK.</u>	Modulation:	<u>GFSK</u>
RBW:	<u>30 kHz</u>	VBW:	<u>100 kHz</u>
Tested By:	<u>Jimmy Tseng</u>	Tested Date:	<u>Aug. 01, 2023</u>

Channel	Frequency (MHz)	Separation Read Value (MHz)	20 dB bandwidth (MHz)	Limit (MHz) (> two-thirds of the 20 dB bandwidth)
CH00	2402	0.963	0.949	0.633
CH39	2441	1.185	1.002	0.668
CH78	2480	1.038	1.020	0.680

CH00 :



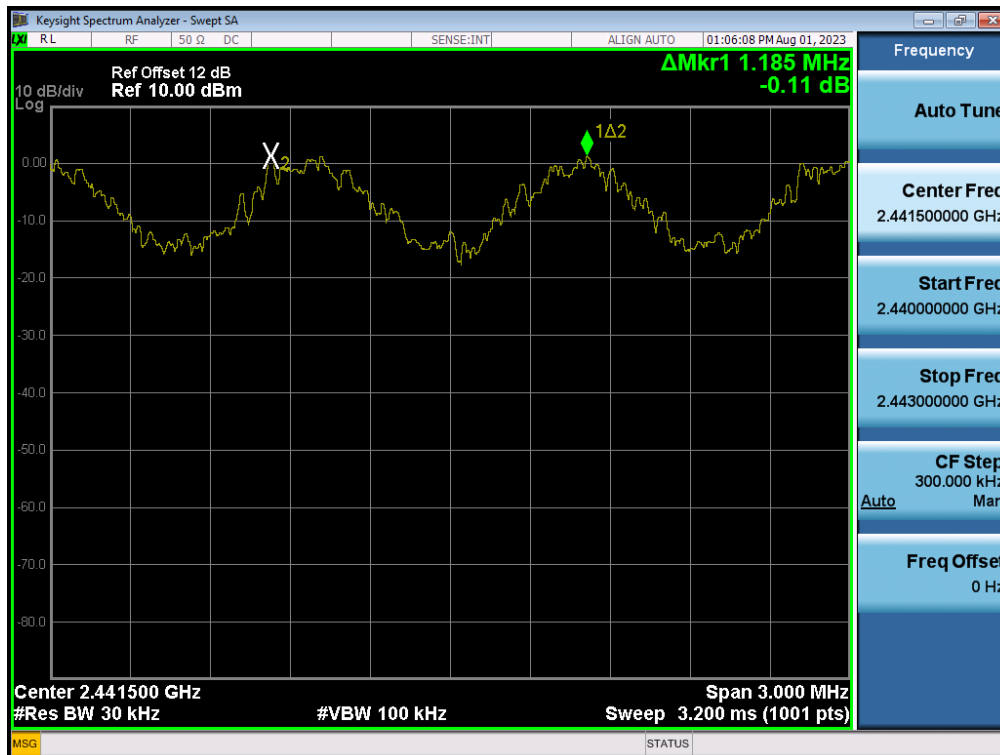


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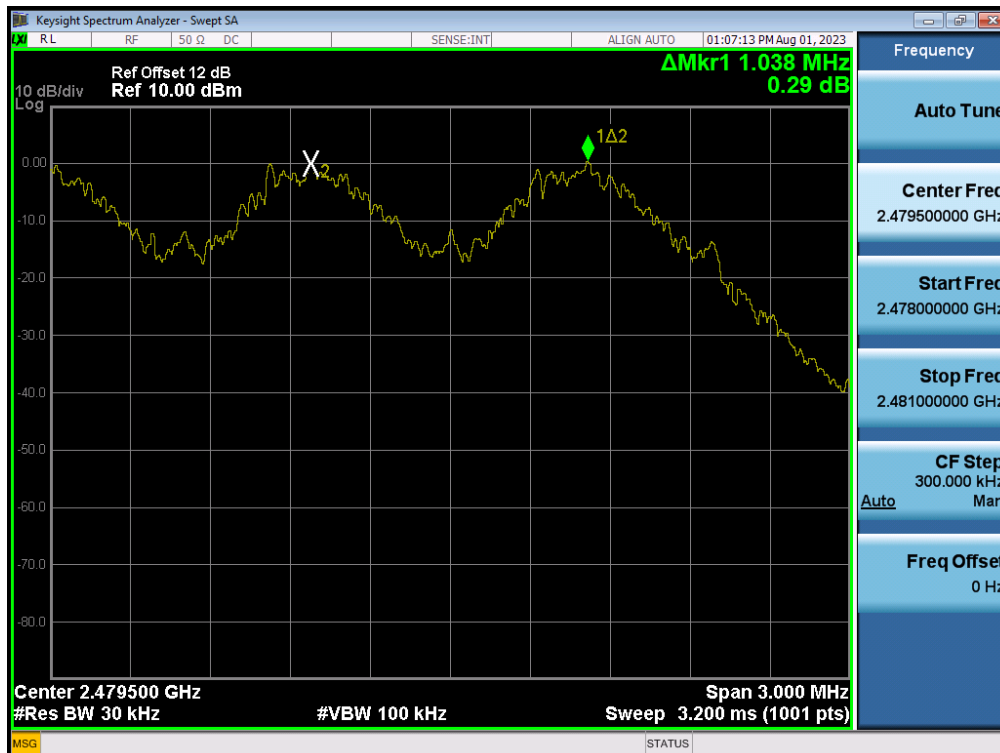
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CH39 :



CH78 :

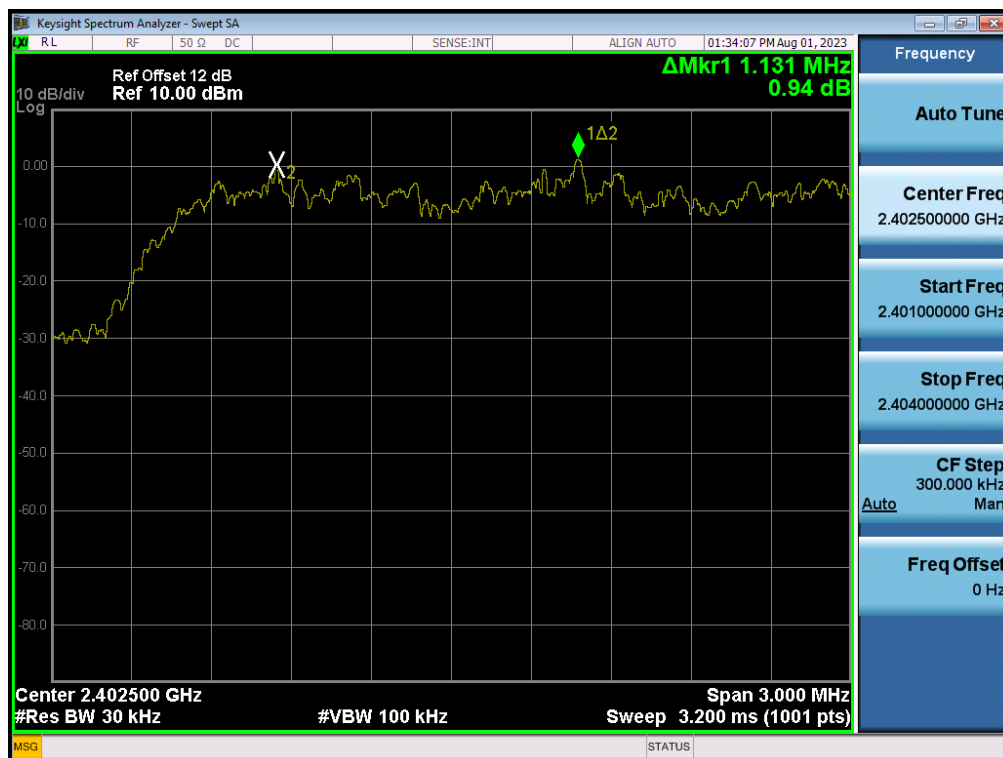


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Temperature:	28 °C	Humidity:	74 %RH
Spectrum Detector:	PK.	Modulation:	8-DPSK
RBW:	30 kHz	VBW:	100 kHz
Tested By:	Jimmy Tseng	Tested Date:	Aug. 01, 2023

Channel	Frequency (MHz)	Separation Read Value (MHz)	20 dB bandwidth (MHz)	Limit (MHz) (> two-thirds of the 20 dB bandwidth)
CH00	2402	1.131	1.254	0.836
CH39	2441	1.138	1.269	0.846
CH78	2480	0.998	1.273	0.849

CH00 :





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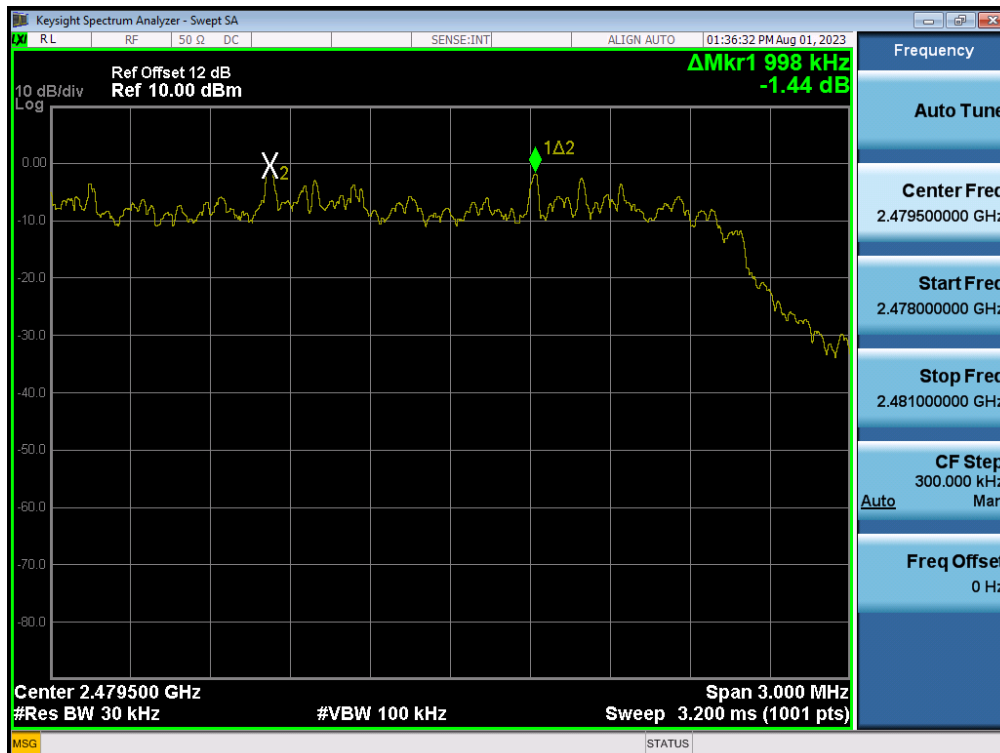
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CH39 :



CH78 :



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12. Antenna application

12.1 Antenna requirement

FCC Part 15E section 15.407 requirement:

For the band 5.725-5.85 GHz, If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

12.2 Result

The EUT's antenna used a FPC Antenna . Gain of 5.1G & 5.8G antenna types is 2.99 dBi that meet the requirement.

13. Description of RF Exposure

SAR compliance has been evaluated in the product(s), and can be used in host product(s) with substantially similar physical dimensions, construction, and electrical and RF characteristics. End-users must be provided with specific information required to satisfy RF exposure compliance for all final host devices. Compliance of this device in all final host configurations is the responsibility of the Grantee.

- The separation distance -20 cm must be clearly stated in the operating and/or installation manual that is supplied to the User.
- This application is being made on behalf of the "Grantee".

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14. TERMS OF ABBREVIATION

AV.	Average detection
AZ(°)	Turn table azimuth
Correct.	Correction
EL(m)	Antenna height (meter)
EUT	Equipment Under Test
Horiz.	Horizontal direction
LISN	Line Impedance Stabilization Network
NSA	Normalized Site Attenuation
Q.P.	Quasi-peak detection
SRT Lab	Spectrum Research & Testing Laboratory, Inc.
Vert.	Vertical direction