FCC Part 15C TEST REPORT

FCC ID:2BASU-2406A

Product	**:**	**Bluetooth Speaker**
Model Name	**:**	**Classic B65A, Classic B40A**
Brand	**:**	DAYTON AUDIO
Report No.	**:**	**NCT24036132-2**

Prepared for

Dayton Audio

705 Pleasant Valley Drive, Springboro, OH 45066 USA

Prepared by

Shenzhen NCT Testing Technology Co., Ltd.

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1 TEST RESULT CERTIFICATION

Applicant's name	:	Dayton Audio
Address	:	705 Pleasant Valley Drive, Springboro, OH 45066 USA
Manufacture's name	:	HUIZHOU CITY SOUNDTOUCH ELECTRONICS CO.,LTD
Address	:	4#01, Liandong U Valley, No.1 Shuiqing Road, Shuikou Street, Huicheng District, Huizhou City
Product name	:	Bluetooth Speaker
Model name	:	Classic B65A, Classic B40A
Additional model	:	N/A
Standards	:	FCC CFR47 Part 15 Section 15.247
Test procedure	:	ANSI C63.10:2013
Date of test	:	Aug. 07, 2024 to Sep. 14, 2024
Date of Issue	:	Sep. 14, 2024
Test Result	:	Pass

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Test Engineer:

Keven Wu / Engineer

Technical Manager:

Henry Wang / Manager

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2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
Conducted Spurious Emission	15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
6dB Bandwidth & 99% OCB	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3)	PASS
Power Spectral Density	15.247(e)	PASS
Antenna Requirement	15.203 15.247 (c)	PASS

Remark:

1. “N/A” denotes test is not applicable in this Test Report.

2.1 Test Site

Site Description

EMC Lab.	:	Accredited by CNAS, 2022-09-27
		The certificate is valid until 2028.01.07
		The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)
		The Certificate Registration Number is L8251
		Designation Number: CN1347
		Test Firm Registration Number: 894804
		Accredited by A2LA, June 14, 2023
		The Certificate Registration Number is 6837.01
		Accredited by Industry Canada, November 09, 2018
		The Conformity Assessment Body Identifier is CN0150
		Company Number: 30806
Name of Firm	:	Shenzhen NCT Testing Technology Co., Ltd.
Site Location	:	A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

3 General Information

3.1 General Description of E.U.T.

Product Name	:	Bluetooth Speaker
Model Name	:	Classic B65A, Classic B40A
Sample ID	:	240802018, 240802016
Sample(s) Status	:	Engineer sample
Additional model	:	N/A
Model difference	:	All models have the same circuit principle and internal structure, but the model name and appearance size are different.
Operating frequency	:	2402-2480MHz
Number of Channels	:	40 channels
Type of Modulation	:	GFSK
Antenna installation	:	PCB Antenna
Antenna Gain	:	-1.04 dBi
Power supply	:	AC100V-240V 50/60Hz
Hardware Version	:	1.06
Software Version	:	V1.9
Remark：the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.		

3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

The details of test channels and bandwidth were for RF conductive measurement.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	**2402**	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	**19**	**2440**	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	**2480**
12	2426	26	2454		
13	2428	27	2456		

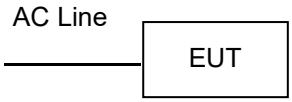
Note:

1. Test of channel was included the lowest, middle and highest frequency in highest data rate and to perform the test, then record on this report.

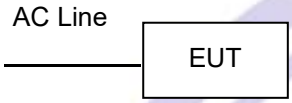
Channel	Frequency(MHz)
0	2402
19	2440
39	2480

3.3 Test Setup Configuration

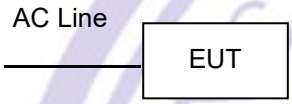
Conducted Emission



Radiated Emission



Conducted Spurious



3.4 Test Mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Test Software	SW_2853_FCC_20210611_v1.0
Power level setup	≤5dBm

4 Equipment During Test

4.1 Equipments List

Conducted emission Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	944 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESPI	101604	Rohde & Schwarz	2024/6/17	2025/6/16
LISN	ENV 216	102796	Rohde & Schwarz	2024/6/17	2025/6/16
LISN	VN1-13S	004023	CRANAGE	2024/6/17	2025/6/16
Cable	RG223-1500MM	NA	RG	2024/6/17	2025/6/16

Radiated emission & Radio Frequency Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESCI	101178	Rohde & Schwarz	2024/6/17	2025/6/16
Spectrum Analyze（10Hz-26.5GHz）	N9020A	MY50510202	Agilent	2024/6/17	2025/6/16
Amplifi（30MHz-1GHz）	BBV 9743 B	00374	SCHNWARZBECK	2024/6/17	2025/6/16
Bilog Antenna（30MHz-1GHz）	VULB9162	00473	SCHNWARZBECK	2023/3/19	2025/3/18
Horn antenna（1GHz-18GHz）	BBHA 9120 D	02622	SCHNWARZBECK	2023/3/19	2025/3/18
Pream plifier（1GHz-18GHz）	BBV 9718D	00042	SCHNWARZBECK	2024/6/17	2025/6/16
Spectrum Analyze（1GHz-40GHz）	FSV 40	100952	Rohde & Schwarz	2024/6/17	2025/6/16
Pream plifier（15GHz-40GHz）	BBV 9718D	0024	SCHNWARZBECK	2024/6/17	2025/6/16
Broadband Antenna（15GHz-40GHz）	SAS-574	588	A.H.System	2023/3/19	2025/3/18
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHNWARZBECK	2024/6/20	2025/6/19

Amplifier (9KHz-30MHz)	CVP 9222 C	00109	CHNWARZBECK	2024/6/18	2025/6/17
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2024/6/17	2025/6/16
MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2024/6/17	2025/6/16
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2024/6/17	2025/6/16
Power Sensor	TR1029-2	512364	Techoy	2024/6/17	2025/6/16
RF Swith	TR1029-1	512364	Techoy	2024/6/17	2025/6/16
Cable	DA800-4000MM	NA	DA	2024/6/17	2025/6/16
Cable	DA800-11000MM	NA	DA	2024/6/17	2025/6/16

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	AUDIX	e3	6.120718
2	EMC radiation test system	AUDIX	e3	6.120718
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

4.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Bluetooth Speaker	DAYTON AUDIO	Classic B65A, Classic B40A	N/A	EUT
E-2	Notebook	lenovo	B40-80	MP07F6JD	Auxiliary

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

5 Conducted Emission

Test Requirement	:	FCC CFR 47 Part 15 Section 15.207
Test Method	:	ANSI C63.10: 2013 and RSS-Gen
Test Result	:	PASS
Frequency Range	:	150kHz to 30MHz
Class/Severity	:	Class B

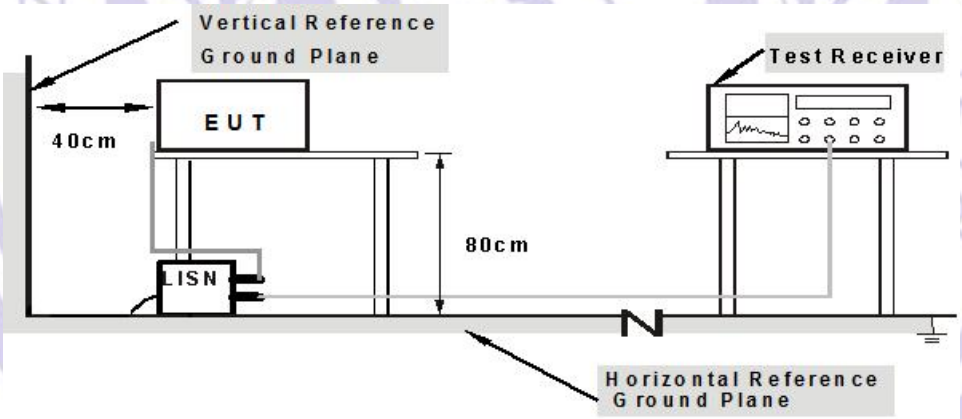
5.1 E.U.T. Operation

Operating Environment :

Temperature	:	25.5 °C
Humidity	:	51 % RH
Atmospheric Pressure	:	101.2kPa

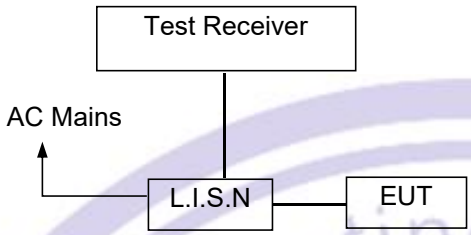
5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	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 0.50MHz.

5.6 Measurement Description

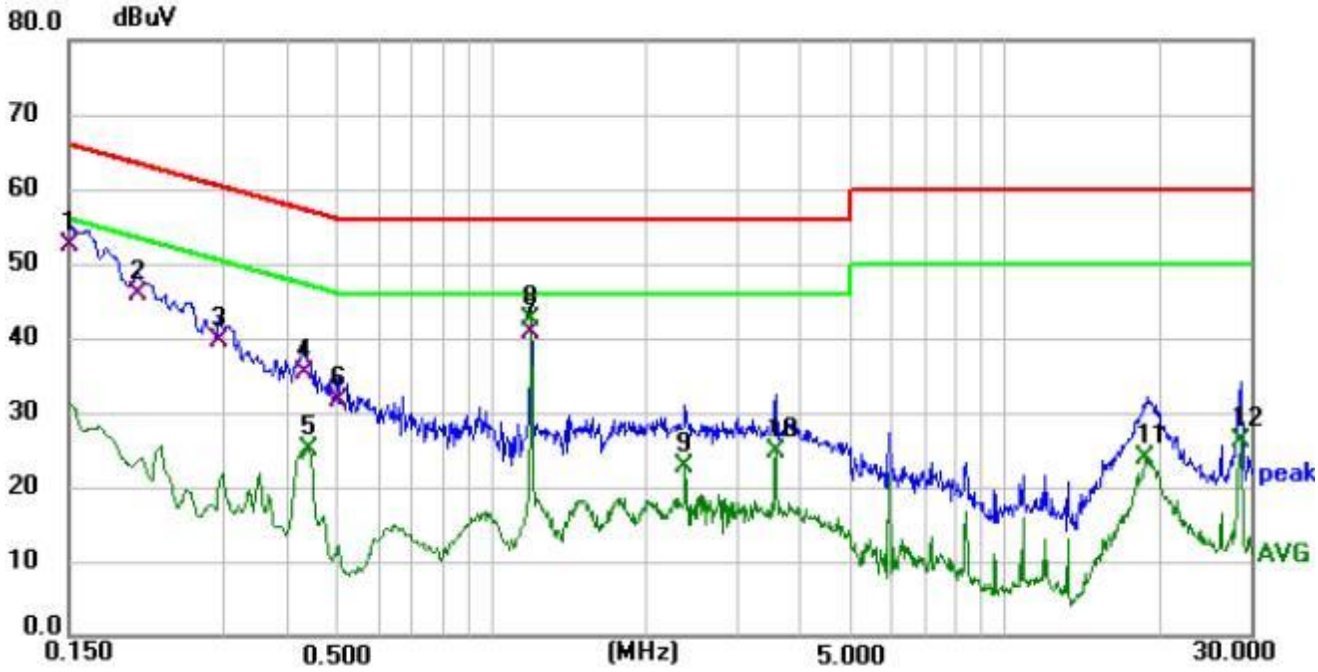
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

Pass

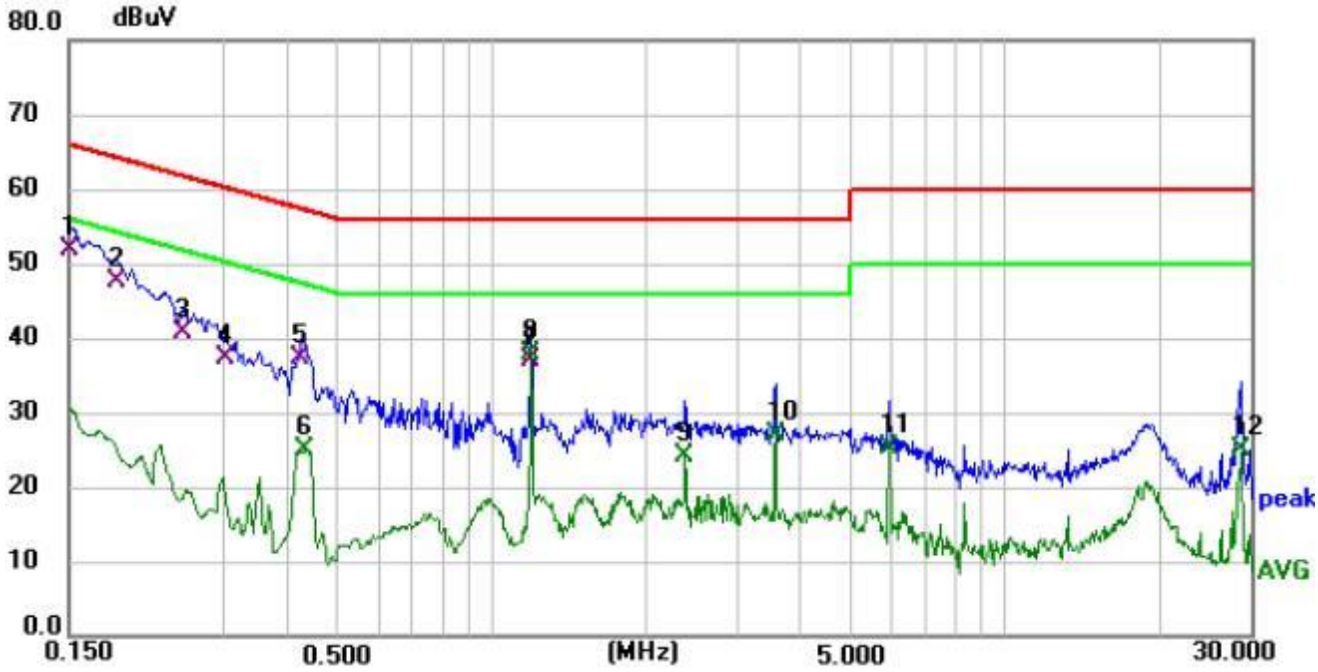
Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (GFSK 2LE) are recorded in the following pages and the others modulation methods do not exceed the limits.

Channel:	2LE High	Phase :	L
Model:	Classic B65A		



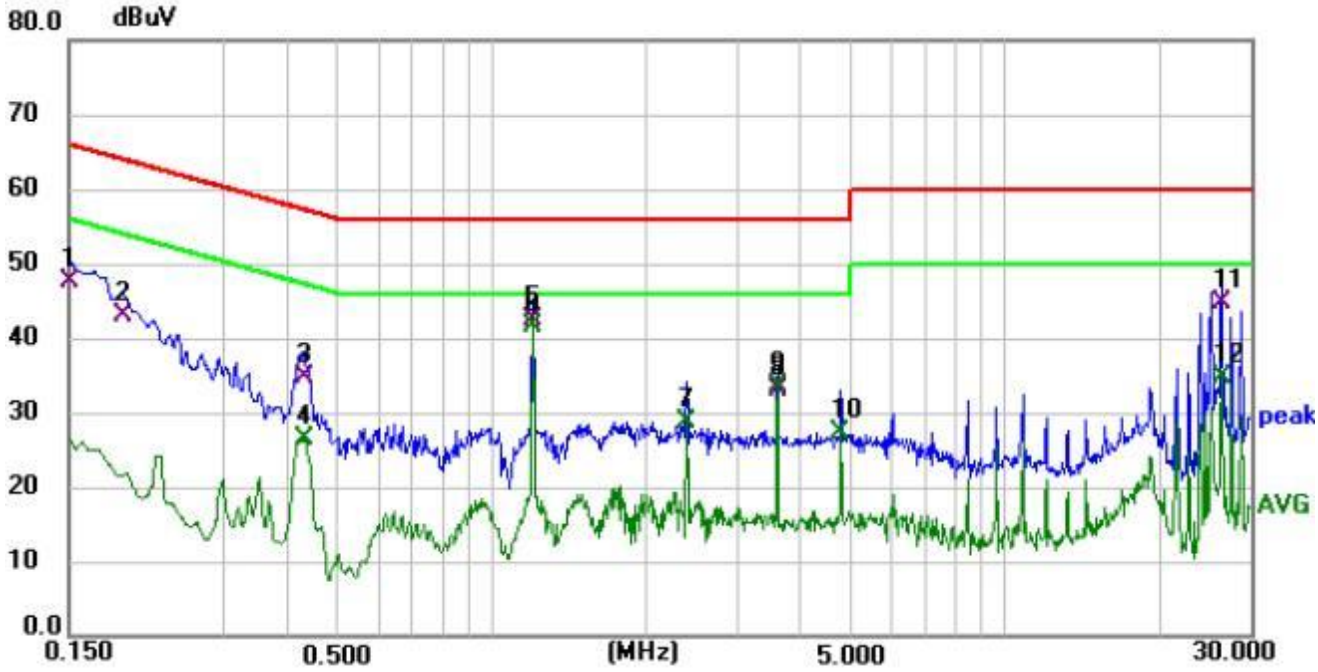
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.150	42.29	10.09	52.38	66.00	-13.62	QP
2	0.204	35.69	10.18	45.87	63.45	-17.58	QP
3	0.294	29.55	10.12	39.67	60.41	-20.74	QP
4	0.429	25.34	10.08	35.42	57.27	-21.85	QP
5	0.438	15.08	10.06	25.14	47.10	-21.96	AVG
6	0.501	21.81	9.88	31.69	56.00	-24.31	QP
7	1.189	30.75	9.88	40.63	56.00	-15.37	QP
8 *	1.189	32.55	9.88	42.43	46.00	-3.57	AVG
9	2.377	12.40	10.19	22.59	46.00	-23.41	AVG
10	3.574	14.95	9.72	24.67	46.00	-21.33	AVG
11	18.750	13.22	10.50	23.72	50.00	-26.28	AVG
12	28.775	15.85	10.37	26.22	50.00	-23.78	AVG

Channel:	2LE High	Phase :	N
Model:	Classic B65A		



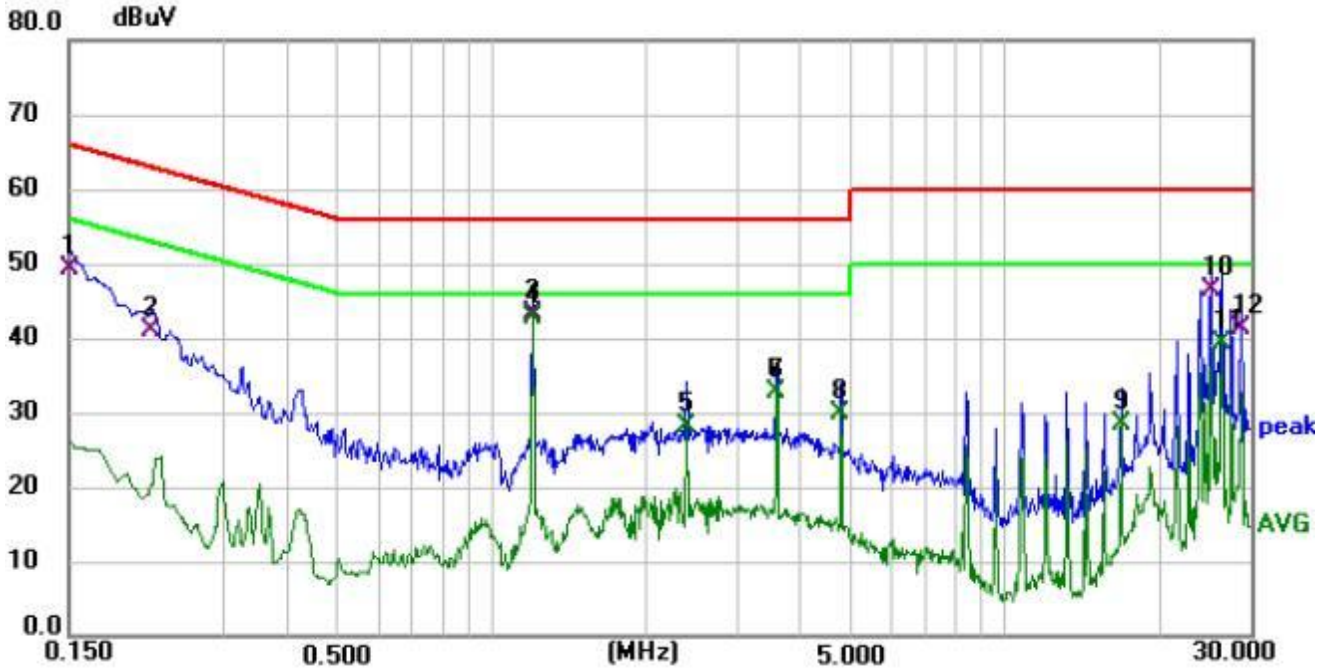
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.150	41.74	10.09	51.83	66.00	-14.17	QP
2	0.186	37.68	9.96	47.64	64.21	-16.57	QP
3	0.249	30.86	9.94	40.80	61.79	-20.99	QP
4	0.303	27.30	9.96	37.26	60.16	-22.90	QP
5	0.424	27.16	10.01	37.17	57.37	-20.20	QP
6	0.433	15.11	10.02	25.13	47.19	-22.06	AVG
7	1.189	27.00	9.94	36.94	56.00	-19.06	QP
8 *	1.189	27.97	9.94	37.91	46.00	-8.09	AVG
9	2.377	14.17	9.84	24.01	46.00	-21.99	AVG
10	3.574	17.02	9.92	26.94	46.00	-19.06	AVG
11	5.950	15.51	9.74	25.25	50.00	-24.75	AVG
12	28.775	14.23	10.63	24.86	50.00	-25.14	AVG

Channel:	2LE High	Phase :	L
Model:	Classic B40A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.150	37.51	10.09	47.60	66.00	-18.40	QP
2	0.191	32.81	10.16	42.97	63.99	-21.02	QP
3	0.429	24.77	10.08	34.85	57.27	-22.42	QP
4	0.429	16.47	10.08	26.55	47.27	-20.72	AVG
5	1.198	32.54	9.88	42.42	56.00	-13.58	QP
6 *	1.198	31.66	9.88	41.54	46.00	-4.46	AVG
7	2.395	18.57	10.18	28.75	46.00	-17.25	AVG
8	3.610	23.43	9.71	33.14	56.00	-22.86	QP
9	3.610	23.81	9.71	33.52	46.00	-12.48	AVG
10	4.789	17.25	9.91	27.16	46.00	-18.84	AVG
11	26.325	34.30	10.42	44.72	60.00	-15.28	QP
12	26.325	24.18	10.42	34.60	50.00	-15.40	AVG

Channel:	2LE High	Phase :	N
Model:	Classic B40A		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.150	39.24	10.09	49.33	66.00	-16.67	QP
2	0.217	30.99	9.93	40.92	62.93	-22.01	QP
3	1.198	33.42	9.94	43.36	56.00	-12.64	QP
4 *	1.198	32.68	9.94	42.62	46.00	-3.38	AVG
5	2.395	18.41	9.83	28.24	46.00	-17.76	AVG
6	3.592	22.85	9.92	32.77	56.00	-23.23	QP
7	3.592	22.80	9.92	32.72	46.00	-13.28	AVG
8	4.789	20.20	9.79	29.99	46.00	-16.01	AVG
9	16.775	18.36	10.03	28.39	50.00	-21.61	AVG
10	25.150	36.17	10.40	46.57	60.00	-13.43	QP
11	26.325	28.88	10.47	39.35	50.00	-10.65	AVG
12	28.725	30.59	10.63	41.22	60.00	-18.78	QP

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method : ANSI C63.10:2013

Test Result : PASS

Measurement Distance : 3m

Limit : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))}$ + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))}$ + 40
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)}$ + 40
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

6.1 EUT Operation

Operating Environment :

Temperature : 23.5 °C

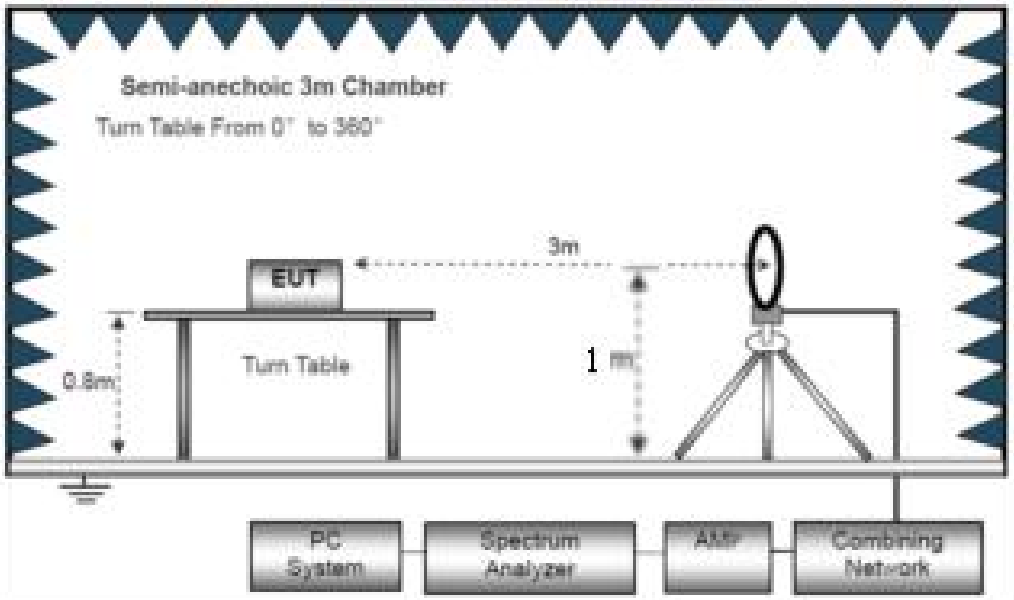
Humidity : 51.1 % RH

Atmospheric Pressure : 101.2kPa

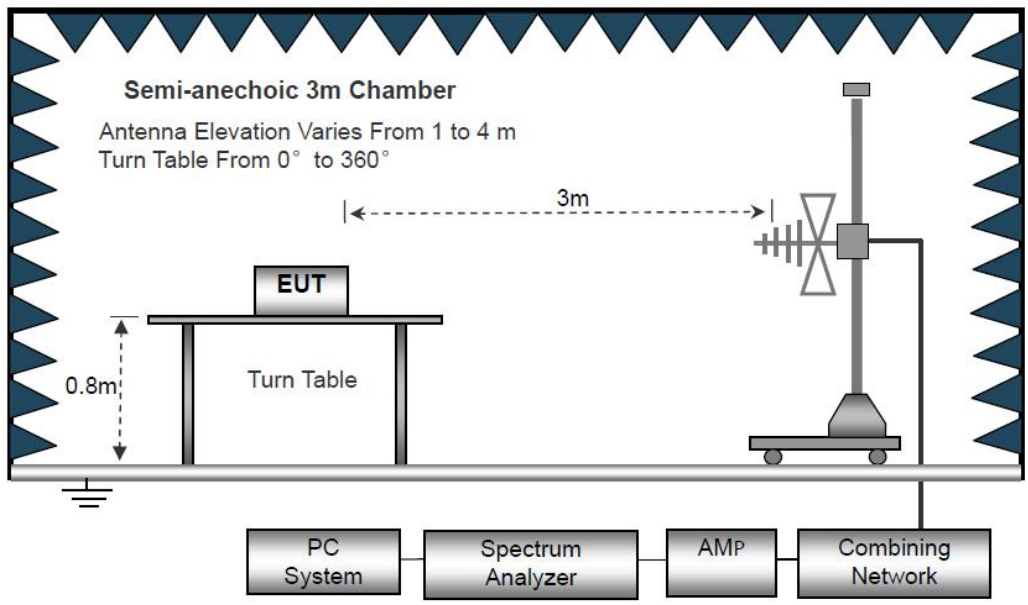
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

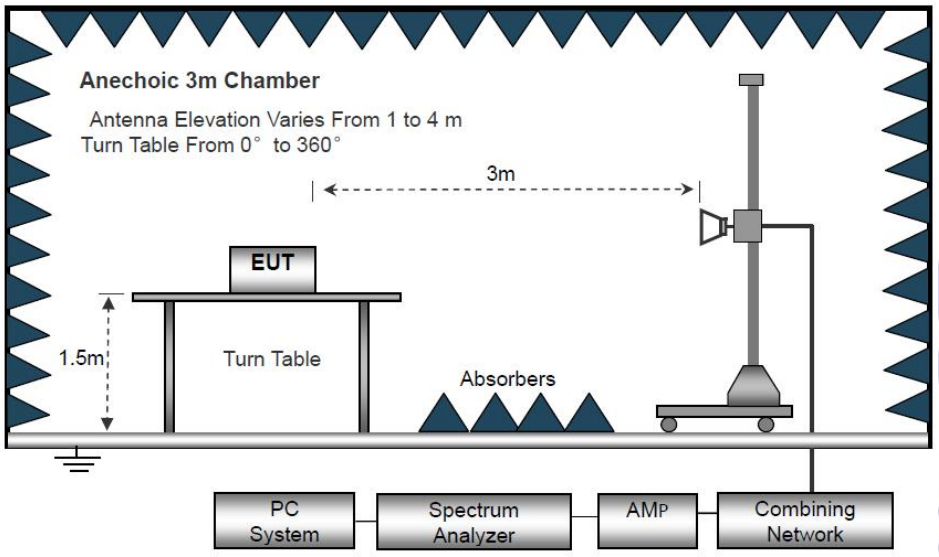
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



6.3 Spectrum Analyzer Setup

	Frequency	Detector	RBW	VBW	Remark
Receiver Setup	Below 30MHz	--	10kHz	10kHz	--
	30MHz ~ 1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value

6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

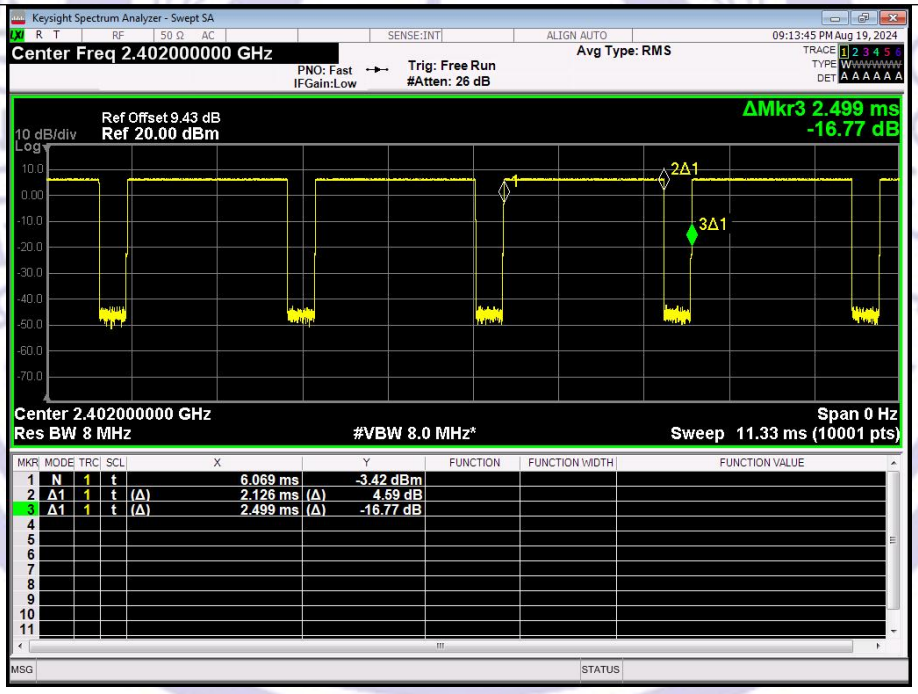
8. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

For Average Measurement:

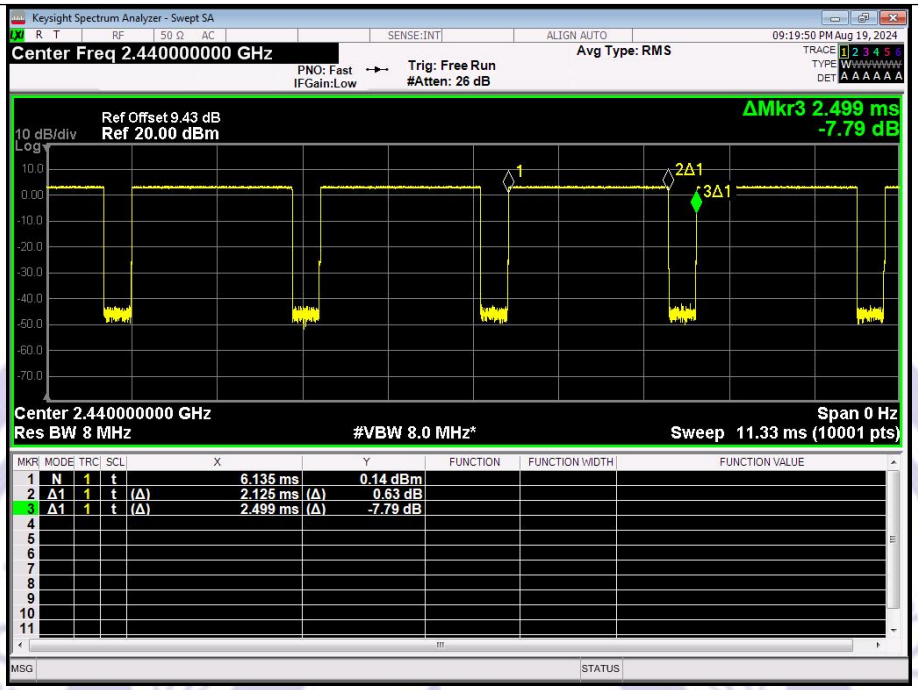
VBW=10Hz, when duty cycle is no less than 98 percent.

VBW≥1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

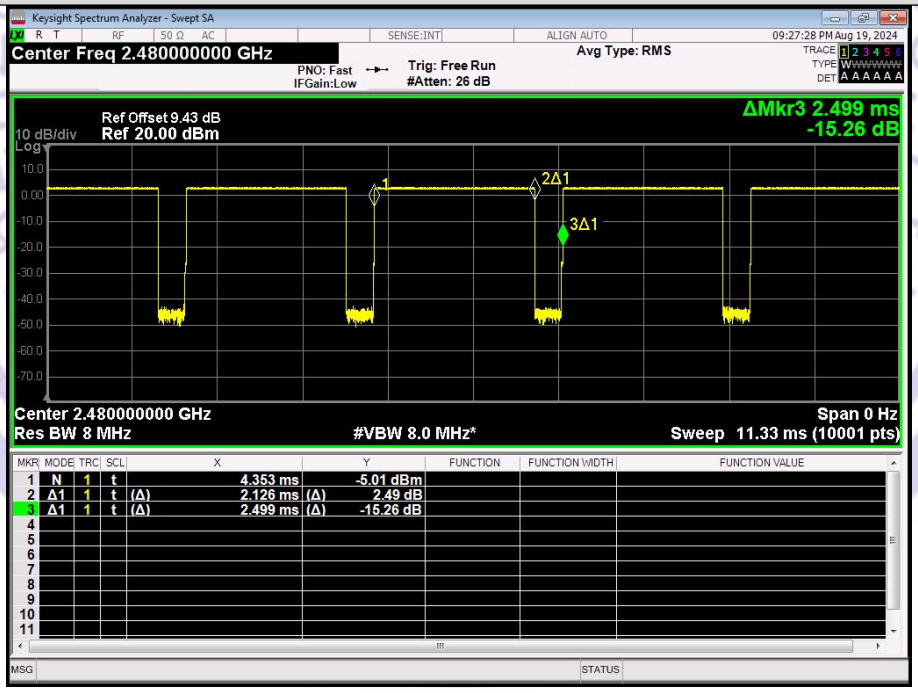
Mode	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)
LE	0	2.126	2.499	85.08	0.8508	0.7017
	19	2.125	2.499	85.03	0.8503	0.7043
	39	2.126	2.499	85.08	0.8508	0.7017
2LE	0	1.072	1.250	85.79	0.8579	0.6656
	19	1.072	1.249	85.79	0.8579	0.6656
	39	1.072	1.250	85.79	0.8579	0.6656



BLE 1M_Channel 0



BLE 1M_Channel 19



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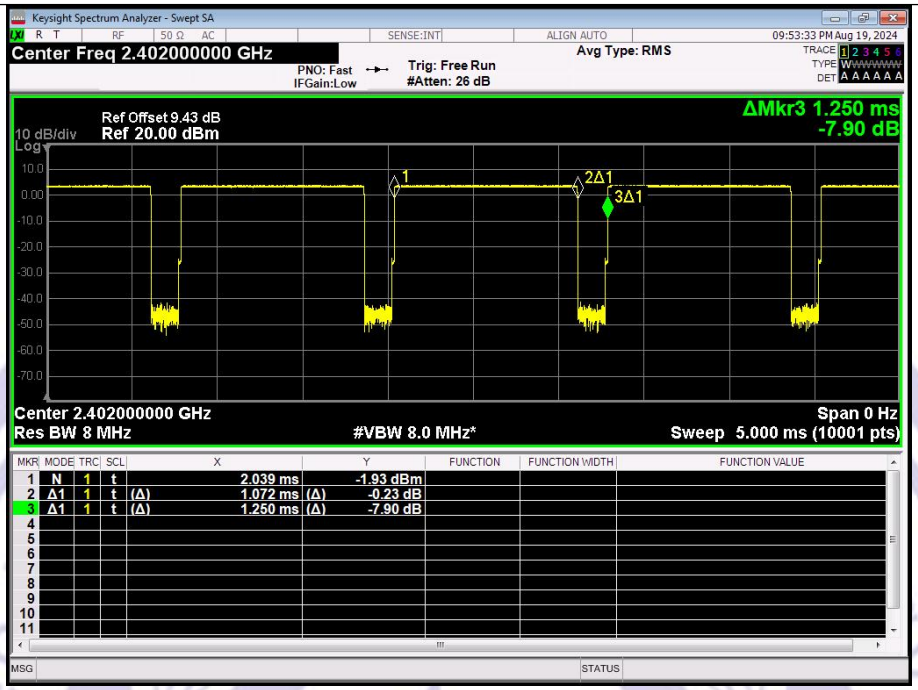

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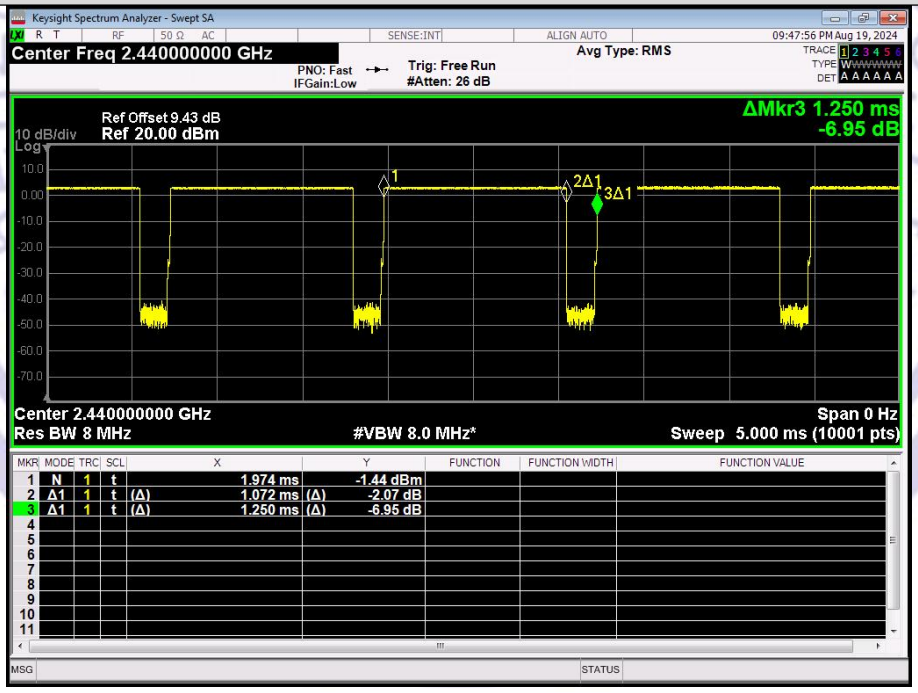

BLE 2M_Channel 19