Test Report

Verified code: 590905

Report No.: E20220126055701-3

Customer:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, China
Sample Name:	Wireless earphones
Sample Model:	E505A
Receive Sample Date:	Feb.14,2022
Test Date:	Feb.15,2022 ~ Mar.03,2022
Reference Document:	CFR 47, FCC Part 15 Subpart C RADIO FREQUENCY DEVICES:Subpart C—Intentional Radiators
Test Result:	Pass

Prepared by: Yang Zhaoyun Reviewed by: Jiang Tao Approved by: Xiao Liang

GUANGZHOU GRG METROLOGY & TEST CO., LTD

Issued Date: 2022-03-24

GUANGZHOU GRG METROLOGY & TEST CO., LTD.
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Statement

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2. The sample information is provided by the client and responsible for its authenticity; The content of the report is only valid for the samples sent this time.

3. When there are reports in both Chinese and English, the Chinese version will prevail when the language problems are inconsistent.

4. If there is any objection concerning the report, please inform us within 15 days from the date of receiving the report.

5. Without the agreement of the laboratory, the client is not authorized to use the test results for unapproved propaganda.

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Table of Contents

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1. TEST RESULT SUMMARY

FCC 47 CFR Part 15 Subpart C 15.247，ANSI C63.10-2013 KDB 558074 D01 15.247 measurement guidance v05r02			
Standard	**Item**	**Limit / Severity**	**Result**
FCC 47 CFR Part 15 Subpart C (15.247)	Antenna Requirement	Section 15.203	PASS
	20dB Bandwidth	Section 15.247(a)(1)	PASS
	Carrier Frequencies Separated	Section 15.247(a)(1)	PASS
	Hopping Channel Number	Section 15.247(a)(1)(ii)	PASS
	Dwell Time	Section 15.247(a)(1)(iii)	PASS
	Maximum Peak Output Power	Section 15.247(b)(1)	PASS
	Conducted Emission	Section 15.207	Not Applicable
	Conducted band edges and Spurious Emission	Section 15.209 &15.247(d)	PASS
	Radiated Spurious Emission	Section 15.209 &15.247(d)	PASS
	Restricted bands of operation	Section 15.247 (d) &15.205	PASS

The EUT antenna is FPC antenna. Max Antenna gain is -0.5dBi .which accordance 15.203.is considered sufficient to comply with the provisions of this section

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2. GENERAL DESCRIPTION OF EUT

2.1 APPLICANT

Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, China

2.2 MANUFACTURER

Name:	OnePlus Technology (Shenzhen) Co., Ltd.
Address:	18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen, China

2.3 FACTORY

Name:	Jiangxi Risound Electronics Co., Ltd.
Address:	No.271, Innovation Avenue, Jinggangshan Economic and Technological Development Zone, Ji'an City, Jiangxi Province

2.4 BASIC DESCRIPTION OF EQUIPMENT UNDER TEST

Equipment:	Wireless earphones
Model No.:	E505A
Adding Model:	/
Models discrepancy:	/
Trade Name:	ONEPLUS
FCC ID:	2ABZ2-E505AR
Power supply:	DC 3.8V power supplied by earphones battery DC 5V power supplied by E505A charging case or DC 3.7V power supplied by charging case battery
Charging Case:	E505A Input: 5.0V ⎓ 0.9A Output: 5.0V ⎓ 0.3A Rated Capacity:480mAh 1.77Wh
Charging Case Battery Specification:	Rechargeable Li-ion Battery, Model:751443-1 Rated Voltage:3.7Vdc Rated Capacity:480mAh 1.77Wh Limited Charge voltage:4.35Vdc
Earphones Battery Specification:	Rechargeable Li-ion Cell , Model:1058PF3 Rated Voltage:3.8Vdc Rated Capacity:41mAh 0.155Wh

Frequency Band:	2402MHz~2480MHz
Transmit Power:	GFSK:13.12dBm π/4-DQPSK:13.06dBm 8DPSK: 13.08dBm
Type of Modulation:	FHSS (GFSK for 1Mbps, π/4-DQPSK for 2Mbps,8DPSK for 3Mbps)
Antenna Specification:	FPC antenna with - 0.5dBi gain (Max)
Temperature Range:	0℃~35℃
Hardware Version:	AA460_0
Software Version:	V1.0.0
Sample No:	E20220126055701-0006 E20220126055701-0008
Note:	Earphone is E505A,Charging Case is E505A

2.5 TEST OPERATION MODE

Mode No.	Description of the modes
1	Bluetooth(BT) fixed frequency transmitting

2.6 LOCAL SUPPORTIVE

Name of Equipment	Manufacturer	Model	Serial Number	Note
Notebook	LENOVO	TianYi 310-14ISK	MP18DLC6	/

2.7 CONFIGURATION OF SYSTEM UNDER TEST

EUT

Test software:

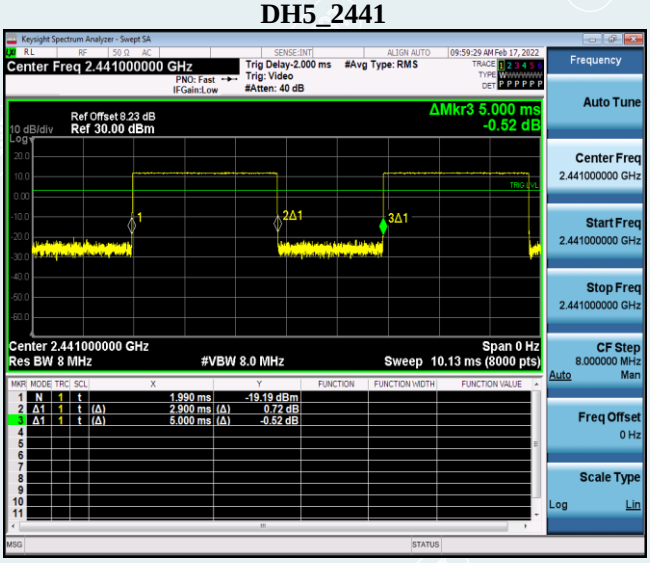
Software version	Test level
BQB.exe	3

2.8 DUTY CYCLE

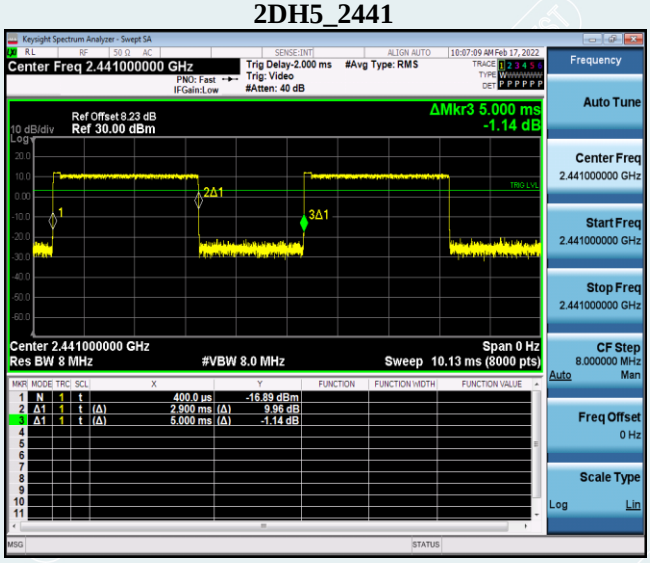
Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

Test Mode	Antenna	Frequency [MHz]	ON Time [ms]	Period [ms]	DC [%]	T [s]
DH5	Ant1	2441	2.90	5.00	58.00	0.00290
2DH5	Ant1	2441	2.90	5.00	58.00	0.00290
3DH5	Ant1	2441	2.90	5.00	58.00	0.00290

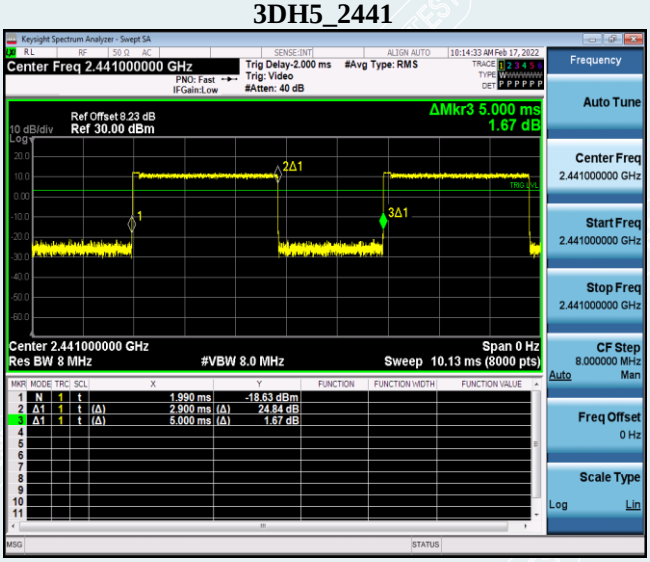
DH5_2441



2DH5_2441



3DH5_2441



3. LABORATORY AND ACCREDITATIONS

3.1 LABORATORY

The tests & measurements refer to this report were performed by Shenzhen EMC Laboratory of Guangzhou GRG Metrology & Test Co., Ltd.

Add	:	No.1301 Guanguang Road Xinlan Community, Guanlan Street, Longhua District Shenzhen, 518110, People's Republic of China
P.C.	:	518000
Tel	:	0755-61180008
Fax	:	0755-61180008

3.2 ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to GB/T 27025(ISO/IEC 17025:2017)

USA	A2LA(Certificate #2861.01)
China	CNAS(L0446)

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

Canada	ISED (Company Number: 24897，CAB identifier:CN0069)
USA	FCC (Registration Number: 759402，Designation Number:CN1198)

Copies of granted accreditation certificates are available for downloading from our web site, http://www.grgtest.com

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3.3 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement		Frequency	Uncertainty
Radiated Emission	Horizontal	9kHz～30MHz	4.46dB
		30MHz～1000MHz	4.30dB
		1GHz～18GHz	5.60dB
		18GHz～26.5GHz	3.65dB
	Vertical	9kHz～30MHz	4.46dB
		30MHz～1000MHz	4.30dB
		1GHz～18GHz	5.60dB
		18GHz～26.5GHz	3.65dB

Measurement	Uncertainty
RF frequency	6.0×10^{-6}
RF power conducted	0.78 dB
Occupied channel bandwidth	0.4 dB
Unwanted emission, conducted	0.68 dB
Humidity	6 %
Temperature	2℃

This uncertainty represents an expanded uncertainty factor of *k*=2.

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4. LIST OF USED TEST EQUIPMENT AT GRGT

Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Hopping Channel Number				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2022-04-16
Dwell Time				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2022-04-16
Radiated Spurious Emission&Restricted bands of operation				
Test S/W	EZ	CCS-2ANT	/	/
Test Receiver	R&S	ESCI	100088	2022-10-31
Preamplifier	EMEC	EM330	/	2022-03-21
Bi-log Antenna	TESEQ	CBL6143A	32399	2022-11-25
Spectrum Analyzer	Agilent	N9010A	MY52221469	2022-04-16
Loop Antenna	TESEQ	HLA6121	52599	2022-04-21
Horn Antenna	Schwarzbeck	BBHA9120D (1201)	02143	2022-10-22
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170-497	2022-10-16
Amplifier	Tonscend	TAP01018048	AP20E8060075	2022-05-09
Amplifier	Tonscend	TAP184050	AP20E806071	2022-05-17
Test S/W	Tonscend	JS36-RSE/2.5.1.5		
20 dB Bandwidth				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2022-04-16
Maximum Peak Output Power				
Pulse power sensor	Agilent	MA2411B	1126150	2022-03-21
Power meter	Anritsu	ML2495A	1204003	2022-03-21
Conducted band edges and Spurious Emission				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2022-04-16
Carrier Frequencies Separated				
Spectrum Analyzer	Agilent	N9010A	MY52221469	2022-04-16

Note: The calibration interval of the above test instruments is 12 months.

5. EUT TEST CONDITIONS

Type of antenna: FPC antenna

Test frequencies: According to the 15.31(m) Measurements on intentional radiators or receivers, other than TV broadcast receivers, shall be performed and. if required. reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in the following table:

Frequency range over which device operates	Number of frequencies	Location in the range of operation
1 MHz or less	1	Middle
1 to 10 MHz	2	1 near top and 1 near bottom
More than 10 MHz	3	1 near top 1 near middle and 1 near bottom

EUT channels and frequencies list:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	14	2416	28	2430
1	2403	15	2417	29	2431
2	2404	16	2418	30	2432
3	2405	17	2419	31	2433
4	2406	18	2420	32	2434
5	2407	19	2421	33	2435
6	2408	20	2422	34	2436
7	2409	21	2423	35	2437
8	2410	22	2424	36	2438
9	2411	23	2425	37	2439
10	2412	24	2426	38	2440
11	2413	25	2427	39	2441
12	2414	26	2428	40	2442
13	2415	27	2429	41	2443

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
42	2444	55	2457	68	2470
43	2445	56	2458	69	2471
44	2446	57	2459	70	2472
45	2447	58	2460	71	2473
46	2448	59	2461	72	2474
47	2449	60	2462	73	2475
48	2450	61	2463	74	2476
49	2451	62	2464	75	2477
50	2452	63	2465	76	2478
51	2453	64	2466	77	2479
52	2454	65	2467	78	2480
53	2455	66	2468		
54	2456	67	2469		

Test frequency is the lowest channel: 0 frequency(2402MHz), middle channel: 39 frequency (2441MHz) and highest channel: 78 frequency(2480MHz)

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6. 20dB BANDWIDTH

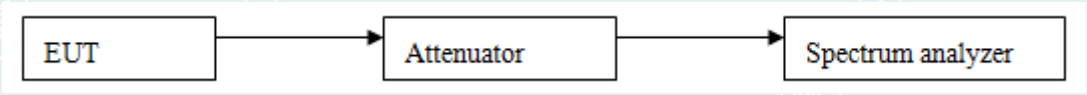
6.1 LIMITS

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.

6.2 TEST PROCEDURES

1) Remove the antenna from the EUT, and then connect a low loss RF cable from antenna port to the spectrum analyzer.
2) Set the spectrum analyzer as RBW=20 kHz, VBW=62 kHz, Span=3MHz, Sweep = auto. Allow the trace to stabilize, record 20dB bandwidth value.
3) Repeat until all the test channels are investigated.

6.3 TEST SETUP



6.4 TEST RESULTS

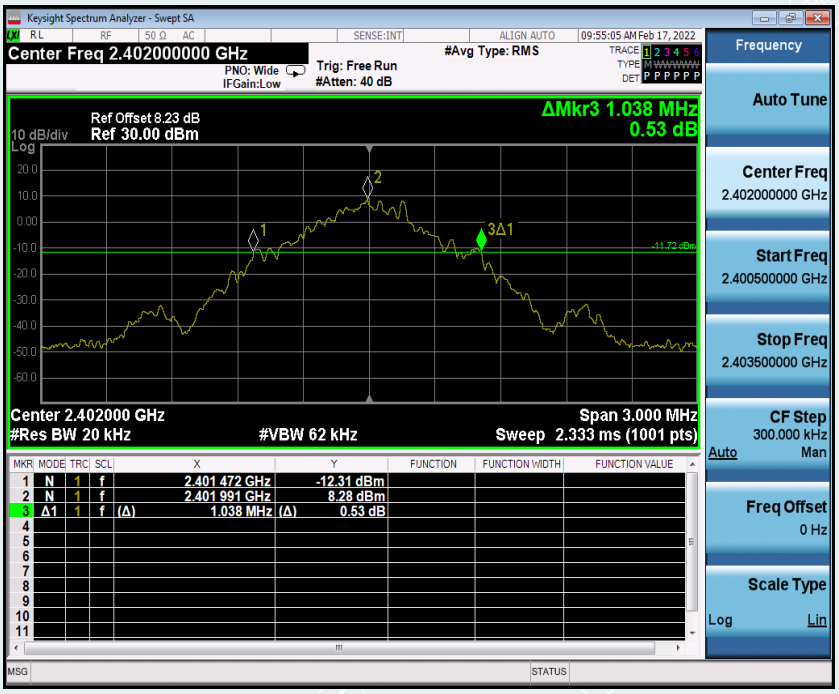
Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

Test mode	Channel	Frequency (MHz)	20 dB Bandwidth (kHz)
DH5	Lowest	2402	1038
	Middle	2441	1023
	Highest	2480	1026
Test mode	**Channel**	**Frequency (MHz)**	**20 dB Bandwidth (kHz)**
2DH5	Lowest	2402	1182
	Middle	2441	1182
	Highest	2480	1182
Test mode	**Channel**	**Frequency (MHz)**	**20 dB Bandwidth (kHz)**
3DH5	Lowest	2402	1239
	Middle	2441	1182
	Highest	2480	1182

Result plot as follows:

DH5

Lowest Channel

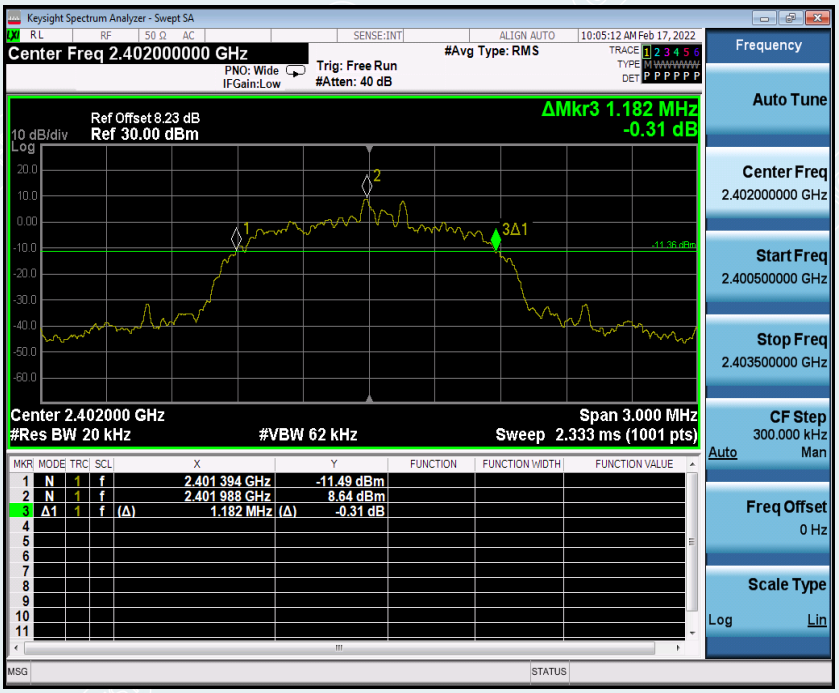


Middle Channel

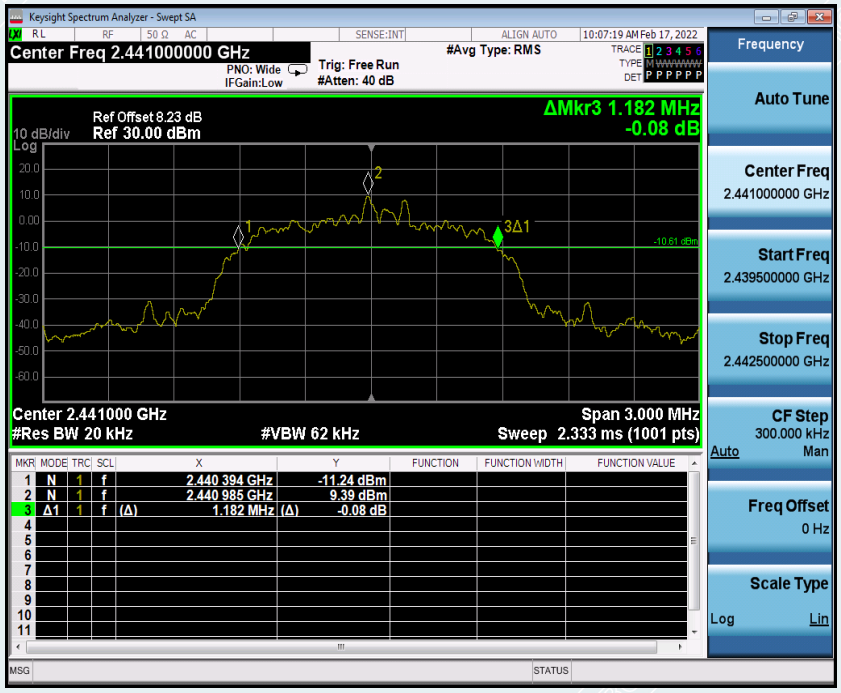
Highest Channel

2DH5

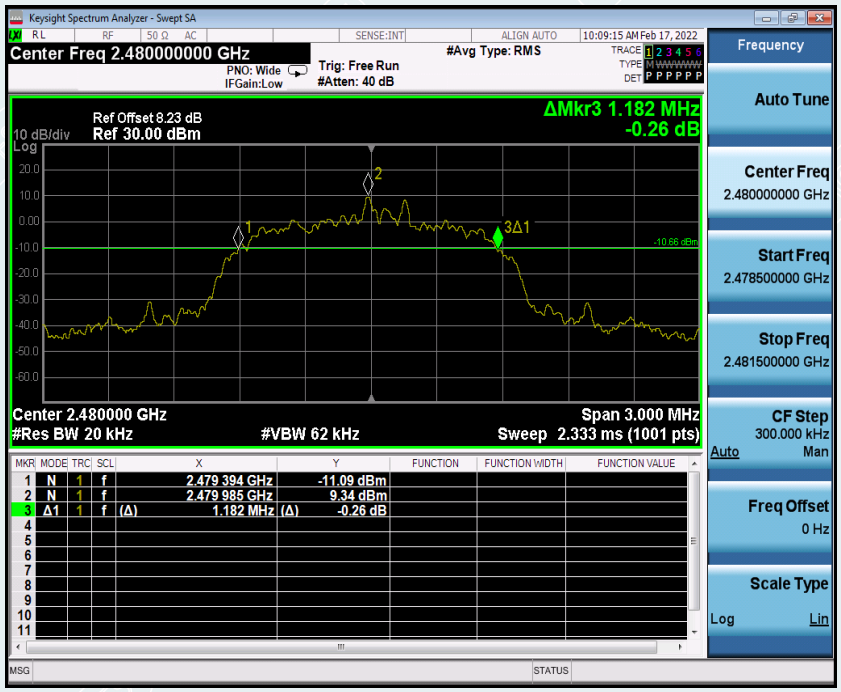
Lowest Channel



Middle Channel



Highest Channel

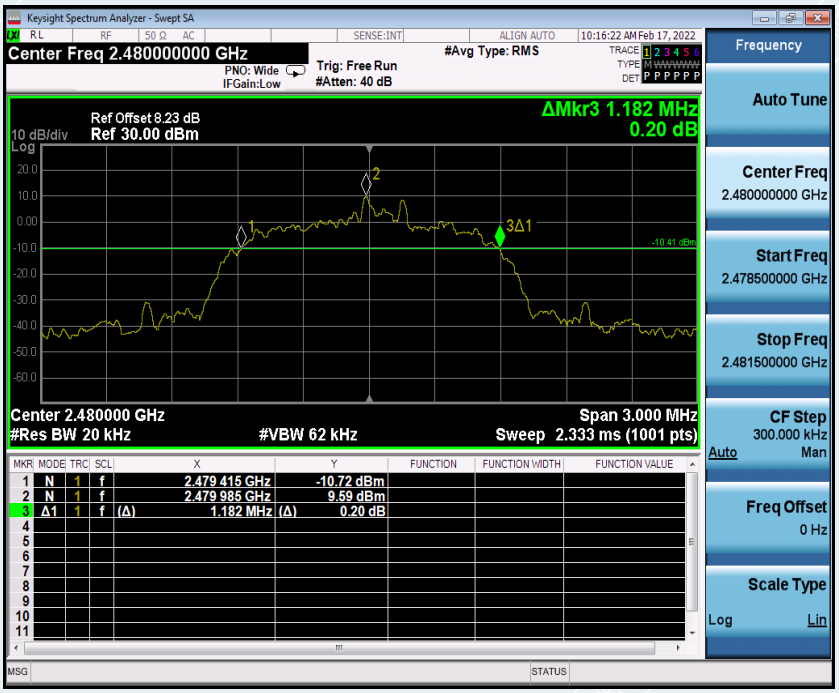


3DH5

Lowest Channel

Middle Channel

Highest Channel



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7. CARRIER FREQUENCIES SEPARATED

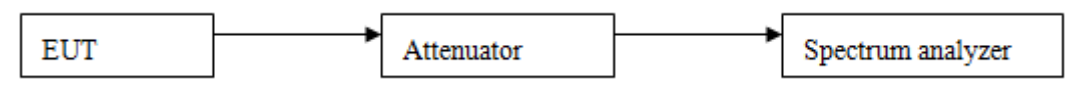
7.1 LIMITS

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, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

7.2 TEST PROCEDURES

1) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2) Set center frequency of spectrum analyzer = middle of hopping channel.
3) Set the spectrum analyzer as RBW=100kHz, VBW=300kHz, Adjust Span to 3 MHz, Sweep = auto.
4) Use the marker-delta function to mark hopping channel carrier frequencies and record the channel separation.

7.3 TEST SETUP



7.4 TEST RESULTS

Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

DH5

Channel Separation (MHz)	Two-thirds of the 20 dB Bandwidth (kHz)	Channel Separation Limit	Result
1.002	682	> Two-thirds of the 20 dB Bandwidth	Pass

2DH5

Channel Separation (MHz)	Two-thirds of the 20 dB Bandwidth (kHz)	Channel Separation Limit	Result
0.994	788	> Two-thirds of the 20 dB Bandwidth	Pass

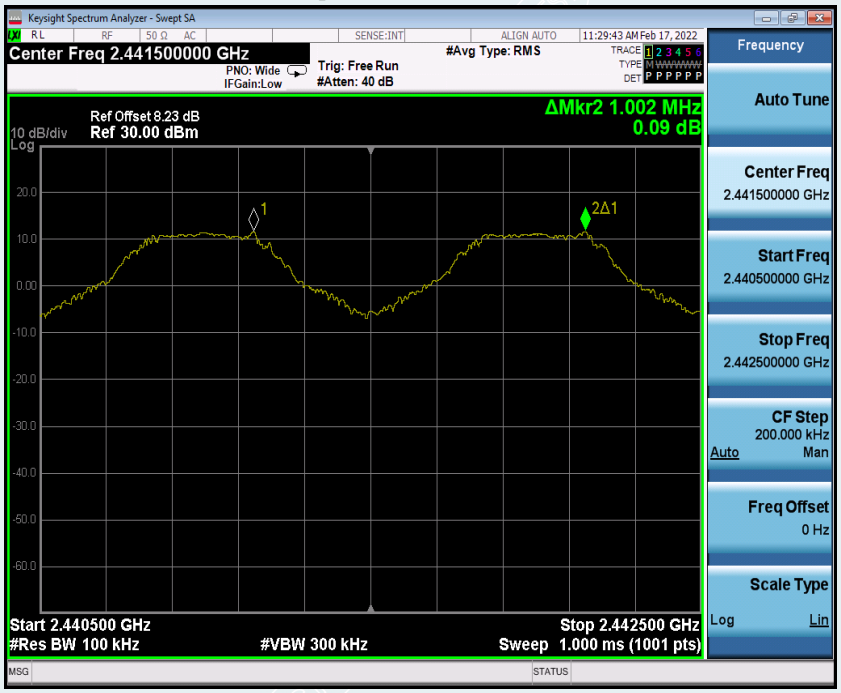
3DH5

Channel Separation (MHz)	Two-thirds of the 20 dB Bandwidth (kHz)	Channel Separation Limit	Result
1.002	788	> Two-thirds of the 20 dB Bandwidth	Pass

Result plot as follows:

DH5

Measurement of Channel Separation



2DH5

Measurement of Channel Separation

3DH5

Measurement of Channel Separation

Test result: The unit does meet the FCC requirements.

---------- The following blanks ----------

8. HOPPING CHANNEL NUMBER

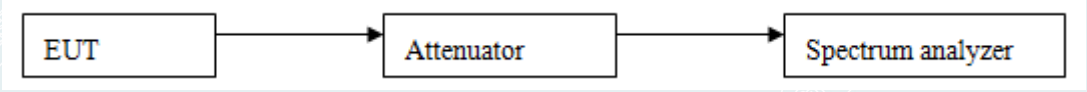
8.1 LIMITS

Regulation 15.247 (a) (1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

8.2 TEST PROCEDURES

1) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2) Set the spectrum analyzer as RBW=100kHz, VBW=300kHz.
3) Set the spectrum analyzer: start frequency = 2400MHz. stop frequency = 2483.5MHz. Submit the test result graph.

8.3 TEST SETUP



8.4 TEST RESULTS

Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

GFSK

Result (No. of CH)	Limit (No. of CH)	Result
79	≥15	PASS

π/4-DQPSK

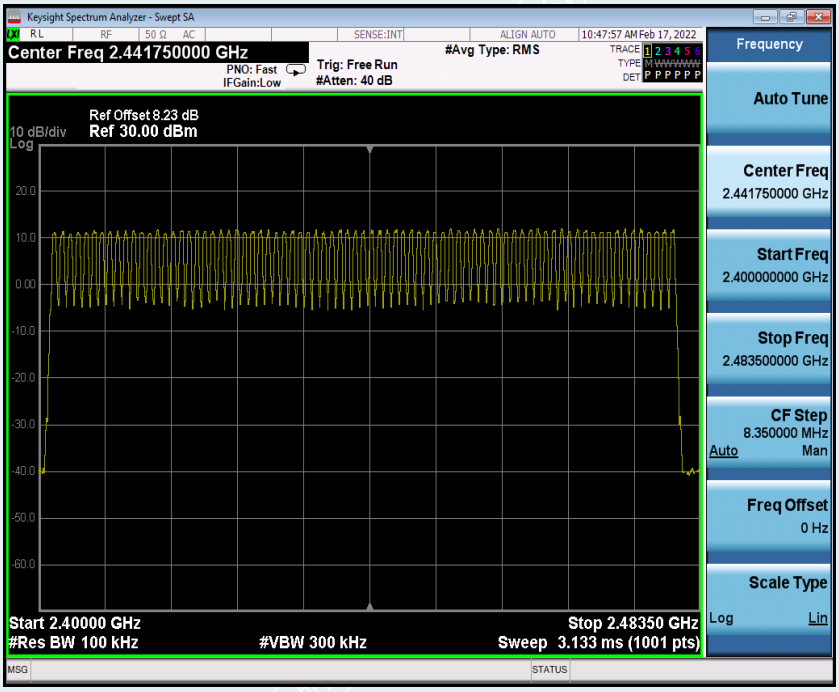
Result (No. of CH)	Limit (No. of CH)	Result
79	≥15	PASS

8DPSK

Result (No. of CH)	Limit (No. of CH)	Result
79	≥15	PASS

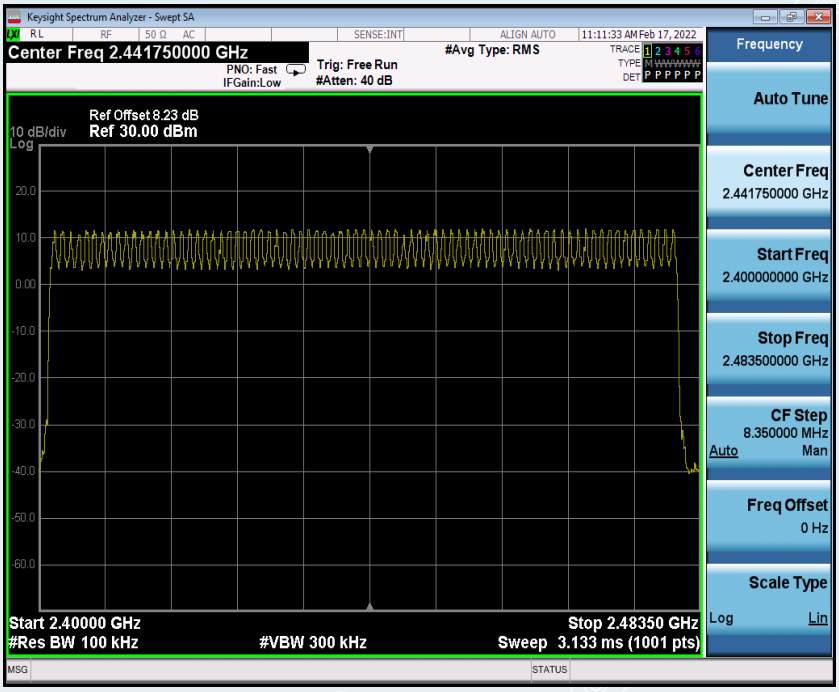
GFSK

2.400 GHz – 2.4835 GHz



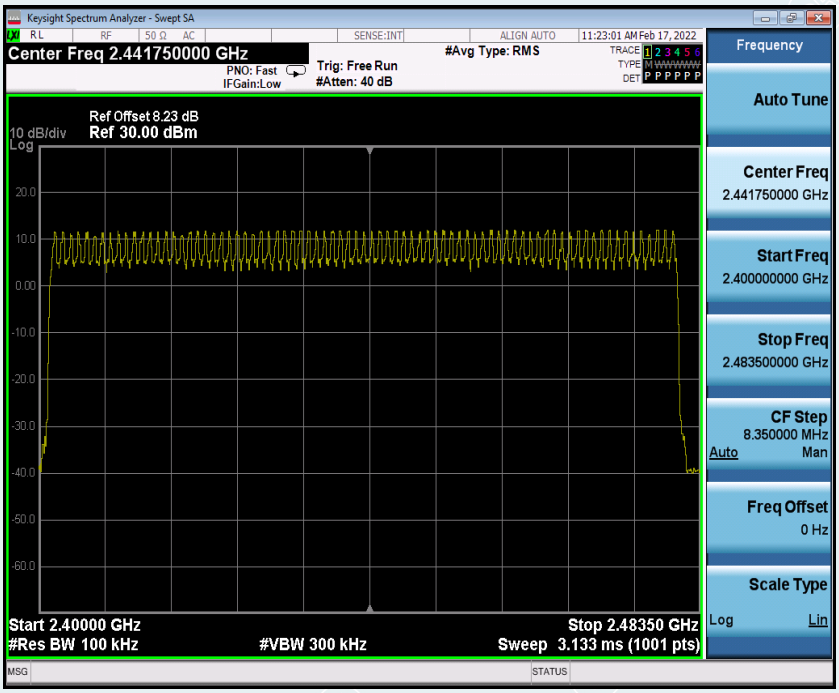
π/4-DQPSK

2.400 GHz – 2.4835 GHz



8DPSK

2.400 GHz – 2.4835 GHz



Test result: The unit does meet the FCC requirements.

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9. DWELL TIME

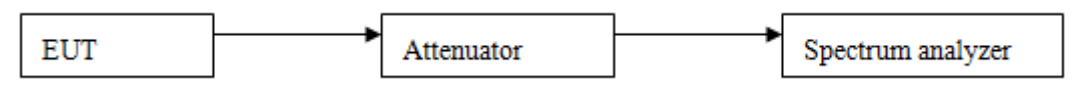
9.1 LIMITS

Regulation 15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

9.2 TEST PROCEDURES

1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2) Set spectrum analyzer span = 0. centered on a hopping channel.
3) Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Detector Function = Peak. Trace = Max hold.
4) Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g.. data rate. modulation format. etc.). Repeat this test for each variation.
5) DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot TX, 1 time slot RX).So, the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.
6) DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slotsTX, 1 time slot RX).So, the dwell time is the time duration of the pulse times 5.06 x 31.6 = 160 within 31.6 seconds.
7) DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slotsTX, 1 time slot RX).So, the dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.

9.3 TEST SETUP



9.4 TEST RESULTS

Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

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

GFSK: Middle Channel (2.441GHz)

DH1	time slot=	0.39	(ms)*	(1600/(2*79))	*	31.6	=	124.8	ms
DH3	time slot=	1.64	(ms)*	(1600/(4*79))	*	31.6	=	262.4	ms
DH5	time slot=	2.89	(ms)*	(1600/(6*79))	*	31.6	=	308.3	ms

π/4-DQPSK: Middle Channel (2.441GHz)

2DH1	time slot=	0.40	(ms)*	(1600/(2*79))	*	31.6	=	128	ms
2DH3	time slot=	1.65	(ms)*	(1600/(4*79))	*	31.6	=	264	ms
2DH5	time slot=	2.91	(ms)*	(1600/(6*79))	*	31.6	=	310.4	ms

8DPSK: Middle Channel (2.441GHz)

3DH1	time slot=	0.40	(ms)*	(1600/(2*79))	*	31.6	=	128	ms
3DH3	time slot=	1.65	(ms)*	(1600/(4*79))	*	31.6	=	264	ms
3DH5	time slot=	2.90	(ms)*	(1600/(6*79))	*	31.6	=	309.3	ms

The results are not greater than 0.4 seconds.
The unit does meet the requirements.

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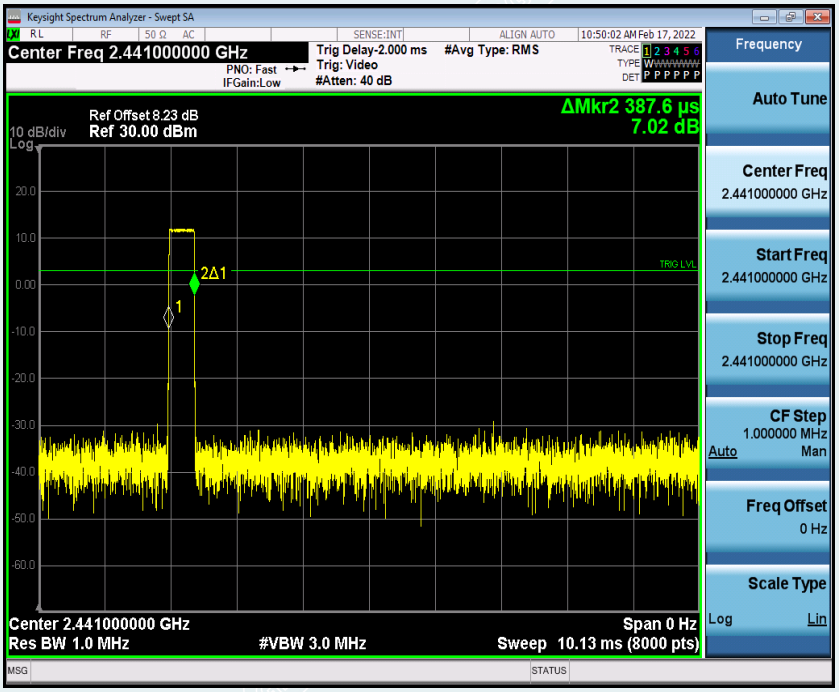
Please refer the graph as below:

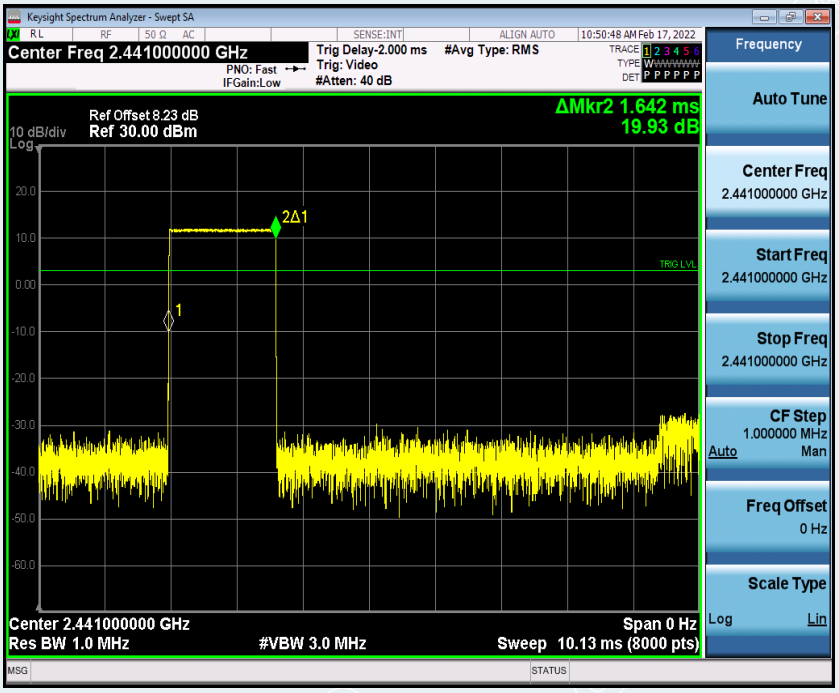
GFSK

Middle Frequency (2.441GHz)

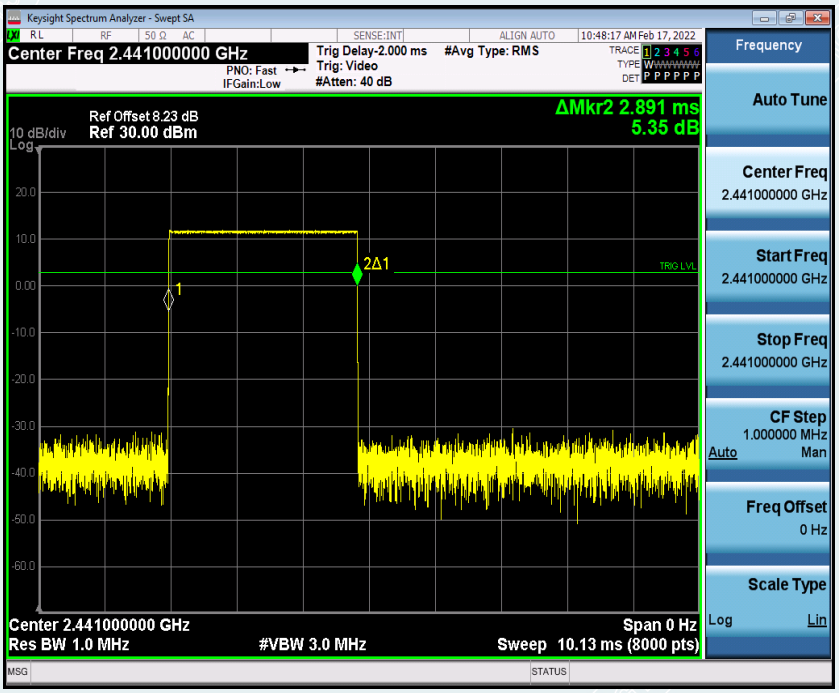
DH1



DH3

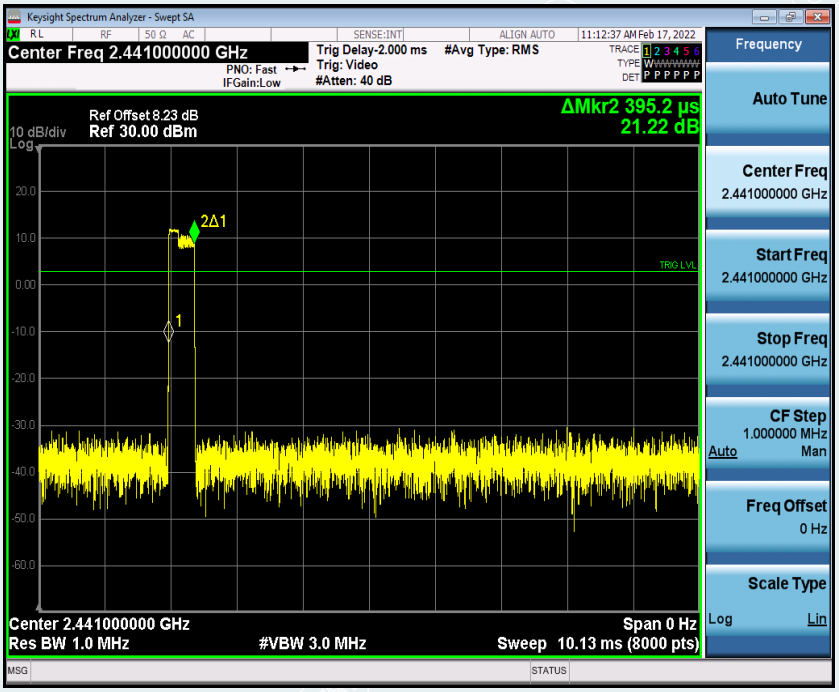


DH5

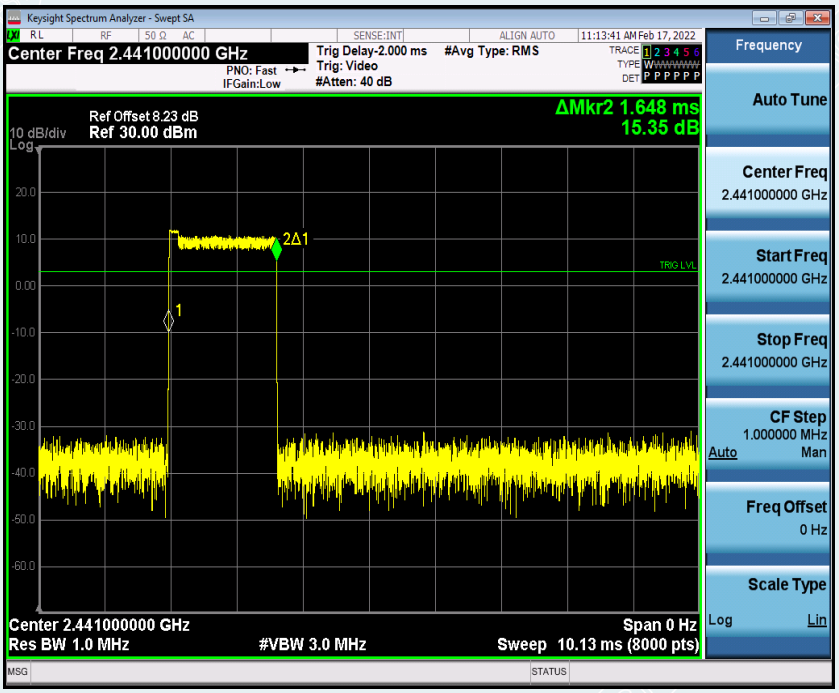


---------- **The following blanks** ----------

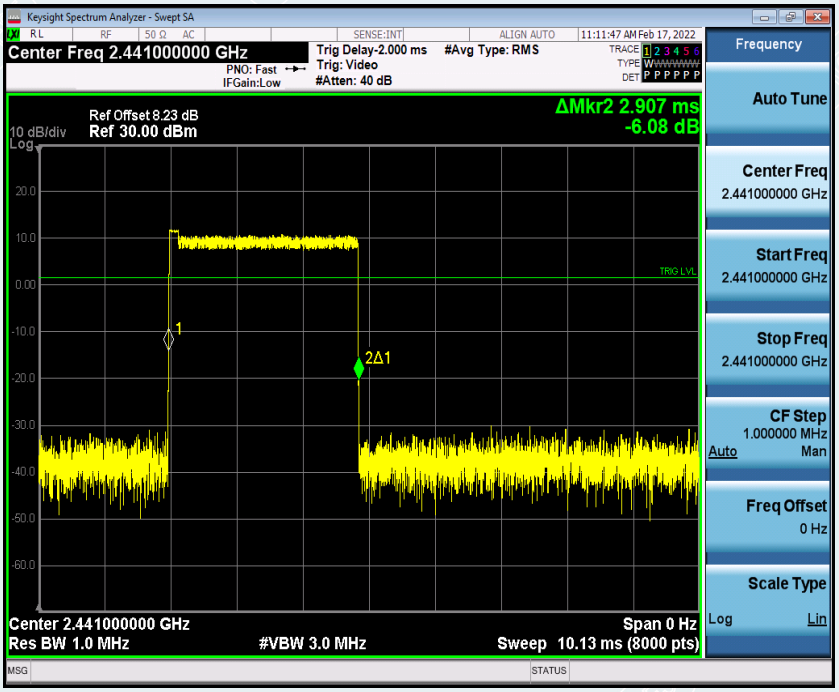
π/4-DQPSK
Middle Frequency (2.441GHz)
2DH1



2DH3



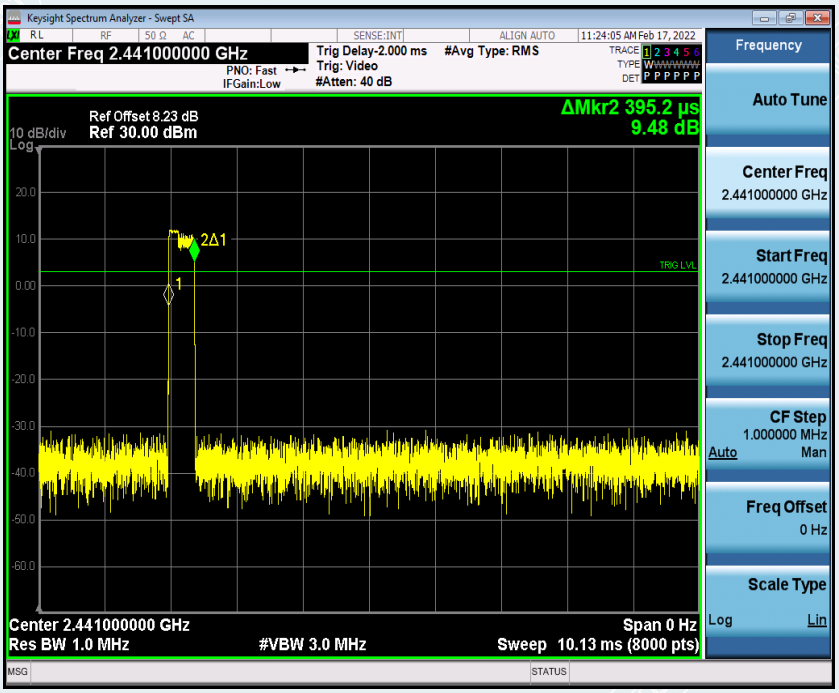
2DH5



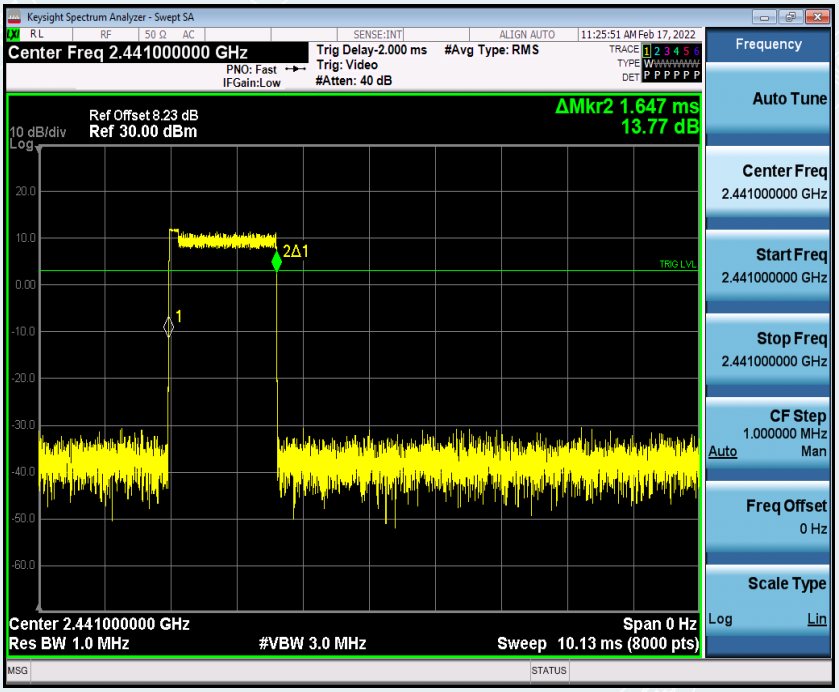
8DPSK

Middle Frequency (2.441GHz)

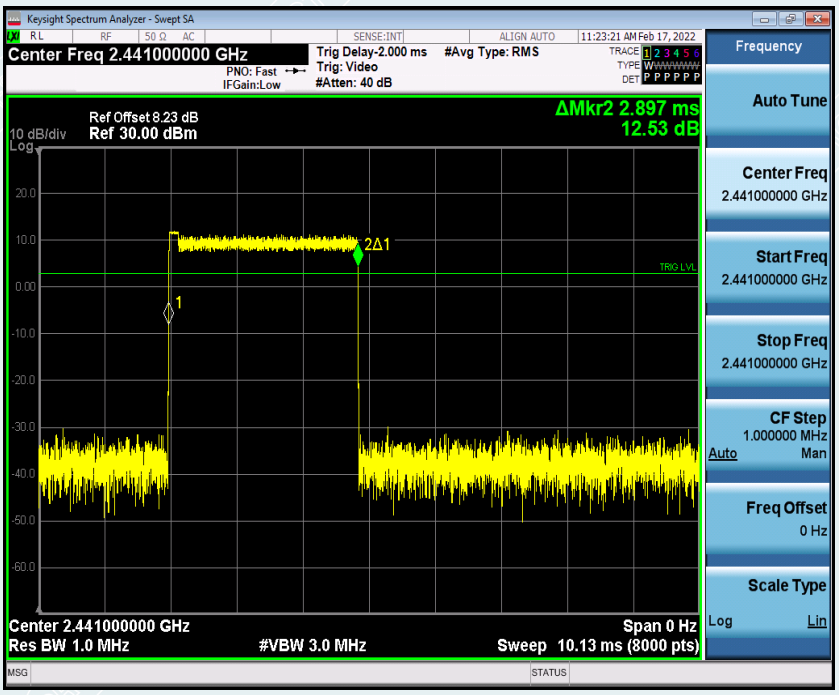
3DH1



3DH3


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Avg Type: RMS
#Atten: 40 dB
11:25:51 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 1.647 ms
13.77 dB
2Δ1
1
TRIG LVL
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

3DH5


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Fast
IFGain:Low
Trig Delay-2.000 ms
Trig: Video
#Avg Type: RMS
#Atten: 40 dB
11:23:21 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 30.00 dBm
ΔMkr2 2.897 ms
12.53 dB
2Δ1
1
TRIG LVL
Center 2.441000000 GHz
Res BW 1.0 MHz
#VBW 3.0 MHz
Span 0 Hz
Sweep 10.13 ms (8000 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

10. MAXIMUM PEAK OUTPUT POWER

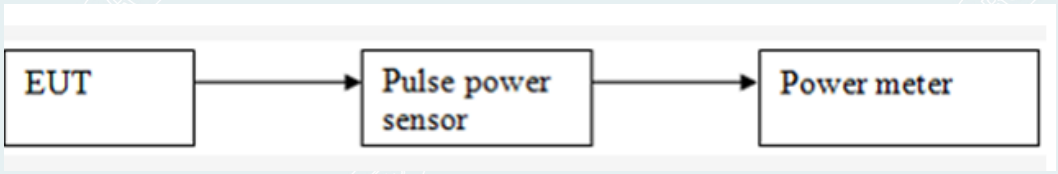
10.1 LIMITS

Regulation 15.247 (b)(1)For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

10.2 TEST PROCEDURES

1) Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the power meter and enable the EUT transmit continuously.
2) Keep the EUT in transmitting at lowest, middle and highest channel individually. Record the max value.

10.3 TEST SETUP



10.4 TEST RESULTS

Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/ Average	Pass/Fail
Lowest	2.402	12.83	20.97	Peak	Pass
Middle	2.441	13.12			Pass
Highest	2.480	13.07			Pass

2DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/ Average	Pass/Fail
Lowest	2.402	12.71	20.97	Peak	Pass
Middle	2.441	12.97			Pass
Highest	2.480	13.06			Pass

3DH5

Test Channel	Fundamental Frequency (GHz)	Max Output Power(dBm)	Limit (dBm)	Peak/ Average	Pass/Fail
Lowest	2.402	12.70	20.97	Peak	Pass
Middle	2.441	12.96			Pass
Highest	2.480	13.08			Pass

Test result: The unit does meet the FCC requirements.

11. CONDUCTED BAND EDGES AND SPURIOUS EMISSIONS

11.1 LIMITS

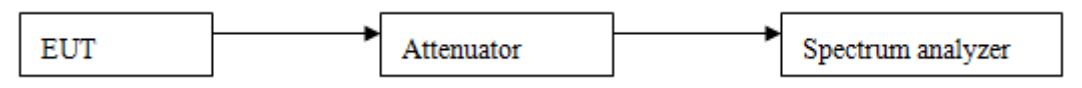
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

11.2 TEST PROCEDURES

Test procedures follow KDB 558074 D01 DTS Measurement Guidance v05r02.

1) Remove the antenna from the EUT and then connect a low attenuation cable from the antenna port to the spectrum.
2) Set the spectrum analyzer: RBW =100kHz; VBW =300kHz, Frequency range = 30MHz to 26.5GHz; Sweep = auto; Detector Function = Peak. Trace = Max, hold.
3) Measure and record the results in the test report.
4) The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

11.3 TEST SETUP



11.4 TEST RESULTS

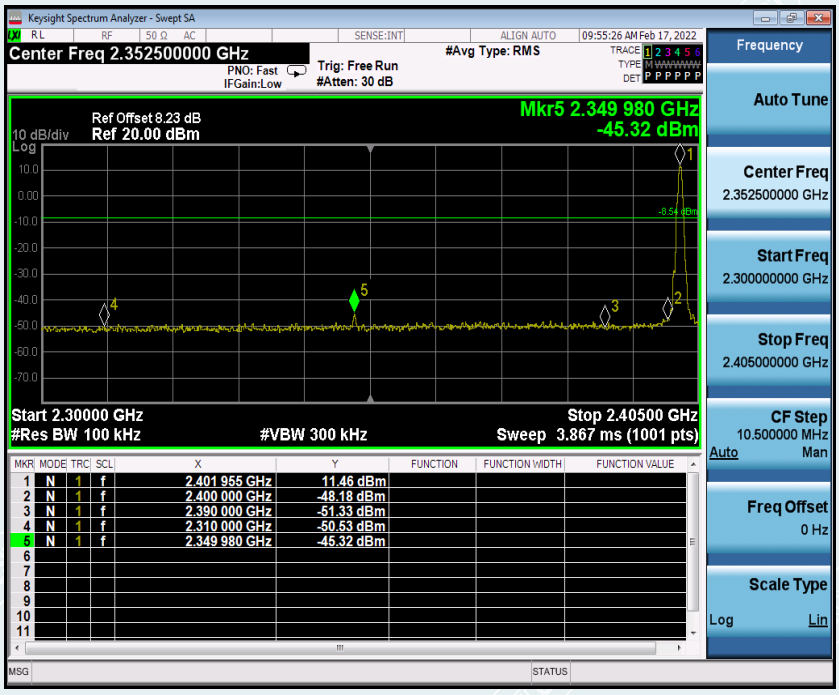
Environment: 23.1℃/53%RH Voltage: DC 3.8V
Tested By: Lu Wei Date: 2022/02/17

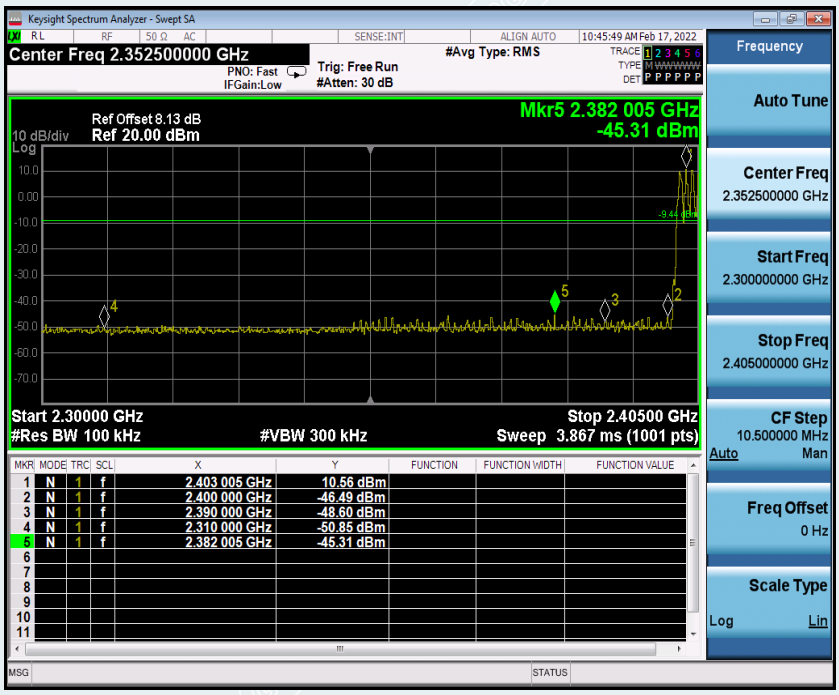
Test result plot as follows:

Band Edges

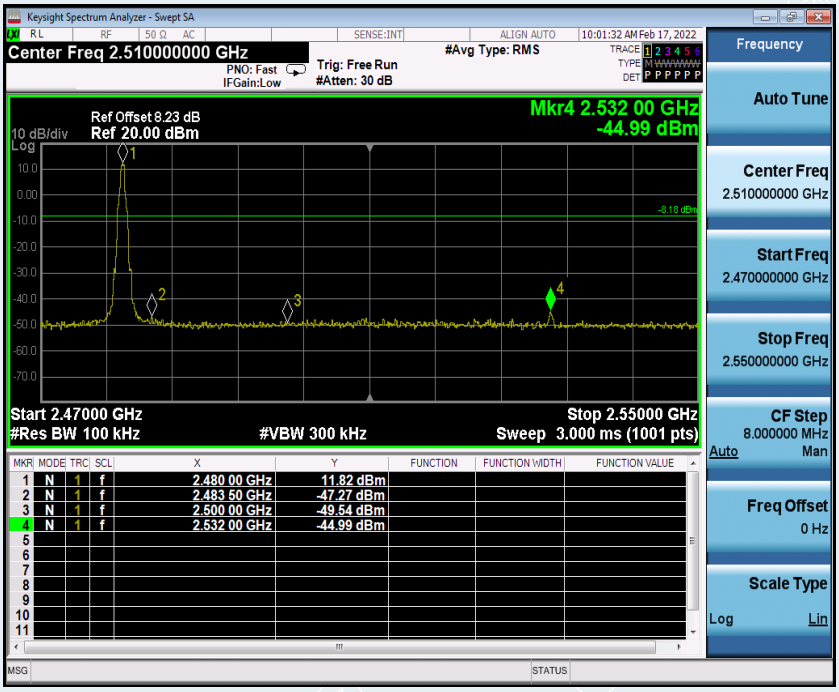
DH5

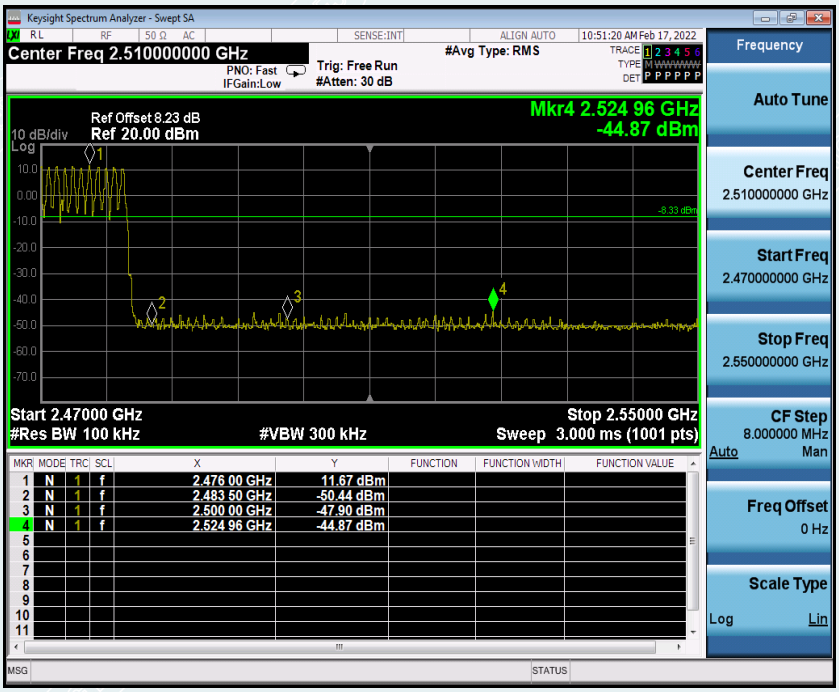
CH Low (2.30GHz ~2.405GHz)



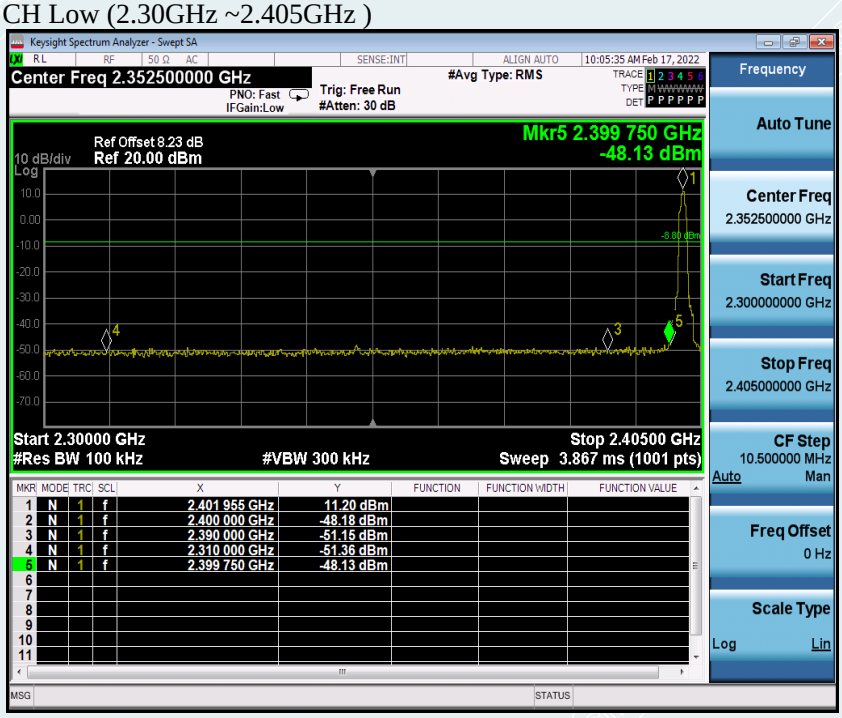


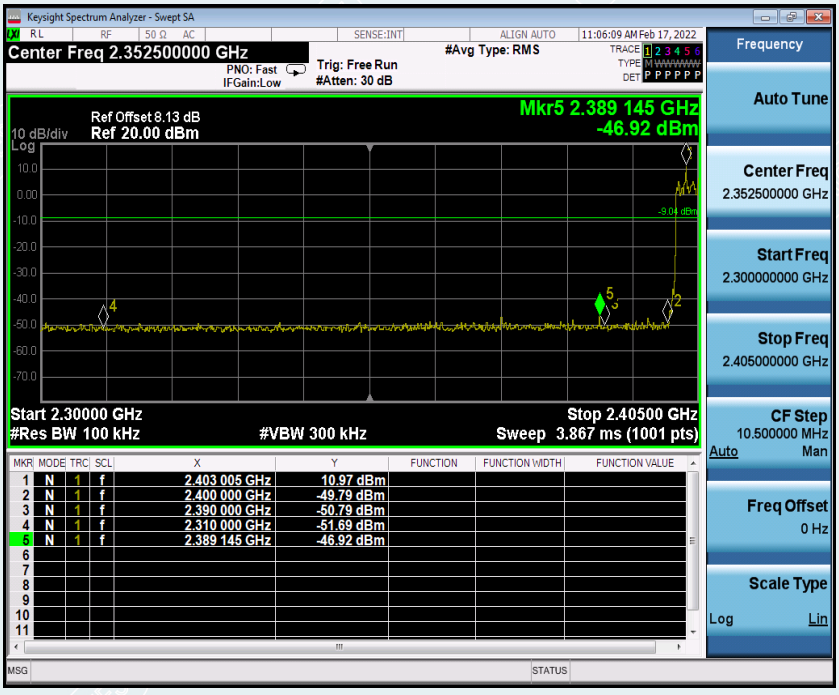
CH High (2.47GHz ~ 2.55GHz)



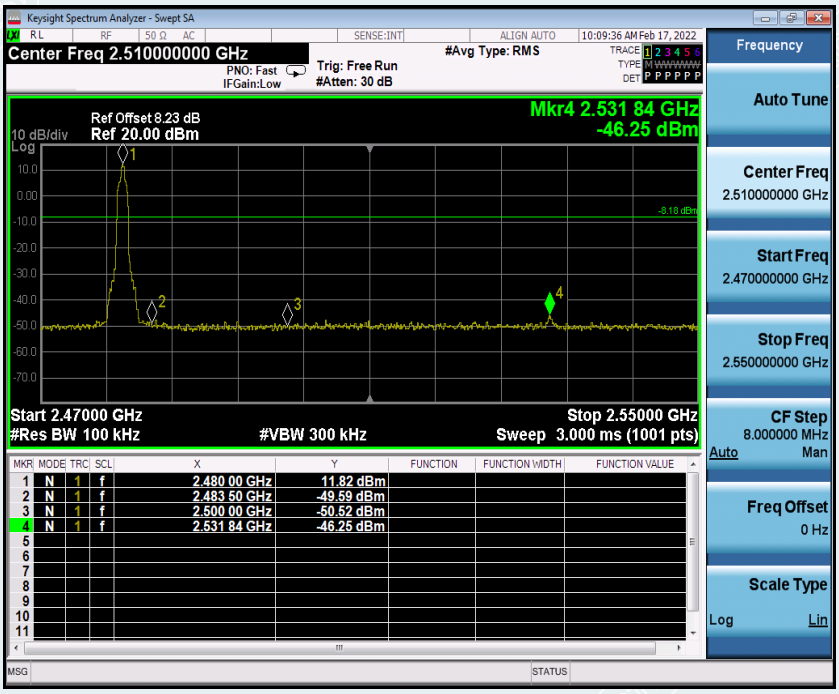


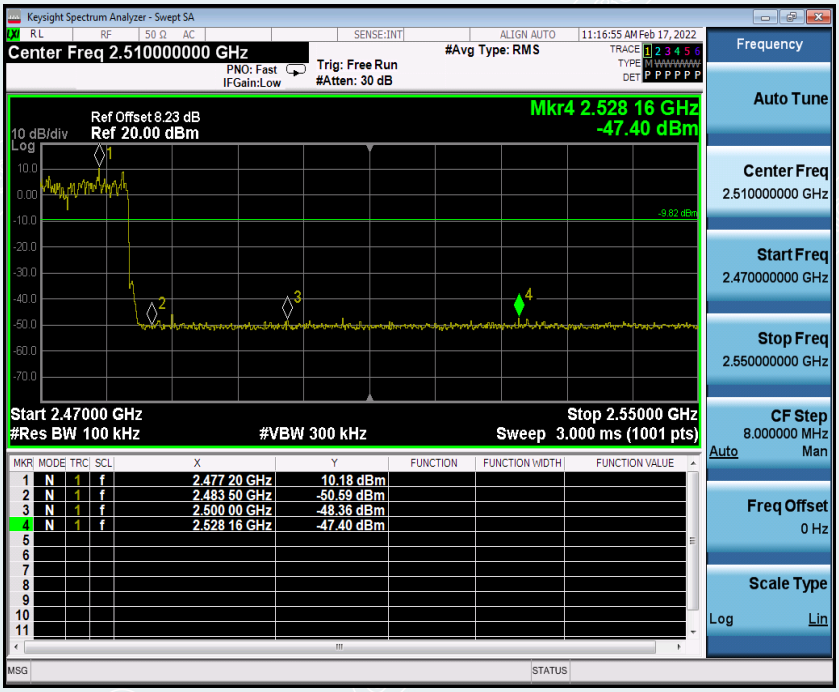
2DH5
CH Low (2.30GHz ~2.405GHz)



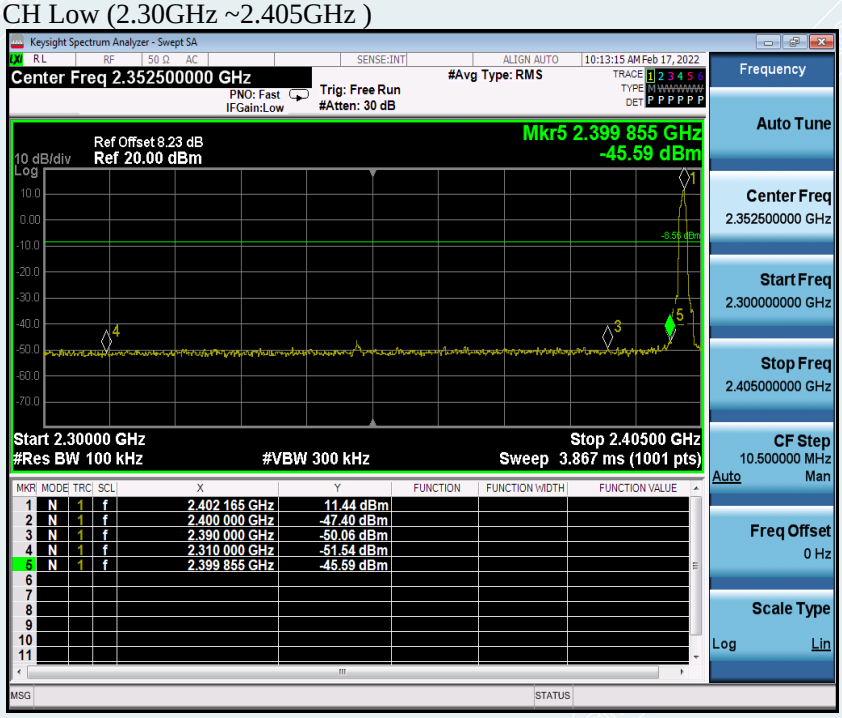


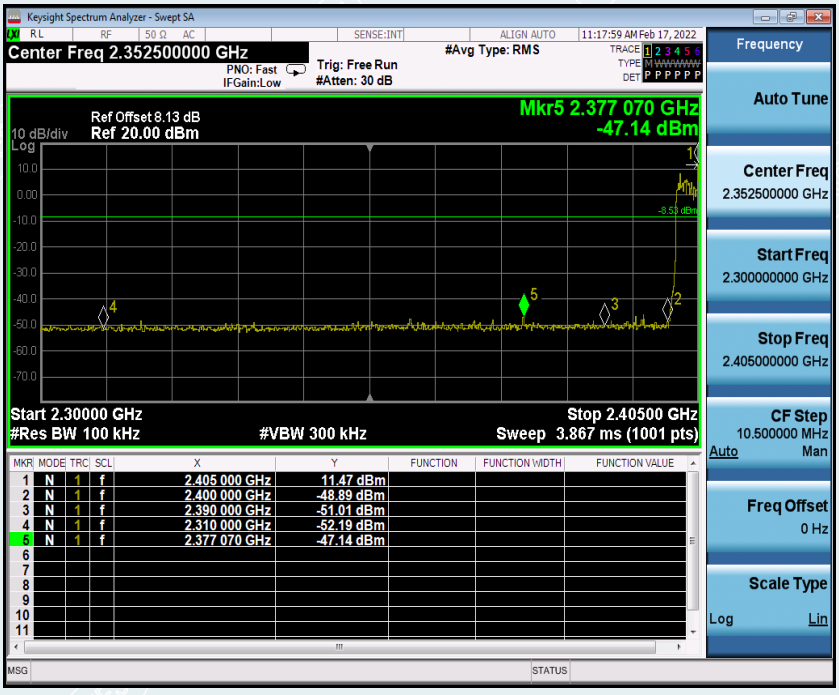
CH High (2.47GHz ~ 2.55GHz)



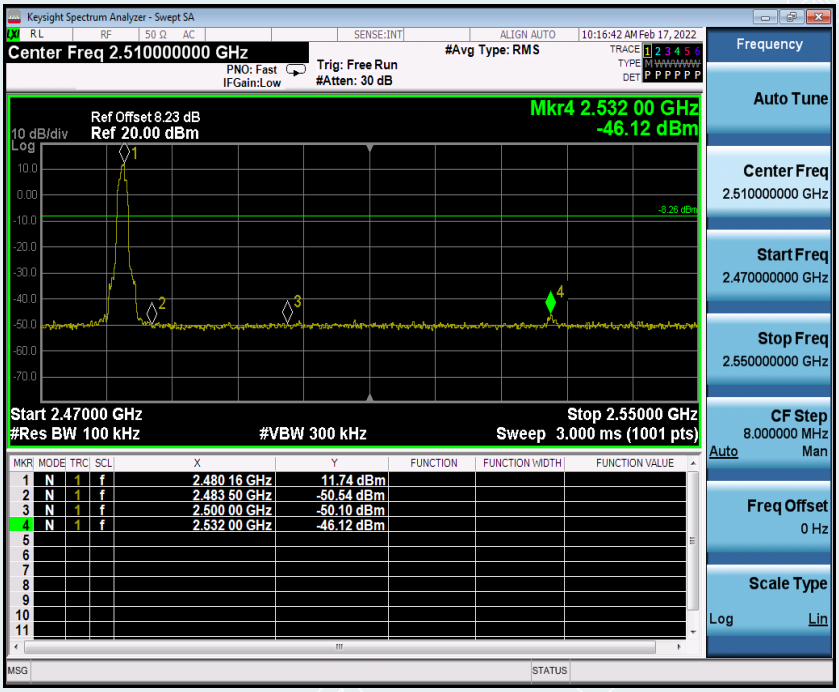


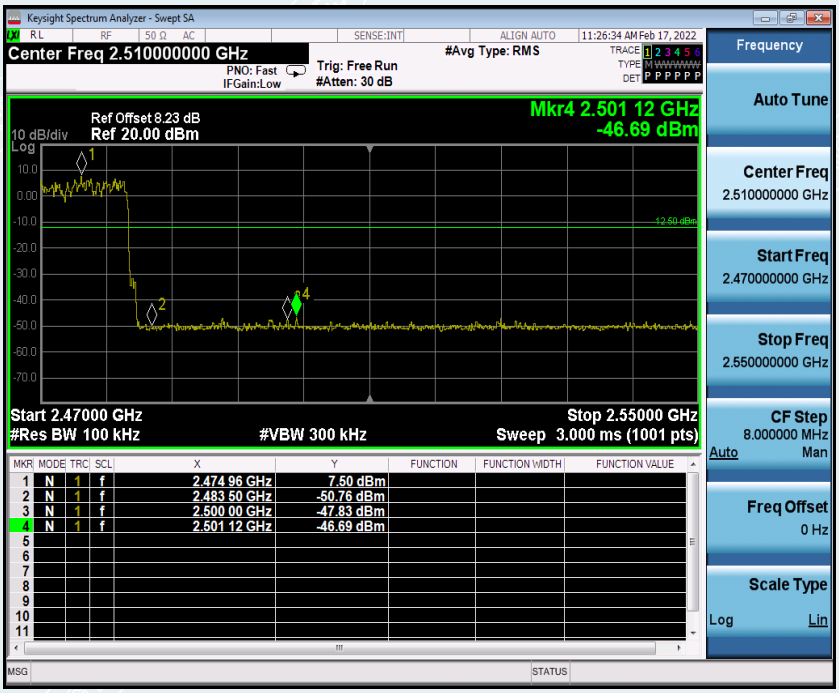
3DH5
CH Low (2.30GHz ~2.405GHz)



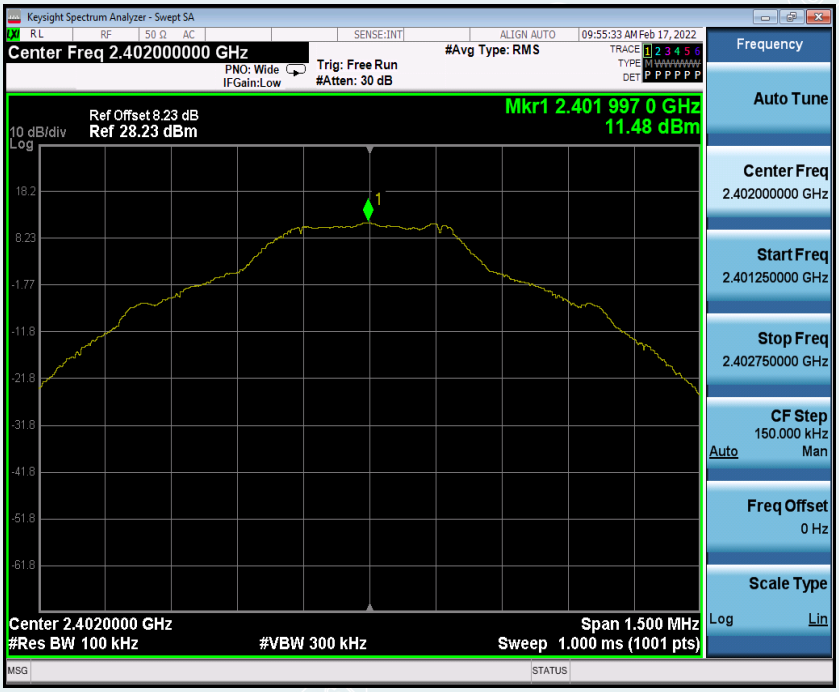


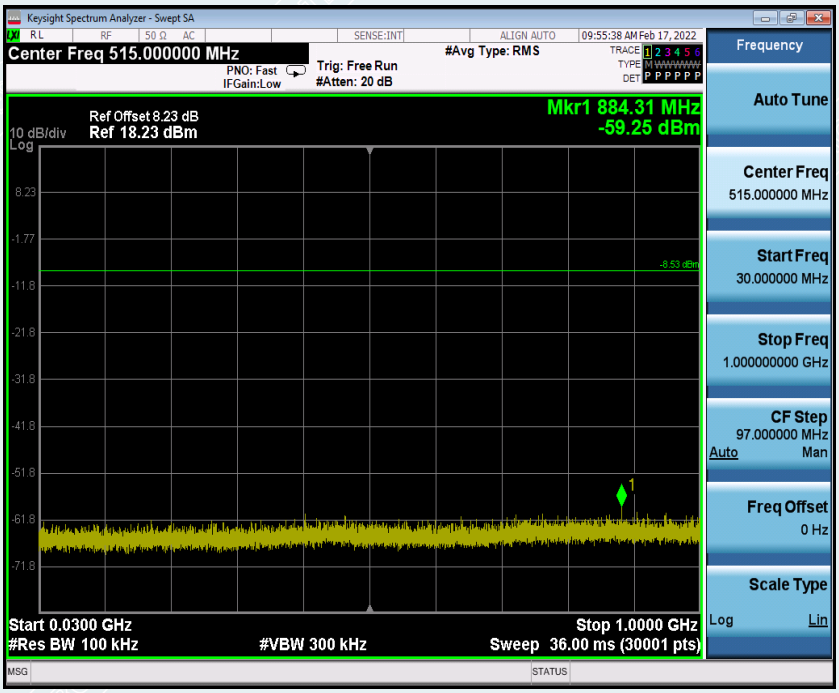
CH High (2.47GHz ~ 2.55GHz)

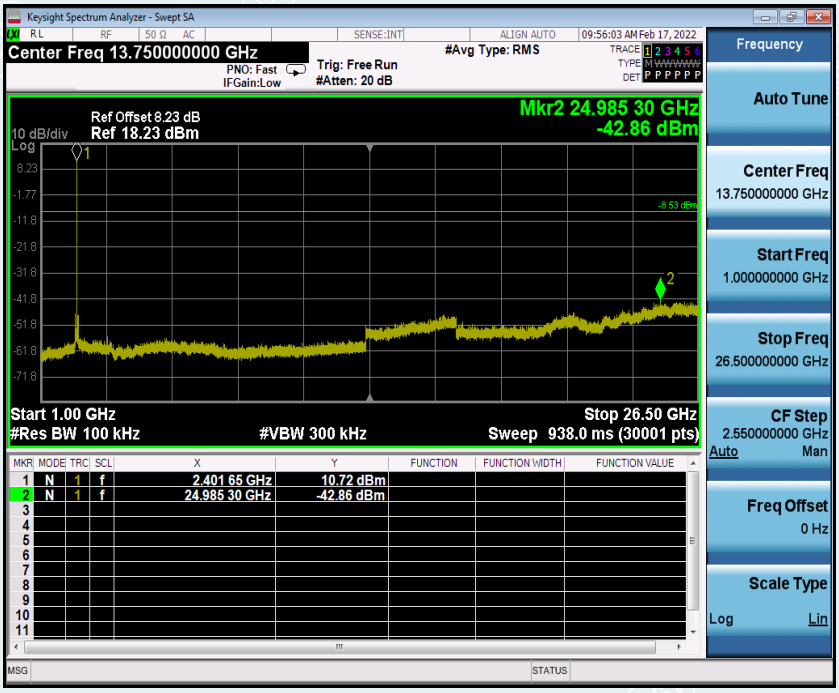




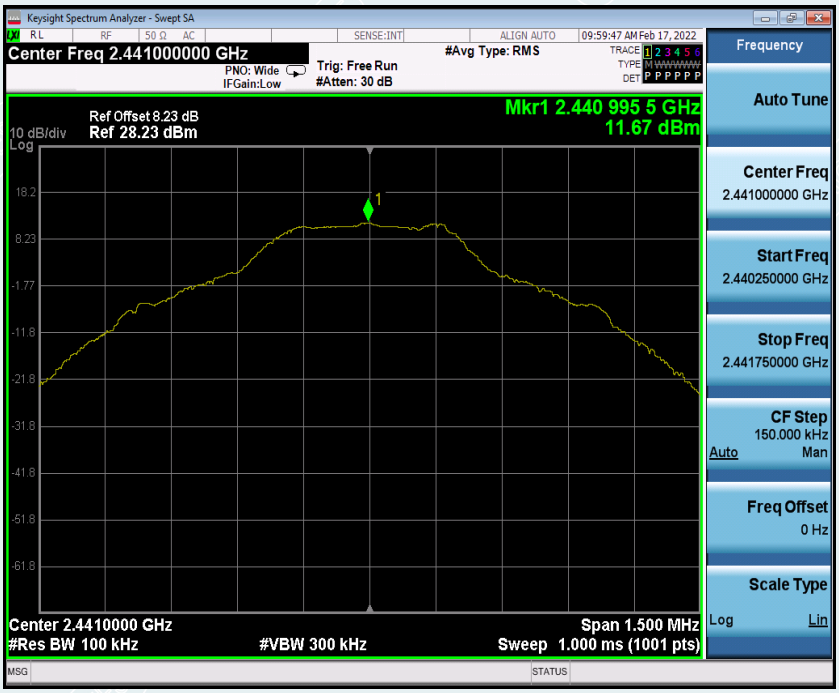
Spurious Emissions
DH5
CH Low

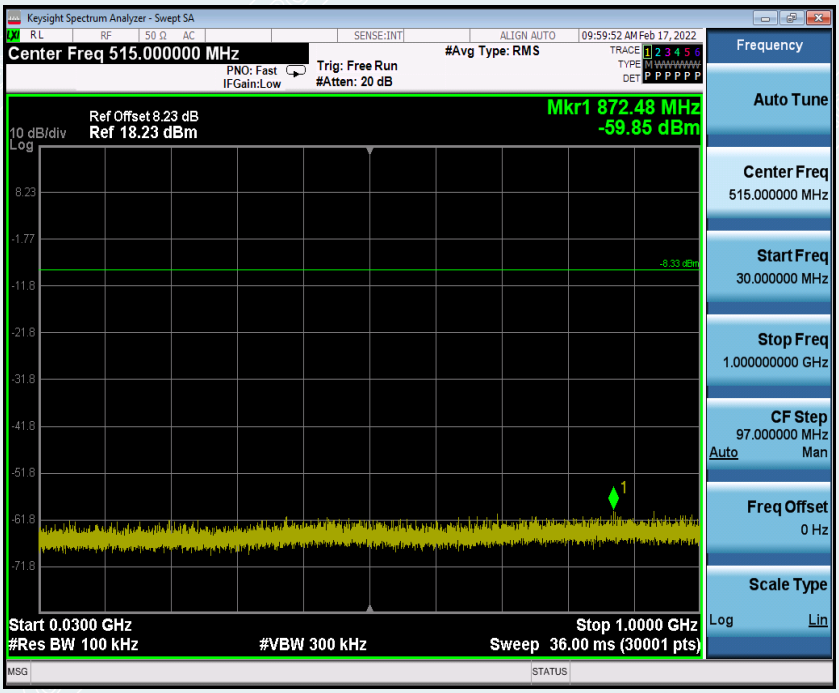


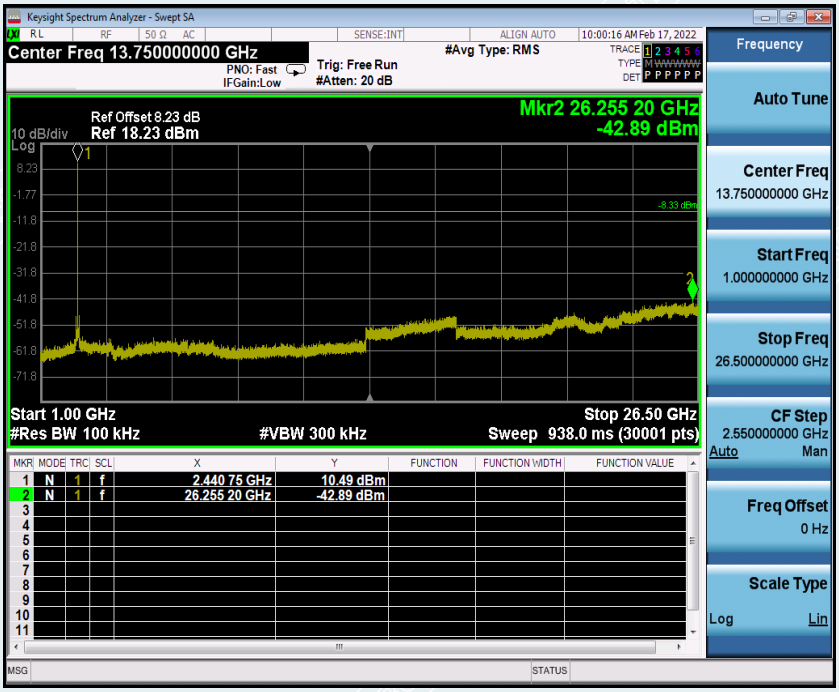



Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
09:56:03 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Mkr2 24.985 30 GHz
-42.86 dBm
-8.53 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
1 N 1 f 2.401 65 GHz 10.72 dBm
2 N 1 f 24.985 30 GHz -42.86 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

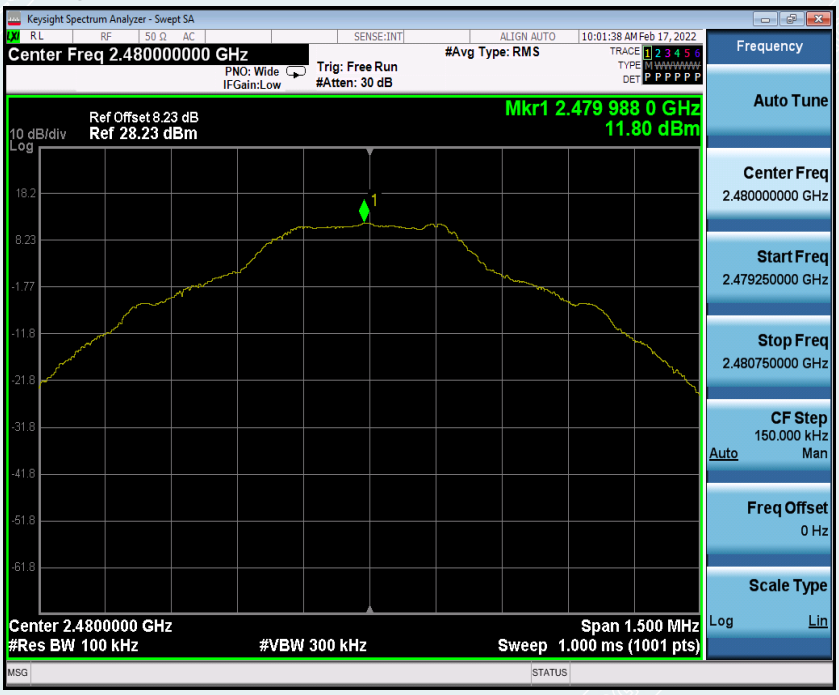
CH Mid

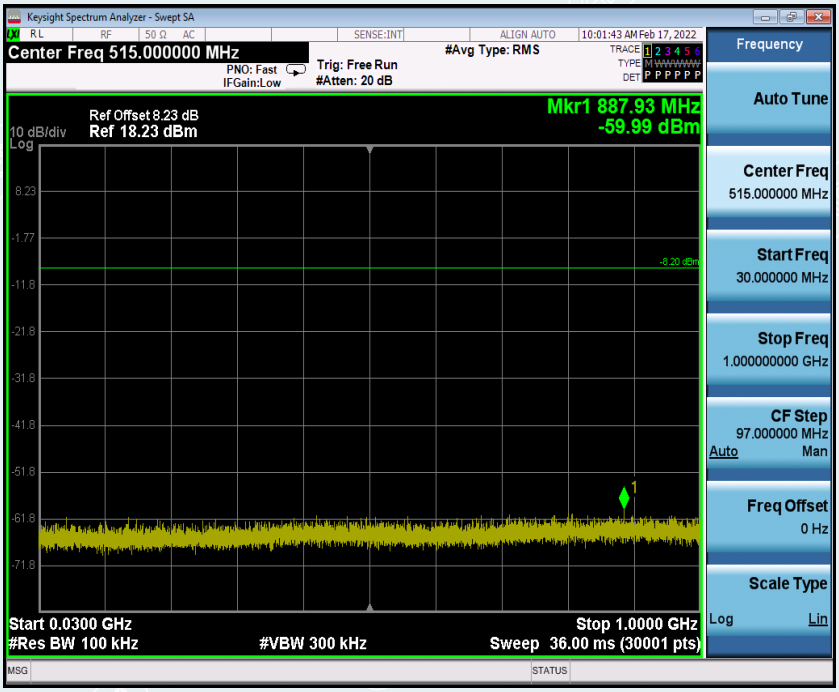

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
09:59:47 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Mkr1 2.440 995 5 GHz
11.67 dBm
Center 2.4410000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.440250000 GHz
Stop Freq
2.441750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

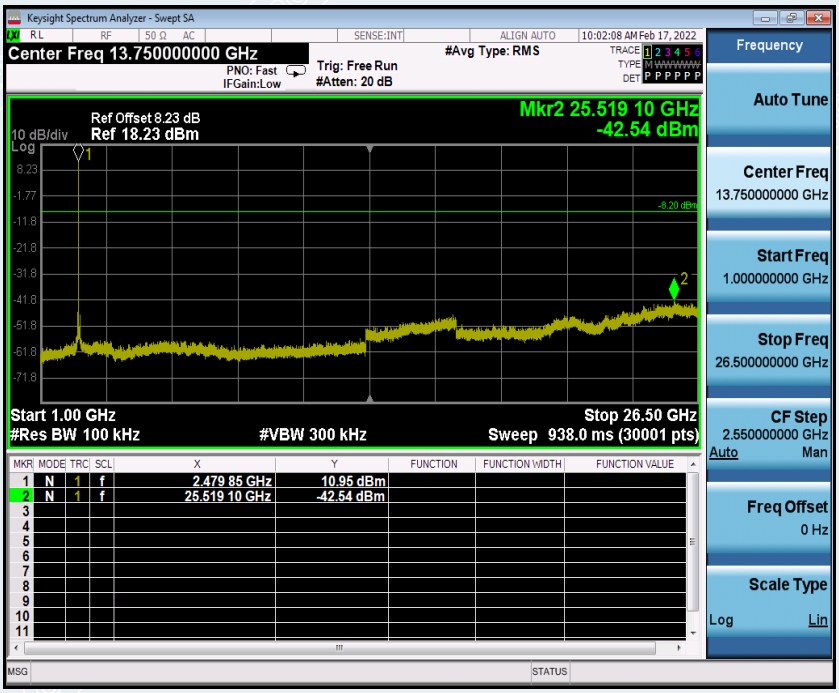

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
09:59:52 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr1 872.48 MHz
-59.85 dBm
-8.33 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:00:16 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 26.255 20 GHz
-42.89 dBm
-8.33 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.440 75 GHz 10.49 dBm
2 N 1 f 26.255 20 GHz -42.89 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

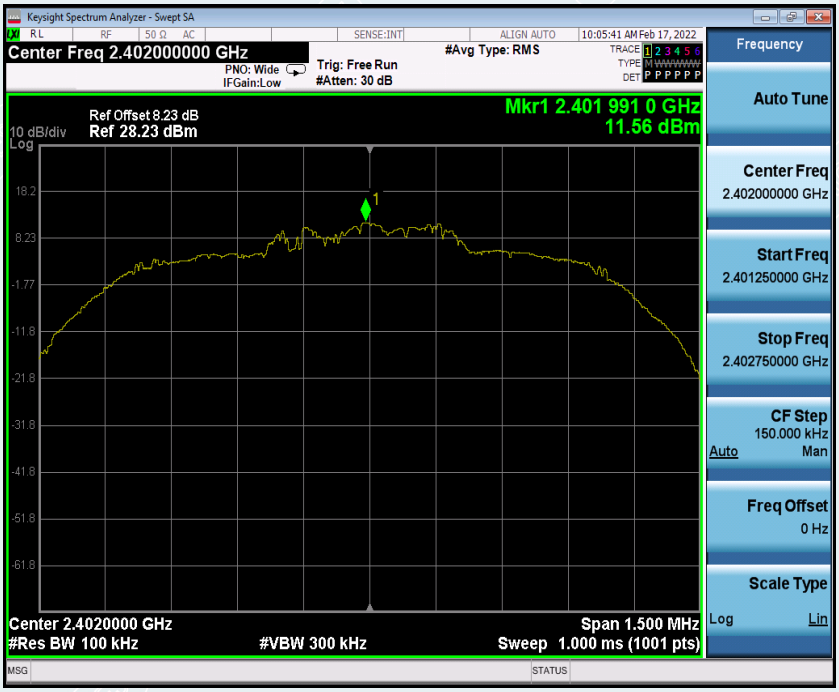
CH High

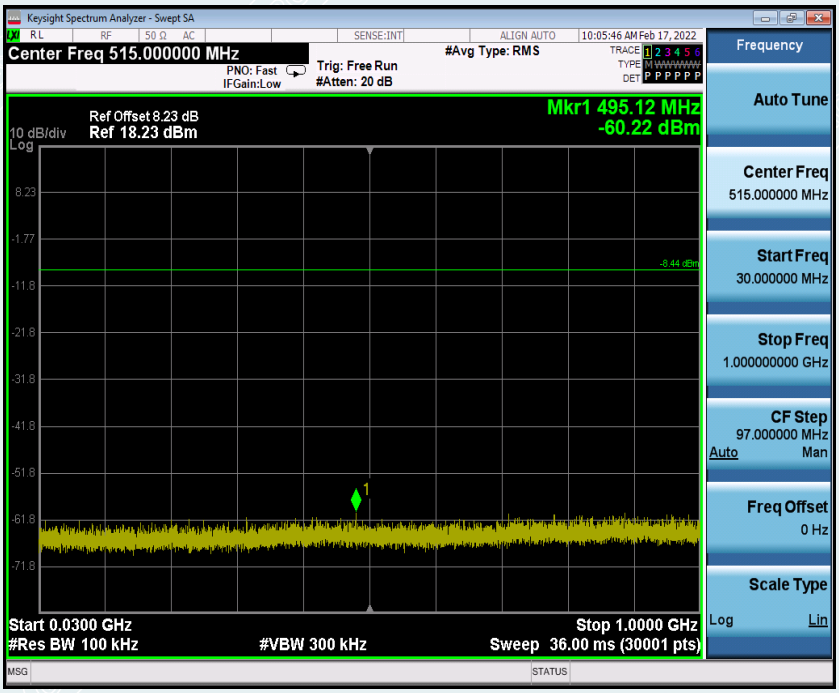

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:01:38 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Mkr1 2.479 988 0 GHz
11.80 dBm
Center 2.4800000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479250000 GHz
Stop Freq
2.480750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

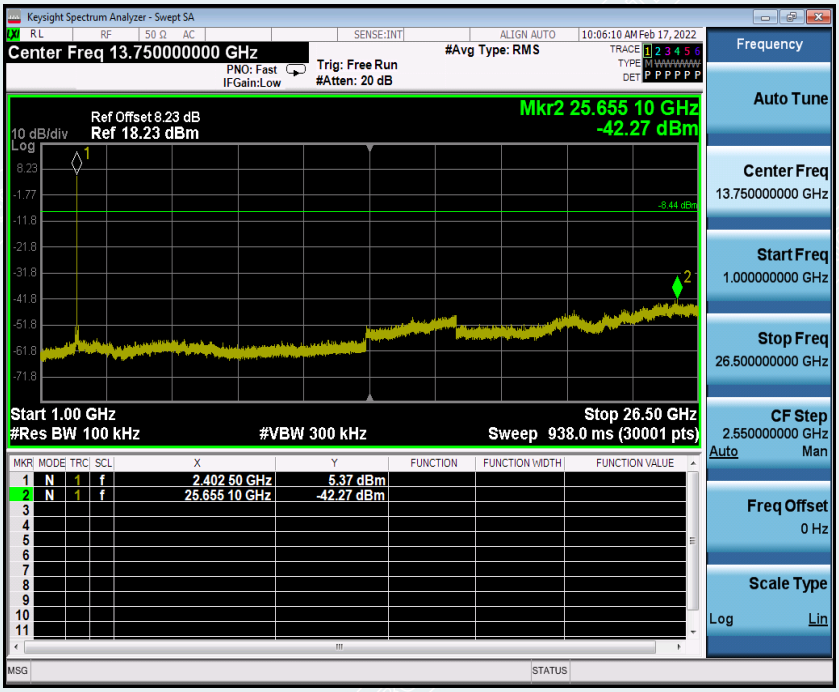

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:01:43 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Mkr1 887.93 MHz
-59.99 dBm
-8.20 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:02:08 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 25.519 10 GHz
-42.54 dBm
-8.20 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
1 N 1 f 2.479 85 GHz 10.95 dBm
2 N 1 f 25.519 10 GHz -42.54 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

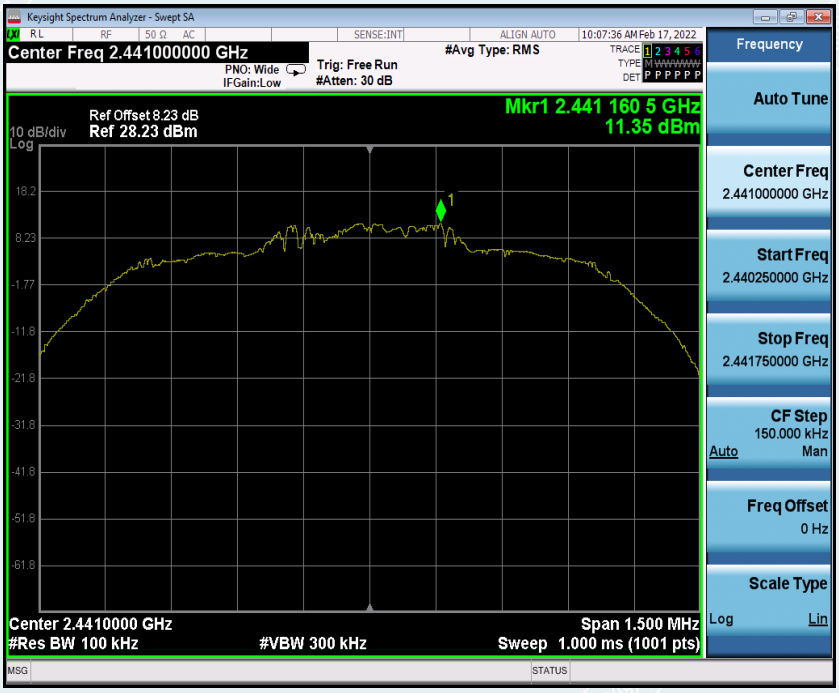
2DH5
CH Low

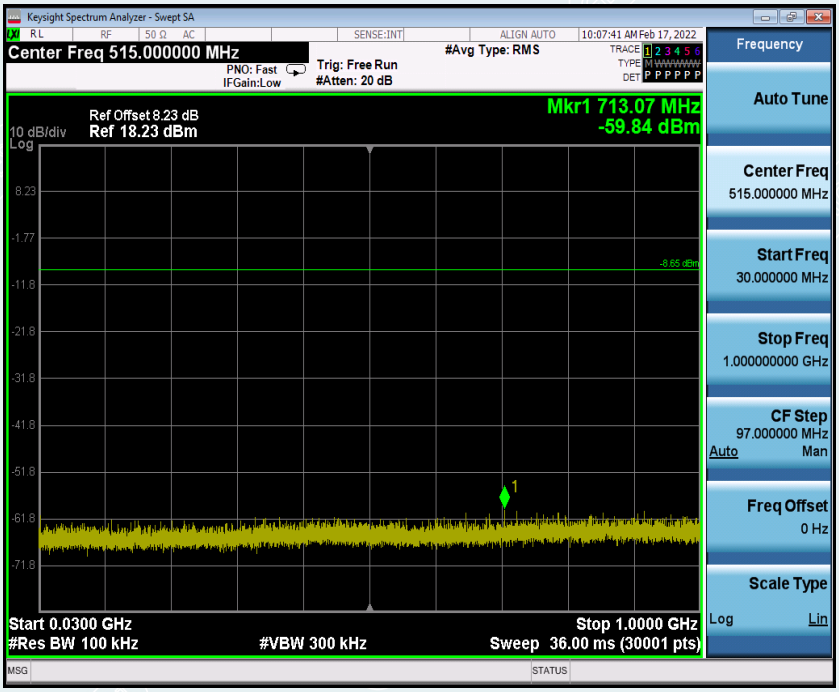

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.402000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:05:41 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Log
Mkr1 2.401 991 0 GHz
11.56 dBm
Center 2.4020000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.402000000 GHz
Start Freq
2.401250000 GHz
Stop Freq
2.402750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

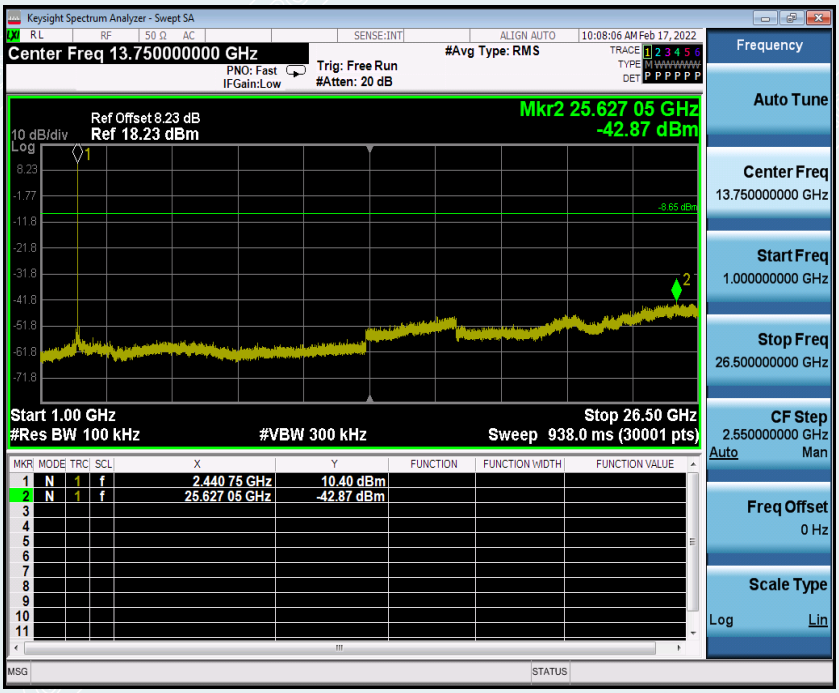

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:05:46 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr1 495.12 MHz
-60.22 dBm
-8.44 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:06:10 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 25.655 10 GHz
-42.27 dBm
-8.44 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.402 50 GHz 5.37 dBm
2 N 1 f 25.655 10 GHz -42.27 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

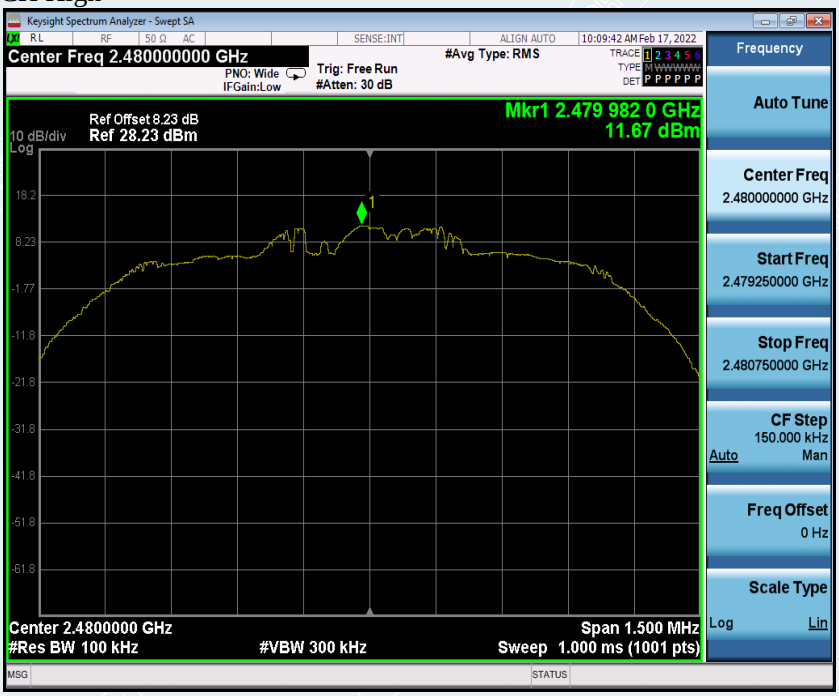
CH Mid

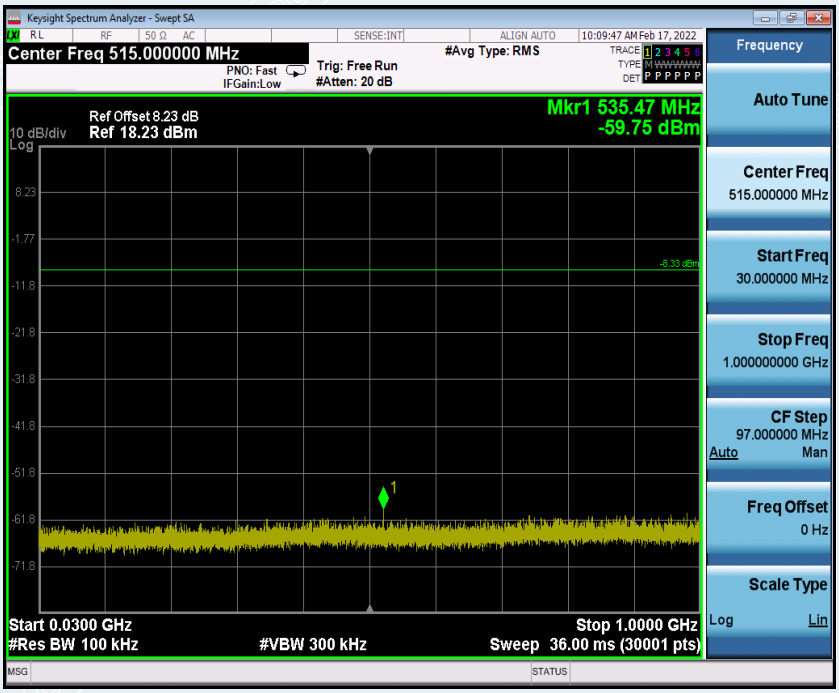

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:07:36 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Mkr1 2.441 160 5 GHz
11.35 dBm
Center 2.4410000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.440250000 GHz
Stop Freq
2.441750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

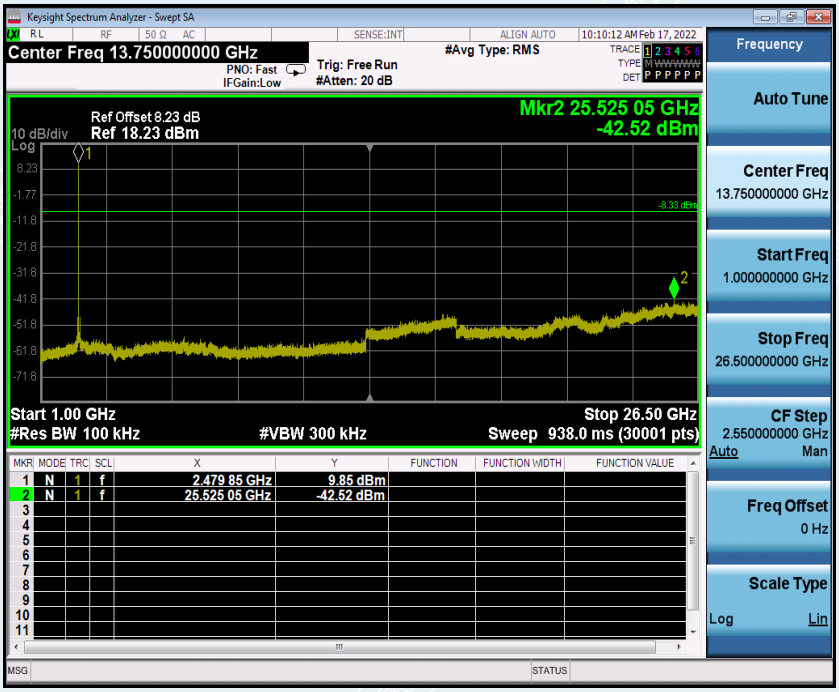

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:07:41 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Mkr1 713.07 MHz
-59.84 dBm
-8.65 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:08:06 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 25.627 05 GHz
-42.87 dBm
-8.65 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
1 N 1 f 2.440 75 GHz 10.40 dBm
2 N 1 f 25.627 05 GHz -42.87 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

CH High

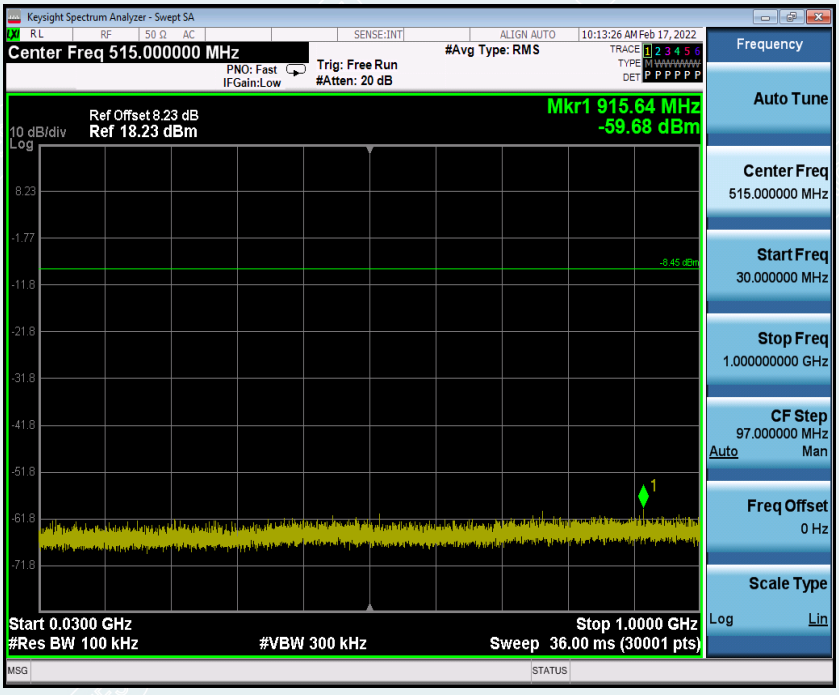

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:09:42 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Log
Mkr1 2.479 982 0 GHz
11.67 dBm
Center 2.4800000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479250000 GHz
Stop Freq
2.480750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

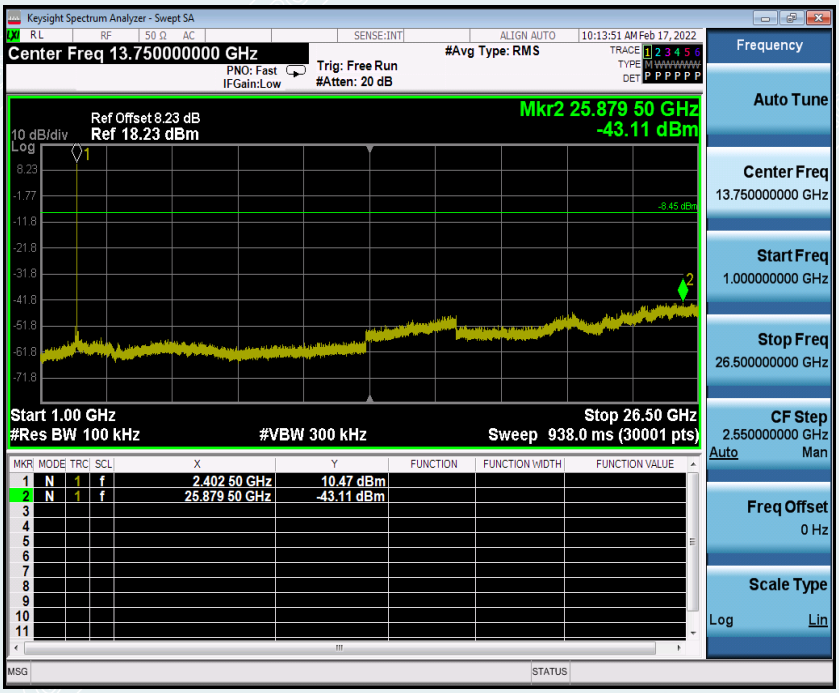

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:09:47 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr1 535.47 MHz
-59.75 dBm
-8.33 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:10:12 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 25.525 05 GHz
-42.52 dBm
-8.33 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.479 85 GHz 9.85 dBm
2 N 1 f 25.525 05 GHz -42.52 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

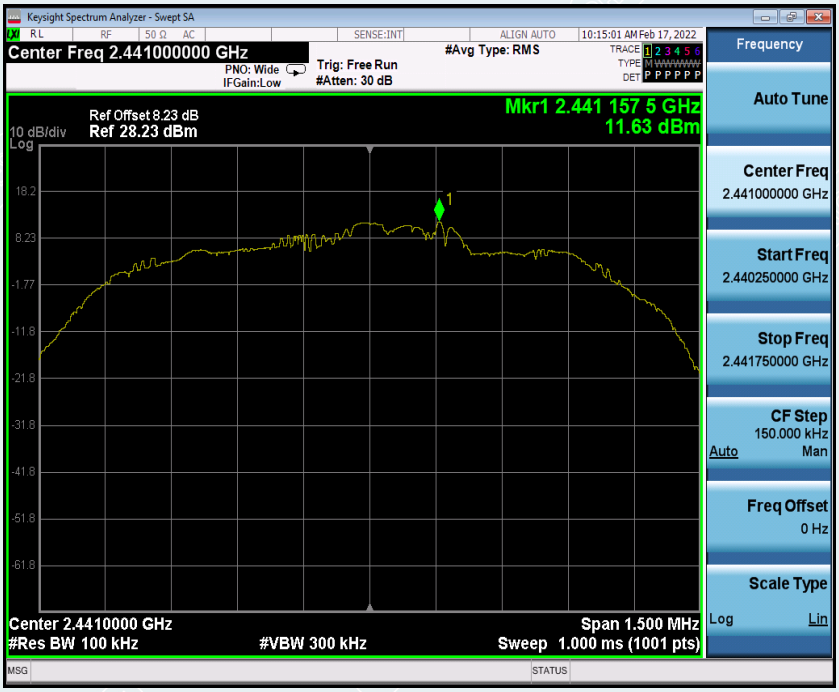
3DH5
CH Low

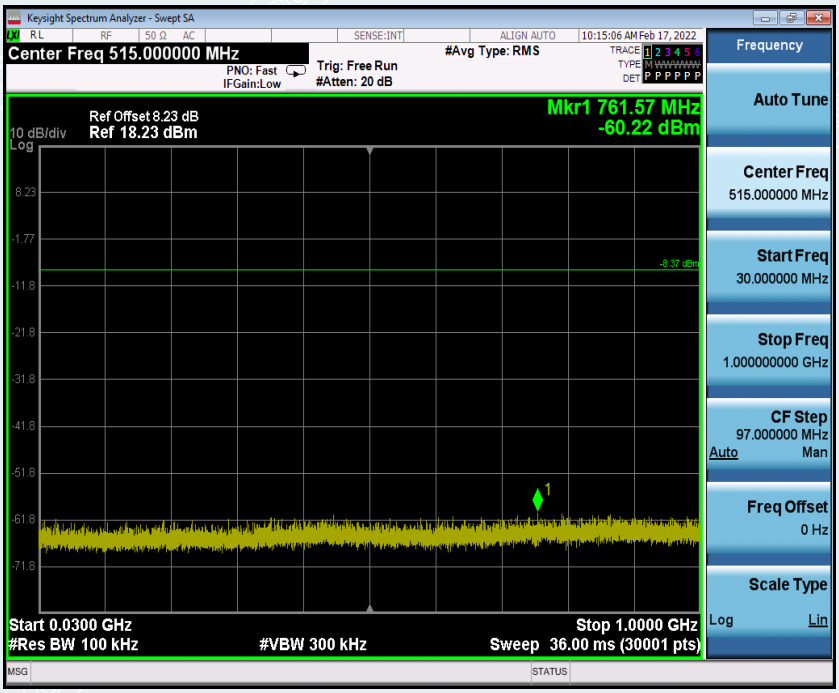

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.402000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:13:21 AM Feb 17, 2022
Frequency
Auto Tune
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Mkr1 2.401 991 0 GHz
11.55 dBm
Center Freq
2.402000000 GHz
Start Freq
2.401250000 GHz
Stop Freq
2.402750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
Center 2.4020000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
MSG
STATUS

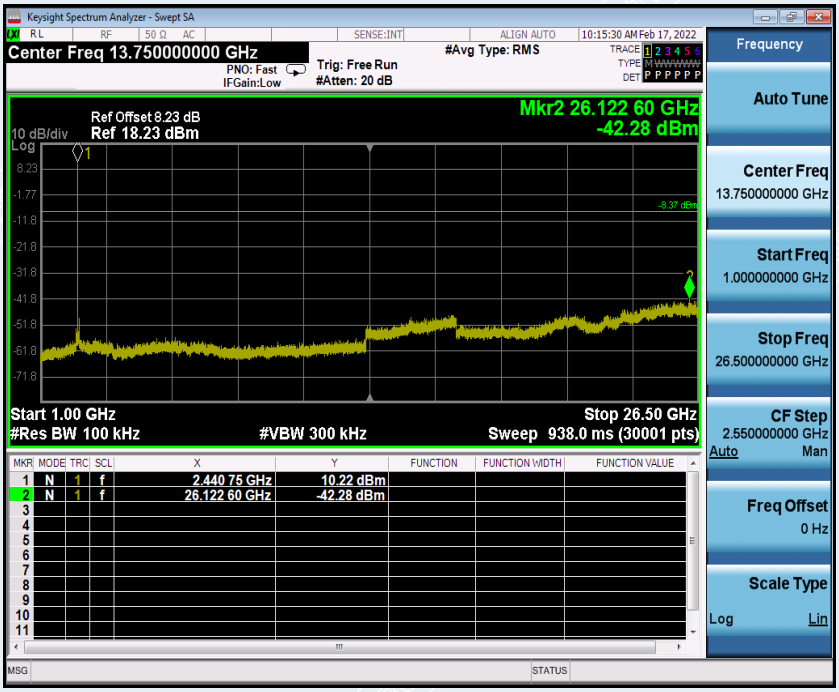

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:13:26 AM Feb 17, 2022
Frequency
Auto Tune
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Mkr1 915.64 MHz
-59.68 dBm
-8.45 dBm
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:13:51 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 25.879 50 GHz
-43.11 dBm
-8.45 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
1 N 1 f 2.402 50 GHz 10.47 dBm
2 N 1 f 25.879 50 GHz -43.11 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

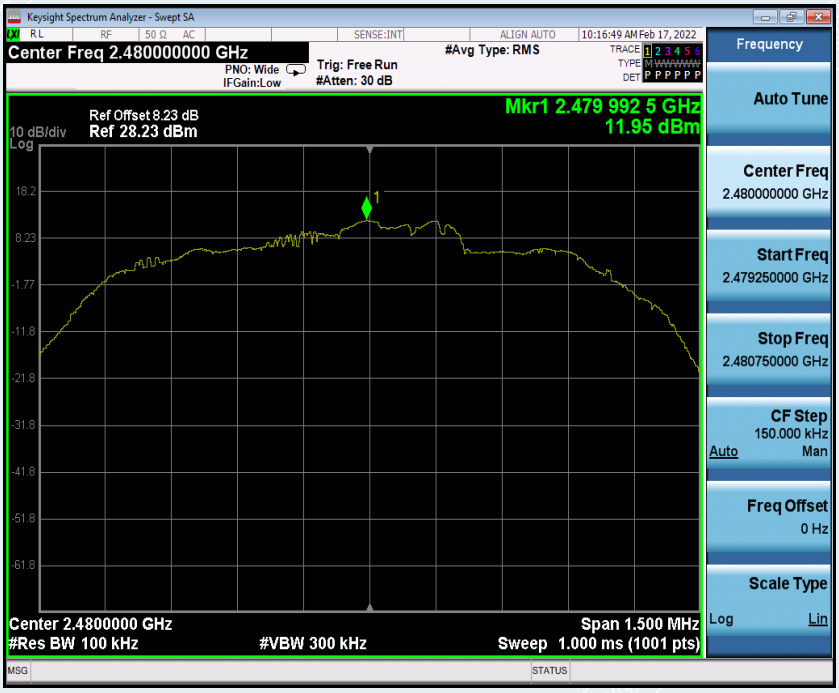
CH Mid

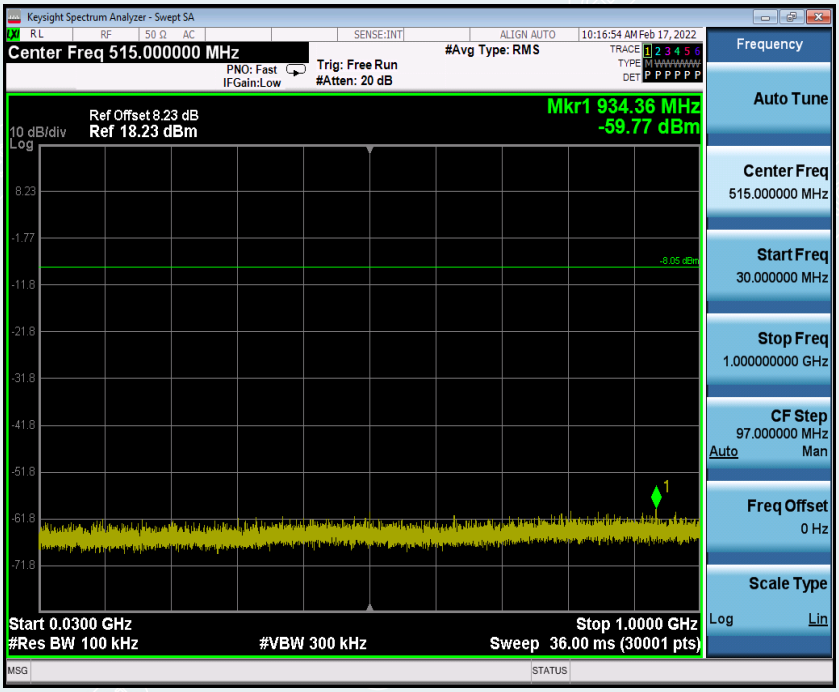

Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:15:01 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Log
Mkr1 2.441 157 5 GHz
11.63 dBm
Center 2.4410000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441000000 GHz
Start Freq
2.440250000 GHz
Stop Freq
2.441750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

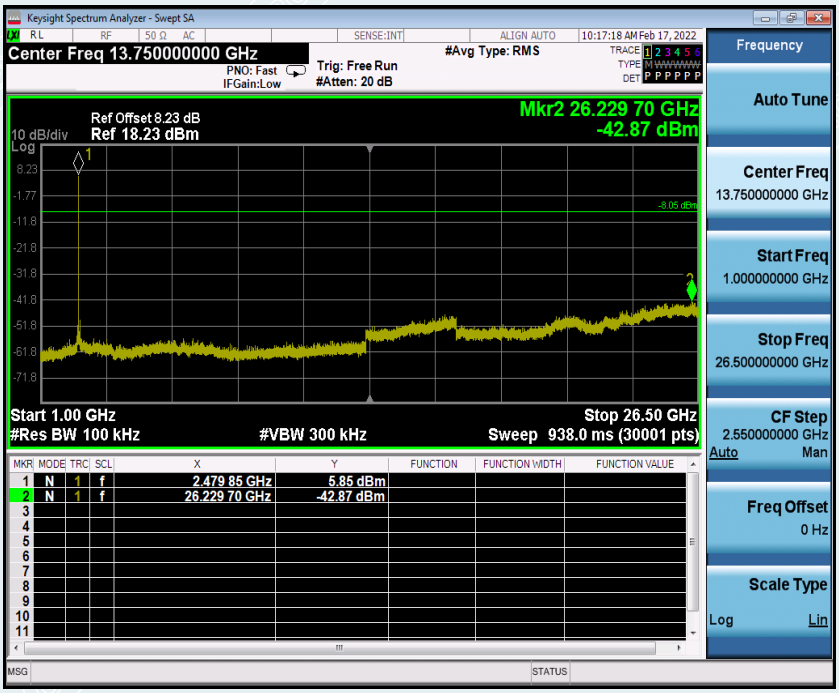

Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:15:06 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr1 761.57 MHz
-60.22 dBm
-8.37 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 13.750000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:15:30 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr2 26.122 60 GHz
-42.28 dBm
-8.37 dBm
Start 1.00 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 26.50 GHz
Sweep 938.0 ms (30001 pts)
MKR MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE
1 N 1 f 2.440 75 GHz 10.22 dBm
2 N 1 f 26.122 60 GHz -42.28 dBm
Frequency
Auto Tune
Center Freq
13.750000000 GHz
Start Freq
1.000000000 GHz
Stop Freq
26.500000000 GHz
CF Step
2.550000000 GHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS

CH High


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.480000000 GHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 30 dB
#Avg Type: RMS
10:16:49 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 28.23 dBm
Log
Mkr1 2.479 992 5 GHz
11.95 dBm
18.2
8.23
-1.77
-11.8
-21.8
-31.8
-41.8
-51.8
-61.8
Center 2.4800000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Span 1.500 MHz
Sweep 1.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.480000000 GHz
Start Freq
2.479250000 GHz
Stop Freq
2.480750000 GHz
CF Step
150.000 kHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS


Keysight Spectrum Analyzer - Swept SA
Center Freq 515.000000 MHz
PNO: Fast
IFGain:Low
Trig: Free Run
#Atten: 20 dB
#Avg Type: RMS
10:16:54 AM Feb 17, 2022
Ref Offset 8.23 dB
10 dB/div
Ref 18.23 dBm
Log
Mkr1 934.36 MHz
-59.77 dBm
8.23
-1.77
-11.8
-21.8
-31.8
-41.8
-51.8
-61.8
-71.8
-8.05 dBm
Start 0.0300 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 1.0000 GHz
Sweep 36.00 ms (30001 pts)
Frequency
Auto Tune
Center Freq
515.000000 MHz
Start Freq
30.000000 MHz
Stop Freq
1.000000000 GHz
CF Step
97.000000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin
MSG
STATUS



The unit does meet the FCC requirements.

---------- The following blanks ----------

12. RADIATED SPURIOUS EMISSIONS

12.1 LIMITS

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.

Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5-93.8
0.490-1.705	24000/F(kHz)	30	73.8-63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

NOTE:

(1) The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

(2) The lower limit shall apply at the transition frequencies.

12.2 TEST PROCEDURES

1) Sequence of testing 9 kHz to 30 MHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 0.8 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions.

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna height is 1.0 meter.

--- At each turntable position the analyzer sweeps with peak detection to find the maximum of all emissions

Final measurement:

--- Identified emissions during the pre measurement the software maximizes by rotating the turntable position (0 °to 360 °) and by rotating the elevation axes (0 °to 360 °).

--- The final measurement will be done in the position (turntable and elevation) causing the highest emissions with QP detector.

--- The final levels, frequency, measuring time, bandwidth, turntable position, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

2) Sequence of testing 30 MHz to 1 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a table with 0.8 m height is used, which is placed on the ground plane.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna is polarized vertical and horizontal.

--- The antenna height changes from 1 to 4 meter.

--- At each turntable position, antenna polarization and height the analyzer sweeps three times in peak to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable rotates from 0 °to 360 °and antenna movement between 1 and 4 meter.

--- The final measurement will be done with QP detector with an EMI receiver.

--- The final levels, frequency, measuring time, bandwidth, antenna height, antenna polarization, turntable angle, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the premeasurement with marked maximum final measurements and the limit will be stored.

3) Sequence of testing 1 GHz to 18 GHz

Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 3 meter.

--- The EUT was set into operation.

Pre measurement:

--- The turntable rotates from 0 °to 360 °.

--- The antenna is polarized vertical and horizontal.

--- The antenna height scan range is 1 meter to 4 meter.

--- At each turntable position and antenna polarization the analyzer sweeps with peak detection to find the maximum of all emissions.

Final measurement:

--- The final measurement will be performed with minimum the six highest peaks.

--- According to the maximum antenna and turntable positions of premeasurement the software maximize the peaks by changing turntable rotates from 0 °to 360 °and antenna movement between 1 and 4 meter. This procedure is repeated for both antenna polarizations.

--- The final measurement will be done in the position (turntable, EUT-table and antenna polarization) causing the highest emissions with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, turntable position, EUT-table position, antenna polarization, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement with marked maximum final measurements and the limit will be stored.

---------- **The following blanks** ----------

4) Sequence of testing above 18 GHz
Setup:

--- The equipment was set up to simulate a typical usage like described in the user manual or described by manufacturer.

--- If the EUT is a tabletop system, a rotatable table with 1.5 m height is used.

--- If the EUT is a floor standing device, it is placed on the ground plane with insulation between both.

--- Auxiliary equipment and cables were positioned to simulate normal operation conditions

--- The AC power port of the EUT (if available) is connected to a power outlet below the turntable.

--- The measurement distance is 1 meter.

--- The EUT was set into operation.

Pre measurement:

--- The antenna is moved spherical over the EUT in different polarisations of the antenna.

Final measurement:

--- The final measurement will be performed at the position and antenna orientation for all detected emissions that were found during the pre measurements with Peak and Average detector.
--- The final levels, frequency, measuring time, bandwidth, correction factor, margin to the limit and limit will be recorded. Also a plot with the graph of the pre measurement and the limit will be stored.

NOTE:
(a).The frequency from 9kHz to 150kHz, Set RBW=300Hz(for Peak & AVG), VBW=300Hz(for Peak & AVG). The frequency from 150kHz to 30MHz, Set RBW=9kHz, VBW=9kHz, (for QP Detector).
(b).The frequency from 30MHz to 1GHz, Set RBW=120kHz, VBW=300kHz, (for QP Detector).
(c).The frequency above 1GHz, for Peak detector: Set RBW=1MHz,VBW=3MHz.
(d). The frequency above 1GHz, for Avg detector: Set RBW=1MHz,if the EUT is configured to transmit with duty cycle ≥98%，set VBW≤RBW/100 (i.e.,10kHz) but not less than 10 Hz. If the EUT duty cycle is ＜98%，set VBW≥1/T, Where T is defined in section 2.8.
(e). For radiated measurement,pre-scanned in three orthogonal panels,X,Y,Z.The worst cases(X plane) were recorded in this report.

---------- **The following blanks** ----------

12.3 TEST SETUP

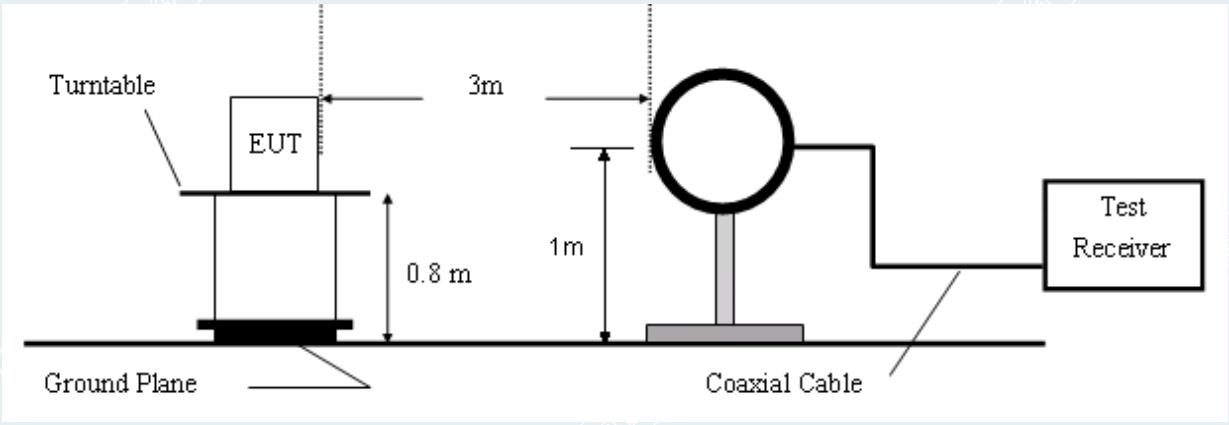


Figure 1. 9 kHz to 30MHz radiated emissions test configuration

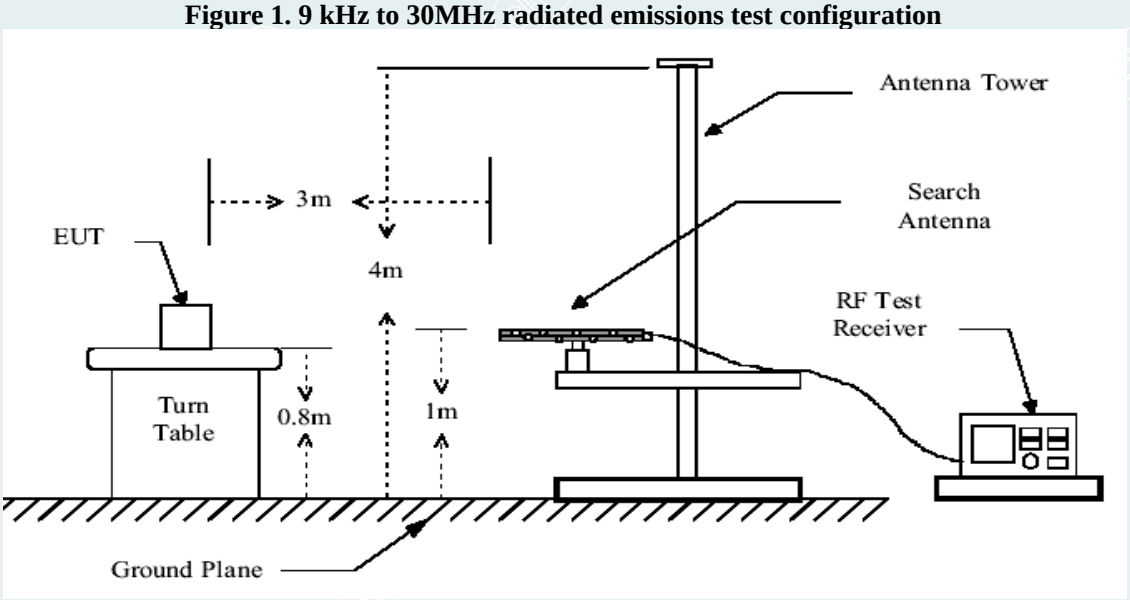


Figure 2. 30MHz to 1GHz radiated emissions test configuration

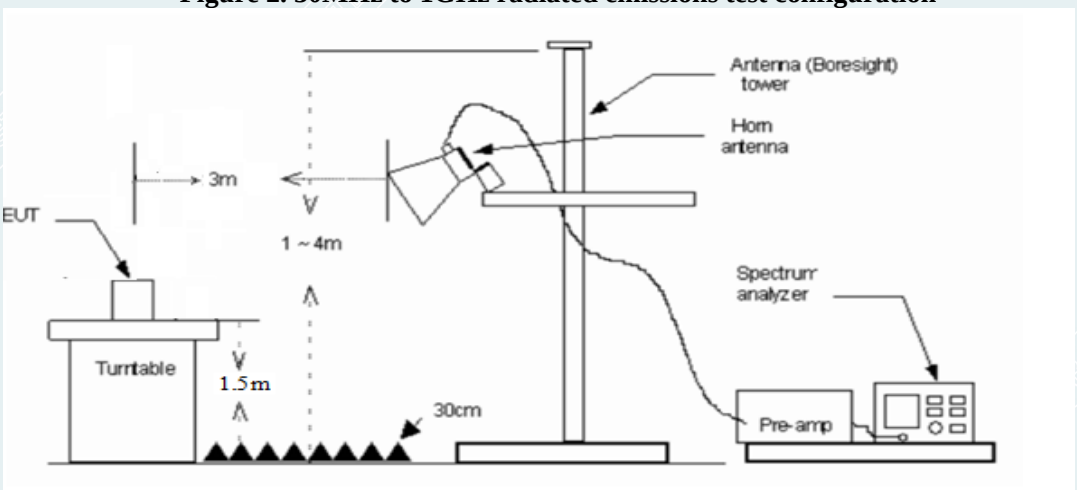


Figure 3. 1GH to 18GHz radiated emissions test configuration

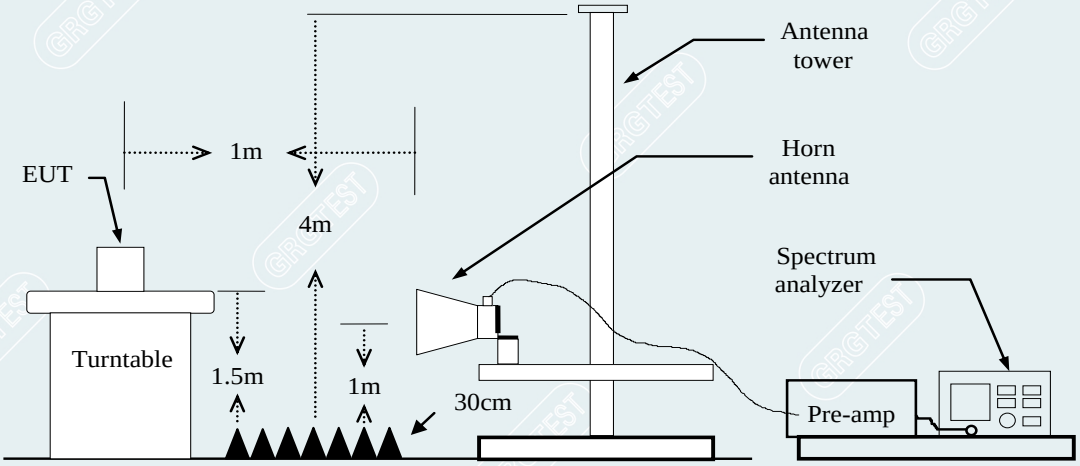


Figure 4. 18GHz to 26.5GHz radiated emissions test configuration

12.4 DATA SAMPLE

30MHz to 1GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	37.06	-15.48	21.58	40.00	-18.42	QP	Vertical

1GHz to 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	65.45	-11.12	54.33	74.00	-19.67	peak	Vertical
xxx	xxx	63.00	-11.12	51.88	54.00	-2.12	AVG	Vertical

Above 18GHz

No.	Frequency (MHz)	Reading (dBuV/m)	Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Pole
xxx	xxx	68.86	57.66	-11.20	83.54	25.88	peak	Vertical
xxx	xxx	68.89	-11.20	57.69	63.54	5.85	AVG	Vertical

Frequency (MHz) = Emission frequency in MHz
Ant.Pol. (H/V) = Antenna polarization
Reading (dBuV) = Uncorrected Analyzer / Receiver reading
Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
Result (dBuV/m) = Reading (dBuV) + Correction Factor (dB/m)
Limit (dBuV/m) = Limit stated in standard
Margin (dB) = Remark Result (dBuV/m) – Limit (dBuV/m)
Peak = Peak Reading
QP = Quasi-peak Reading
AVG = Average Reading

12.5 TEST RESULTS

9kHz to 1GHz:

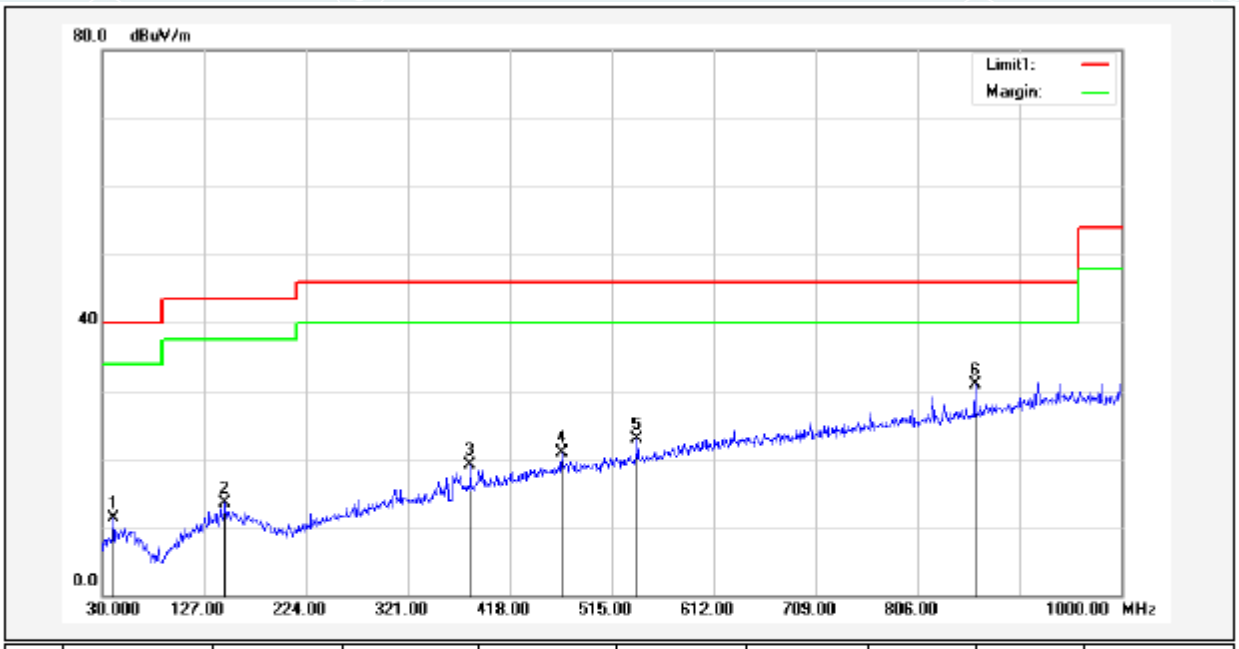
Mode: DH5

Low Frequency (2402MHz) Date: 2022/02/22

Test Engineer: Tang Shenghui

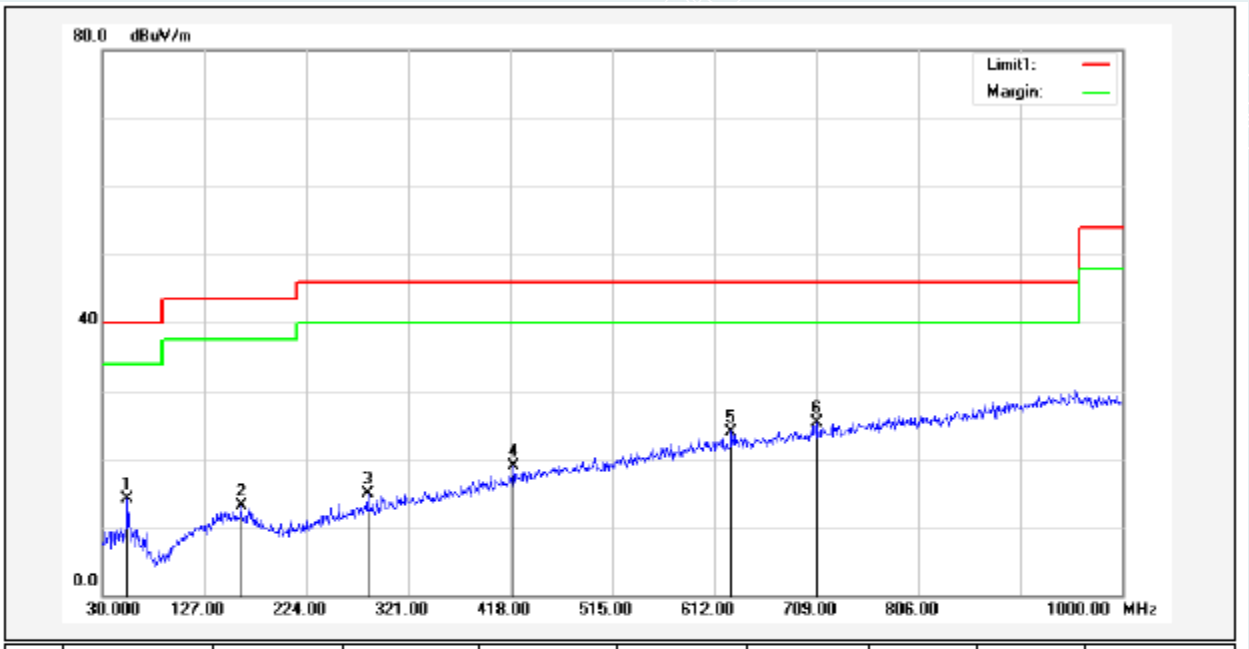
Test Voltage: DC 3.8V

Polarity: Horizontal



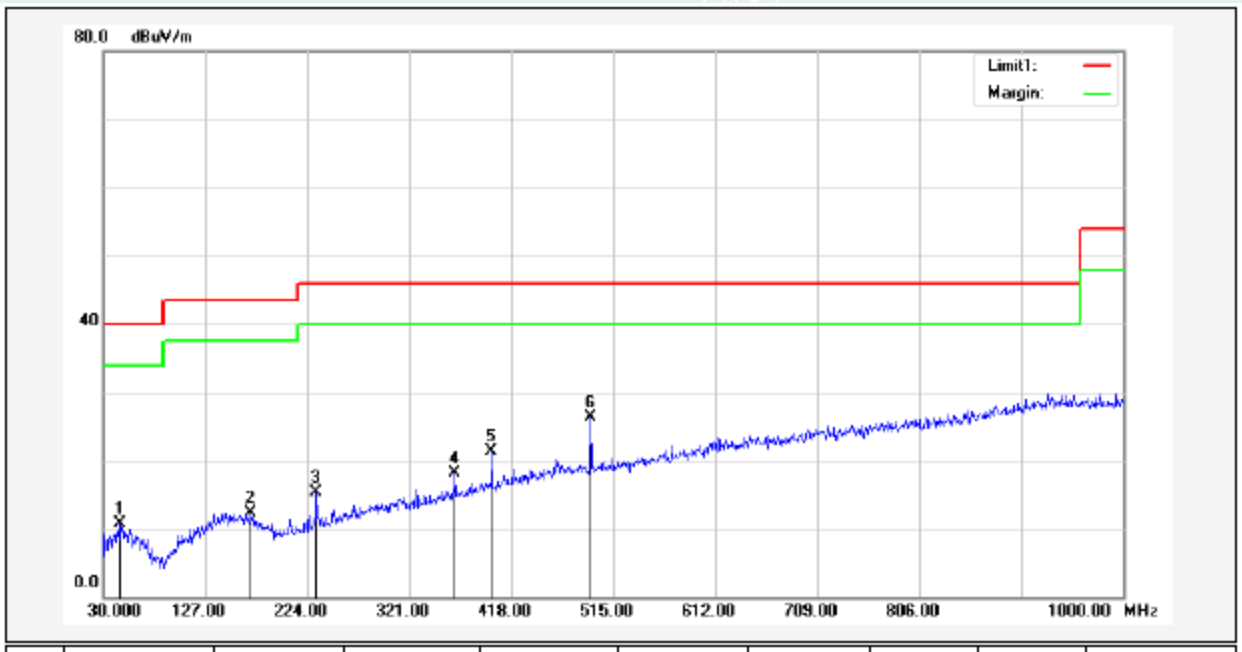
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	40.6700	38.10	-26.87	11.23	40.00	-28.77	160	200	QP
2	147.3700	38.03	-24.50	13.53	43.50	-29.97	150	200	QP
3	380.1700	39.84	-20.71	19.13	46.00	-26.87	165	300	QP
4	467.4700	38.83	-17.88	20.95	46.00	-25.05	360	388	QP
5	539.2500	39.18	-16.29	22.89	46.00	-23.11	217	200	QP
6*	860.3200	40.93	-10.12	30.81	46.00	-15.19	358	400	QP

Mode: DH5
Low Frequency (2402MHz) Date: 2022/02/22
Test Engineer: Tang Shenghui
Test Voltage: DC 3.8V
Polarity: Vertical



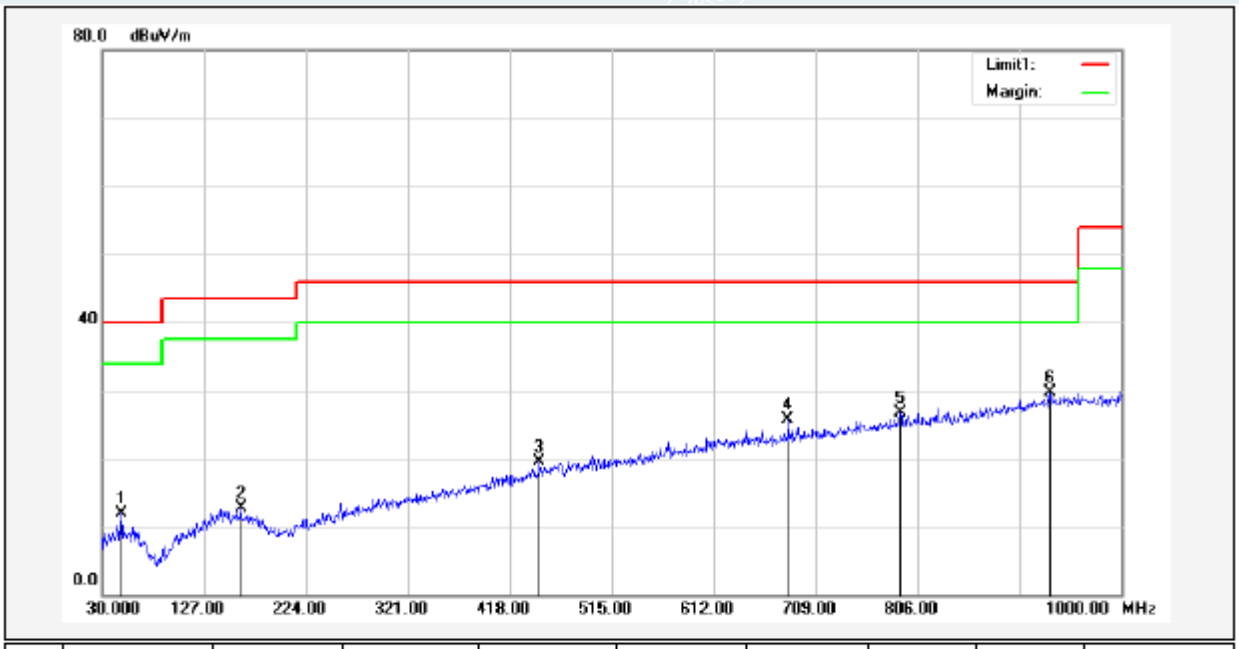
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	54.2500	40.90	-26.82	14.08	40.00	-25.92	0	183	QP
2	161.9200	37.71	-24.61	13.10	43.50	-30.40	194	300	QP
3	282.2000	38.61	-23.75	14.86	46.00	-31.14	0	388	QP
4	420.9100	38.13	-19.22	18.91	46.00	-27.09	187	200	QP
5	628.4900	38.02	-14.02	24.00	46.00	-22.00	28	100	QP
6*	709.0000	37.75	-12.53	25.22	46.00	-20.78	39	300	QP

Mode: DH5
Low Frequency (2441MHz) Date: 2022/02/22
Test Engineer: Tang Shenghui
Test Voltage: DC 3.8V
Polarity: Horizontal



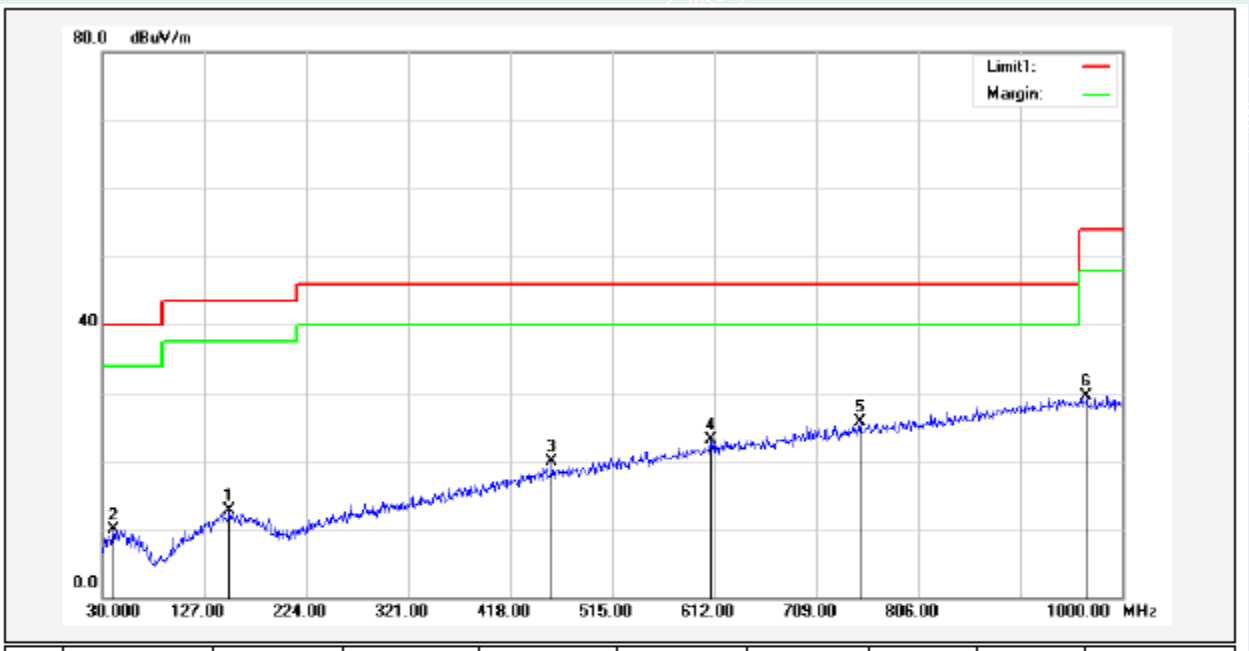
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	45.5200	37.28	-26.66	10.62	40.00	-29.38	273	200	QP
2	170.6500	37.15	-24.89	12.26	43.50	-31.24	360	278	QP
3	232.7300	41.08	-25.77	15.31	46.00	-30.69	337	100	QP
4	364.6500	39.34	-21.29	18.05	46.00	-27.95	320	400	QP
5	399.5700	41.33	-19.97	21.36	46.00	-24.64	358	300	QP
6*	493.6600	43.64	-17.42	26.22	46.00	-19.78	358	300	QP

Mode: DH5
Low Frequency (2441MHz) Date: 2022/02/22
Test Engineer: Tang Shenghui
Test Voltage: DC 3.8V
Polarity: Vertical



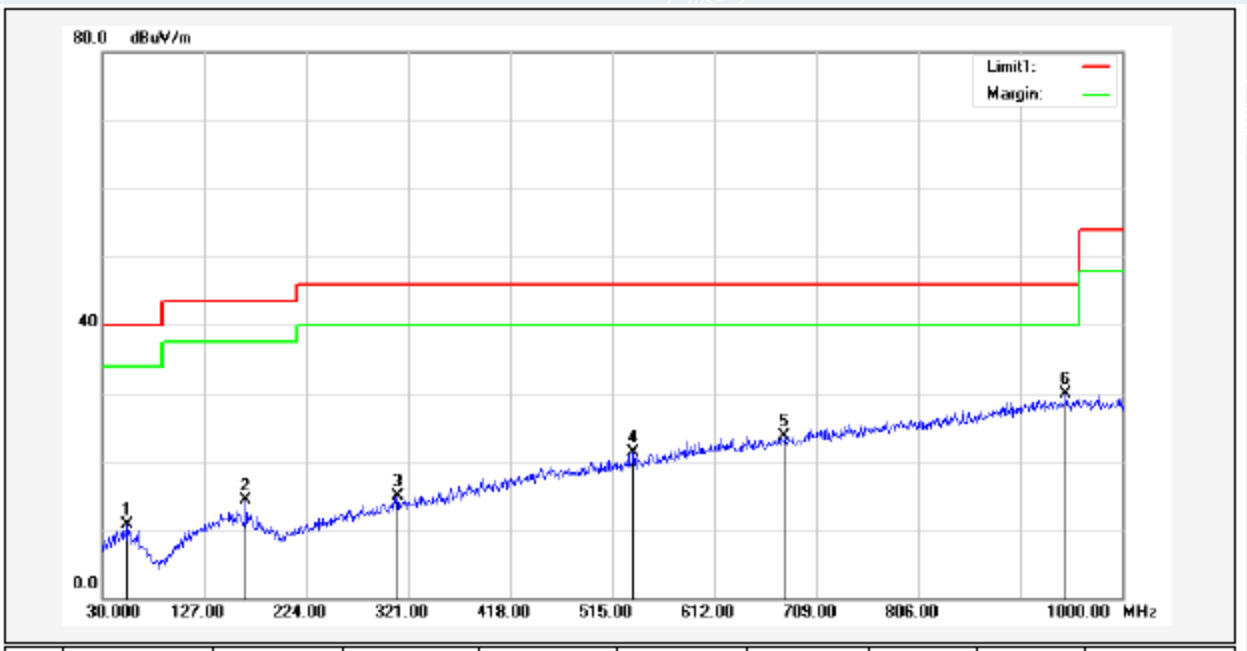
No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	48.4300	38.55	-26.55	12.00	40.00	-28.00	0	163	QP
2	161.9200	37.25	-24.61	12.64	43.50	-30.86	249	300	QP
3	446.1300	37.80	-18.31	19.49	46.00	-26.51	349	100	QP
4	682.8100	38.76	-13.05	25.71	46.00	-20.29	357	400	QP
5	789.5100	37.72	-11.07	26.65	46.00	-19.35	198	200	QP
6*	932.1000	38.69	-8.99	29.70	46.00	-16.30	329	200	QP

Mode: DH5
Low Frequency (2480MHz) Date: 2022/02/22
Test Engineer: Tang Shenghui
Test Voltage: DC 3.8V
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	151.2500	37.17	-24.39	12.78	43.50	-30.72	360	237	QP
2	40.6700	36.74	-26.87	9.87	40.00	-30.13	333	200	QP
3	457.7700	37.95	-18.04	19.91	46.00	-26.09	1	100	QP
4	608.1200	37.40	-14.33	23.07	46.00	-22.93	0	312	QP
5*	750.7100	37.30	-11.65	25.65	46.00	-20.35	316	200	QP
6	966.0500	38.05	-8.53	29.52	54.00	-24.48	261	300	QP

Mode: DH5
Low Frequency (2480MHz) Date: 2022/02/22
Test Engineer: Tang Shenghui
Test Voltage: DC 3.8V
Polarity: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over (dB)	Degree (deg.)	Height (cm)	Remark
1	53.2800	37.39	-26.74	10.65	40.00	-29.35	252	100	QP
2	166.7700	38.95	-24.74	14.21	43.50	-29.29	255	100	QP
3	311.3000	37.62	-22.81	14.81	46.00	-31.19	294	100	QP
4	535.3700	37.79	-16.39	21.40	46.00	-24.60	258	200	QP
5	678.9300	36.85	-13.12	23.73	46.00	-22.27	65	200	QP
6*	946.6500	38.62	-8.77	29.85	46.00	-16.15	360	298	QP

Remark:

1 No emission found between lowest internal used/generated frequency to 30MHz.
2 Pre-scan all mode and recorded the worst case results in this report (DH5)
3 Measuring frequencies from 9kHz to the 1GHz.
4 Radiated emissions measured in frequency range from 30MHz to 1GHz were made with an instrument using Peak/Quasi-peak detector mode.
5 Data of measurement within this frequency range shown " --- " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
6 The IF bandwidth of SPA between 30MHz to 1GHz was 120kHz.

Above 1GHz:

Mode: DH5
Lowest Frequency (2402MHz) Date: 2022/03/01
Test Engineer: Lu Qiang
Test Voltage: DC 3.8V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1132.7666	57.17	32.48	-24.69	74.00	41.52	200	237	Horizontal
2	1892.8616	58.94	37.06	-21.88	74.00	36.94	100	293	Horizontal
3	3613.2017	53.69	39.30	-14.39	74.00	34.70	100	7	Horizontal
4	4803.9755	58.42	48.64	-9.78	74.00	25.36	100	1	Horizontal
5	7178.0223	48.67	45.50	-3.17	74.00	28.50	200	0	Horizontal
6	9235.1544	46.57	47.27	0.70	74.00	26.73	200	197	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4803.9755	-9.78	52.43	42.65	54.00	11.35	127	11	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1070.5088	58.23	33.24	-24.99	74.00	40.76	200	156	Vertical
2	1506.3133	56.73	33.85	-22.88	74.00	40.15	100	102	Vertical
3	1895.8620	60.13	38.25	-21.88	74.00	35.75	100	259	Vertical
4	3693.8367	53.69	38.87	-14.82	74.00	35.13	100	148	Vertical
5	4803.9755	54.19	44.41	-9.78	74.00	29.59	200	75	Vertical
6	7609.3262	47.67	45.38	-2.29	74.00	28.62	100	128	Vertical

Mode: DH5
Middle Frequency (2441MHz) Date: 2022/03/01
Test Engineer: Lu Qiang
Test Voltage: DC 3.8V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1080.2600	57.27	32.31	-24.96	74.00	41.69	100	190	Horizontal
2	1339.5424	56.76	32.98	-23.78	74.00	41.02	100	82	Horizontal
3	1779.3474	56.45	34.23	-22.22	74.00	39.77	200	333	Horizontal
4	3611.3264	53.99	39.62	-14.37	74.00	34.38	200	5	Horizontal
5	4878.9849	58.09	48.21	-9.88	74.00	25.79	100	20	Horizontal
6	7982.4978	47.51	45.92	-1.59	74.00	28.08	200	118	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4879.9119	-9.88	52.70	42.82	54.00	11.18	145	4	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1120.5151	56.95	32.19	-24.76	74.00	41.81	100	1	Vertical
2	1540.5676	56.47	33.61	-22.86	74.00	40.39	100	191	Vertical
3	1847.1059	58.64	36.76	-21.88	74.00	37.24	100	177	Vertical
4	3573.8217	54.00	38.80	-15.20	74.00	35.20	200	108	Vertical
5	4878.9849	55.11	45.23	-9.88	74.00	28.77	200	60	Vertical
6	7202.4003	49.52	46.37	-3.15	74.00	27.63	200	32	Vertical

Mode: DH5
Highest Frequency (2480MHz) Date: 2022/03/01
Test Engineer: Lu Qiang
Test Voltage: DC 3.8V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1000.0000	63.61	38.45	-25.16	74.00	35.55	100	88	Horizontal
2	1367.2959	56.96	33.31	-23.65	74.00	40.69	200	224	Horizontal
3	1712.5891	58.93	36.55	-22.38	74.00	37.45	200	285	Horizontal
4	3290.6613	54.70	38.73	-15.97	74.00	35.27	100	270	Horizontal
5	4959.6200	60.01	50.00	-10.01	74.00	24.00	100	29	Horizontal
6	7789.3487	47.91	46.05	-1.86	74.00	27.95	200	340	Horizontal

AV Final Data List									
NO.	Freq. [MHz]	Factor [dB]	AV Reading [dBμV/m]	AV Value [dBμV/m]	AV Limit [dBμV/m]	AV Margin [dB]	Height [cm]	Angle [°]	Polarity
1	4959.9176	-10.01	54.39	44.38	54.00	9.62	158	182	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1083.2604	57.39	32.45	-24.94	74.00	41.55	200	326	Vertical
2	1334.0418	56.93	33.12	-23.81	74.00	40.88	100	164	Vertical
3	1724.5906	59.29	36.89	-22.40	74.00	37.11	100	245	Vertical
4	3577.5722	54.23	39.17	-15.06	74.00	34.83	200	56	Vertical
5	4959.6200	53.28	43.27	-10.01	74.00	30.73	200	359	Vertical
6	7157.3947	48.43	45.21	-3.22	74.00	28.79	200	15	Vertical

Mode: 3DH5
Lowest Frequency (2402MHz) Date: 2022/03/02
Test Engineer: Zhang Qiang
Test Voltage: DC 3.8V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1891.6115	57.37	35.49	-21.88	74.00	38.51	200	359	Horizontal
2	3601.9502	54.22	39.93	-14.29	74.00	34.07	200	1	Horizontal
3	4803.9755	56.64	46.86	-9.78	74.00	27.14	100	271	Horizontal
4	7200.5251	48.54	45.41	-3.13	74.00	28.59	200	20	Horizontal
5	10489.6862	44.97	47.91	2.94	74.00	26.09	200	176	Horizontal
6	14228.9036	41.84	50.64	8.80	74.00	23.36	100	74	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1890.6113	58.15	36.27	-21.88	74.00	37.73	200	224	Vertical
2	3609.4512	52.98	38.63	-14.35	74.00	35.37	200	177	Vertical
3	5934.7418	49.75	41.91	-7.84	74.00	32.09	100	346	Vertical
4	7734.9669	47.58	45.36	-2.22	74.00	28.64	200	109	Vertical
5	9621.4527	44.73	46.33	1.60	74.00	27.67	200	285	Vertical
6	13053.1316	42.16	48.76	6.60	74.00	25.24	200	82	Vertical

Mode: 3DH5
Middle Frequency (2441MHz) Date: 2022/03/02
Test Engineer: Zhang Qiang
Test Voltage: DC 3.8V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1890.8614	56.96	35.08	-21.88	74.00	38.92	100	285	Horizontal
2	3491.3114	53.54	38.14	-15.40	74.00	35.86	100	356	Horizontal
3	4882.7353	58.01	48.10	-9.91	74.00	25.90	100	252	Horizontal
4	6814.2268	48.44	44.06	-4.38	74.00	29.94	200	291	Horizontal
5	9480.8101	45.29	46.26	0.97	74.00	27.74	100	273	Horizontal
6	13940.1175	41.34	50.40	9.06	74.00	23.60	200	190	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1890.6113	58.80	36.92	-21.88	74.00	37.08	100	279	Vertical
2	3579.4474	54.19	39.19	-15.00	74.00	34.81	100	1	Vertical
3	4862.1078	52.27	42.55	-9.72	74.00	31.45	100	4	Vertical
4	7202.4003	48.15	45.00	-3.15	74.00	29.00	100	20	Vertical
5	11301.6627	43.99	48.28	4.29	74.00	25.72	100	258	Vertical
6	13887.6110	41.21	50.09	8.88	74.00	23.91	200	54	Vertical

Mode: 3DH5
Highest Frequency (2480MHz) Date: 2022/03/02
Test Engineer: Zhang Qiang
Test Voltage: DC 3.8V

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1892.1115	59.89	38.01	-21.88	74.00	35.99	200	68	Horizontal
2	3579.4474	54.16	39.16	-15.00	74.00	34.84	200	123	Horizontal
3	4959.6200	56.65	46.64	-10.01	74.00	27.36	200	238	Horizontal
4	7725.5907	47.53	45.15	-2.38	74.00	28.85	200	251	Horizontal
5	11356.0445	42.88	47.62	4.74	74.00	26.38	200	1	Horizontal
6	13926.9909	41.17	50.25	9.08	74.00	23.75	100	61	Horizontal

Suspected Data List									
NO.	Freq. [MHz]	Reading [dBμV/m]	Level [dBμV/m]	Factor [dB]	Limit [dBμV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	1731.5914	65.04	42.63	-22.41	74.00	31.37	200	245	Vertical
2	1894.8619	56.27	34.39	-21.88	74.00	39.61	200	89	Vertical
3	3943.2429	53.18	38.98	-14.20	74.00	35.02	200	47	Vertical
4	4959.6200	56.36	46.35	-10.01	74.00	27.65	200	136	Vertical
5	6660.4576	49.00	43.27	-5.73	74.00	30.73	200	357	Vertical
6	10542.1928	43.92	47.32	3.40	74.00	26.68	200	293	Vertical

Remark:

1 Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.

2 The amplitude of 18GHz to 26.5GHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

3 Measurements above show only up to 6 maximum emissions noted, or would be lesser if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.

4 Radiated emissions measured in frequency above 1000MHz were made with an instrument using Peak detector mode and average detector mode of the emission shown in Actual FS column.

5 Spectrum setting:
a. Peak Setting 1GHz – 26.5GHz, RBW = 1MHz, VBW = 1MHz, Sweep time = auto.
b. AV Setting 1GH z- 26.5GHz, RBW = 1MHz, VBW = 10Hz (if the EUT duty cycle is＜98% , set VBW≥1/T),Sweep time = auto.

6 As the Transmit Power of GFSK and 8DPSK is larger than π/4-DQPSK, Therefore, radiated spurious emissions recorded the worst case results in this report.

Test result: The unit does meet the requirements.

13. RESTRICTED BANDS OF OPERATION

13.1 LIMITS

Section 15.247(d) 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)).

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	
13.36 - 13.41			

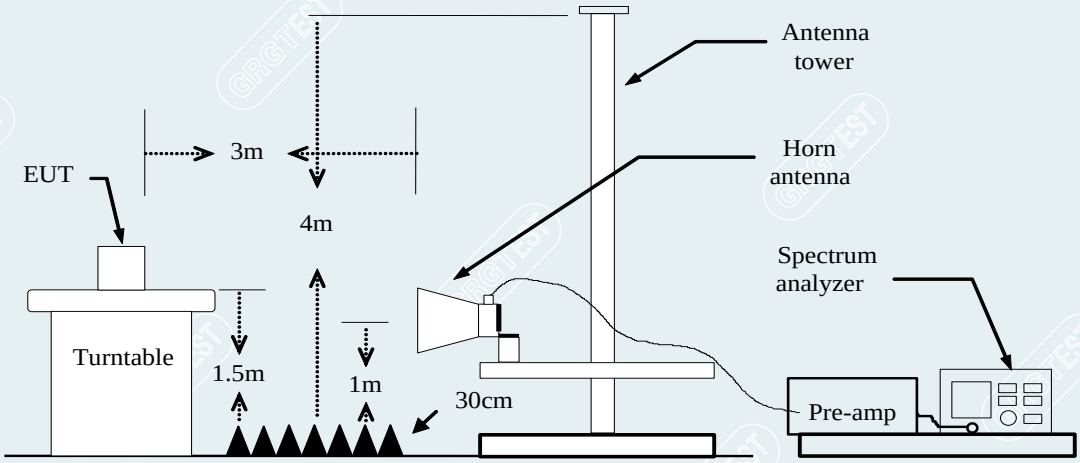
Frequency (MHz)	Quasi-peak(μV/m)	Measurement distance(m)	Quasi-peak(dBμV/m)@distance 3m
0.009-0.490	2400/F(kHz)	300	128.5-93.8
0.490-1.705	24000/F(kHz)	30	73.8-63
1.705-30.0	30	30	69.5
30 ~ 88	100	3	40
88~216	150	3	43.5
216 ~ 960	200	3	46
Above 960	500	3	54

13.2 TEST PROCEDURES

1) The EUT is placed on a turntable, which is 1.5m above the ground plane.
2) The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4) Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
   a) PEAK: RBW=1MHz / VBW=1MHz / Sweep=AUTO
   b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO
5) Repeat the procedures until all the PEAK and AVERAGE versus polarization are measured.

Note: For radiated measurement,pre-scanned in three orthogonal panels,X,Y,Z.The worst cases(X plane) were recorded in this report.

13.3 TEST SETUP

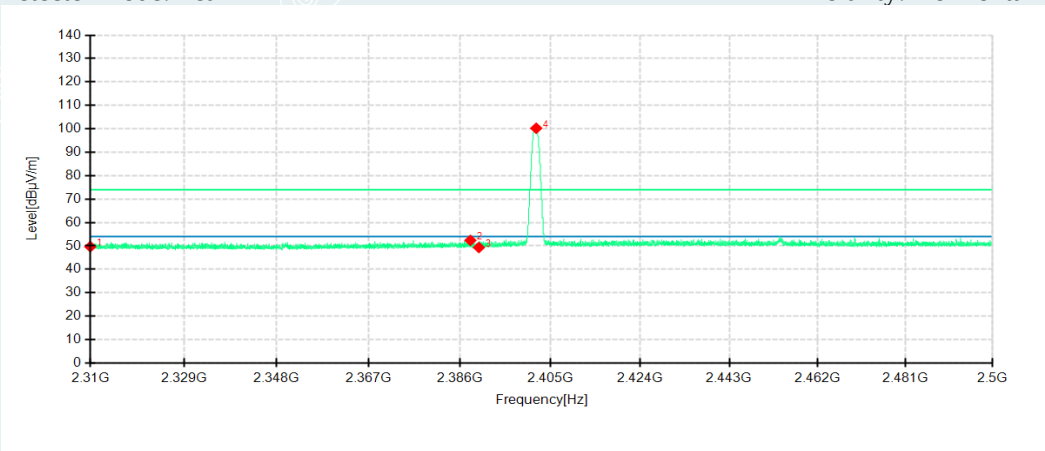


---------- **The following blanks** ----------

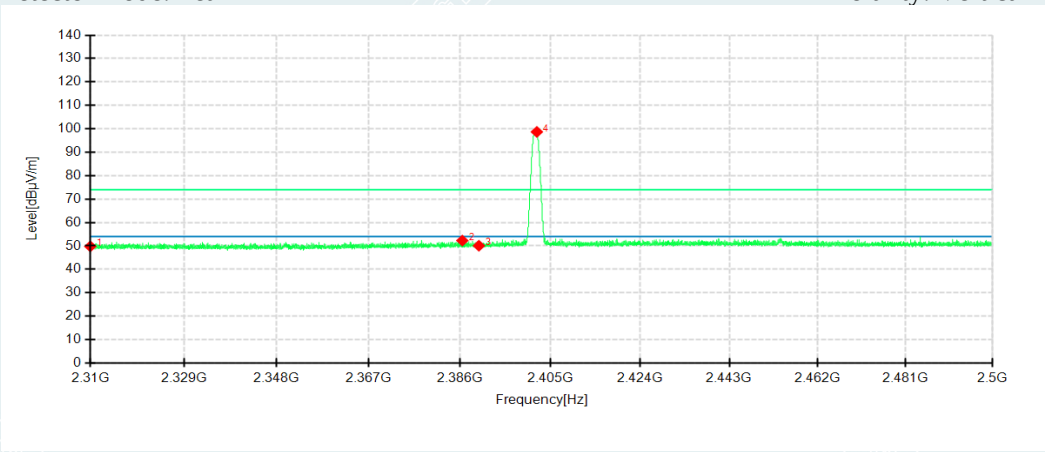
13.4 TEST RESULTS

Equipment:	Wireless earphones	Test Date	2022/03/03
Model No.:	E505A	Test Engineer:	Zhang Zishan
Test Voltage:	DC 3.8V	/	/

DH5
Lowest Channel
Frequency 2402MHz
Detector mode: Peak Polarity: Horizontal



Detector mode: Peak Polarity: Vertical



No.	Frequency MHz	Reading dBµV/m	Level dBµV/m	Factor dB	Limit dBuV/m	Margin dB	Height cm	Angle °	Pole	Remark
1	2310.0000	46.20	49.68	3.48	74.00	24.32	100	204	Horizontal	/
2	2388.2230	48.58	52.36	3.78	74.00	21.64	100	197	Horizontal	/
3	2390.0000	45.52	49.33	3.81	74.00	24.67	200	142	Horizontal	/
4	2402.0360	96.24	100.23	3.99	74.00	-26.23	200	142	Horizontal	No limit
1	2310.0000	46.31	49.79	3.48	74.00	24.21	200	218	Vertical	/
2	2386.5320	48.53	52.28	3.75	74.00	21.72	100	238	Vertical	/
3	2390.0000	46.27	50.08	3.81	74.00	23.92	100	142	Vertical	/
4	2402.1690	94.69	98.68	3.99	74.00	-24.68	100	314	Vertical	No limit