

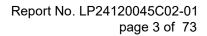
TEST REPORT

Applicant: Address:	Wuchao (Shenzhen) Technology Development Co., Ltd. Room 1916, Tower A, Rongchuang Zhihui Building, Minzhi Street, Longhua District, Shenzhen City, Guangdong, China		
Manufacturer: Address:	Wuchao (Shenzhen) T Room 1916, Tower A, Longhua District, She	Rongchuang Zhi	ihui Building, Minzhi Street,
Factory: Address:	Wuchao (Shenzhen) T Room 1916, Tower A, Longhua District, She	Rongchuang Zhi	ihui Building, Minzhi Street,
E.U.T.:	True Wireless Earpho	ones	
Model Number:	HY-C02		
Trade Mark:	HYUNDAI		
FCC ID:	2BMKL-HY-C02		
Date of Receipt:	2024-12-5	Date of Test:	2024-12-5 to 2024-12-24
Test Specification:	FCC 47 CFR Part 15,	Subpart C	
Test Result:	The equipment under requirements of the s		o be compliance with the
Prepared by:		Approve	d & Authorized Signer:
Jerry Hu/ Engine Date: 2024-12-12	er		nen/Manager ate: 2024-12-24
			ntioned products. It is not permitted to
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	Revision History of This Test Report				
Report Number	Description	Issued Date			
LP24120045C02-01	Initial Issue	2024-12-24			



1. GENERAL PRODUCT INFORMATION

1.1. PRODUCT FUNCTION

Refer to Technical Construction Form and User Manual.

1.2. EUT TECHNICAL DESCRIPTION

Product Name:	True Wireless Earphones
Model No.:	HY-C02
Test Model No:	HY-C02
Difference:	N/A
Serial No.:	N/A
Test sample(s) ID:	LP24120045C02-S001
Sample(s) Status	Engineer sample
Hardware:	V 1.0
Software:	V 1.0
Operation Frequency:	2402MHz-2480MHz
Channel numbers:	79
Channel separation:	1MHz
Modulation type:	GFSK, π/4-DQPSK, 8DPSK
Antenna Type:	Chip Antenna
Antenna gain:	1.7dBi
Power supply:	 ☑ DC 5V form USB ☑ DC 3.7V form battery



1.3. INDEPENDENT OPERATION MODES

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

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

Those data rates (1Mbps for GFSK modulation; 2Mbps for pi/4-DQPSK modulation; 3Mbps for 8DPSK modulation) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	39	2441		
1	2403	40	2442	76	2478
2	2404	41	2443	77	2479
				78	2480
Note: fc=2402MHz+(k-1)×1MHz k=1 to 79					

Frequency and Channel list:

Test Frequency and channel

Lowest Frequency		Middle Frequency		Highest Frequency	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	39	2441	78	2480



1.4. TEST SOFTWARE

Software	Description
FCC assist 1.0.2.2.exe	Set the COM Port Test Tool to set the
	corresponding Test conditions

1.5. GENERAL CONDITION

	Temperature	Humidity
Ambient Condition:	23.5 ℃	49.1%RH

1.6. SUPPORT EQUIPMENT

EUT Cable List and Details				
Cable Description Length (m) Shielded/Unshielded With / Without Ferrite				
/	/	/	/	

Auxiliary Cable List and Details				
Cable Description Length (m) Shielded/Unshielded With / Without Ferrite				
1	/	/	/	

Auxiliary Equipment List and Details					
Description	Description Manufacturer Model Serial Number				
Laptop computer Lenovo Xiaoxin Pro IA5HR PF490VB0					

Notes:

1.All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.

2.Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



2. TEST STANDARDS AND SITES

2.1. DESCRIPTION OF STANDARDS AND RESULTS

The EUT have been tested according to the applicable standards as referenced below.

FCC Part Clause	Test Parameter	Verdict	Remark
15.247(a)(1)	20 dB Bandwidth	PASS	
15.247(a)(1)	Carrier Frequency Separation	PASS	
15.247(a)(1)	Number of Hopping Frequencies	PASS	
15.247(a)(1)	Average Time of Occupancy (Dwell Time)	PASS	
15.247(b)(1)	Maximum Peak Conducted Output Power	PASS	
15.247(d)	Conducted Spurious Emissions	PASS	
15.247(d)	Radiated Spurious Emissions	PASS	
15.209	Radiated Spurious Emissions		
15.207	Conducted Emission	PASS	
15.203	Antenna Application	PASS	
15.247 (a) (1)/g/h	Frequency Hopping System	PASS	
15.247 (a) (1)/g/h		PASS	

NOTE1: N/A (Not Applicable)

NOTE2: According to FCC KDB 558074 D01 15.247 Meas Guidance v05r02, the report use radiated measurements in the restricted frequency bands. In addition, the radiated test is also performed to ensure the emissions emanating from the device cabinet also comply with the applicable limits.



2.2. LIST OF TEST AND MEASUREMENT INSTRUMENTS

For co	onducted emission	on at the main	s terminals tes	t(Shielded R	oom 1)		
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
EMI Test Receiver	Rohde & Schwarz	ESHS30	8290501003	Jan. 24, 2024	1 Year	LEP-E002	\checkmark
Artificial Mains Network	Baluelec	LSN016	BL0411220501 21	Nov. 01, 2021	1 Year	LEP-E067	
Shielded Room 1	MR	MR-L05	LEP-E053	Nov. 17, 2022	3 Year	LEP-E053	\checkmark
Test software	EZ-EMC	Fala	LEPONT-03A2	N/A	N/A	N/A	\checkmark
	For radiated(9K-30M) emis	sion test(966 C	hamber 1)			
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
EMI Test Receiver	Rohde & Schwarz	ESR 3	101849	Jan. 31, 2024	1 Year	LEP-E006	\checkmark
Active Loop Antenna	Schwarzbeck	FMZB 1519C	00008	Jan. 24, 2024	3 Year	LEP-E068	
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	\checkmark
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	\checkmark
	For radiated(30M-1G) emis	sion test(966 C	hamber 1)		•	1
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
EMI Test Receiver	Rohde & Schwarz	ESR 3	101849	Jan. 31, 2024	1 Year	LEP-E006	\checkmark
TRILOG Broadband Antenna	Schwarzbeck	VULB 9163	743	Nov. 20, 2022	3 Year	LEP-E005	
Signal Amplifier	HP	8447D	1726A01222	Jan. 24, 2024	1 Year	LEP-E007	
6dB Attenuator	RswTech	5W 6dB	LEP-E084	Jan. 24, 2024	1 Year	LEP-E084	
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	\checkmark
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	$\overline{\mathbf{A}}$
	For radiated	(1-18G) emiss	ion test(966 Cl	namber 1)		•	
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
Spectrum analyzer	Rohde & Schwarz	FSV40	101412	Jan. 24, 2024	1 Year	LEP-E076	\checkmark
Spectrum analyzer	Agilent	N9020A	MY49100060	Jan. 24, 2024	1 Year	LEP-E020	\checkmark
Horn antenna	Schwarzbeck	BBHA 9120D	01875	Nov. 20, 2022	3 Year	LEP-E024	\checkmark
Preamplifier	Schwarzbeck	BBN 9718B	00010	Jan. 24, 2024	1 Year	LEP-E025	\checkmark
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	\mathbf{N}
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	$\overline{\mathbf{A}}$
	For radiated	(18-40G) emiss	sion test(966 C	hamber 1)		•	
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
Spectrum analyzer	Rohde & Schwarz	FSV40	101412	Jan. 24, 2024	1 Year	LEP-E076	
Horn antenna+Preamplifier	COM-POWER	AH840	10100020	Sep. 05, 2022	3 Year	LEP-E075	
966 Chamber 1	MR	MR-L02	LEP-E051	Nov. 17, 2022	3 Year	LEP-E051	\checkmark
Test software	EZ-EMC	Fala	EMEC-3A1	N/A	N/A	N/A	$\overline{\mathbf{A}}$
		For RF	test			•	
Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	Lab No.	Remark
Spectrum analyzer	Rohde & Schwarz	FSV40	101412	Jan. 24, 2024	1 Year	LEP-E076	$\overline{\checkmark}$
Spectrum analyzer	Agilent	N9020A	MY49100060	Jan. 24, 2024	1 Year	LEP-E020	\checkmark
Vector source	Agilent	N5182A	MY47420382	Jan. 24, 2024	1 Year	LEP-E021	V
Analog signal source	Agilent	N5171B	MY51350292	Jan. 24, 2024	1 Year	LEP-E022	V
All instrument	Rohde & Schwarz	CMW 500	1201.002K50	Jan. 24, 2024	1 Year	LEP-E019	
High and low temperature chamber	Math-mart	MT-1202-40	LEP-E041	Jan. 24, 2024	1 Year	LEP-E041	
control unit	Tonscend	JS0806-2	10165	Jan. 24, 2024	1 Year	LEP-E034	V
Testing software	Tonscend	JSTS1120-3	Ver 2.6.77.0518	N/A	N/A	N/A	\checkmark



2.3. MEASUREMENT UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	±1x10^-5
Maximum Peak Output Power Test	±1.0%
Conducted Emissions Test	±3.08dB
Radiated Emission Test	±4.60dB
Power Density	±0.9%
Occupied Bandwidth Test	±2.3%
Band Edge Test	±1.2%
Antenna Port Emission	±3dB
Temperature	±3.2%
Humidity	±2.5%
Measurement Uncertainty for a level of Co	onfidence of 95%

2.4. TEST FACILITY

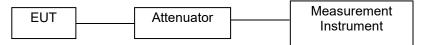
EMC Lab. :	The Laboratory has been assessed and proved to be in compliance with CNAS/CL01 The Certificate Registration Number is L10100. The Laboratory has been assessed and proved to be in compliance with A2LA The Certificate Registration Number is 6901.01
	FCC Designation No.: CN1351 Test Firm Registration No.: 397428
	ISED CAB identifier: CN0151 Test Firm Registration No.: 20133
Test Location :	Dongguan Lepont Testing Service Co., Ltd.
Address :	Room 102, Building 11, No.7, Houjie Science And Technology Avenue, Houjie, Dongguan, Guangdong, China



3. SETUP OF EQUIPMENT UNDER TEST

3.1. RADIO FREQUENCY TEST SETUP 1

The component's antenna ports(s) of the EUT are connected to the measurement instrument per an appropriate attenuator. The EUT is controlled by PC/software to emit the specified signals for the purpose of measurements.



3.2. RADIO FREQUENCY TEST SETUP 2

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10. The test distance is 3m.The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 32.

Below 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna (loop antenna). The Antenna should be positioned with its plane vertical at the specified distance from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. The center of the loop shall be 1 m above the ground. For certain applications, the loop antenna plane may also need to be positioned horizontally at the specified distance from the EUT.

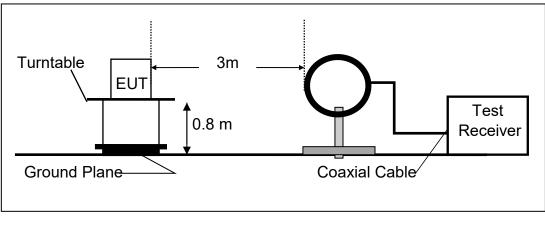
Above 30MHz:

The EUT is placed on a turntable 0.8 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

Above 1GHz:

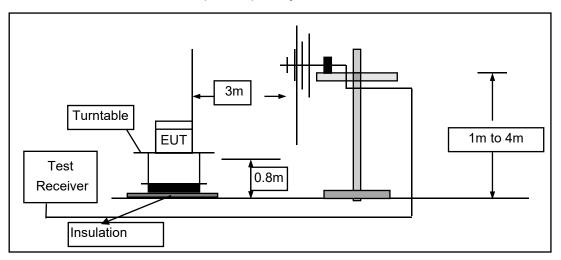
(Note: the FCC's permission to use 1.5m as an alternative per TCBC Conf call of Dec. 2, 2014.) The EUT is placed on a turntable 1.5 meters above the ground in the chamber, 3 meter away from the antenna. The maximal emission value is acquired by adjusting the antenna height, polarisation and turntable azimuth. Normally, the height range of antenna is 1 m to 4 m, the azimuth range of turntable is 0° to 360°, and the receive antenna has two polarizations Vertical (V) and Horizontal (H).

(a) Radiated Emission Test Set-Up, Frequency Below 30MHz

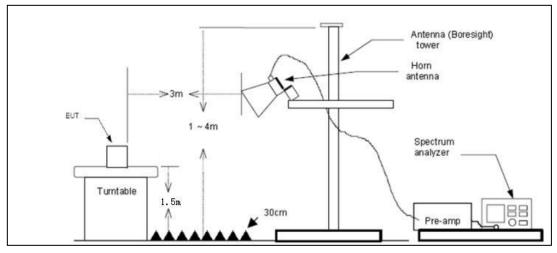


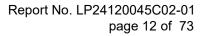


(b) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(c) Radiated Emission Test Set-Up, Frequency above 1000MHz





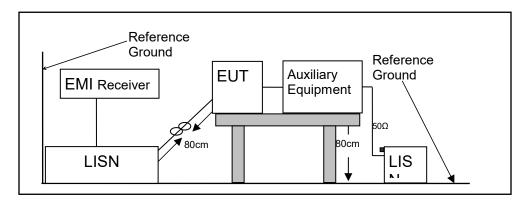


3.3. CONDUCTED EMISSION TEST SETUP

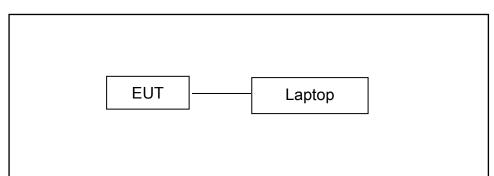
The mains cable of the EUT (Perfect Share Mini) must be connected to LISN. The LISN shall be placed 0.8m from the boundary of EUT and bonded to a ground reference plane for LISN mounted on top of the ground reference plane. This distance is between the closest points of the LISN and the EUT. All other units of the EUT and associated equipment shall be at least 0.8m from the LISN.

Ground connections, where required for safety purposes, shall be connected to the reference ground point of the LISN and, where not otherwise provided or specified by the manufacturer, shall be of same length as the mains cable and run parallel to the mains connection at a separation distance of not more than 0.8m.

According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.



3.4. BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM





4. TEST RESULTS AND MEASUREMENT DATA

4.1. 20DB BANDWIDTH

4.1.1. Applicable Standard

According to FCC Part 15.247(a)(1) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.1.2. Conformance Limit

No limit requirement.

4.1.3. Test Configuration

Test according to clause 3.1 radio frequency test setup 1

4.1.4. Test Procedure

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

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

Set to the maximum power setting and enable the EUT transmit continuously Set RBW = 30 kHz.

Set the video bandwidth (VBW) =100 kHz.

Set Span= approximately 2 to 3 times the 20 dB bandwidth

Set Detector = Peak.

Set Trace mode = max hold.

Set Sweep = auto couple.

The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 20 dB down one side of the emission. Reset the marker delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 20 dB bandwidth of the emission.

If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. Measure and record the results in the test report.

Test Results:



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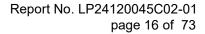
TestMode	Antenna	Freq(MHz)	20dB EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]
		2402	1.002	2401.493	2402.495	N/A
DH5	Ant1	2441	1.017	2440.481	2441.498	N/A
		2480	1.044	2479.460	2480.504	N/A
		2402	1.278	2401.364	2402.642	N/A
2DH5	Ant1	2441	1.290	2440.367	2441.657	N/A
		2480	1.305	2479.340	2480.645	N/A
		2402	0.966	2401.487	2402.453	N/A
3DH5	Ant1	2441	1.020	2440.484	2441.504	N/A
		2480	1.023	2479.487	2480.510	N/A



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Test Graphs















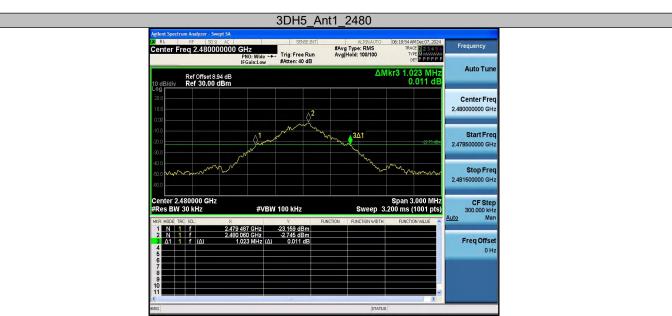
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4.2. CARRIER FREQUENCY SEPARATION

4.2.1. Applicable Standard

According to FCC Part 15.247(a)(1) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.2.2. Conformance Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

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

4.2.3. Test Configuration

Test according to clause 3.1 radio frequency test setup 1

4.2.4. Test Procedure

■ According to FCC Part15.247(a)(1)

The EUT must have its hopping function enabled.

Set the RBW =300kHz.

Set VBW =300kHz.

Set the span = wide enough to capture the peaks of two adjacent channels Set Sweep time = auto couple.

Set Detector = peak. Set Trace mode = max hold.

Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section. Submit this plot.



Test Results:

TestMode	Antenna	Freq(MHz)	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Нор	0.85	≥0.696	PASS
2DH5	Ant1	Нор	0.916	≥0.870	PASS
3DH5	Ant1	Нор	0.952	≥0.682	PASS

Test Graphs



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		3DH5_A	nt1_Hop		
Agilent Spectrum Analyzer - Swep (M RL RF 50.0 Center Freq 2.441500		SENSE:INT → Trig: Free Run #Atten: 40 dB	ALIGNAUTO #Avg Type: RMS Avg Hold: 5000/5000	D6:49:17 AM Dec 07, 2024 TRACE 2 3 4 5 6 TYPE M WARMAN DET P P P P P	
Ref Offset 8.94 10 dB/div Ref 30.00 dE	l dB Bm			ΔMkr2 952 kHz -0.082 dB	Auto Tune
20.0					Center Freq 2.441500000 GHz
0.00	1 		2∆1	and the second	Start Freq 2.440500000 GHz
-10.0 provent		The second secon		- Marco	Stop Freq 2.442500000 GHz
-30.0					CF Step 200.000 kHz <u>Auto</u> Man
-50.0					Freq Offset 0 Hz
-60.0					
Start 2.440500 GHz #Res BW 300 kHz	#VBV	V 300 kHz	Sweep 1	Stop 2.442500 GHz .000 ms (1001 pts)	
MSG			STATU	3	



4.3. NUMBER OF HOPPING FREQUENCIES

4.3.1. Applicable Standard

According to FCC Part 15.247(a)(1) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.3.2. Conformance Limit

Frequency hopping systems operating in the 2400-2483.5MHz band shall use at least 15 channels.

4.3.3. Test Configuration

Test according to clause 3.1 radio frequency test setup 1

4.3.4. Test Procedure

According to FCC Part15.247(a)(1)(iii)
 The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
 Span = the frequency band of operation (2400-2483.5MHz)
 RBW ≥ 100KHz
 VBW ≥ RBW
 Sweep = auto
 Detector function = peak
 Trace = max hold
 Allow the trace to stabilize. It may prove necessary to break the span up to sections, in order to clearly show all of the hopping frequencies.

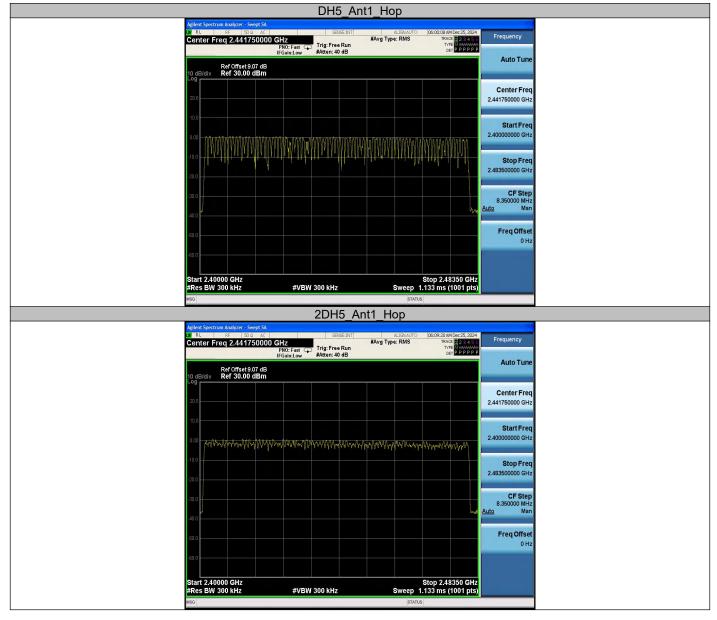
Test Results:

TestMode	Antenna	Freq(MHz)	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Нор	79	≥15	PASS
2DH5	Ant1	Нор	79	≥15	PASS
3DH5	Ant1	Нор	79	≥15	PASS



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Test Graphs



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		3DH5_A	Ant1_Hop			
Agilent Spectrum Analyzer - Swept SA (W RL RF 50.0 AC Center Freq 2.44175000		SENSE:INT Trig: Free Run #Atten: 40 dB	ALIGN #Avg Type: RM	AUTO 06:49:3 S	BAM Dec 07, 2024 TRACE 1 2 3 4 5 6 TYPE MWAWAWA DET PPPPPP	
Ref Offset 9.07 dE 10 dB/div Ref 30.00 dBm	3					Auto Tune
20.0						Center Freq 2.441750000 GHz
	ANN ADADRAD			YAANAAAAA	MAMM	Start Freq 2.400000000 GHz
-10.0		Plant	Elmontoll	111101-10		Stop Freq 2.483500000 GHz
-30.0					hay	CF Step 8.350000 MHz <u>Auto</u> Man
-50.0						Freq Offset 0 Hz
Start 2.40000 GHz #Res BW 300 kHz		300 kHz		Stop 2	.48350 GHz	
#Res BW 300 KHz	#VBW	300 KH2	SWE	status	is (1001 pts)	



4.4. AVERAGE TIME OF OCCUPANCY (DWELL TIME)

4.4.1. Applicable Standard

According to FCC Part 15.247(a)(1) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.4.2. Conformance Limit

For frequency hopping systems operating in the 2400-2483.5MHz band, the average time of occupancy on any channel shall not be greater than 0.4s within a period of 0.4s multiplied by the number of hopping channels employed.

4.4.3. Test Configuration

Test according to clause 3.1 radio frequency test setup 1

4.4.4. Test Procedure

■ According to FCC Part15.247(a)(1)(iii)

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

RBW = 1 MHz

 $VBW \ge RBW$

Sweep = as necessary to capture the entire dwell time per hopping channel

Detector function = peak

Trace = max hold

If possible, 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. The limit is specified in one of the subparagraphs of this Section.



Test Results:

TestMode	Antenna	Freq(MHz)	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH5	Ant1	Нор	2.885	60	0.173	≤0.4	PASS
2DH5	Ant1	Нор	2.891	130	0.376	≤0.4	PASS
3DH5	Ant1	Нор	2.361	80	0.189	≤0.4	PASS

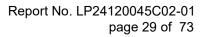
Test Graphs

	DH5_Ant1_Hop		
Aglient Spectrum Analyzer - Swept SA 2 R R Spectrum Callyzer - Swept SA Center Freq 2.4441000000 GHz	SENSE:INT ALIGN Trig Delay-2.000 ms #Avg Type: RM	AUTO 06:36:12 AM Dec 07, 2024 S TRACE 1 2 3 4 5 6	Frequency
PNO: Fast IFGain:Low	Trig: Video #Atten: 40 dB	ΔMkr2 2.885 ms	Auto Tune
Ref Offset 8.94 dB 10 dB/div Ref 30.00 dBm Log		2101KF2 2.885 ms 17.83 dB	
20.0			Center Freq 2.441000000 GHz
0.00	2Δ1		Start Freq 2.441000000 GHz
-10.0 -20.0		TRIO LVL,	Stop Freq 2.441000000 GHz
-ann -ann <mark>bean bhailte ann an bhailte ann ann ann ann ann ann ann ann ann an</mark>	dha bayin a tid payrondh bistor ad autor		CF Step 1.000000 MHz Auto Man
	la paliti pa Paliti paliti na palatanja	an tana ang ang ang ang ang ang ang ang ang	Freq Offset 0 Hz
Center 2.441000000 GHz		Span 0 Hz	
Res BW 1.0 MHz #VE		ep 10.13 ms (8000 pts) status	
Agilent Spectrum Analyzer - Swept SA Bill RL RF 1500 AC Center Freq 2.441000000 GHz PRO: Fast IFG6mLow	Trig Delay0.000 s #Avg Type: RM →→→ Trig: Video	AUTO 06:36:22 AM Dec 07, 2024 S TRACE 2 3 4 5 6 TYPE WWWWWW DET P P P P P	Frequency
Ref Offset 8.94 dB 10 dB/div Ref 30.00 dBm			Auto Tune
			Center Freq 2.441000000 GHz
			Start Freq 2.441000000 GHz
-10.0		TRIGLUL	Stop Freq 2.441000000 GHz
	the gradest action to a static part of the second of the s	et ligt så et dreitte possibilitet til den so Se stat sog af den sog af sog sog af sog af den sog	CF Step 510.000 kHz Auto Man
-60 0			Freq Offset 0 Hz
-60.0			
		Span 0 Hz eep 3.162 s (30000 pts)	
MSG		STATUS	

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	2DH5_Ant1_Hop		
Agilent Spectrum Analyzer - Swept SA W RL RF 50 Ω AC Center Freq 2.441000000 GHz PNO: Fast - [Ecalin] ow	SENSE:INT ALIGN AUTO Trig Delay-2.000 ms #Avg Type: RMS Trig: Video #Atten: 40 dB	06:42:29 AM Dec 07, 2024 TRACE 2 3 4 5 6 TYPE WWWND CT P P P P P	
Ref Offset 8.94 dB		Mkr2 2.891 ms Auto Tune 1.10 dB	
		Center Freq 2.441000000 GHz	
0.00	2Δ1	Start Freq 2.441000000 GHz	
-10.0		100 LVL Stop Freq 2.441000000 GHz	
-30.0	idine letteridine offense altitude der	CF Step 1.000000 MHz Auto Man	
	destruction in the contract and page	Freq Offset 0 Hz	
-60.0			
Center 2.441000000 GHz		Span 0 Hz	
Center 2.441000000 GHz Res BW 1.0 MHz #VB	3W 3.0 MHz Sweep 10 status	Span 0 Hz 0.13 ms (8000 pts)	
 Res BW 1.0 MHz #VB vss	SENSE:INT ALIGNAUTO		
Res BW 1.0 MHz #VB vss	STATUS	06:42:59.0M Dec107, 2024 TRACE 0 2:3 4:3 TYPE WANNAMAN DEF IP P P P P P	
 Res BW 1.0 MHz #VB MSG Agitent Spectrum Analyzer - Swept SA W RL RF S02 AC Center Freq 2.441000000 GHz PN0: Fast - IFGaintow	SENSE:INT ALIGNAUTO		
Res BW 1.0 MHz #VB MSG Applert Spectrum Analyzer - Swept SA W RL PF SO: AC Center Freq 2.441000000 GHz FMO: Fast - IFGain.tow	SENSE:INT ALIGNAUTO	06:42:59.0M Dec107, 2024 TRACE 0 2:3 4:3 TYPE WANNAMAN DEF IP P P P P P	
Res BW 1.0 MHz #VB MSG Agitent Spectrum Analyzer - Swept SA W RL RF S02 AC Center Freq 2.441000000 GHz PN0: Fast - IFGaintow	SENSE:INT ALIGNAUTO	06-42-39 AM Dec 07, 2024 TMC 2 2 3 4 5 6 TMC 2 2 3 4 5 6 TMC 2 2 3 4 5 6 TMC 2 3 5 6 TMC 2 5 6 T	
Res BW 1.0 MHz #VB MSG Aglent Spectrum Analyzer - Swept SA WB RL FF 30.0 AC Center Freq 2.441000000 GHz PRO: Fast - IF-Gainclow Ref Offset 8.94 dB Log 20.0 10.0 ID dB/div 10.0	SENSE:INT ALIGNAUTO	106-62-39 AM Dec 07, 2024 TRACE 12-3 G-56 TREE 22-3 G-56 Cer 12-2 F P P P Auto Tune Center Freq 2.441000000 GHz Start Freq	
Res BW 1.0 MHz #VB MSG	SENSE:INT ALIGNAUTO	(0.42.39 AM Dec 07, 2024 Three (2.1 4 - 6.7) (2.1 4 -	
Res BW 1.0 MHz #VB MSG	SENSE:INT ALIGNAUTO	106-02.200 M Dec 07,2024 Frequency Proce Proce	
Res BW 1.0 MHz #VB MSG	SENSE:INT ALIGNAUTO	(0.42.39 AM Dec 07, 2024 Three (2.1 4 - 6.7) (2.1 4 -	
Res BW 1.0 MHz #VB visci	STATUS	20:42:39:MI Dec 07,2024 Frequency Those if 2 at most if 2 at mos	





	3DH5 Ant1	Нор		
Agilent Spectrum Analyzer - Swept SA OU RL RF ISO AC Center Freq 2.441000000 GHz IFGaint.to	SENSE:INT Trig Delay-2.000 ms #Av ar →→ Trig: Video	ALIGNAUTO 06:50:00 AM Dec 07, 2024 g Type: RMS TRACE 1029 4 5 6 TYPE ITMACE DET P P P P P	Frequency	
Ref Offset 8.94 dB 10 dB/div Ref 30.00 dBm Log		∆Mkr2 2.361 ms 5.57 dB	Auto Tune	
20.0			Center Freq 2.441000000 GHz	
0.00	•2∆1		Start Freq 2.441000000 GHz	
-10.0		TRIG LVL	Stop Freq 2.441000000 GHz	
-30.0 14440-14450-14460-1449		u kana ya dan pangan tali taya kana ya kana ya	CF Step 1.000000 MHz <u>Auto</u> Man	
-50 0 -60 0			Freq Offset 0 Hz	
Center 2.441000000 GHz Res BW 1.0 MHz #V	/BW 3.0 MHz	Span 0 Hz Sweep 10.13 ms (8000 pts)		
MSG Agilent Spectrum Analyzer - Swept SA		STATUS		
Center Freq 2.441000000 GHz PNO: Fast IFGain:Los	t 🛶 Trig: Video	ALIGNAUTO 06:50:10 AM Dec 07, 2024 rg Type: RMS TRACE 2 2 3 4 5 W TYPE WANNAW DET P P P P P	Frequency	
Ref Offset 8.94 dB 10 dB/div Ref 30.00 dBm			Auto Tune	
20.0			Center Freq 2.441000000 GHz	
0.00			Start Freq 2.441000000 GHz	
-10.0		1789 LVL.	Stop Freq 2.441000000 GHz	
-30.0	antigen and have a set of second s	i por fatti bati bati offerti bati di bati offerti bati di bati Bati di bati di	CF Step 510.000 kHz Auto Man	
-40.0				
-40.0			Freq Offset 0 Hz	
400 400 Center 2.44 1000000 GHz Res BW 510 kHz #V	/BW 3.0 MHz	Span 0 Hz Sweep 3.162 s (30000 pts)		



4.5. MAXIMUM PEAK CONDUCTED OUTPUT POWER

4.5.1. Applicable Standard

According to FCC Part 15.247(b)(1) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.5.2. Conformance Limit

The max For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

4.5.3. Test Configuration

Test according to clause 4.5.4 radio frequency test setup 1

4.5.4. Test Procedure

■ According to FCC Part15.247(b)(1)

As an alternative to a peak power measurement, compliance with the limit can be based on a measurement of the maximum conducted output power.

Use the following spectrum analyzer settings:

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel Set RBW > the 20 dB bandwidth of the emission being measured

Set VBW ≥ RBW

Set Sweep = auto

Set Detector function = peak

Set Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission to determine the peak amplitude level.

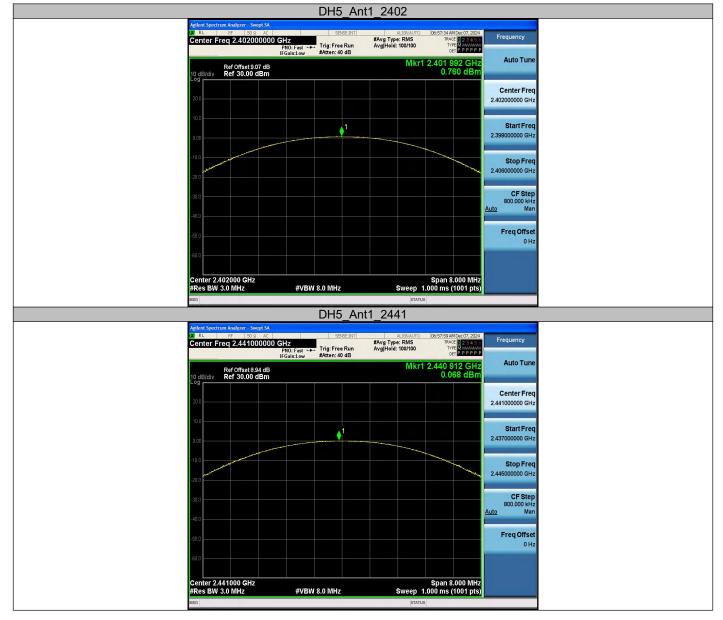


Test Results

Test Mode	Antenna	Freq(MHz)	Conducted Peak Powert[dBm]	Conducted Limit[dBm]	Verdict			
DH5	Ant1	2402	0.76	≤20.97	PASS			
		2441	0.07	≤20.97	PASS			
		2480	-0.56	≤20.97	PASS			
	Ant1	2402	1.58	≤20.97	PASS			
2DH5		Ant1	Ant1	Ant1	2441	0.85	≤20.97	PASS
		2480	0.17	≤20.97	PASS			
3DH5	Ant1	2402	0.73	≤20.97	PASS			
		2441	0.10	≤20.97	PASS			
		2480	-0.53	≤20.97	PASS			

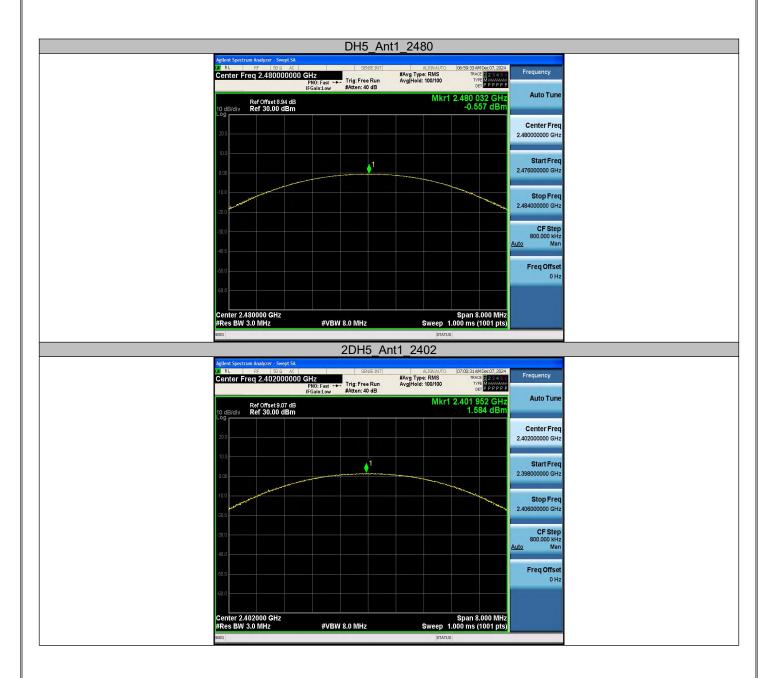


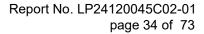
Test Graphs



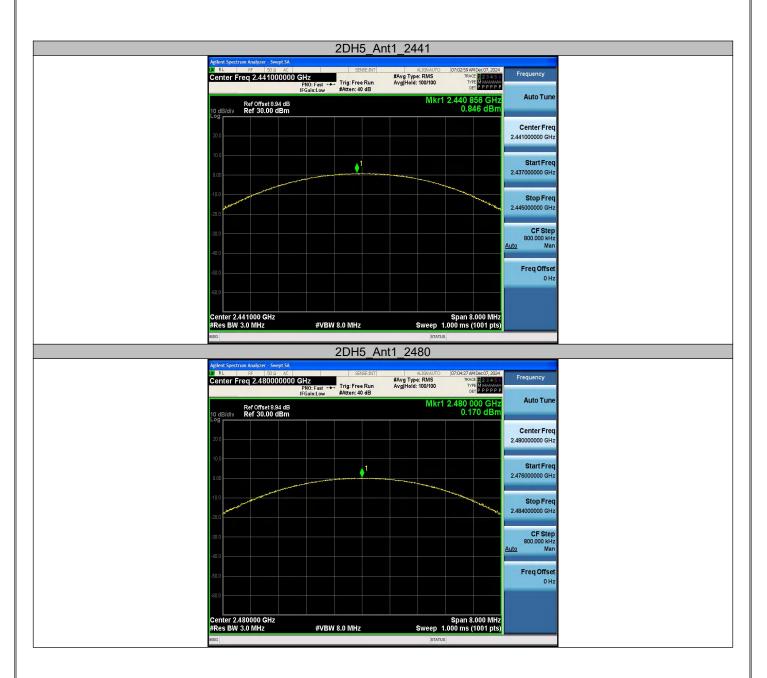
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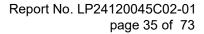




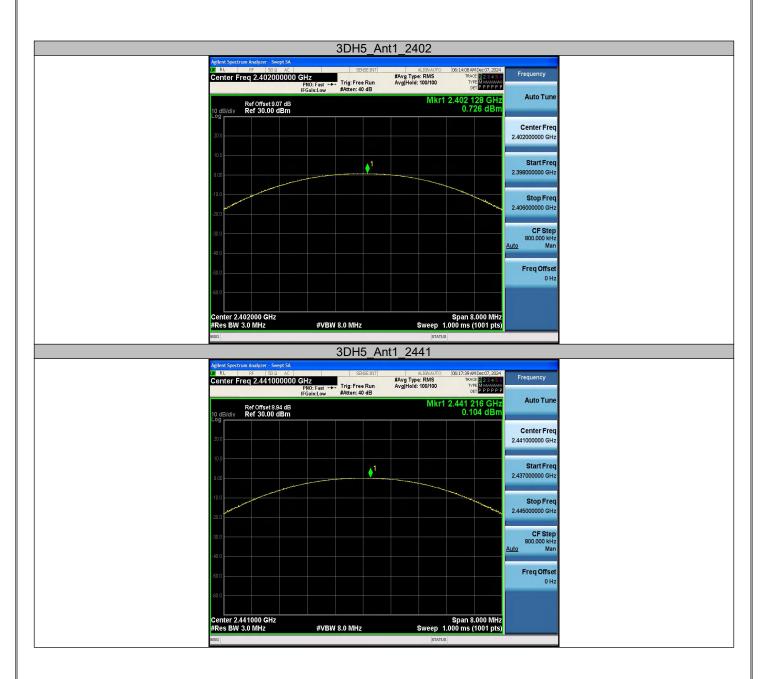












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	3DH5_An	t1_2480		
Agilent Spectrum Analyzer - Swept SA Di Rit. 1978 - 1930 - AC Center Freq 2.480000000 C	GHz PR0: Fast →→ IFGain:Low #Atten: 40 dB		123456 Ререре	
10 dB/div Ref 30.00 dBm		Mkr1 2.479 90 -0.528	4 GHz Auto Tune 8 dBm	
20.0			Center Freq 2.480000000 GHz	
0.00	↓ 1		Start Freq 2.476000000 GHz	
-10.0			Stop Freq 2.484000000 GHz	
-30 D			CF Step 800.000 kHz <u>Auto</u> Man	
-60 D			Freq Offset 0 Hz	
Center 2.480000 GHz #Res BW 3.0 MHz wsg	#VBW 8.0 MHz	Span 8.0 Sweep 1.000 ms (10 status	001 pts)	



4.6. CONDUCTED SUPRIOUS EMISSION AND BAND EDGE

4.6.1. Applicable Standard

According to FCC Part 15.247(d) and KDB 558074 D01 15.247 Meas Guidance v05r02

4.6.2. Conformance Limit

According to FCC Part 15.247(d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

4.6.3. Test Configuration

Test according to clause 3.1 radio frequency test setup 1

4.6.4. Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer

Reference level measurement

Establish a reference level by using the following procedure:

Set instrument center frequency to DSS channel center frequency.

Set Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel.

Set the RBW = 100 kHz. Set the VBW \ge 3 x RBW.

Set Detector = peak. Set Sweep time = auto couple.

Set Trace mode = max hold. Allow trace to fully stabilize.

Use the peak marker function to determine the maximum Maximum conduceted level.

Note that the channel found to contain the maximum conduceted level can be used to establish the reference level.

Band-edge Compliance of RF Conducted Emissions

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the emission operating on the channel closest to the band-edge, as well as any modulation products which fall outside of the authorized band of operation Set RBW $\ge 1\%$ of the span=100kHz Set VBW \ge RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. The marker-delta value now displayed must comply with the limit specified in this Section.

Now, using the same instrument settings, enable the hopping function of the EUT. Allow the trace to stabilize. Follow the same procedure listed above to determine if any spurious emissions caused by the hopping function also comply with the specified limit.

■ Conduceted Spurious RF Conducted Emission

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic.(30MHz to 26.5GHz). Set RBW = 100 kHz Set VBW \ge RBW

Set Sweep = auto Set Detector function = peak Set Trace = max hold

Allow the trace to stabilize. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this Section.



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Test Results:

TestMode	Antenna	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Low	2402	0.25	-48.45	≤-19.75	PASS
DUE	A pt1	High	2480	-1.38	-49.15	≤-21.38	PASS
DH5	Ant1	Low	Hop_2402	-0.09	-48.72	≤-20.09	PASS
		High	Hop_2480	-0.83	-46.49	≤-20.83	PASS
2DH5		Low	2402	-2.96	-49.51	≤-22.96	PASS
	A pt1	High	2480	-1.17	-49.12	≤-21.17	PASS
	Ant1	Low	Hop_2402	0.57	-49	≤-19.43	PASS
		High	Hop_2480	-2.15	-48.13	≤-22.15	PASS
3DH5	Ant1	Low	2402	0.30	-49.34	≤-19.7	PASS
		High	2480	-0.74	-49.84	≤-20.74	PASS
		Low	Hop_2402	0.26	-49.09	≤-19.74	PASS
		High	Hop_2480	-0.39	-46.56	≤-20.39	PASS



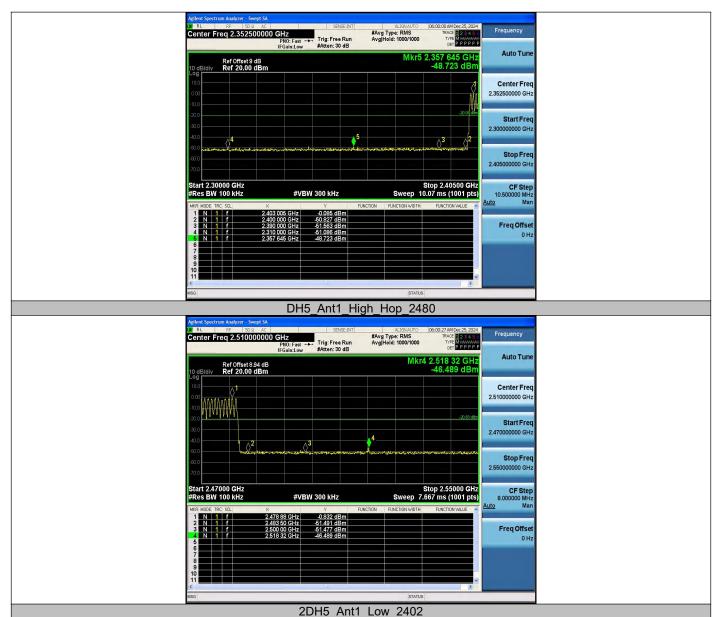
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Test Graphs

	nt1_Low_2402	
Aglient Spectrum Analyzer - Swept SA (2) Rumer Risc Sciences (Constraint - Sources) Center Freq 2.352500000 GHz PN0: Fast - Sources (Fosinit.cov)	Run AvalHold: 100/100 TYPE Minimum	Frequency
Ref Offset 9.07 dB	Mkr5 2.399 645 GHz -48.450 dBm	Auto Tune
100		Center Freq 52500000 GHz
-200	5	Start Freq
100 1 mar and 24 mar and the second of the s	#14.4m,4.5m,4.5m,0.5m,0.5m,0.5m,0.5m,0.5m,0.5m,0.5m,0	Stop Freq 05000000 GHz
Start 2.30000 GHz #Res BW 100 kHz #VBW 300 kHz MNR MODE TRC SQL X Y	Stop 2.40500 GHz Sweep 10.07 ms (1001 pts) FUNCTION FUNCTION WIDTH FUNCTION VALUE Auto	CF Step 10.500000 MHz Man
1 N 1 f 2.401 955 GHz 0.248 0.248 0.248 0.248 0.247 0.248 0.247 0.248 0.247 0.248 0.247 0.248 0.247 0.248 <th0.248< th=""> 0.248 0.248 <</th0.248<>	3m	Freq Offset 0 Hz
7 8 9 10 11	×	
	status nt1_High_2480	
Agilent Spectrum Analyzer - Swept SA 00 RL RF 50.0 AC SEX		
Center Freq 2.510000000 GHz PN0: Fast	#Avg Type: RMS TRACE 1 2 3 4 5 6 Run Avg Hold: 100/100 Type MWWWWW	Frequency
Ref Offset8.94 dB 10 dB/div Ref 20.00 dBm	Mkr4 2.500 72 GHz -49.150 dBm	Auto Tune
	2.51	Center Freq 10000000 GHz
		Start Freq 70000000 GHz
ານ 2000 ມູນກາງເປັນທາງ⁶⁵⁵ ¹⁹ປີບໍ່ໄດ້ມີ ເປັນການສາມະນ ີ ໄດ້ສາມສາກຊິງການເສດແມ່ນ 2000 -	alter hand the second	Stop Freq
Start 2.47000 GHz #Res BW 100 kHz #VBW 300 kHz MRF MODE TRC SCL X Y	Stop 2.55000 GHz Sweep 7.667 ms (1001 pts) FUNCTION FUNCTION VIOLT	CF Step 8.000000 MHz Man
1 N 1 f 2.480 00 GHz - 3.833 G 2 N 1 f 2.485 00 GHz 5.815 G 3 N 1 f 2.800 00 GHz 5.8718 d 4 N 1 f 2.500 00 GHz 5.778 d 5 G	3m	Freq Offset 0 Hz
9 9 10 11		
MSG	STATUS	
	I Low Hop 2402	

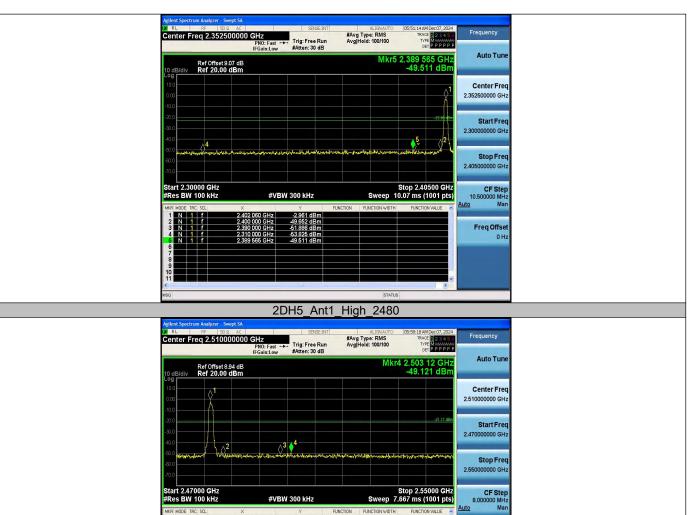


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-1.167 dBm -52.356 dBm -51.467 dBm -49.121 dBm

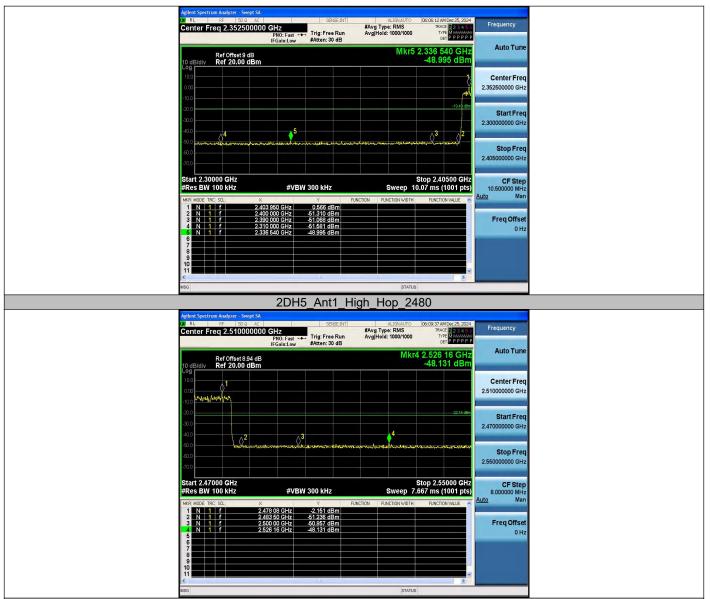
2DH5 Ant1 Low Hop 2402

2.483 50 GHz 2.500 00 GHz 2.503 12 GHz

Freq Offset 0 Hz



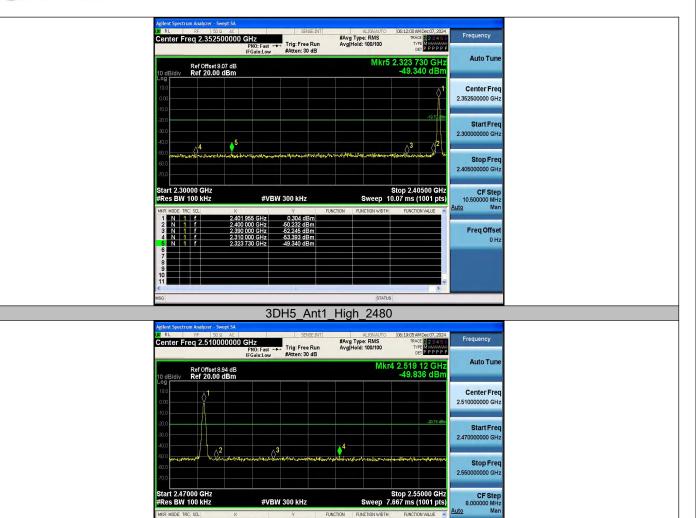
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3DH5_Ant1_Low_2402



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Auto

Freq Offset 0 Hz

#VBW 300 kHz

-53.026 dBm -53.178 dBm -49.836 dBm

3DH5 Ant1 Low Hop 2402

2.483 50 GHz 2.500 00 GHz 2.519 12 GHz



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Agilent Spectrum Analyzer - Swept SA				
04 RL RF 50Ω AC Center Freq 2.352500000 GH: PN	10: Fast +++ Trig: Free Run	ALIGNAUTO #Avg Type: RMS Avg Hold: 1000/1000	06:10:33 AM Dec 25, 2024 TRACE 2 3 4 5 6 TYPE MWWWWW DET P P P P P P	Frequency
Ref Offset 9 dB 10 dB/div Ref 20.00 dBm	ain:Low #Atten: 30 dB	Mkr5	2.373 605 GHz -49.085 dBm	Auto Tune
10.0 0.00				Center Freq 2.352500000 GHz
-10.0			-19.74 dEH	Start Freq
-40.0 -60.0	ta famili an anna	5	and a standard and a standard and a standard	2.30000000 GHz
-70.0				Stop Freq 2.405000000 GHz
Start 2.30000 GHz #Res BW 100 kHz	#VBW 300 kHz	Sweep 10	Stop 2.40500 GHz 0.07 ms (1001 pts) FUNCTION VALUE	CF Step 10.500000 MHz Auto Man
1 N 1 f 2.404790 2 N 1 f 2.400000 3 N 1 f 2.390000	0 GHz 0.264 dBm 0 GHz -50.661 dBm 0 GHz -51.767 dBm 0 GHz -51.576 dBm			Freq Offset 0 Hz
5 N 1 F 2.373 605 6 7 8	GHz -49.085 dBm		3	UHZ
9 10 11			~	
MSG	3DH5_Ant1_Hi	ah Hop 24		
Agilent Spectrum Analyzer - Swept SA UNI R L RF 50 Ω AC	SENSE:INT		06:10:51 AM Dec 25, 2024	Frequency
IFG	IO: Fast ↔ Trig: Free Run ain:Low #Atten: 30 dB	Avg Hold: 1000/1000	TRACE 123456 TYPE MUMMUM DET P P P P P P	Auto Tune
Ref Offset 8.94 dB 10 dB/div Ref 20.00 dBm			4 2.518 00 GHz -46.561 dBm	
10.0 0000 0000 0000 0000 0000 0000 0000				Center Freq 2.510000000 GHz
-10.0			-20.39 dBn	Start Freq 2.470000000 GHz
-40.0 -50.0	man 2 Allan a growth	4	a harrow and a manager for more	
-80.0				Stop Freq 2.550000000 GHz
Start 2.47000 GHz #Res BW 100 kHz	#VBW 300 kHz		Stop 2.55000 GHz 667 ms (1001 pts)	CF Step 8.000000 MHz Auto Man
1 N 1 f 2.476 00 2 N 1 f 2.483 50 3 N 1 f 2.500 00 4 N 1 f 2.518 00	0 GHz -0.387 dBm			Freq Offset
4 N Y Y 231800 5 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7				0 Hz
9	کر کھی ہے ا			

STATUS