

CTC Laboratories, Inc.

TEST REPORT

Report No:	CTC2024240510		
FCC ID:	WNA-HPR3A-W5		
Applicant:	Shenzhen Skyworth Digital Technology Co.,LTD.		
Address:	14/F Unit A. Skyworth Building, Gaoxin Ave.1s., Nanshan District, Shenzhen, China		
Manufacturer	Shenzhen Skyworth Digital Techno	ology Co.,LTD.	
Address:	14/F Unit A. Skyworth Building, Ga District, Shenzhen, China	aoxin Ave.1s., Nanshan	
Product Name:	TBD, SET TOP BOX		
Trade Mark:	SKYWORTH, STRONG, QVWI, N	ext	
Model/Type reference:	HPR3A		
Listed Model(s):	HPR311		
Standard:	FCC CFR Title 47 Part 15 Subpart C Section 15.247		
Test Report Form No	CTC-TR-059_A1		
Master TRF	Dated 2024-09-20		
Date of receipt of test sample:	Oct. 18, 2024		
Date of testing	Oct. 21, 2024 ~ Oct. 30, 2024		
Date of issue	Dec. 06, 2024		
Result	PASS		
Compiled by:		1. mail ann	
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(Printed name+signature)	Totti Zhao	/*	

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands 902–928MHz, 2400–2483.5MHz, and 5725–5850MHz.

<u>ANSI C63.10-2013</u>: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

1.2. Report Version

Revised No.	Report No.	Date of issue	Description
01	CTC2024240510	Dec. 06, 2024	Original

1.3. Test Description

FCC Part 15 Subpart C (15.247)			
Test Item	Standard Section	Result	Test Engineer
Antenna Requirement	15.203	Pass	Alicia Liu
Conducted Emission	15.207	Pass	Alicia Liu
Restricted Bands	15.205	Pass	Alicia Liu
Hopping Channel Separation	15.247(a)(1)	Pass	Alicia Liu
Dwell Time	15.247(a)(iii)	Pass	Alicia Liu
Peak Output Power	15.247(b)(1)	Pass	Alicia Liu
Number of Hopping Frequency	15.247(a)(iii)	Pass	Alicia Liu
Conducted Band Edge and Spurious Emissions	15.247(d)	Pass	Alicia Liu
Radiated Band Edge and Spurious Emissions	15.205&15.209& 15.247(d)	Pass	Alicia Liu
Radiated Spurious Emission	15.247(d) &15.209	Pass	Alicia Liu
20dB Bandwidth	15.247(a)	Pass	Alicia Liu

Note:

1. The measurement uncertainty is not included in the test result.

2. N/A: means this test item is not applicable for this device according to the technology characteristic of device.

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1.4. Test Facility

Address of the report laboratory

CTC Laboratories, Inc.

Add: Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luhu Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

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1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM);Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties radio equipment characteristics; Part 2" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the CTC Laboratories, Inc. quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Test Items	Measurement Uncertainty	Notes
20dB Emission Bandwidth	±0.0196%	(1)
Carrier Frequency Separation	±1.9%	(1)
Number of Hopping Channel	±1.9%	(1)
Time of Occupancy	±0.028%	(1)
Max Peak Conducted Output Power	±0.743 dB	(1)
Band-edge Spurious Emission	±1.328 dB	(1)
Conducted RF Spurious Emission	9kHz-1GHz: ±0.746dB 1GHz-26GHz: ±1.328dB	(1)
Conducted Emissions 9kHz~30MHz	±3.08 dB	(1)
Radiated Emissions 30~1000MHz	±4.51 dB	(1)
Radiated Emissions 1~18GHz	±5.84 dB	(1)
Radiated Emissions 18~40GHz	±6.12 dB	(1)

Below is the best measurement capability for CTC Laboratories, Inc.

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental Conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15 °C to 35 °C
Relative Humidity:	20 % to 75 %
Air Pressure:	101 kPa

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2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Shenzhen Skyworth Digital Technology Co.,LTD.
Address:	14/F Unit A. Skyworth Building, Gaoxin Ave.1s., Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Skyworth Digital Technology Co.,LTD.
Address:	14/F Unit A. Skyworth Building, Gaoxin Ave.1s., Nanshan District, Shenzhen, China
Factory:	Shenzhen Skyworth Digital Technology Co., LTD. Baoan Factory
Address:	2-5F,Integration Multi-Storied Building, Skyworth Science and Technology Industrial Park, Tangtou Industrial Zone, Shiyan Street, Baoan District, Shenzhen city, China.

2.2. General Description of EUT

Product Name:	TBD, SET TOP BOX
Trade Mark:	SKYWORTH, STRONG, QVWI, Next
Model/Type reference:	HPR3A
Listed Model(s):	HPR311
Model Difference:	Only the models name is different
Sample ID:	CTC241012-002-S001
Power Supply:	DC12V 1A from AC/DC Adapter
Adapter Model 1	YS-SKY120100U00P ^{Note1} Input: 100-240V~ 50/60Hz 0.5A Output: 12Vdc/1A 12.0W
Adapter Model 2	RJ-SKY120100U60S ^{Note2} Input: 100-240V~ 50/60Hz 0.5A Output: 12Vdc/1A 12.0W
Adapter Model 3	BS12A-1201000US Input: 100-240V~ 50/60Hz 0.4A Output: 12Vdc/1A 12.0W
Hardware version:	/
Software version:	/

Note:

1. YS-SKY120100U0XP, (where X represents for marketing purpose with no safety impact, it can be 0-9)

2. RJ-SKY120100UXXS (XX=00-99, stands for customer code)

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Bluetooth 5.0 / BR+EDR	
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Operation Frequency:	2402MHz~2480MHz
Channel Number:	79
Channel Separation:	1MHz
Antenna Type:	PCB Antenna
Antenna Gain:	1.87 dBi



2.3. Accessory Equipment Information

Equipment Information				
Name	Model	S/N	Manufacturer	
Notebook	ThinkPad T460s	/	Lenovo	
Cable Information				
Name	Shielded Type	Ferrite Core	Length	
LAN Cable	Unshielded	NO	150cm	
Test Software Information				
Name	Version	/	/	
SecureCRT	1	/	1	

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2.4. Operation State

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT EDR, 79 channels are provided to the EUT. Channels 00/39/78 were selected for testing.

Operation Frequency List:

Channel	Frequency (MHz)
00	2402
01	2403
:	:
38	2440
39	2441
40	2442
:	:
77	2479
78	2480

Note: The display in grey were the channel selected for testing.

Test Mode:

For RF test items:

The engineering test program was provided and enabled to make EUT continuous transmit.

For AC power line conducted emissions:

The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.

For Radiated spurious emissions test item:

The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

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2.5. Measurement Instruments List

	RF Test System - SRD					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated Until	
1	MXA Signal Analyzer	Keysight	N9020A	MY46471737	Dec. 12, 2024	
2	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	Dec. 12, 2024	
3	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	Dec. 12, 2024	
4	USB Wideband Power Sensor	Keysight	U2021XA	MY55130004	Mar. 15, 2025	
5	USB Wideband Power Sensor	Keysight	U2021XA	MY55130006	Mar. 15, 2025	
6	High and low temperature test chamber	ESPEC	MT3035	/	Mar. 25, 2025	
7	Test Software	Tonscend	JS1120-3	V2.6.88.0346	/	

		Radia	ited emission		
Item	Test Equipment	Manufacturer	Manufacturer Model No.		Calibrated Until
1	Trilog-Broadband Antenna	Schwarzbeck	VULB 9163	01026	Dec. 18, 2024
2	Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-647	Sep. 25, 2025
3	Test Receiver	Keysight	N9038A	MY56400071	Dec. 12, 2024
4	Broadband Amplifier	SCHWARZBECK	BBV9743B	259	Dec. 12, 2024
5	Mirowave Broadband Amplifier	SCHWARZBECK	BBV9718C	111	Dec. 12, 2024
6	3m chamber 3	YIHENG	EE106	/	Aug. 28, 2026
7	Test Software	FARA	EZ-EMC	FA-03A2	/

	Conducted emission									
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibrated until					
1	LISN	R&S	ENV216	101112	Dec. 12, 2024					
2	LISN	R&S	ENV216	101113	Dec. 12, 2024					
3	EMI Test Receiver	R&S	ESCS30	100353	Dec. 12, 2024					
4	ISN CAT6	Schwarzbeck	NTFM 8158	CAT6-8158-0046	Dec. 12, 2024					
5	ISN CAT5	Schwarzbeck	NTFM 8158	CAT5-8158-0046	Dec. 12, 2024					
6	Test Software	R&S	EMC32	6.10.10	/					

Note: 1. The Cal. Interval was one year.

- 2. The Cal. Interval was three years of the antenna.
- 3. The cable loss has been calculated in test result which connection between each test instruments.

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3. TEST ITEM AND RESULTS

3.1. Conducted Emission

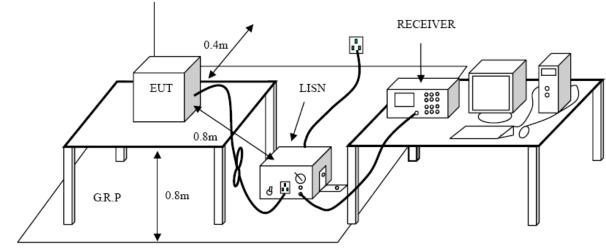
<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.207

	Conducte	ed Limit (dBμV)
Frequency (MHz)	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration



Test Procedure

1. The EUT was setup according to ANSI C63.10:2013 requirements.

2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.

3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm / 50 μ H coupling impedance for the measuring equipment. 4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

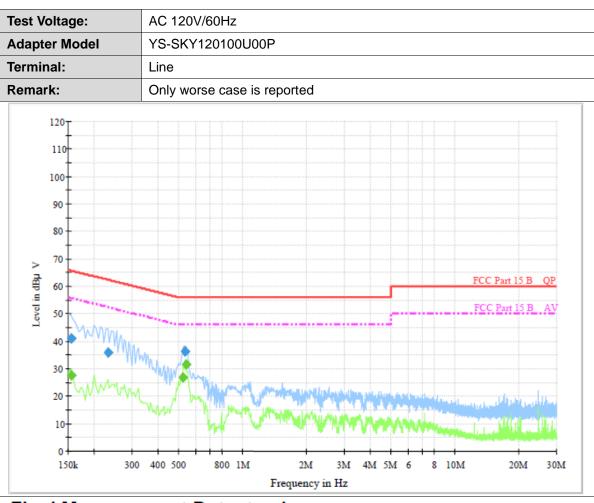
8. During the above scans, the emissions were maximized by cable manipulation.

Test Mode

Please refer to the clause 2.4.

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Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.154500	41.1	1000.00	9.000	On	L1	9.5	24.7	65.8	
0.231000	36.0	1000.00	9.000	On	L1	9.5	26.4	62.4	
0.532500	36.3	1000.00	9.000	On	L1	9.5	19.7	56.0	

Final Measurement Detector 2

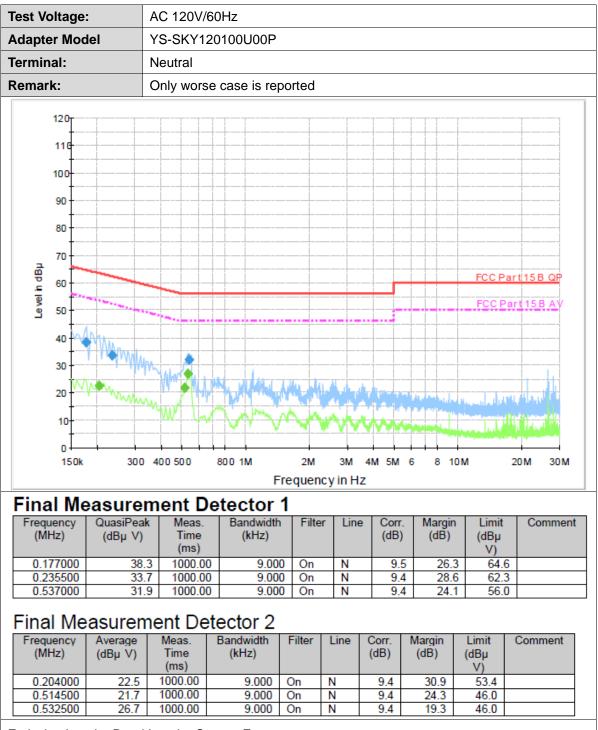
Frequency (MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.154500	27.8	1000.00	9.000	On	L1	9.5	28.0	55.8	
0.519000	26.9	1000.00	9.000	On	L1	9.5	19.1	46.0	
0.537000	31.4	1000.00	9.000	On	L1	9.5	14.6	46.0	

Emission Level = Read Level + Correct Factor

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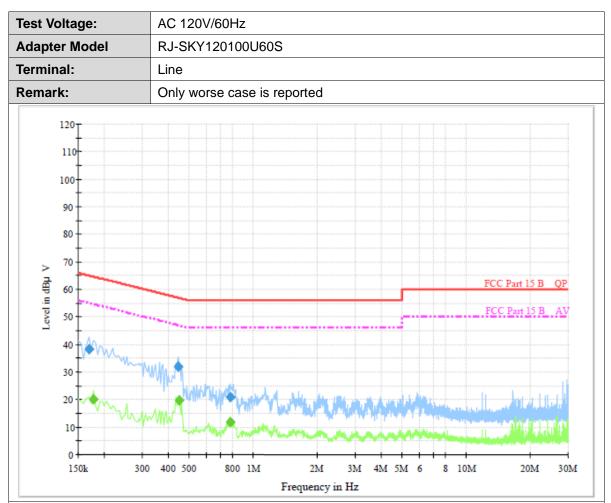




Emission Level = Read Level + Correct Factor

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Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.168000	38.3	1000.00	9.000	On	L1	9.5	26.8	65.1	
0.442500	31.9	1000.00	9.000	On	L1	9.5	25.1	57.0	
0.780000	21.1	1000.00	9.000	On	L1	9.5	34.9	56.0	

Final Measurement Detector 2

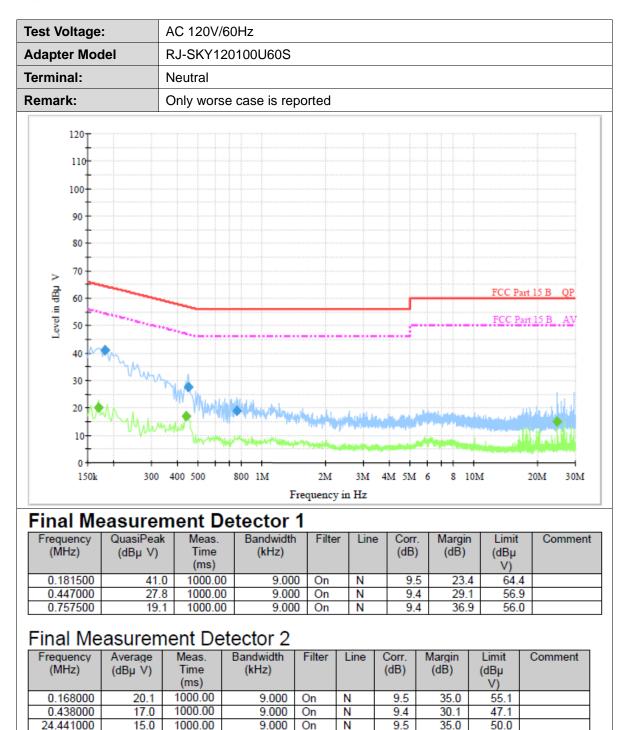
Average	Meas.	Bandwidth	Filter	Line	Corr.	Margin	Limit	Comment
(dBµV)	Time	(kHz)			(dB)	(dB)	(dBµ	
	(ms)						V)	
20.2	1000.00	9.000	On	L1	9.5	34.4	54.6	
19.8	1000.00	9.000	On	L1	9.5	27.1	46.9	
11.8	1000.00	9.000	On	L1	9.5	34.2	46.0	
	(dBµ V) 20.2 19.8	(dBµ V) Time (ms) 20.2 1000.00 19.8 1000.00	(dBμ V) Time (ms) (kHz) 20.2 1000.00 9.000 19.8 1000.00 9.000	(dBμ V) Time (ms) (kHz) 20.2 1000.00 9.000 On 19.8 1000.00 9.000 On	(dBμ V) Time (ms) (kHz) Image: Comparison of the state of th	(dBμ V) Time (ms) (kHz) (dB) 20.2 1000.00 9.000 On L1 9.5 19.8 1000.00 9.000 On L1 9.5	(dBμ V) Time (ms) (kHz) (dB) (dB) (dB) 20.2 1000.00 9.000 On L1 9.5 34.4 19.8 1000.00 9.000 On L1 9.5 27.1	(dBμ V) Time (ms) (kHz) (dB) (dB)

Emission Level = Read Level + Correct Factor

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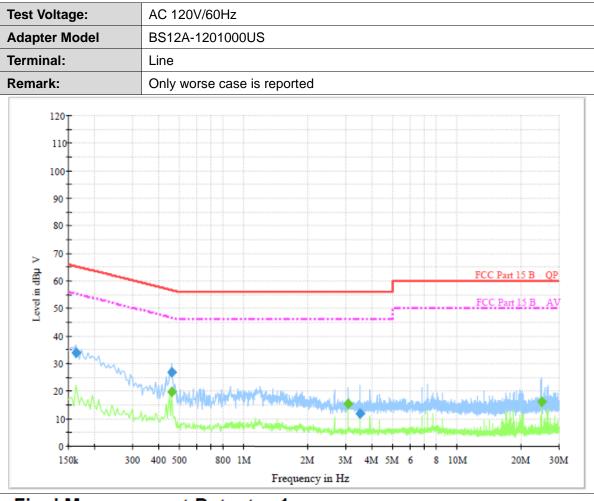




Emission Level = Read Level + Correct Factor

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Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.163500	33.8	1000.00	9.000	On	L1	9.5	31.5	65.3	
0.460500	27.0	1000.00	9.000	On	L1	9.5	29.7	56.7	
3.489000	11.9	1000.00	9.000	On	L1	9.5	44.1	56.0	

Final Measurement Detector 2

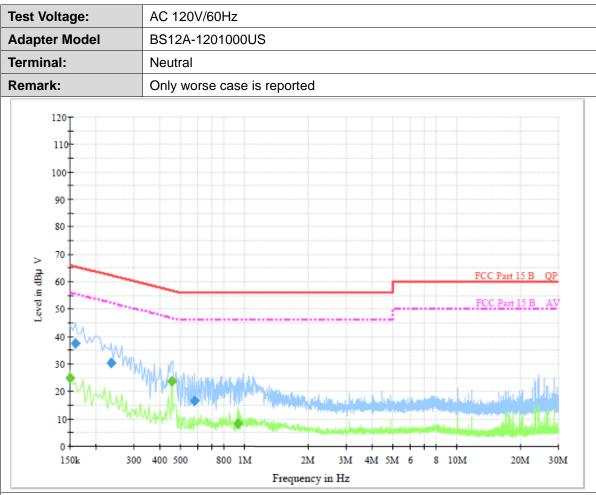
	Frequency (MHz)	Average (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
[0.460500	19.8	1000.00	9.000	On	L1	9.5	26.9	46.7	
ĺ	3.075000	15.2	1000.00	9.000	On	L1	9.5	30.8	46.0	
[24.954000	16.3	1000.00	9.000	On	L1	9.7	33.7	50.0	

Emission Level = Read Level + Correct Factor

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Final Measurement Detector 1

Frequency (MHz)	QuasiPeak (dBµ V)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµ V)	Comment
0.159000	37.6	1000.00	9.000	On	Ν	9.5	27.9	65.5	
0.235500	30.6	1000.00	9.000	On	N	9.4	31.7	62.3	
0.577500	16.5	1000.00	9.000	On	Ν	9.4	39.5	56.0	

Final Measurement Detector 2

Frequency	Average	Meas.	Bandwidth	Filter	Line	Corr.	Margin	Limit	Comment
(MHz)	(dBµV)	Time	(kHz)			(dB)	(dB)	(dBµ	
		(ms)						V)	
0.150000	25.0	1000.00	9.000	On	N	9.5	31.0	56.0	
0.451500	23.6	1000.00	9.000	On	N	9.4	23.2	46.8	
0.924000	8.2	1000.00	9.000	On	Ν	9.4	37.8	46.0	

Emission Level = Read Level + Correct Factor

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3.2. Radiated Emission

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.209

Frequency	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(meters)
0.009~0.490	2400/F (kHz)	300
0.490~1.705	24000/F (kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

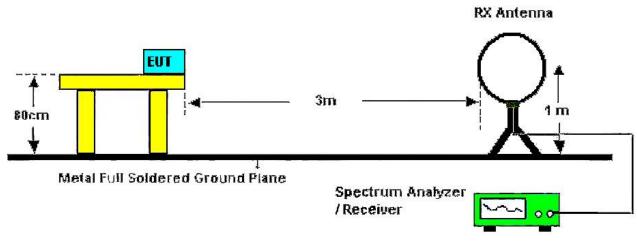
	dBµV/m	(at 3 meters)
Frequency Range (MHz)	Peak	Average
Above 1000	74	54

Note:

(1) The tighter limit applies at the band edges.

(2) Emission Level ($dB\mu V/m$)=20log Emission Level ($\mu V/m$).

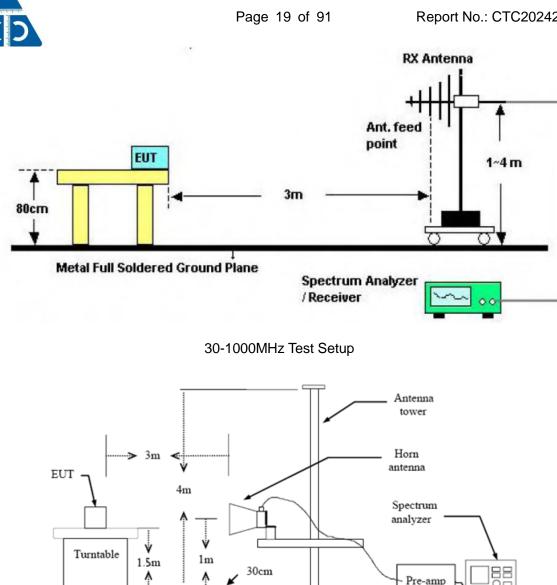
Test Configuration



Below 30MHz Test Setup

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Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013.

The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for 2. above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.

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

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

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

Use the following spectrum analyzer settings 6.

Span shall wide enough to fully capture the emission being measured; (1)

(2) 9k – 150kHz:

RBW=300 Hz, VBW=1 kHz, Sweep=auto, Detector function=peak, Trace=max hold (3) 0.15M – 30MHz:

RBW=10 kHz, VBW=30 kHz, Sweep=auto, Detector function=peak, Trace=max hold (4) 30M - 1 GHz:

RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold

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If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the guasi-peak detector and reported.

(5) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.10 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

9 kHz~30 MHz

From 9 kHz to 30 MHz: The conclusion is PASS.

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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An	t. Pol.			Н	oriz	ont	al									
Ad	apter	Model		Y	S-S	KY	12010	0000P								
Tes	st Moc	le:		T	X G	FS	K Moo	de 2402MHz								
Re	mark:			0	nly	wo	rse ca	se is reporte	d.							
90.0	dBu\	//m									Î	ĺ	ĺ			
80																
70																
60										F	CC Part15	Class B 3	3M Radiatio	DN		
50									-	м	argin -6 d	B				
40	<u> </u>								-						5 × 6	
30													*		×	
20			INIAMA.					2	4/1		b lynn wert	S.A. 4		a market	- Jungt and	
10	Jun Market	water at the state of the state	linite J.M	(MM)	4MA	Mus	w. W. W. W.	work water	M	Manterstan	Al Mart	V. marrie				
0	ļ					. 14. 1	<u> </u>		_							
-10	0.000														1000.0	
3	0.000		60	0.00	_			(MHz)		300).00				1000.0	
1	No.	Freq (M	uen Hz)	су			ading 8u∨)	Factor (dB/m)		Level BuV/m)		mit V/m)	Margi (dB)		Detector	
	1	57.3	3923	3		36	.82	-18.62		18.20	40	.00	-21.8	0	QP	Ť
	2	171.	392	6		40	.37	-19.37		21.00	43	.50	-22.5	0	QP	
	3	392.	095	1		35	.53	-15.27		20.26	46	.00	-25.7	4	QP	
	4	588.	905	1		36	.59	-9.76		26.83	46	.00	-19.1	7	QP	T

6

5 *

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

-5.55

-3.32

35.51

32.10

46.00

54.00

-10.49

-21.90

QP

QP

41.06

35.42

2.Margin value = Level -Limit value

836.2443

986.0717

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Ant. Pol	•	Ve	ertical						
Adapter	Model	Y	S-SK	Y12010	0U00P				
Fest Mo	de:	Т	K GFS	SK Mod	e 2402MHz				
Remark:	:	0	nly wo	orse cas	se is reported	l.			
30.0 dBu	V/m								
30									
70									
50						F	CC Part15 Class B	3M Radiation	
50						M	argin -6 dB		
10 									
	1	w						5	6
30		h.	W. Human		Why is the	Δ		5	6
20		h uyyi	W WINNING AND	AND	W Walnut	Marrian man	a walking all for and go half	5 Juniter Mary	6
30		444 4 11	W. Managara	A A A A A A A A A A A A A A A A A A A	W Walking W	Martin man	nertherade the	5 Julion Wandhar	E Manager
20		1	WWWWWWWWW	A A A A A A A A A A A A A A A A A A A	White	Martin Martin	Nerthangen and a hale	5 Juniten Marinen	E Management
		60.00	N. M.		(MHz)		0.00	5 hallow	5
			Rea		Warner				1000.00
	Frequer (MHz	псу		ading BuV)	(MHz)	30 Level	0.00	Margin	1000.00
	Frequer	ncy)	(dl	ading	(MHz) Factor	30 Level	0.00 Limit	Margin	1000.00
30 20 10 30.000 NO.	Frequer (MHz	ncy))7	(dl 48	ading BuV)	(MHz) Factor (dB/m)	30 Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	1000.00

4

5

6

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

-19.57

-9.69

-3.38

21.98

28.30

30.88

43.50

46.00

54.00

-21.52

-17.70

-23.12

QP

QP

QP

41.55

37.99

34.26

2.Margin value = Level -Limit value

174.4241

590.9737

982.6200

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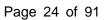
Ant	. Pol.			Horiz	onta	al							
Ada	apter l	Model		RJ-S	KY1	20100	0U60S						
Test	t Mod	le:		TX G	FSk	K Mode	e 2402MHz						
Ren	nark:			Only	wor	se cas	e is reported.						
90.0 F	dBuV	'/m											
BO													
0													
60											3M Radiatio	DN	
50 40									Margin -6 d	B			
30							2						
20		Jul	Aliantia, and	Alu.			\longrightarrow	hymneyyyyne	5 (()	e Martin Martin	6 In Am Waln	knot many	mulence
10	and hunder		. վ. այս դերգե	Wyn	Ministra	ner mander der	un an an an and a start a start a start a start a start a start	~ Aunth And A	Wynyfall Pm				
0													
-10 30	.000		60.00)			(MHz)	:	300.00				1000.00
N	lo.		uency Hz)	F		ding uV)	Factor (dB/m)	Level (dBuV/m		mit ıV/m)	Marg (dB)		etector

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	51.3005	36.78	-18.04	18.74	40.00	-21.26	QP
2 *	183.2005	50.46	-20.13	30.33	43.50	-13.17	QP
3	291.0358	34.20	-17.83	16.37	46.00	-29.63	QP
4	400.4318	38.72	-15.07	23.65	46.00	-22.35	QP
5	483.9094	32.51	-12.51	20.00	46.00	-26.00	QP
6	590.9737	31.32	-9.69	21.63	46.00	-24.37	QP

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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Ant	. Pol.			Ve	ertica	ıl						
Ada	pter	Model		R	J-SK	Y120	100	U60S				
Tes	t Mod	le:		ТΣ	(GF	SK N	lode	e 2402MHz				
Ren	nark:			Or	nly w	orse	cas	e is reported				
90.0 	dBu¥	//m										
80												
70												
60										CC Part15 Class B	3M Radiation	
50									, ,	largin -6 dB		
40												
30			Manaka					3 14			6	
20		MANN	- 197	runii in	4h.			1 Mr. war	V u.	5	and and the off	Annana
10	WWWWWW	din adin				WMM March	han	May w	Werning working	a manus pris	of the work of the second	
	Mu						× ·		60°			
0 -10												
	.000		60	.00				(MHz)	30	0.00		1000.00
N	lo.	Freq (M	uenc IHz)	ÿ		eadin BuV		Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	*	52.2	2079		5	0.52	2	-18.13	32.39	40.00	-7.61	QP

2

3

4

5

6

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

-20.25

-18.86

-20.09

-16.23

-9.69

30.00

27.06

26.74

19.00

27.27

40.00

43.50

43.50

46.00

46.00

-10.00

-16.44

-16.76

-27.00

-18.73

QP

QP

QP

QP

QP

50.25

45.92

46.83

35.23

36.96

2.Margin value = Level -Limit value

69.1141

141.8262

182.5592

350.4768

590.9737

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Δn	t. Pol.		Hor	rizonta	al					
		Model			20100	0US				
	st Mod					e 2402MHz				
Re	mark:		Onl	y wor	rse cas	e is reported.				
90.0) dBu	//m		-		•	1		1 1	
80										
70				_						
60							FI	CC Part15 Class B 3	M Radiation	
50							м	argin -6 dB		
40				<u> </u>				4		
30								3 × 5		E E
20		1	41.	2		. And	Ma MM we with.	And which	multimult	humher
10	- March			Mymy	http://	wither when the state	- Artha W	la kirVAMushi. Avi uz		
0	- W									
-10	30.000					(MHz)				1000.000
	30.000	60.	.00			(MHZ)	300	.00		1000.000
	No.	Frequenc (MHz)	y		ding uV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	58.8185		36	.67	-18.72	17.95	40.00	-22.05	QP
	2	77.8654		40	.06	-21.82	18.24	40.00	-21.76	QP

6

3

4 *

5

Remarks: 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

-16.42

-15.27

-12.33

-3.32

31.95

34.79

29.67

32.02

46.00

46.00

46.00

54.00

-14.05

-11.21

-16.33

-21.98

QP

QP QP

QP

48.37

50.06

42.00

35.34

2.Margin value = Level -Limit value

343.1800

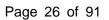
392.0951

492.4685

986.0717

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Ant. I	Pol			V	ertic	- al										
		Model					120100									
Test I		e:		T	ΧG	FS	K Mod	e 2402MH	IZ							
Rema				0	nly	wo	rse ca	se is repor	ted.							
90.0 	dBu¥	'/m														
BO —																
70 -																
50 -											FCC Part1	i Class B	3M Radiation	n		
50 -											Margin -6 (iB				
40 -						_										
30												5 X			6 X	
20	1 X			1	Å	114		and the	*	. MAMANA AND A	พาใ ^ห ้ไฟไมก	allow	purchardenne	mouth	mart	
10	, June	navig for the state	Marin 1	WWW)	ψ.		A management	MULLIN	N.N	אשינו רייא	ייזייז און און					
) 10																
30.00	00		6	0.00				(MI	Hz)	30	00.00				1000	.00
No	b .	Freq (M	uen IHz)	су			iding 8uV)	Facto (dB/m		Level (dBuV/m)		mit ıV/m)	Margir (dB)	De	tecto)r
1		32.	7486	3		37	.23	-18.92	2	18.31	40	.00	-21.69) (QP	_
2		57.	3923	3		35	.98	-18.62	2	17.36	40	.00	-22.64	1 (QP	_

3

4

5 *

6

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

-21.67

-19.61

-12.14

-3.38

21.02

22.33

30.96

31.48

40.00

43.50

46.00

54.00

-18.98

-21.17

-15.04

-22.52

QP

QP

QP

QP

42.69

41.94

43.10

34.86

2.Margin value = Level -Limit value

77.0505

175.0367

501.1790

982.6200

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Ant. Pol.	Horizontal
Test Mode:	TX GFSK Mode 2402MHz
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1	4803.676	41.90	2.00	43.90	74.00	-30.10	peak
2 *	4803.713	27.51	2.00	29.51	54.00	-24.49	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

nt. Pol.		Vertical					
est Mod	de:	TX GFSK Mo	de 2402MHz	<u>Z</u>			
emark:		No report for limit.	the emission	which more t	han 20 dB be	elow the p	rescribed
		1		1			
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No.		· ·				-	Detector peak

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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nt. Pol.		Horizontal					
est Mod	le:	TX GFSK Mo	de 2441MHz	2			
Remark:		No report for limit.	the emission	which more t	han 20 dB be	elow the p	rescribed
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
No.						-	Detector AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Ant. Pol.		Vertical					
Test Mod	de:	TX GFSK Mo	de 2441MHz	2			
Remark:		No report for limit.	the emission	which more	han 20 dB be	elow the p	rescribed
						1	1 1
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4881.083	41.42	2.09	43.51	74.00	-30.49	peak
2 *	4881.157	26.43	2.09	28.52	54.00	-25.48	AVG
Remarks I.Factor	: (dB/m) = Antenn	a Factor (dB/m	n)+Cable Fac	ctor (dB)-Pre-	amplifier Fac	tor	
	value = Level -L	•	-	. ,	-		

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Ant. Pol.		Horizontal						
Test Mod	de:	TX GFSK Mo	de 2480MHz	7				
Remark:		No report for limit.	the emission	which more	than 20 dB b	elow the p	orescribed	
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4959.809	40.59	2.21	42.80	74.00	-31.20	peak	
2 *	4960.965	26.54	2.21	28.75	54.00	-25.25	AVG	
							· /	_

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Ant. Po	ol.	Vertical					
lest M	ode:	TX GFSK Mo	de 2480MHz	z			
Remar	'k:	No report for the emission which more than 20 dB below the prescribe limit.					rescribec
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 '	* 4959.997	26.38	2.21	28.59	54.00	-25.41	AVG
2	4960.284	40.59	2.21	42.80	74.00	-31.20	peak

2.Margin value = Level -Limit value

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Ant. Pol.	Horizontal
Test Mode:	TX π/4-DQPSK Mode 2402MHz
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1 *	4803.263	27.03	1.99	29.02	54.00	-24.98	AVG
2	4804.355	41.32	2.00	43.32	74.00	-30.68	peak

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

Ant. Pol.	Vertical
Test Mode:	TX π/4-DQPSK Mode 2402MHz
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1 '	4803.350	27.13	2.00	29.13	54.00	-24.87	AVG
2	4803.822	41.79	2.00	43.79	74.00	-30.21	peak

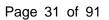
Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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Ant. Pol.		Horizontal						
Test Mod	le:	TX π/4-DQPSK Mode 2441MHz						
Remark:		No report for t limit.	the emission	which more t	han 20 dB be	elow the p	rescribed	
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4882.768	40.31	2.09	42.40	74.00	-31.60	peak	
2 *	4882.775	26.48	2.09	28.57	54.00	-25.43	AVG	
·								

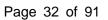
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Ant. Pol.		Vertical					
est Mod	le:	TX π/4-DQPS	SK Mode 244	1MHz			
emark:		No report for limit.	the emission	which more t	han 20 dB be	elow the p	rescribed
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	4881.245	40.69	2.09	42.78	74.00	-31.22	peak
2 *	4882.093	26.60	2.09	28.69	54.00	-25.31	AVG

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Test Mode: Remark:		•		-	han 20 dB be	low the p	rescribed	
Remark:		•	the emission	which more t	han 20 dB be	low the p	rescribed	
					Remark: No report for the emission which more than 20 dB below th limit.			
No. Fr	equency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1 4	959.559	40.83	2.21	43.04	74.00	-30.96	peak	
2* 4	960.308	26.63	2.21	28.84	54.00	-25.16	AVG	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

			Vertical						
	Test Mode: TX π/4-DQPSK Mode 2480MHz								
emark:		No report for the emission which more than 20 dB below the prescribe limit.					rescribed		
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1 *	4960.230	26.57	2.21	28.78	54.00	-25.22	AVG		
2	4960.242	40.84	2.21	43.05	74.00	-30.95	peak		

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Ant. Pol.	Horizontal
Test Mode:	TX 8-DPSK Mode 2402MHz
Remark:	No report for the emission which more than 20 dB below the prescribed limit.

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)		Margin (dB)	Detector
1 *	4803.065	27.29	1.99	29.28	54.00	-24.72	AVG
2	4803.753	40.82	2.00	42.82	74.00	-31.18	peak

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

Ant. Pol.		Vertical					
Test Mode: TX 8-DPSK Mode 2402MHz							
Remark:		No report for the emission which more than 20 dB below the prescribed limit.					
	Frequency	Reading	Factor	Level	Limit	Margin	-

No.	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1 *	4803.139	27.18	1.99	29.17	54.00	-24.83	AVG
2	4803.618	41.58	2.00	43.58	74.00	-30.42	peak

Remarks:

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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Ant. Pol.		Horizontal						
Test Mode: TX 8-DPSK Mode 2441MHz								
Remark:		No report for the emission which more than 20 dB below the prescribed limit.				rescribed		
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1	4881.187	40.77	2.09	42.86	74.00	-31.14	peak	
2 *	4882.824	26.51	2.09	28.60	54.00	-25.40	AVG	
							<u> </u>	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Ant. Pol.		Vertical							
Test Mod	Test Mode: TX 8-DPSK Mode 2441MHz								
Remark:		No report for the emission which more than 20 dB below the prescribed limit.							
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector		
1	4881.300	41.14	2.09	43.23	74.00	-30.77	peak		
2 *	4882.876	26.54	2.09	28.63	54.00	-25.37	AVG		
		· · · · ·					· /		
Remarks I.Factor	: (dB/m) = Antenn	a Factor (dB/m)+Cable Fac	tor (dB)-Pre-a	amplifier Fact	or			
	value = Level -L	,				.01			

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Ant. Pol.		Horizontal						
est Mod	Dete: TX 8-DPSK Mode 2480MHz							
Remark: No report for the emission which more than 20 dB below the prescriber limit.					rescribed			
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
No.		-				-	Detector AVG	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

Ant. Pol.		Vertical						
est Mo	de:	TX 8-DPSK Mode 2480MHz						
emark	:	No report for the emission which more than 20 dB below the prescribed limit.						
No.	Frequency (MHz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	
1 *	4960.136	26.30	2.21	28.51	54.00	-25.49	AVG	
2	4960.940	40.12	2.21	42.33	74.00	-31.67	peak	

2.Margin value = Level -Limit value

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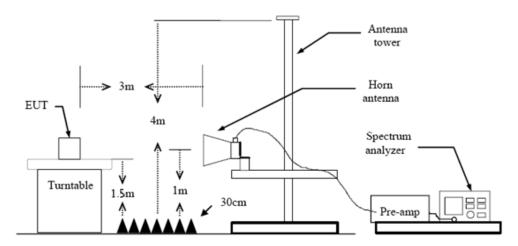
3.3. Band Edge Emissions (Radiated)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)

Restricted Frequency Band	(dBµV/m) (at 3m)				
(MHz)	Peak	Average			
2310 ~ 2390	74	54			
2483.5 ~ 2500	74	54			

Test Configuration



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.

2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.

3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.10 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

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nt. Pol.			Horizonta								
est Mod	e:		GFSK Mo	de 2402	2MHz						
20.0 dBuV	'/m			1			1		1		1
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,											
,								FCC Part1	5 C - Above 1G	PK	-
, ,											
								FCC Part1	5 C - Above 1G	AV	
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)											
).0 2306.000	2316.00	2326.00	2336.00	2346.00	(MHz)	236	6.00	2376.00 23	386.00 239	6.00 240	 36.0
No.	-	Jency Hz)	Readir (dBu\	-	- actor dB/m)		vel IV/m)	Limit (dBuV/n	Margii n) (dB)	Detect	tor
1	2390	000.	22.94	t 3	31.31	54	.25	74.00	-19.75	5 peal	k
2 *	2390		6.16		31.31		.47	54.00		_ ·	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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2 *	23	90.00	00	5	5.81		31	.31		37	.12	5	4.00	-1	6.88	3 /	400	3
Domork	<u></u>																	
Remark 1.Facto) = An	tenna	Fac	tor (d	B/m	n)+Cat	ole Fa	act	tor (dE	8)-Pre-	ampli	ifier Fa	ctor				

2.Margin value = Level -Limit value

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	ode: JuV/m	GFSK Mode	2480MHz				
	JuV/m						
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					FCC Part15 C	Abarra 10 A	
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2476.50	0 2486.50 2496.5	0 2506.50 25	516.50 (MHz)	2536.50	2546.50 2556.	.50 2566.	50 2576.
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.500	17.67	31.48	49.15	74.00	-24.85	peak
2 *	2483.500	5.35	31.48	36.83	54.00	-17.17	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

CTC Laboratories, Inc.



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2477.500	2487.50	2497.50	2507.50 2	2517.50 (MHz)	2537.50	2547.50 2557.	.50 2567.9	50 2577.9
No.		uency Hz)	Reading (dBuV)	Factor (dB/m)		Limit (dBuV/m)	Margin (dB)	Detector
1	2483	3.500	17.93	31.48	49.41	74.00	-24.59	peak
2 *	2483	3.500	5.53	31.48	37.01	54.00	-16.99	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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nt. Pol.			Horizontal					
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No.	Frequ (Mł	iency Hz)	Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390	.000	19.17	31.31	50.48	74.00	-23.52	peak
2 *	2390	.000	4.59	31.31	35.90	54.00	-18.10	AVG
			1	1	1	1		

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

CTC Laboratories, Inc.



nt. Pol	-	Vertical					
est Mo	de:	π/4-DQPSK	Mode 2402M	Hz			
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2305.500) 2315.50 2325	.50 2335.50 2	345.50 (MHz)	2365.50	2375.50 2385	.50 2395.	50 2405.
	Frequenc	y Reading	Factor	Level	Limit	Margin	
No.	(MHz)	(dBuV)	(dB/m)		(dBuV/m)		Detector
1	2390.000) 19.46	31.31	50.77	74.00	-23.23	peak
2 *	2390.000	6.30	31.31	37.61	54.00	-16.39	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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nt. Pol.		Hori	zontal					
est Mod	le:	π/4-	DQPSK N	Mode 2480N	Hz			
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2476.500	2486.50 249	6.50 25	06.50 25	16.50 (MHz)	2536.50	2546.50 2556.	.50 2566.	50 2576.
No.	Frequence (MHz)		eading dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.50	0 1	14.24	31.48	45.72	74.00	-28.28	peak
2 *	2483.50	0	5.47	31.48	36.95	54.00	-17.05	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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nt.	Pol.			1	Verti	cal											
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247	7.500	2487.50	249	7.50	250	7.50	25	17.50	(MH	zj	253	7.50	2547.50	D 2557	.50 256	67.50	2577
N	0.		queno 1Hz)	зy		adin BuV)			actor 3/m)			vel V/m)		imit uV/m)	Margi (dB)	n c	etecto
1		248	3.50	0	2	0.21		31	.48		51	.69	74	4.00	-22.3	1	peak
2	*	248	3.50	0	5	5.93		31	.48		37	.41	54	4.00	-16.59	9	AVG
															-		
	arks:																

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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Ant. Pol	-	Horizontal					
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No.	Frequency (MHz)	/ Reading (dBu∀)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
		47.47	31.31	48.48	74.00	-25.52	peak
1	2390.000	17.17	01.01				1 I

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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nt. Pol.		1	Vertical					
est Mod	le:		8-DPSK M	ode 2402MHz				
20.0 dBu\	//m				i i		1	
0								
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.0 2305.500	2315.50	2325.50	2335.50	2345.50 (MHz)	2365.50	2375.50 2385	.50 2395.	50 2405.
No.		Jency Hz)	Reading (dBuV)	-	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2390	000.	16.42	31.31	47.73	74.00	-26.27	peak
2 *	2390	000.	5.28	31.31	36.59	54.00	-17.41	AVG

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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nt. Pol.		Horizontal					
est Mod	le:	8-DPSK Mod	e 2480MHz				
0.0 dBu\	//m						
0							
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2476.500	2486.50 2496	.50 2506.50 25	16.50 (MHz)	2536.50	2546.50 2556.	.50 2566.	50 2576.
	Frequenc	y Reading	Factor	Level	Limit	Margin	-
No.	(MHz)	(dBuV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	Detector
1	2483.500) 13.59	31.48	45.07	74.00	-28.93	peak
2 *	2483.500) 5.74	31.48	37.22	54.00	-16.78	AVG
~							1

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value

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nt.	Pol.			Vertical					
est	Mod	e:		8-DPSK Mod	le 2480MHz				
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0.0 247	77.500	2487.50	2497.50	2507.50 2	517.50 (MHz)	2537.50	2547.50 2557.	50 2567.5	50 2577.9
Ν	lo.		uency Hz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
	1	248	3.500	16.36	31.48	47.84	74.00	-26.16	peak
2	*	248	3.500	5.62	31.48	37.10	54.00	-16.90	AVG
								-	

1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor

2.Margin value = Level -Limit value

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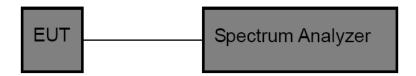
3.4. Band Edge and Spurious Emissions (Conducted)

<u>Limit</u>

FCC CFR Title 47 Part 15 Subpart C Section 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 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.

Test Configuration



Test Procedure

- 1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
- 2. Set to the maximum power setting and enable the EUT transmit continuously.
- Use the following spectrum analyzer settings: RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic. Sweep = auto, Detector function = peak, Trace = max hold.
- 4. Measure and record the results in the test report.

Test Mode

Please refer to the clause 2.4.

Test Result

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Band Edge Conducted Test

TestMode	Antenna	ChName	Freq(MHz)	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
		Low	2402	4.11	-48.54	≤-15.89	PASS
DH5	Ant1	High	2480	4.75	-47.97	≤-15.26	PASS
DHD	DH5 ANU	Low	Hop_2402	5.75	-49.59	≤-14.25	PASS
		High	Hop_2480	6.26	-47.86	≤-13.74	PASS
	Ant1	Low	2402	2.52	-48.99	≤-17.48	PASS
2DH5		High	2480	3.11	-48.31	≤-16.89	PASS
		Low	Hop_2402	2.92	-48.81	≤-17.08	PASS
		High	Hop_2480	6.55	-48.03	≤-13.45	PASS
	3DH5 Ant1 -	Low	2402	3.20	-48.4	≤-16.8	PASS
3DH5 An		High	2480	2.96	-48.05	≤-17.04	PASS
		Low	Hop_2402	6.33	-48.81	≤-13.67	PASS
		High	Hop_2480	3.65	-48.89	≤-16.35	PASS

Conducted Spurious Emissions Test

TestMode	Antenna	Freq(MHz)	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
			Reference	3.48	3.48	[ubiiij 	PASS
		2402 2441	30~1000	3.48	-55.1	 ≤-16.52	PASS
				3.48			PASS
			1000~26500		-41.64	≤-16.52 	
DUC	A		Reference	3.52	3.52		PASS
DH5	Ant1		30~1000	3.52	-54.7	≤-16.48	PASS
			1000~26500	3.52	-41.73	≤-16.48	PASS
		2480	Reference	4.01	4.01		PASS
			30~1000	4.01	-55.11	≤-15.99	PASS
			1000~26500	4.01	-41.57	≤-15.99	PASS
		2402	Reference	2.39	2.39		PASS
			30~1000	2.39	-54.89	≤-17.61	PASS
			1000~26500	2.39	-41.69	≤-17.61	PASS
		2441	Reference	2.25	2.25		PASS
2DH5	Ant1		30~1000	2.25	-54.88	≤-17.75	PASS
			1000~26500	2.25	-41.58	≤-17.75	PASS
		2480	Reference	3.11	3.11		PASS
			30~1000	3.11	-54.55	≤-16.89	PASS
			1000~26500	3.11	-41.42	≤-16.89	PASS
	1 5 Ant1	2402	Reference	2.43	2.43		PASS
			30~1000	2.43	-54.98	≤-17.57	PASS
			1000~26500	2.43	-40.85	≤-17.57	PASS
3DH5		2441	Reference	2.22	2.22		PASS
			30~1000	2.22	-55	≤-17.78	PASS
			1000~26500	2.22	-40.96	≤-17.78	PASS
		2480	Reference	2.89	2.89		PASS
			30~1000	2.89	-54.9	≤-17.11	PASS
			1000~26500	2.89	-41.55	≤-17.11	PASS

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Band Edge Conducted Test plot as follows:

•	0H5 Ant1	Low_2402			
Agilent Spectrum Analyzer - Swept SA			02:35:57 PMNov 04, 2024		
Center Freq 2.352500000 GHz PN0: Fast → IF6ain:Low		#Avg Type: RMS Avg Hold: 100/100	TRACE 123456 TYPE MULTURE DET PPPPP	Frequency	
Ref Offset 8.57 dB 10 dB/div Ref 20.00 dBm		Mkr5	2.364 890 GHz -48.538 dBm	Auto Tune	
10 dB/div Ref 20.00 dBm				Center Freq	
-10.0			-15.85 dBn	2.352500000 GHz	
-20.0				Start Freq 2.30000000 GHz	
-40.0		5	3 2	2.00000000 0112	
60.0	Let la contra la			Stop Freq 2.40500000 GHz	
Start 2.30000 GHz		<u> </u>	Stop 2.40500 GHz	CF Step	
MKR MODE TRC SCL X	V 300 kHz	Sweep 1 NCTION FUNCTION WIDTH	0.07 ms (1001 pts) FUNCTION VALUE	10.500000 MHz <u>Auto</u> Man	
1 N 1 f 2.402 060 GHz 2 N 1 f 2.400 000 GHz 3 N 1 f 2.300 000 GHz 4 N 1 f 2.310 000 GHz	4.108 dBm -52.214 dBm -50.754 dBm -51.951 dBm -48.538 dBm			Freq Offset	
4 N 1 f 2.310 000 GHz 5 N 1 f 2.364 890 GHz 6 7	-48.538 dBm			0 Hz	
8 9 10					
11	H	STATU	>		
	H5_Ant1_	High_2480			
Agilent Spectrum Analyzer - Swept SA (μ) RL RF 50 Ω AC	SENSE:PULSE	ALIGN AUTO	02:41:33 PMNov 04, 2024	Frequency	
Center Freq 2.510000000 GHz PNO: Fast	⊶ Trig: Free Run #Atten: 30 dB	#Avg Type: RMS Avg Hold: 100/100	TRACE 1 2 3 4 5 6 TYPE MUSEUM DET P P P P P P		
Ref Offset 8.57 dB 10 dB/div Ref 20.00 dBm		Mkr	4 2.529 60 GHz -47.965 dBm	Auto Tune	
10.0				Center Freq	
-10.0			-15.26 dBm	2.51000000 GHz	
-20.0				Start Freq 2.47000000 GHz	
-40.0	3 Andreagene Jand Marshall Marsh		adadaaa	Oten Free	
-60.0				Stop Freq 2.55000000 GHz	
Start 2.47000 GHz #Res BW 100 kHz #VBW	N 300 kHz	Sween 7	Stop 2.55000 GHz .667 ms (1001 pts)	CF Step 8.000000 MHz	
MKR MODELTRC SCL X	Y FU	NCTION FUNCTION WIDTH		<u>Auto</u> Man	
3 N 1 f 2.500 00 GHz 4 N 1 f 2.529 60 GHz	4.745 dBm -51.681 dBm -50.520 dBm -47.965 dBm			Freq Offset 0 Hz	
5 6 7			3		
8 9 10 11					
< MSG	ш	STATU	s		
	5_Ant1_Lo	w_Hop_24	02		
Agilent Spectrum Analyzer - Swept SA Image: Solution of the state of the sta	SENSE:PULSE	#Avg Type: RMS	03:24:58 PMNov 04, 2024 TRACE 1 2 3 4 5 6 TYPE MMMMMM	Frequency	
IFGain:Low	⊶ Trig: Free Run #Atten: 30 dB	Avg Hold: 100/100	DETPPPP	Auto Tune	
Ref Offset 8.3 dB 10 dB/div Ref 20.00 dBm		WIKI5	2.391 245 GHz -49.591 dBm		
				Center Freq 2.352500000 GHz	
-10.0			-14.28 de r		
-30.0				Start Freq 2.30000000 GHz	
-500 nder Witter Strander Berlins timber Jonanne Bater	earthangarana	And all these and a straight of		Stop Freq	
-70.0				2.405000000 GHz	
Start 2.30000 GHz #Res BW 100 kHz #VBW	N 300 kHz	Sweep 1	Stop 2.40500 GHz 0.07 ms (1001 pts)	CF Step 10.500000 MHz	
MKR MODE TRC SCL X	Y BI	NCTION FUNCTION WIDTH		<u>Auto</u> Man	
1 1 2,100,300,112 2 N 1 f 2,400,000,6Hz 3 N 1 f 2,390,000,6Hz 4 N 1 f 2,390,000,6Hz 5 N 1 f 2,391,245,6Hz	5.748 dBm -52.387 dBm -50.904 dBm -52.964 dBm -49.591 dBm			Freq Offset 0 Hz	
6 7 8					
9 10 11					
MSG	11	STATU	s		

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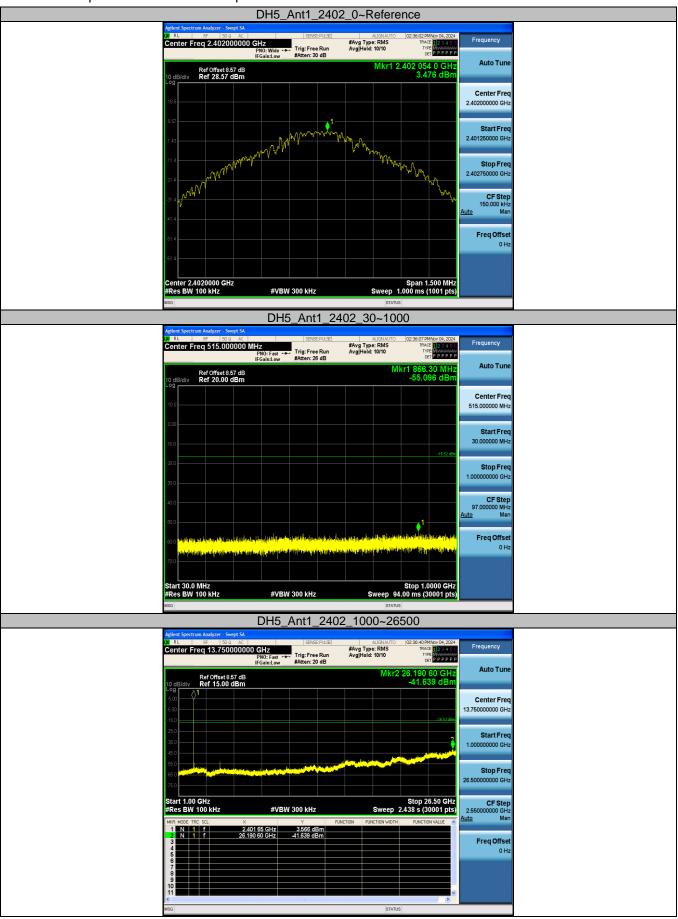




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Conducted Spurious Emissions Test plot as follows



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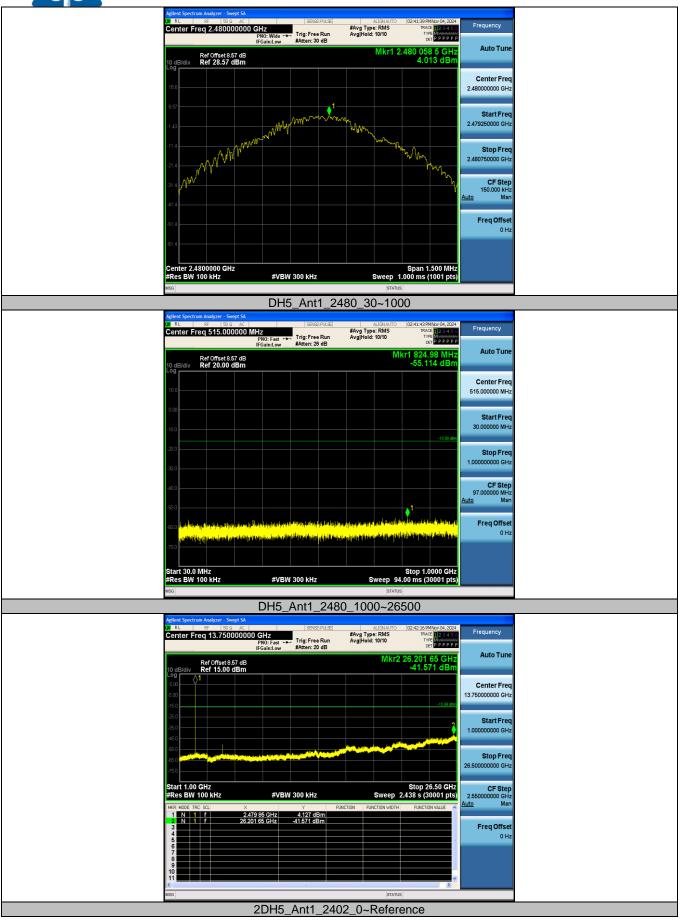
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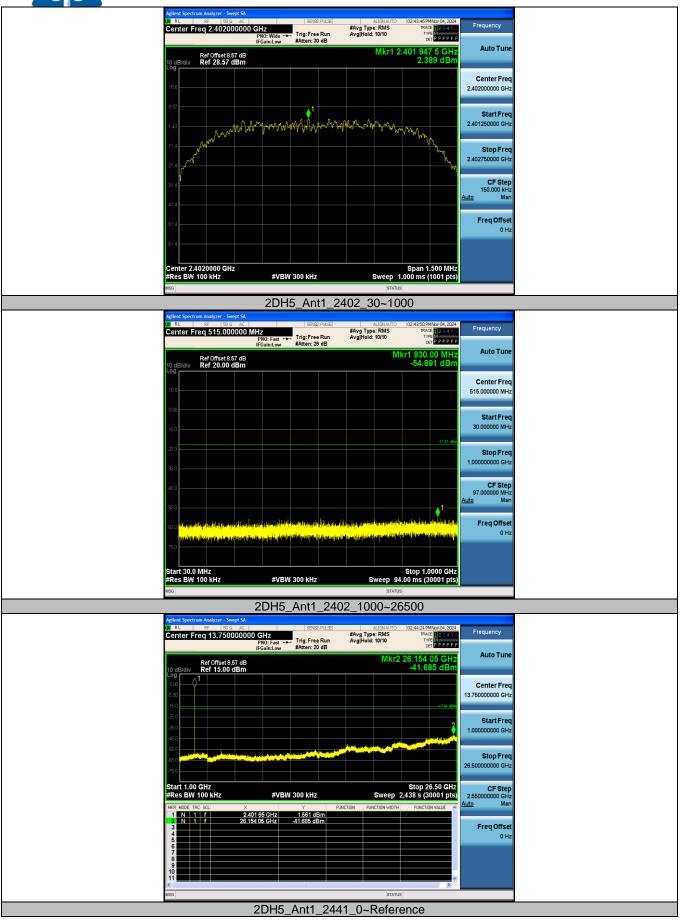
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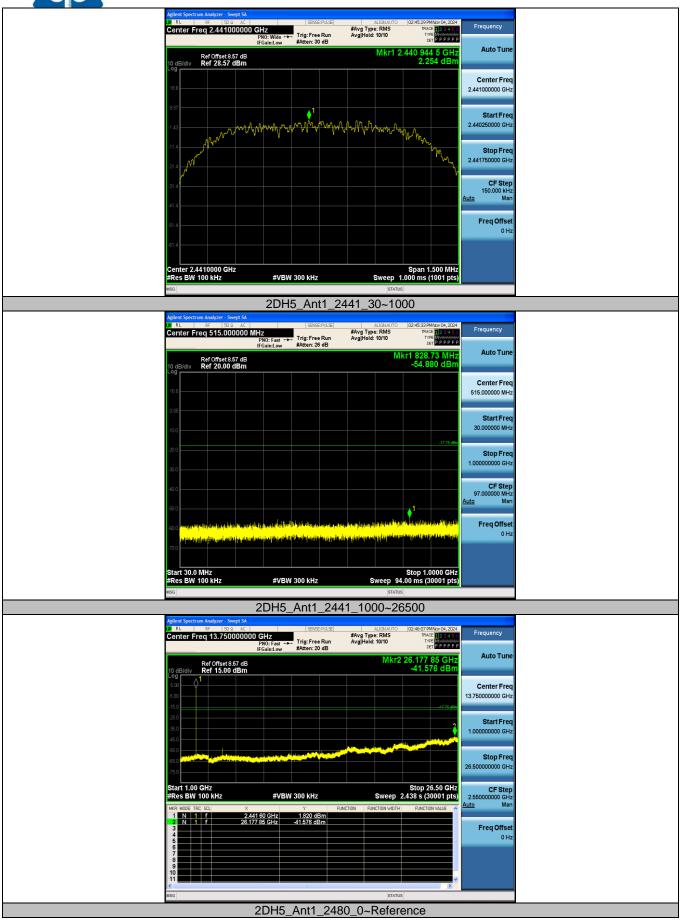
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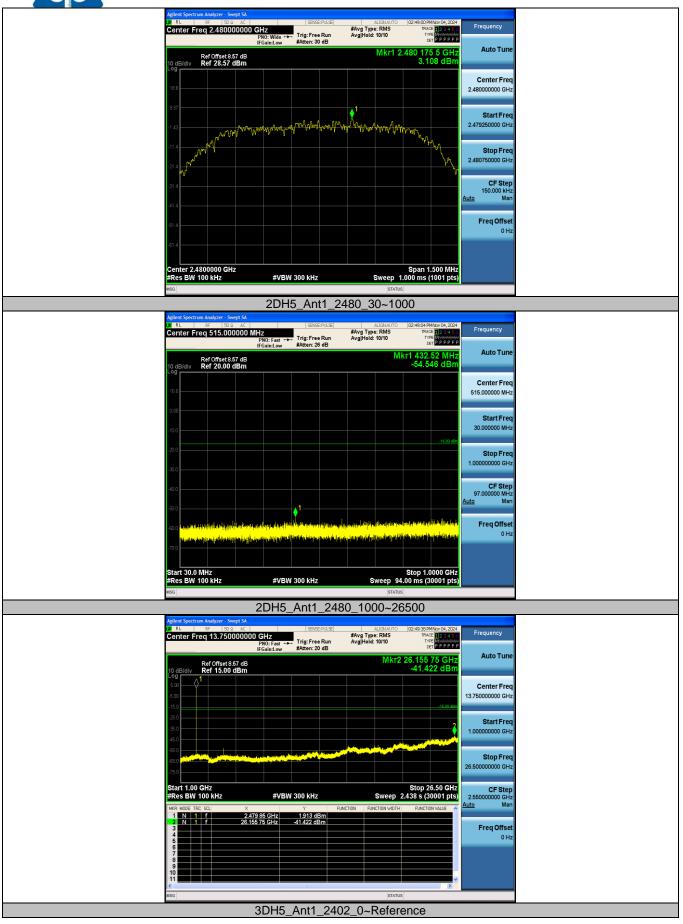
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