

# **TEST REPORT**

Report No.:	BCTC2207707044-1E
Applicant:	ROCKPI TRADING LIMITED
Product Name:	ROCK Pi 4/ROCK 4
Model/Type reference:	ROCK 4C Plus
Tested Date:	2022-07-19 to 2022-07-26
Issued Date:	2022-07-26
She	nzhen Beer Festing Co., Ltd.
No.: BCTC/RF-EMC-007	Page: 1 of 80 Edition: A.5



# FCC ID:2A3PA-ROCK4C

Product Name:	ROCK Pi 4/ROCK 4
Trademark:	N/A
Model/Type Reference:	ROCK 4C Plus ROCK Pi 4C Plus, ROCK Pi 4C Pro, ROCK Pi 4C Max, ROCK 4C, ROCK 4C Plus, ROCK 4C Pro, ROCK 4C Max
Prepared For:	ROCKPI TRADING LIMITED
Address:	Room 11, 27 / f, Ga wah international centre, 191 Javaroad, north point, Hong Kong
Manufacturer:	ROCKPI TRADING LIMITED
Address:	Room 11, 27 / f, Ga wah international centre, 191 Javaroad, north point, Hong Kong
Prepared By:	Shenzhen BCTC Testing Co., Ltd.
Address:	1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Sample Received Date:	2022-07-19
Sample tested Date:	2022-07-19 to 2022-07-26
Issue Date:	2022-07-26
Report No.:	BCTC2207707044-1E
Test Standards:	FCC Part15.247 ANSI C63.10-2013
Test Results:	PASS
Remark:	This is Bluetooth Classic radio test report.

Tested by:

VONE

Brave Zeng/ Project Handler

Approved by:

Zero Zhou/Reviewer

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(Note: N/A Means Not Applicable)

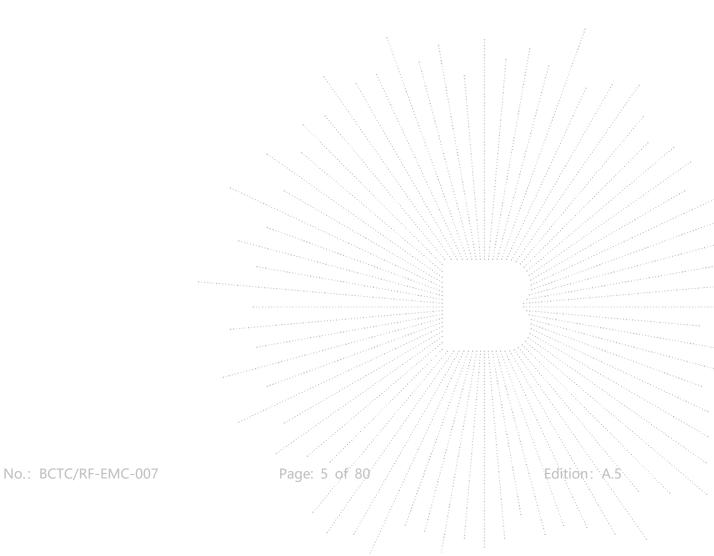
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# 1. Version

Report No.	Issue Date	Description	Approved
BCTC2207707044-1E	2022-07-26	Original	Valid







# 2. Test Summary

The Product has been tested according to the following specifications:

No.	Test Parameter	Clause No.	Results
1	Conducted emission AC power port	§15.207	PASS
2	Conducted peak output power for FHSS	§15.247(b)(1)	PASS
3	20dB Occupied bandwidth	§15.247(a)(1)	PASS
4	Number of hoppingfrequencies	§15.247(a)(1)(iii)	PASS
5	Dwell Time	§1 5.247(a)(1)(iii)	PASS
6	Spurious RF conducted emissions	§15.247(d)	PASS
7	Band edge	§15.247(d)	PASS
8	Spurious radiated emissions for transmitter	§15.247(d) & §15.209 & §15.205	PASS
9	Antenna Requirement	15.203	PASS



# 3. Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the Product as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

No.	Item	Uncertainty
1	3m chamber Radiated spurious emission(30MHz-1GHz)	U=4.3dB
2	3m chamber Radiated spurious emission(9KHz-30MHz)	U=3.7dB
3	3m chamber Radiated spurious emission(1GHz-18GHz)	U=4.5dB
4	3m chamber Radiated spurious emission(18GHz-40GHz)	U=3.34dB
5	Conducted Emission (150kHz-30MHz)	U=3.20dB
6	Conducted Adjacent channel power	U=1.38dB
7	Conducted output power uncertainty Above 1G	U=1.576dB
8	Conducted output power uncertainty below 1G	U=1.28dB
9	humidity uncertainty	U=5.3%
10	Temperature uncertainty	U=0.59°C



#### **Product Information And Test Setup** 4.

#### 4.1 Product Information

Model/Type reference:	ROCK 4C Plus ROCK Pi 4C Plus, ROCK Pi 4C Pro, ROCK Pi 4C Max, ROCK 4C, ROCK 4C Plus, ROCK 4C Pro, ROCK 4C Max
Model differences:	All the model are the same circuit and RF module, except model names.
Bluetooth Version:	BT 5.0
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	Bluetooth: 2402-2480MHz
Type of Modulation:	Bluetooth: GFSK, π/ 4 DQPSK, 8DPSK
Number Of Channel	79CH
Antenna installation:	FPC antenna
Antenna Gain:	2 dBi
Ratings:	DC 5V From adapter

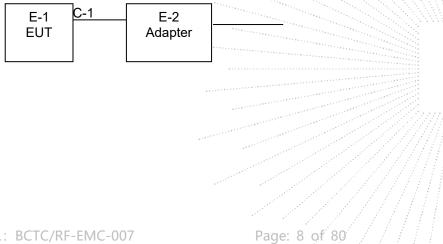
# 4.2 Test Setup Configuration

See test photographs attached in EUT TEST SETUP PHOTOGRAPHS for the actual connections between Product and support equipment.

Conducted Emission:

E-1	C-1	E-2	
EUT		Adapter	

**Radiated Spurious Emission** 



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# 4.3 Support Equipment

No.	Device Type	Brand	Brand Model Series No.		Note
E-1	ROCK Pi 4/ROCK 4	N/A	ROCK 4C Plus	Ref. the Section 4.1	EUT
E-2	Adapter	N/A			Auxiliary

ltem	Shielded Type	Ferrite Core	Length	Note
C-1	N/A	N/A	0.3M	DC cable unshielded

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.

#### 4.4 Channel List

СН	Frequency (MHz)	СН	Frequency (MHz)	СН	Frequency (MHz)	СН	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	: 23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	79	



#### 4.5 Test Mode

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Test Mode	Test mode	Low channel	Middle channel	High channel	
1	Transmitting(GFSK)	2402MHz	2441MHz	2480MHz	
2	Transmitting(π/ 4 DQPSK)	2402MHz	2441MHz	2480MHz	
3	Transmitting(8DPSK)	2402MHz	2441MHz	2480MHz	
4	Transmitting (Conducted emission & Radiated emission)				

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Fully-charged battery is used during the test

#### 4.6 Table Of Parameters Of Text Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version	CMD		
Frequency	2402 MHz	2441 MHz	2480 MHz
Parameters	DEF	DEF	DEF



#### 5. Test Facility And Test Instrument Used

#### 5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Testing Co., Ltd. Address:1-2/F., Building B, Pengzhou Industrial Park, No.158, Fuyuan 1st Road, Zhancheng, Fuhai Subdistrict, Bao'an District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards. FCC Test Firm Registration Number: 712850 IC Registered No.: 23583

#### 5.2 Test Instrument Used

Conducted Emissions Test						
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.	
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023	
LISN	R&S	ENV216	101375	May 24, 2022	May 23, 2023	
Software	Frad	EZ-EMC	EMC-CON 3A1	1	/	
Attenuator	١	10dB DC-6GHz	1650	May 24, 2022	May 23, 2023	

RF Conducted Test						
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.	
Power Metter	Keysight	E4419		May 24, 2022	May 23, 2023	
Power Sensor (AV)	Keysight	E9300A	$\sum_{i=1}^{n} \sum_{j=1}^{n} \prod_{i=1}^{n} \sum_{j=1}^{n} \sum_{j$	May 24, 2022	May 23, 2023	
Signal Analyzer 20kHz-26.5G Hz	Keysight	N9020A	MY49100060	May 24, 2022	May 23, 2023	
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40		May 24, 2022	May 23, 2023	



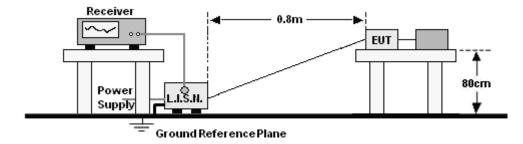
Radiated Emissions Test (966 Chamber)					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
966 chamber	ChengYu	966 Room	966	Jun. 06. 2020	Jun. 05, 2023
Receiver	R&S	ESR3	102075	May 24, 2022	May 23, 2023
Receiver	R&S	ESRP	101154	May 24, 2022	May 23, 2023
Amplifier	SKET	LAPA_01G18 G-45dB	١	May 24, 2022	May 23, 2023
Amplifier	Schwarzbeck	BBV9744	9744-0037	May 24, 2022	May 23, 2023
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	942	May 26, 2022	May 25, 2023
Horn Antenna	Schwarzbeck	BBHA9120D	1541	Jun. 06, 2022	Jun. 05, 2023
Horn Antenn (18GHz-40GHz)	Schwarzbeck	BBHA9170	00822	Jun. 06, 2022	Jun. 05, 2023
Amplifier (18GHz-40GHz)	MITEQ	TTA1840-35- HG	2034381	May 26, 2022	May 25, 2023
Loop Antenna (9KHz-30MHz)	Schwarzbeck	FMZB1519B	00014	May 26, 2022	May 25, 2023
RF cables1 (9kHz-30MHz)	Huber+Suhnar	9kHz-30MHz	B1702988-000 8	May 26, 2022	May 25, 2023
RF cables2 (30MHz-1GHz)	Huber+Suhnar	30MHz-1GHz	1486150	May 26, 2022	May 25, 2023
RF cables3 (1GHz-40GHz)	Huber+Suhnar	1GHz-40GHz	1607106	May 26, 2022	May 25, 2023
Power Metter	Keysight	E4419	I N	May 26, 2022	May 25, 2023
Power Sensor (AV)	Keysight	E9300A		May 26, 2022	May 25, 2023
Signal Analyzer 20kHz-26.5GHz	Keysight	N9020A	MY49100060	May 26, 2022	May 25, 2023
Spectrum Analyzer 9kHz-40GHz	R&S	FSP 40		May 26, 2022	May 25, 2023
Software	Frad	EZ-EMC	FA-03A2 RE	$\sum \left( \sum \left( \frac{1}{2} \right) \right)$	/// / /

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#### 6. Conducted Emissions

#### 6.1 Block Diagram Of Test Setup



#### 6.2 Limit

	Limit (dBuV)		
Frequency (MHz)	Quas-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	
0.50 -5.0	56.00	46.00	
5.0 -30.0	60.00	50.00	

Notes:

1. \*Decreasing linearly with logarithm of frequency.

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

#### 6.3 Test procedure

Receiver Parameters		Setting
Attenuation		10 dB
Start Frequency		0.15 MHz
Stop Frequency		30 MHz
IF Bandwidth		9 kHz

a. The Product was placed on a nonconductive table 0.8 m above the horizontal ground reference plane, and 0.4 m from the vertical ground reference plane, and connected to the main through Line Impedance Stability Network (L.I.S.N).

b. The RBW of the receiver was set at 9 kHz in 150 kHz ~ 30MHz with Peak and AVG detector in Max Hold mode. Run the receiver's pre-scan to record the maximum disturbance generated from Product in all power lines in the full band.

c. For each frequency whose maximum record was higher or close to limit, measure its QP and AVG values and record.

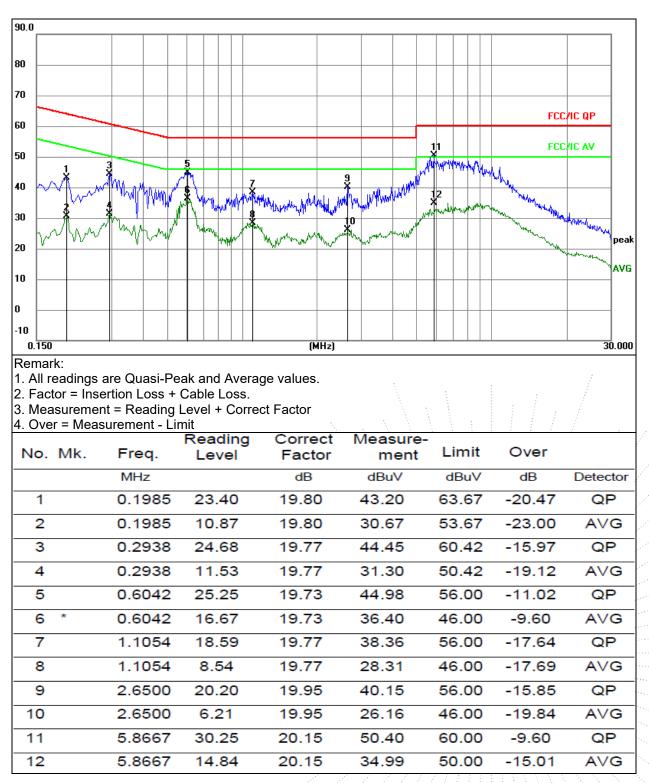
#### 6.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



#### 6.5 Test Result

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	L
Test Mode:	Mode 4	Test Voltage :	DC 5V



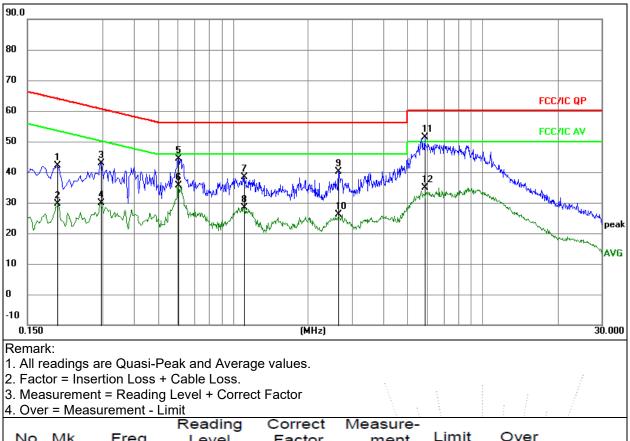
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Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Ν
Test Mode:	Mode 4	Test Voltage :	DC 5V



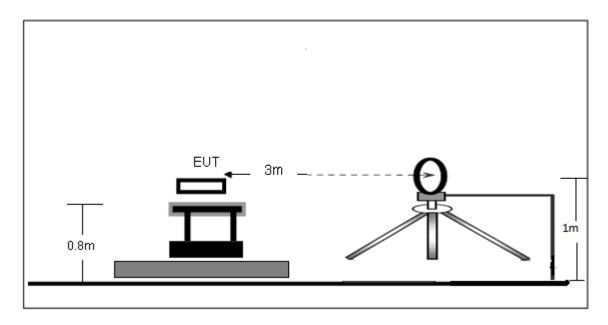
No. Mk.	Freq.	Level	Factor	ment	Limit	Over	
	MHz		dB	dBuV	dBuV	dB	Detector
1	0.1986	22.40	19.80	42.20	63.67	-21.47	QP
2	0.1986	9.87	19.80	29.67	53.67	-24.00	AVG
3	0.2940	23.18	19.77	42.95	60.41	-17.46	QP
4	0.2940	10.03	19.77	29.80	50.41	-20.61	AVG
5	0.6043	24.75	19.73	44.48	56.00	-11.52	QP
6	0.6043	15.91	19.73	35.64	46.00	-10.36	AVG
7	1.1056	18.59	19.77	38.36	56.00	-17.64	QP
8	1.1056	8.54	19.77	28.31	46.00	-17.69	AVG
9	2.6500	20.20	19.95	40.15	56.00	-15.85	QP
10	2.6500	6.21	19.95	26.16	46.00	-19.84	AVG
11 *	5.8668	31.25	20.15	51.40	60.00	-8.60	QP
12	5.8668	14.84	20.15	34.99	50.00	-15.01	AVG



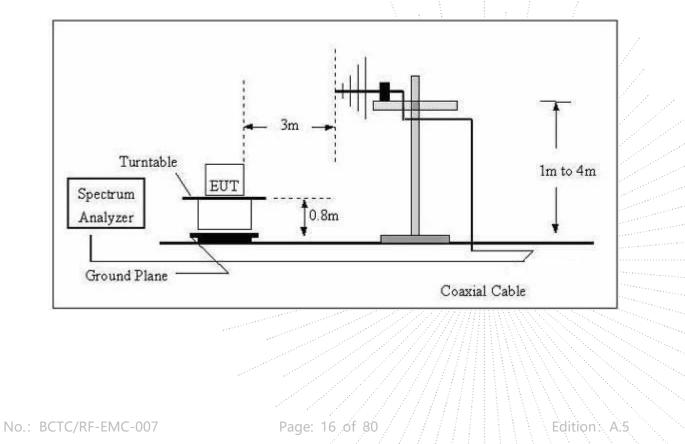
#### 7. Radiated emissions

# 7.1 Block Diagram Of Test Setup

#### (A) Radiated Emission Test-Up Frequency Below 30MHz

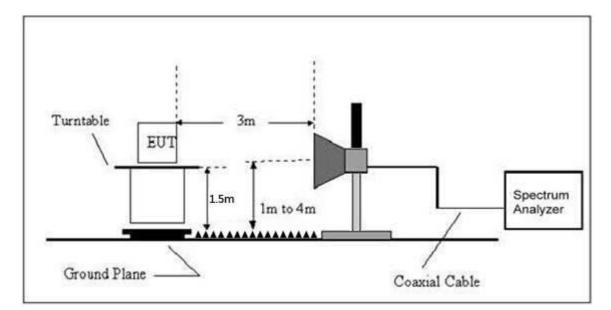


(B) Radiated Emission Test-Up Frequency 30MHz~1GHz





(C) Radiated Emission Test-Up Frequency Above 1GHz



#### 7.2 Limit

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequency	Field Strength	Distance	Field Strength Limit at 3m Distance		
(MHz)	uV/m	(m)	uV/m	dBuV/m	
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log <sup>(2400/F(kHz))</sup> + 80	
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log <sup>(24000/F(kHz))</sup> + 40	
1.705 ~ 30	30	30	100 * 30	20log <sup>(30)</sup> + 40	
30 ~ 88	100	3	100	20log <sup>(100)</sup>	
88 ~ 216	150	3	150	20log <sup>(150)</sup>	
216 ~ 960	200	3	200	20log <sup>(200)</sup>	
Above 960	500	3	500	20log <sup>(500)</sup>	

Limits Of Radiated Emission Measurement (Above 1000MHz)

	Limit (dBuV/m)	(at 3M)
Frequency (MHz)	Peak	Average
Above 1000	74	54

Notes:

(1)The limit for radiated test was performed according to FCC PART 15C.

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

(3) Emission level (dBuV/m)=20log Emission level (uV/m).



Frequency Range Of Radiated Measurement

(a) For an intentional radiator the spectrum shall be investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to at least the frequency shown in this paragraph:

(1) If the intentional radiator operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

(2) If the intentional radiator operates at or above 10 GHz and below 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.

(3) If the intentional radiator operates at or above 30 GHz: to the fifth harmonic of the highest fundamental frequency or to 200 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(4) If the intentional radiator operates at or above 95 GHz: To the third harmonic of the highest fundamental frequency or to 750 GHz, whichever is lower, unless specified otherwise elsewhere in the rules.

(5) If the intentional radiator contains a digital device, regardless of whether this digital device controls the functions of the intentional radiator or the digital device is used for additional control or function purposes other than to enable the operation of the intentional radiator, the frequency range shall be investigated up to the range specified in paragraphs (a) (1)through (4) of this section or the range applicable to the digital device, as shown in paragraph (b)(1) of this section, whichever is the higher frequency range of investigation.

#### 7.3 Test procedure

Receiver Parameter	Setting			
Attenuation	Auto			
9kHz~150kHz	RBW 200Hz for QP			
150kHz~30MHz	RBW 9kHz for QP			
30MHz~1000MHz	RBW 120kHz for QP			

Spectrum Parameter	Setting
1-25GHz	RBW 1 MHz /VBW 1 MHz for Peak, RBW 1 MHz / VBW 10Hz for Average

Below 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.



d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middlest channel, the Highest channel.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

#### 7.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



## 7.5 Test Result

#### Below 30MHz

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Tost Voltago :	DC 5V
Test Mode:	Mode 4	Test Voltage :	00.50

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
				PASS
				PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the

permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

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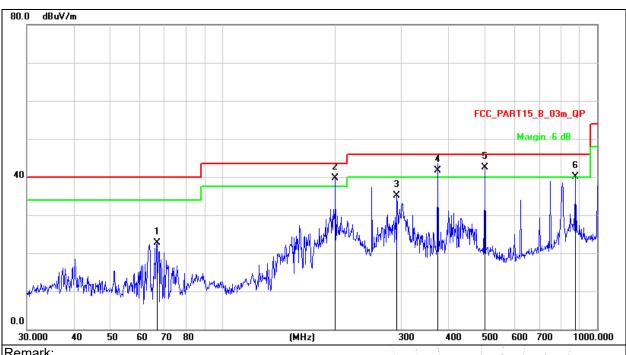
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#### Between 30MHz - 1GHz

Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Horizontal
Test Mode:	Mode 4	Test Voltage:	DC 5V



Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.

2. Measurement = Reading Level + Correct Factor 3. Over = Measurement - Limit

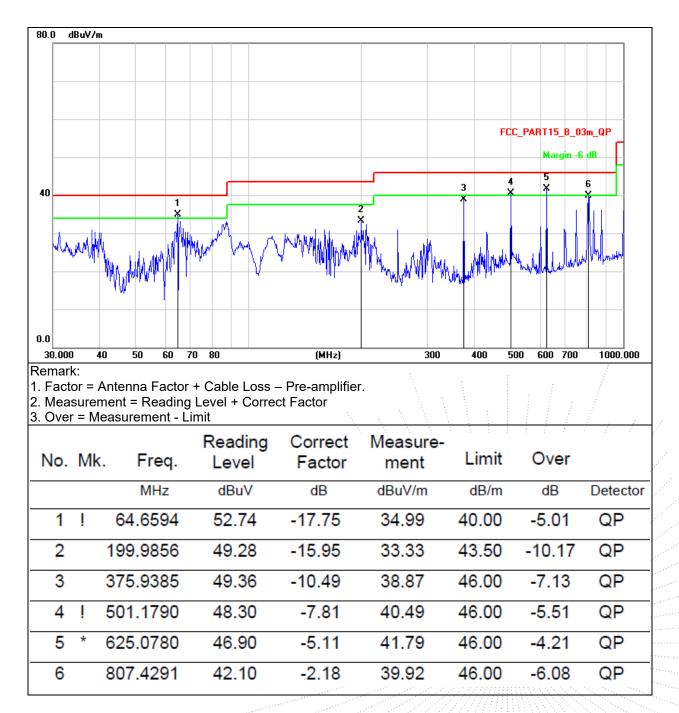
No.         Mk.         Freq.         Reading Level         Correct Factor         Measure- ment         Limit         Over           MHz         dBuV         dB         dBuV/m         dB/m         dB         Detect           1         66.7325         41.01         -18.29         22.72         40.00         -17.28         QP           2         !         199.9856         55.61         -15.95         39.66         43.50         -3.84         QP           3         292.0583         48.29         -13.16         35.13         46.00         -10.87         QP           4         !         374.9995         52.16         -10.50         41.66         46.00         -4.34         QP           5         *         501.1790         50.34         -7.81         42.53         46.00         -3.47         QP           6         !         875.2470         41.43         -1.28         40.15         46.00         -5.85         QP	0.010	/ //	lououronnonit						
1       66.7325       41.01       -18.29       22.72       40.00       -17.28       QP         2       !       199.9856       55.61       -15.95       39.66       43.50       -3.84       QP         3       292.0583       48.29       -13.16       35.13       46.00       -10.87       QP         4       !       374.9995       52.16       -10.50       41.66       46.00       -4.34       QP         5       *       501.1790       50.34       -7.81       42.53       46.00       -3.47       QP	No.	Mk	. Freq.	-			Limit	Over	
2       !       199.9856       55.61       -15.95       39.66       43.50       -3.84       QP         3       292.0583       48.29       -13.16       35.13       46.00       -10.87       QP         4       !       374.9995       52.16       -10.50       41.66       46.00       -4.34       QP         5       *       501.1790       50.34       -7.81       42.53       46.00       -3.47       QP			MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
3       292.0583       48.29       -13.16       35.13       46.00       -10.87       QP         4       !       374.9995       52.16       -10.50       41.66       46.00       -4.34       QP         5       *       501.1790       50.34       -7.81       42.53       46.00       -3.47       QP	1		66.7325	41.01	-18.29	22.72	40.00	-17.28	QP
4       !       374.9995       52.16       -10.50       41.66       46.00       -4.34       QP         5       *       501.1790       50.34       -7.81       42.53       46.00       -3.47       QP	2	İ	199.9856	55.61	-15.95	39.66	43.50	-3.84	QP
5 * 501.1790 50.34 -7.81 42.53 46.00 -3.47 QP	3		292.0583	48.29	-13.16	35.13	46.00	-10.87	QP
	4	İ	374.9995	52.16	-10.50	41.66	46.00	-4.34	QP
6 ! 875.2470 41.43 -1.28 40.15 46.00 -5.85 QP	5	*	501.1790	50.34	-7.81	42.53	46.00	-3.47	QP
	6	İ	875.2470	41.43	-1.28				

No.: BCTC/RF-EMC-007

Edition:



Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	101KPa	Phase :	Vertical
Test Mode:	Mode 4	Test Voltage:	DC 5V



Edition: A.5



Between 1GHz – 25GHz

Polar (H/V)	Frequency	Reading Level	Correct Factor	Measure- ment	Limits	Over	Detector
	(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV/ m)	(dB)	Туре
			GFSK Low ch	annel			
V	4804.00	52.42	-0.43	51.99	74.00	-22.01	PK
V	4804.00	43.89	-0.43	43.46	54.00	-10.54	AV
V	7206.00	42.04	8.31	50.35	74.00	-23.65	PK
V	7206.00	31.88	8.31	40.19	54.00	-13.81	AV
Н	4804.00	50.40	-0.43	49.97	74.00	-24.03	PK
Н	4804.00	40.67	-0.43	40.24	54.00	-13.76	AV
Н	7206.00	39.79	8.31	48.10	74.00	-25.90	PK
Н	7206.00	31.21	8.31	39.52	54.00	-14.48	AV
		G	FSK Middle c	hannel		•	•
V	4882.00	49.57	-0.38	49.19	74.00	-24.81	PK
V	4882.00	42.77	-0.38	42.39	54.00	-11.61	AV
V	7323.00	38.64	8.83	47.47	74.00	-26.53	PK
V	7323.00	29.27	8.83	38.10	54.00	-15.90	AV
Н	4882.00	47.71	-0.38	47.33	74.00	-26.67	PK
Н	4882.00	37.36	-0.38	36.98	54.00	-17.02	AV
Н	7323.00	36.24	8.83	45.07	74.00	-28.93	PK
Н	7323.00	28.35	8.83	37.18	54.00	-16.82	AV
			GFSK High ch	annel			
V	4960.00	51.86	-0.32	51.54	74.00	-22.46	PK
V	4960.00	41.09	-0.32	40.77	54.00	-13.23	AV
V	7440.00	43.70	9.35	53.05	74.00	-20.95	PK
V	7440.00	33.90	9.35	43.25	54.00	-10.75	AV
Н	4960.00	49.59	-0.32	49.27	74.00	-24.73	PK
Н	4960.00	40.37	-0.32	40.05	54.00	-13.95	AV
Н	7440.00	42.34	9.35	51.69	74.00	-22.31	PK
Н	7440.00	35.06	9.35	44.41	54.00	-9.59	AV

Remark:

1.Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level - Limit

2.If peak below the average limit, the average emission was no test.

3. In restricted bands of operation, The spurious emissions below the permissible value more than 20dB

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

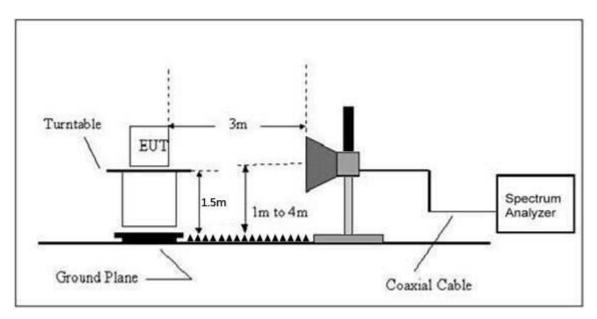
5.All the Modulation are test, the worst mode is GFSK, the data recording in the report.



#### 8. Radiated Band Emission Measurement And Restricted Bands Of Operation

#### 8.1 Block Diagram Of Test Setup

Radiated Emission Test-Up Frequency Above 1GHz



#### 8.2 Limit

FCC Part15 C Section 15.209 and 15.205

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
<sup>1</sup> 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	( <sup>2</sup> )
13.36-13.41			



Limits Of Radiated Emission Measurement (Above 1000MHz)

	Limit (dBuV/m) (at 3M)			
Frequency (MHz)	Peak	Average		
Above 1000	74	54		

Notes:

(1)The limit for radiated test was performed according to FCC PART 15C.

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

(3)Emission level (dBuV/m)=20log Emission level (uV/m).

#### 8.3 Test procedure

Receiver Parameter	Setting			
Attenuation	Auto			
Start Frequency	2300MHz			
Stop Frequency	2520			
RB / VB (Emission In Restricted Band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average			

Above 1GHz test procedure as below:

a. The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c.The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d.For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.

e.The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the Highest channel.

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

#### 8.4 EUT operating Conditions

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



#### 8.5 Test Result

Test mode	Polar (H/V)		Reading Level (dBuV/m)	Correct Factor (dB)	Measure- ment (dBuV/m)	Limits (dBuV/m)		Result		
	(1	(11112)			РК	РК	AV			
		Low Channel 2402MHz								
	Н	2390.00	52.47	-6.70	45.77	74.00	54.00	PASS		
	Н	2400.00	56.88	-6.71	50.17	74.00	54.00	PASS		
	V	2390.00	51.81	-6.70	45.11	74.00	54.00	PASS		
0501	V	2400.00	52.27	-6.71	45.56	74.00	54.00	PASS		
GFSK			High	n Channel 2	480MHz		•			
	Н	2483.50	50.50	-6.79	43.71	74.00	54.00	PASS		
	Н	2500.00	48.15	-6.81	41.34	74.00	54.00	PASS		
	V	2483.50	50.13	-6.79	43.34	74.00	54.00	PASS		
	V	2500.00	45.95	-6.81	39.14	74.00	54.00	PASS		
	Low Channel 2402MHz									
	Н	2390.00	52.67	-6.70	45.97	74.00	54.00	PASS		
	Н	2400.00	56.64	-6.71	49.93	74.00	54.00	PASS		
	V	2390.00	53.39	-6.70	46.69	74.00	54.00	PASS		
	V	2400.00	55.03	-6.71	48.32	74.00	54.00	PASS		
π/4DQPSK	High Channel 2480MHz									
	Н	2483.50	50.74	-6.79	43.95	74.00	54.00	PASS		
	Н	2500.00	47.85	-6.81	41.04	74.00	54.00	PASS		
	V	2483.50	53.26	-6.79	46.47	74.00	54.00	PASS		
	V	2500.00	48.82	-6.81	42.01	74.00	54.00	PASS		
		Low Channel 2402MHz								
	Н	2390.00	53.28	-6.70	46.58	:74.00	54.00	PASS		
	Н	2400.00	56.76	-6.71	50.05	74.00	54.00	PASS		
	V	2390.00	52.85	-6.70	46.15	74.00	54.00	PASS		
	V	2400.00	54.18	-6.71	47.47	74.00	54.00	PASS		
8DPSK			High	n Channel 2	480MHz					
	Н	2483.50	51.42	-6.79	44.63	74.00	54.00	PASS		
	Н	2500.00	49.14	-6.81	42.33	74.00	54.00	PASS		
	V	2483.50	51.30	-6.79	44.51	74.00	54.00	PASS		
	V	2500.00	47.22	-6.81	40.41	74.00	54.00	PASS		

#### Remark:

1. Emission Level = Meter Reading + Factor, Factor = Antenna Factor + Cable Loss – Pre-amplifier. Over= Emission Level - Limit

2. If the PK measured levels comply with average limit, then the average level were deemed to comply with average limit.

3 In restricted bands of operation, The spurious emissions below the permissible value more than 20dB

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



#### 9. Spurious RF Conducted Emissions

#### 9.1 Block Diagram Of Test Setup



#### 9.2 Limit

Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.205(c))

#### 9.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;

2. Set the spectrum analyzer:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

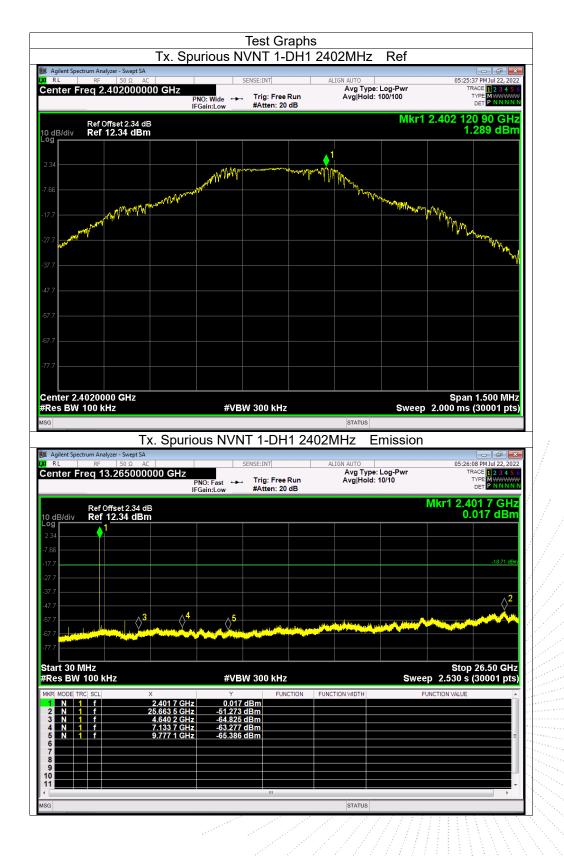
Detector function = peak, Trace = max hold

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# 9.4 Test Result



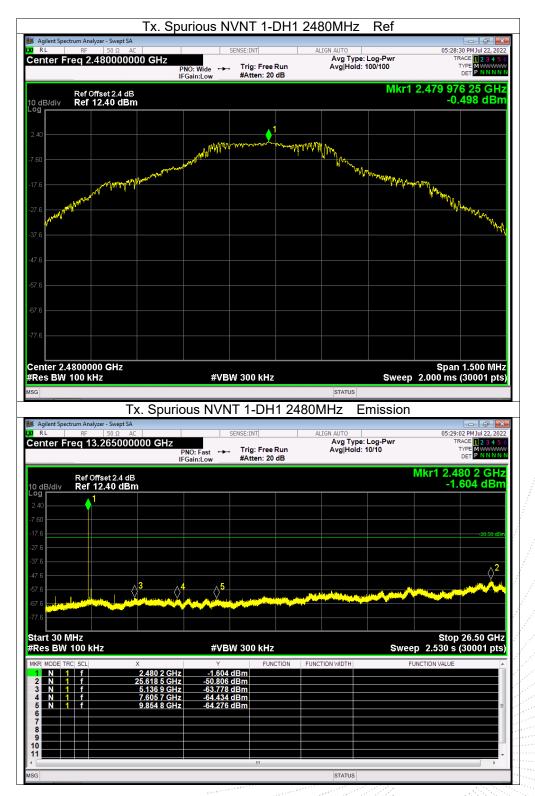
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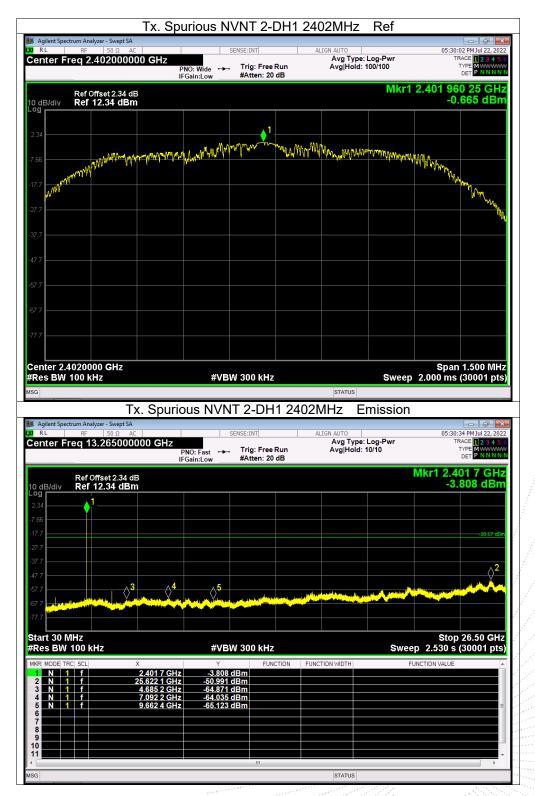


Agilent Spectrum Analyzer - Swept	SA		1-DH1 2441M		
RL RF 50 Ω enter Freq 2.441000	0000 GHz P		ALIGN AUT Avg Free Run Avg h: 20 dB	o J Type: Log-Pwr  Hold: 100/100	05:27:00 PM Jul 22, 20 TRACE 1 2 3 4 5 TYPE MWWW DET P N N N
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enter 2.4410000 GHz					Span 1.500 MH
Res BW 100 kHz		#VBW 300 I		Sweep	2.000 ms (30001 pt
	Tx. Spuric	ous NVNT 1-E	DH1 2441MHz	Emission	
Agilent Spectrum Analyzer - Swept R L RF 50 Ω	AC AC	DUS NVNT 1-E	ALIGN AUT	0	05:27:31 PM Jul 22, 202
Agilent Spectrum Analyzer - Swept R L RF 50 Ω	SA AC 00000 GHz F	SENSE:INT	ALIGN AUT		05:27:31 PM Jul 22, 202
Agilent Spectrum Analyzer - Swept RL RF 50 Ω enter Freq 13.26500 Bef Offset 2.36	AC	SENSE:INT	ALIGN AUT Avg Free Run Avg	o j Type: Log-Pwr  Hold: 10/10	05:27:31 PM Jul 22,202 TRACE 1 2 3 4 5 TYPE MWWW DET PNNNN Mkr1 2.441 4 GH2
Agilent Spectrum Analyzer - Swept           RL         RF         50 Ω           enter Freq 13.26500           Ref Offset 2.36           0 dB/div         Ref 12.36 di           9         1	AC	SENSE:INT	ALIGN AUT Avg Free Run Avg	o j Type: Log-Pwr  Hold: 10/10	05:27:31 PM Jul 22,202 TRACE 1 2 3 4 5 TYPE MWWW DET PNNNN Mkr1 2.441 4 GH2
Agilent Spectrum Analyzer - Swept RL RF 50.Ω enter Freq 13.2650( Ref Offset 2.36 0 dB/div Ref 12.36 dl 9 1 1 64	AC	SENSE:INT	ALIGN AUT Avg Free Run Avg	o j Type: Log-Pwr  Hold: 10/10	05:27:31 PM Jul 22, 20: TRACE 12.3 4 5 TYPE 12.3 4 5 TYPE 12.3 4 5 TYPE 12.3 4 5 NNNN Mkr1 2.441 4 GH: 1.460 dBn
Agilent Spectrum Analyzer - Swept RL RF 50.0 enter Freq 13.26500 Ref Offset 2.36 0 dB/div Ref 12.36 dl 9 4 1 64 7.6	AC	SENSE:INT	ALIGN AUT Avg Free Run Avg	o j Type: Log-Pwr  Hold: 10/10	05:27:31 PM Jul 22, 20: TRACE 12.3 4 5 TYPE 12.3 4 5 TYPE 12.3 4 5 TYPE 12.3 4 5 NNNN Mkr1 2.441 4 GH: 1.460 dBn
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Agilent Spectrum Analyzer - Swept RL RF 50.2 enter Freq 13.26500 Ref Offset 2.36 0 dB/div Ref 12.36 dI 2 36 7 6 7 7 6 7 7 6 7 7 6 7 7 6 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	AC AC AC AC AC AC AC AC AC AC AC AC AC A	PNO: Fast Gain:Low → Trig: F #Atter #Atter #VBW 300 F 1.460 dBm -50.501 dBm	ALIGN AUT Avg ree Run Avg : 20 dB	O Type: Log-Pwr Hold: 10/10	05:27:31 PMJul 22, 202 TRACE 12:34 5 UPP NINNN Mkr1 2.441 4 GH: 1.460 dBn .18.44 cB
Agilent Spectrum Analyzer - Swept           RL         RF         50 Ω           enter Freq 13.26500           Ref Offset 2.36           O dB/div         Ref 12.36 dl           2.36         1           7.6         1           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           7.7.6         2           1         1           2         1           2         1           3         1           4         1           5         1	x 2.441 4 GHz 2.441 4 GHz 2.481 2 GHz 4.985 2 GHz	SENSE:INT     SEN     SENSE:INT     SE	ALIGN AUT Avg 20 dB	O Type: Log-Pwr Hold: 10/10	05:27:31 PMJJJ 22, 202 TRACE    2:3 4:5 DET P NNNN Mkr1 2.441 4 GH: 1.460 dBn .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB
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Agilent Spectrum Analyzer - Swept RL RF 50 Ω enter Freq 13.26500 Ref Offset 2.36 0 dB/div Ref 12.36 dl 2 36 7 6 7 7 6 1 1 1 1 1 1 1 1 1 1 1 1 1	x 2.441 4 GHz 2.441 4 GHz 2.481 2 GHz 4.985 2 GHz	SENSE:INT     SEN     SENSE:INT     SE	ALIGN AUT Avg 20 dB	O Type: Log-Pwr Hold: 10/10	05:27:31 PMJJJ 22, 202 TRACE    2:3 4:5 DET P NNNN Mkr1 2.441 4 GH: 1.460 dBn .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB
Agilent Spectrum Analyzer - Swept RL RF 50 Ω enter Freq 13.26500 Ref Offset 2.36 D dE/div Ref 12.36 dl 29 20 20 20 20 20 20 20 20 20 20	x 2.441 4 GHz 2.441 4 GHz 2.481 2 GHz 4.985 2 GHz	SENSE:INT     SEN     SENSE:INT     SE	Free Run Avg 2 dB 5 ce Run Avg 2 co dB 5 ce Run Avg 5	O Type: Log-Pwr Hold: 10/10	05:27:31 PMJJJ 22, 202 TRACE    2:3 4:5 DET P NNNN Mkr1 2.441 4 GH: 1.460 dBn .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB .10.44 dB



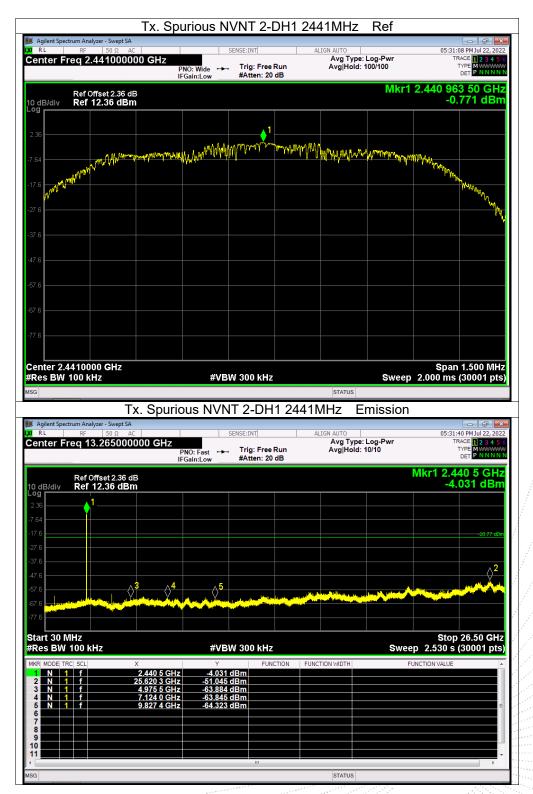






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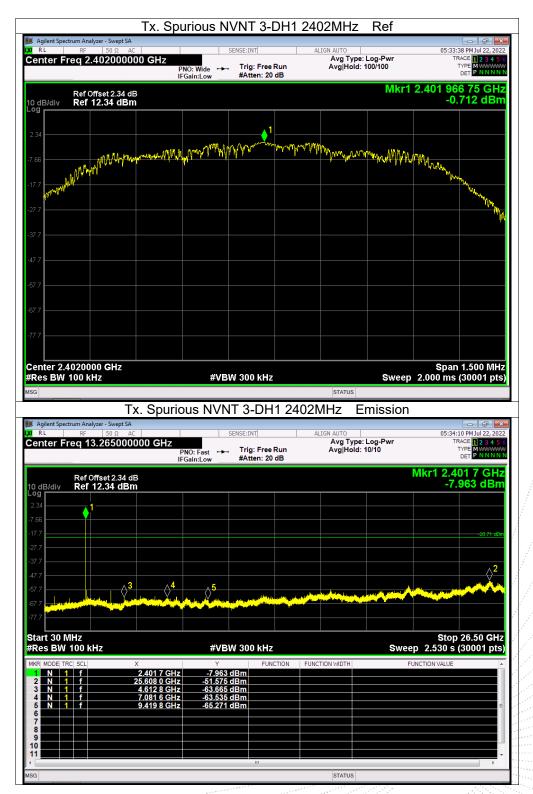




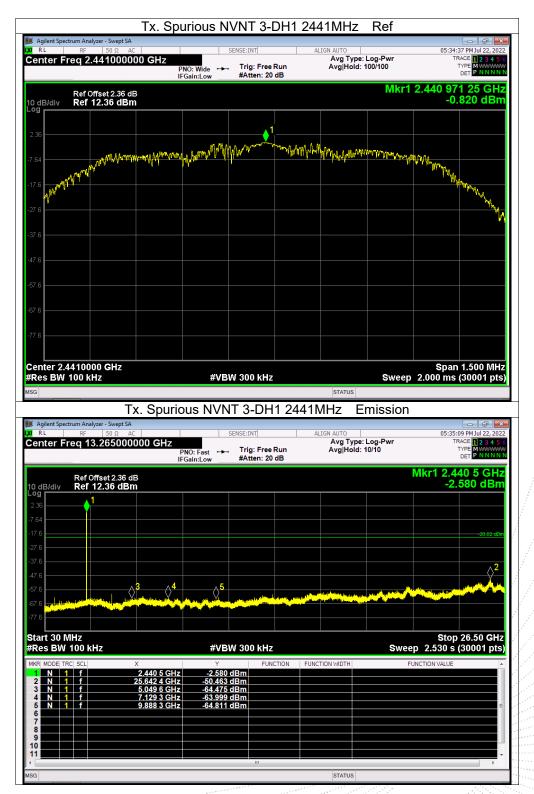


Agilent Spectrum Analyzer - Swe				2480MHz			
RL RF 50 Ω enter Freq 2.48000	00000 GHz		ig: Free Run Atten: 20 dB	ALIGN AUTO Avg Typ Avg Hold	e: Log-Pwr I: 100/100	05:32:19 PM Jul TRACE 1 TYPE M DET P	2 3 4 5
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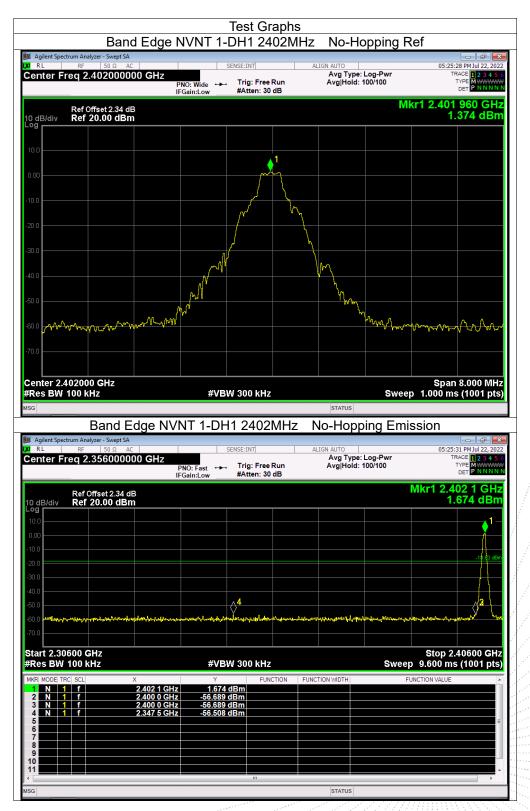


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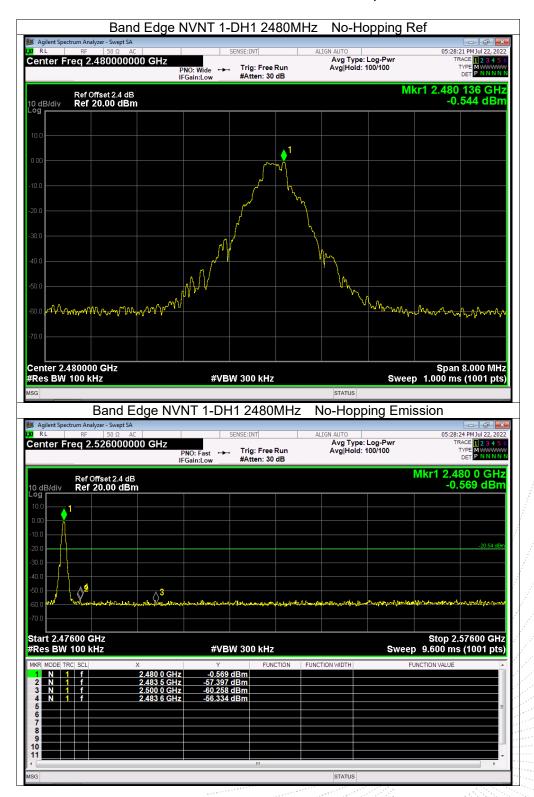
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Ref         S0 0.2           Center Freq 13.26500           Ref Offset 2.4           0 dB/div           Ref 12.40 d           2.40           1           7.60           7.60           7.60           7.60           7.60           7.60           7.60           7.60           7.60           7.60           7.60           7.61           7.62           7.64           7.65           7.65           7.60           7.61           7.62           7.63           7.64           7.65           7.65           7.66           7.61           7.62           7.63           7.64           7.75           7.75           7.76           7.76           7.76           7.76           7.76           7.76           7.76           7.76           7.76           7.76           7.76 <t< td=""><td>ESA AC 000000 GHz II dB Bm 3 3 4 3 4 2.480 2 GHz 2.480 2 GHz 5.089 3 GHz</td><td>PNO: Fast → Tr Gain:Low → Tr 5 5 5 #VBW 31 7 -3.698 dBm -64.066 dBm</td><td>INT ig: Free Run tten: 20 dB</td><td>Alion Auto Avg Typ Avg Hoid</td><td>e: Log-Pwr :: 10/10</td><td>Mkr1 2.4 -3.</td><td>29 PHJUI22, 202 ACC II 2 3 4 5 TPE P NNNN BO 2 GH2 698 dBm -22 52 dBm 226.50 GHZ</td></t<>	ESA AC 000000 GHz II dB Bm 3 3 4 3 4 2.480 2 GHz 2.480 2 GHz 5.089 3 GHz	PNO: Fast → Tr Gain:Low → Tr 5 5 5 #VBW 31 7 -3.698 dBm -64.066 dBm	INT ig: Free Run tten: 20 dB	Alion Auto Avg Typ Avg Hoid	e: Log-Pwr :: 10/10	Mkr1 2.4 -3.	29 PHJUI22, 202 ACC II 2 3 4 5 TPE P NNNN BO 2 GH2 698 dBm -22 52 dBm 226.50 GHZ
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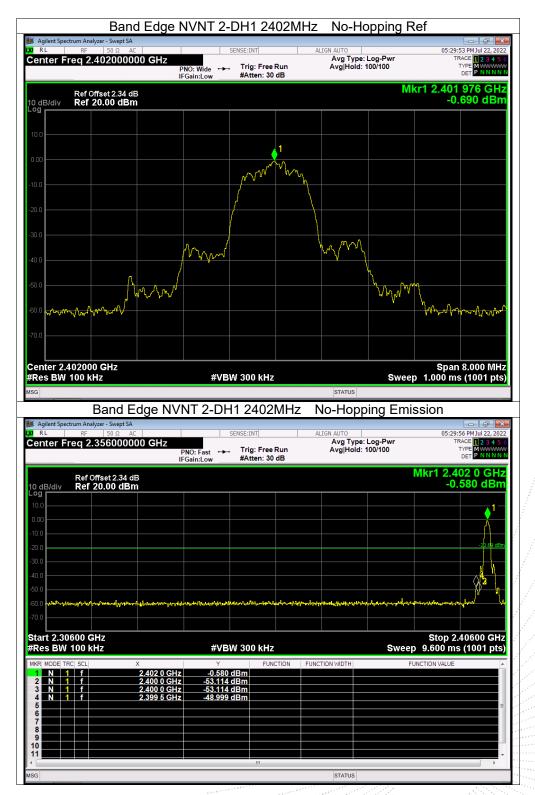


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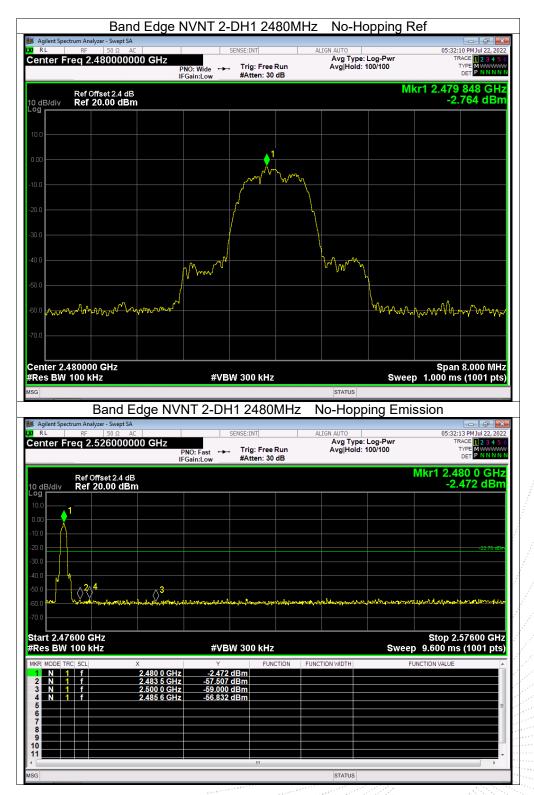




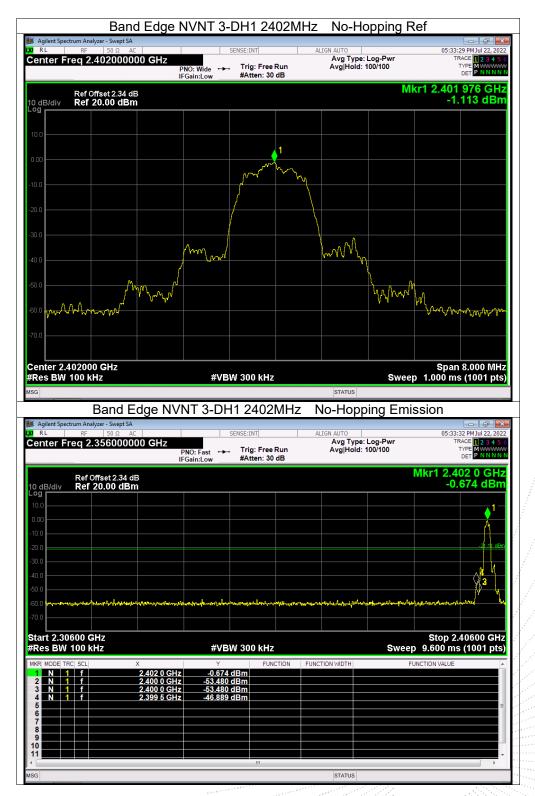




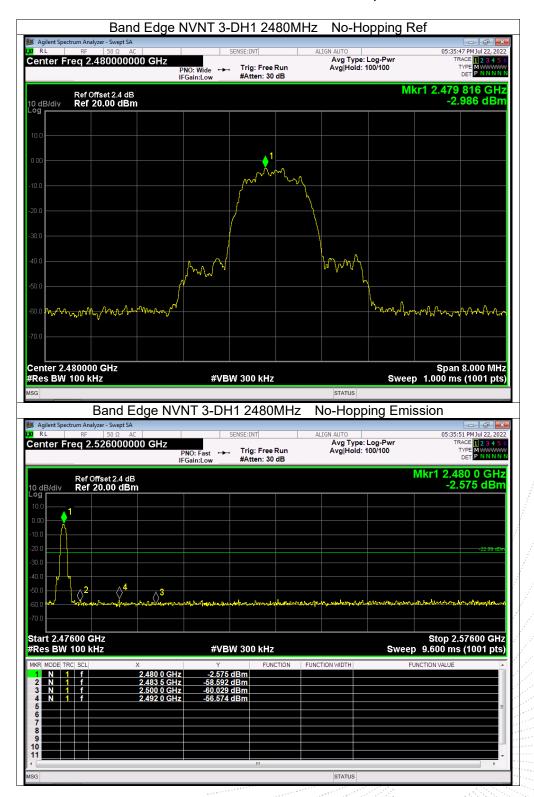




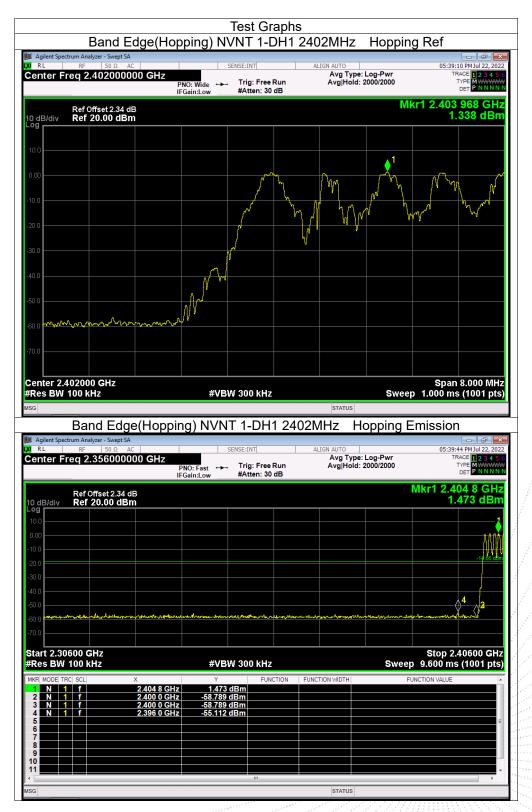












Edition: A.5

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No.: BCTC/RF-EMC-007







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Agilent Spectrum Analyzer - Sw RL RF 50 enter Freq 2.35600 Ref Offset 2 Ref Offset 2 Ref 20.00 Ref 20.00	xept 5A Ω AC D 000000 GHz P IF 2.34 dB 0Bm 0 Bm 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	SENSE NO: Fast → Tr Gain:Low ### #VBW 31 Y -1.049 dBm	EINT rig: Free Run Atten: 30 dB	ALIGN AUTO Avg Tyj Avg Hol	ype: Log-Pwr old: 2000/2000	05:50:55 PM JUI 22, 2 TRACE 12, 2 TRACE 12, 2 TRACE 12, 2 TRACE 12, 2 Mkr1 2, 405 0 GH -1.049 dB
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Edition: A.5

No.: BCTC/RF-EMC-007



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Band Ec Agilent Spectrum Analyzer - Swep RL RF 50.0 enter Freq 2.52600 Ref Offset 2.4 Ref 20.00 c	it SA AC 00000 GHz If I dB	NO: Fast ↔	3-DH1 2 55:INT Trig: Free Run	ALIGN AUTO	Hopping Type: Log-Pwr	g Emissio	OD 102:58 PM Jul 22, 2 TRACE 1 2 3 4 TYPE MWWW DET P. N.N. 478 0 GH
Agilent Spectrum Analyzer - Swey RL RF 50 Q enter Freq 2.52600	it SA AC 00000 GHz If I dB	NO: Fast ↔	3-DH1 2 55:INT Trig: Free Run	ALIGN AUTO	Hopping Type: Log-Pwr	g Emissio	OD 102:58 PM Jul 22, 2 TRACE 1 2 3 4 TYPE MWWW DET P. N.N. 478 0 GH
Band Ec           Agilent Spectrum Analyzer - Swep           RL         RF           Source         Source           enter Freq 2.52600           BB/div         Ref Offset 2.4           Ref Offset 2.4           00           1           00           1           00           1           00           1           00           1           00           1           00           1           00           1	it SA AC 00000 GHz If I dB	NO: Fast ↔	3-DH1 2 55:INT Trig: Free Run	ALIGN AUTO	Hopping Type: Log-Pwr	g Emissio	OD 102:58 PM Jul 22, 2 TRACE 1 2 3 4 TYPE MWWW DET P. N.N. 478 0 GH
Agilent Spectrum Analyzer - Swep RL RF 50 Ω enter Freq 2.526000 C Agilent Spectrum Analyzer - Swep enter Freq 2.526000 Ref Offset 2.4 Ref 20.00 c 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	it SA AC 00000 GHz If I dB	NO: Fast ↔	3-DH1 2 55:INT Trig: Free Run	ALIGN AUTO	Hopping Type: Log-Pwr	g Emissio of: Mkr1 2	OD 102:58 PM Jul 22, 2 TRACE 1 2 3 4 TYPE MWWW DET P. N.N. 478 0 GH
Band Ec Agilent Spectrum Analyzer - Swep RL RF 50 Q enter Freq 2.52600 Ref Offset 2.4 Ref 20.00 c 0 dB/div Ref 20.00 c 0 dB/div Ref 20.00 c 0 dB/div Ref 20.00 c	it SA AC 00000 GHz If I dB	NO: Fast ↔	3-DH1 2 55:INT Trig: Free Run	ALIGN AUTO	Hopping Type: Log-Pwr	g Emissio	22:55 PM Jul 22, 2 TRACE 12 34 DET 2 NNN DET 2 NNN 478 0 GH 2.478 dB
Band Ec Agilent Spectrum Analyzer - Swep RL RF 50 Ω enter Freq 2.526000 0	AC AC AC BC F F F AC F F F F F F F F F F F F F	NO: Fast	3-DH1 2 SEINT Trig: Free Run #Atten: 30 dB	480MHz	Type: Log-Pwr Hold: 2000/2000	g Emissio	2.57600 GI ms (1001 p
Agilent Spectrum Analyzer - Swep RL RF 50 Q enter Freq 2.526000 Ref Offset 2.4 Ref 20.00 c 0 G 0 G 0 G 0 G 0 G 0 G 0 G 0 G	AC AC AC AC P P P P P P P P P P P P P	PNO: Fast Gain:Low #VBW 1	3-DH1 2 SE:INT Trig: Free Run Katten: 30 dB Solution Solution Solution Solution FUNCTION M	480MHz	Type: Log-Pwr Hold: 2000/2000	g Emissio	2.57600 GI ms (1001 p
Band Ec           Agilent Spectrum Analyzer - Swep           RL         RF         50 Ω           enter Freq 2.526000           Add Alexandrom         Ref Offset 2.4           D dB/div         Ref Offset 2.4           D dB/div         Ref 2.0.00 c           D dB/div         Ref 2.4           <	AC PIF	NO: Fast Gain:Low	3-DH1 2 SE:INT Trig: Free Run Katten: 30 dB 300 kHz FUNCTION m m	480MHz	Type: Log-Pwr Hold: 2000/2000	g Emissio	2.57600 GI ms (1001 p
Band Ec           Agilent Spectrum Analyzer - Swep           PL         RF         50 Ω           enter Freq 2.52600           0         1         1           0         1         1         1           0         1         1         1         1           0         1         1         1         1         1           0         1         1         1         1         1         1           0         1	AC AC AC AC AC P F F A AC AC AC AC AC AC AC AC AC	×VO: Fast Gain:Low #VBW : 2.478 dB -57.612 dB	3-DH1 2 SE:INT Trig: Free Run Katten: 30 dB 30 dB FUNCTION M M	480MHz	Type: Log-Pwr Hold: 2000/2000	g Emissio	2:57600 G ms (1001 p
Band Ec         Agilent Spectrum Analyzer - Swep         RL       RF       50 Q         enter Freq 2.526000       Second       Second         dB/div       Ref Offset 2.4       Ref 20.00 c         0       Image: Second Sec	AC 0000 GHz P	×VO: Fast Gain:Low #VBW : 2.478 dB -57.612 dB	3-DH1 2 SE:INT Trig: Free Run Katten: 30 dB 30 dB FUNCTION M M	480MHz	Type: Log-Pwr Hold: 2000/2000	g Emissio	2:57600 G ms (1001 p



### 10. 20 dB Bandwidth

### 10.1 Block Diagram Of Test Setup



#### 10.2 Limit

N/A

#### 10.3 Test procedure

- 1. Set RBW = 30kHz.
- 2. Set the video bandwidth (VBW)  $\ge$  3 x RBW.
- 3. Detector = Peak.
- 4. Trace mode = max hold.
- 5. Sweep = auto couple.
- 6. Allow the trace to stabilize.

7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

### 10.4 Test Result

Mode	Frequency (MHz)	-20 dB Bandwidth (MHz)	Verdict
1-DH1	2402	1.012	Pass
1-DH1	2441	1.049	Pass
1-DH1	2480	1.037	Pass
2-DH1	2402	1.334	Pass
2-DH1	2441	1.325	Pass
2-DH1	2480	1.345	Pass
3-DH1	2402	1.290	Pass
3-DH1	2441	1.322	Pass
3-DH1	2480	1.257	Pass
	1-DH1 1-DH1 2-DH1 2-DH1 2-DH1 3-DH1 3-DH1	Mode         (MHz)           1-DH1         2402           1-DH1         2441           1-DH1         2480           2-DH1         2402           2-DH1         2441           2-DH1         2441           3-DH1         2402           3-DH1         2441	Mode         (MHz)         (MHz)           1-DH1         2402         1.012           1-DH1         2441         1.049           1-DH1         2480         1.037           2-DH1         2402         1.334           2-DH1         2441         1.325           2-DH1         2480         1.345           3-DH1         2402         1.290           3-DH1         2441         1.322









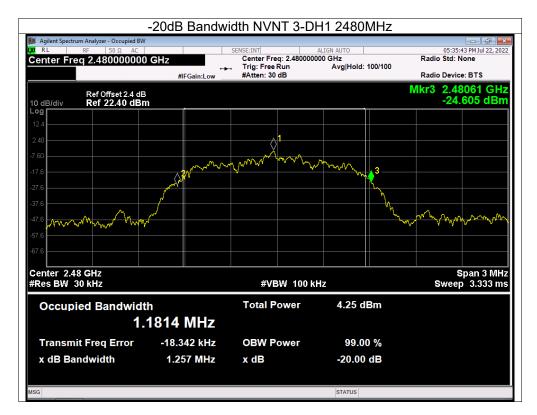












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### 11. Maximum Peak Output Power

### 11.1 Block Diagram Of Test Setup



### 11.2 Limit

		FCC Part15 (15.247) ,	Subpart C	
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1)	Peak Output Power	0.125 watt or 21dBm	2400-2483.5	PASS

### 11.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

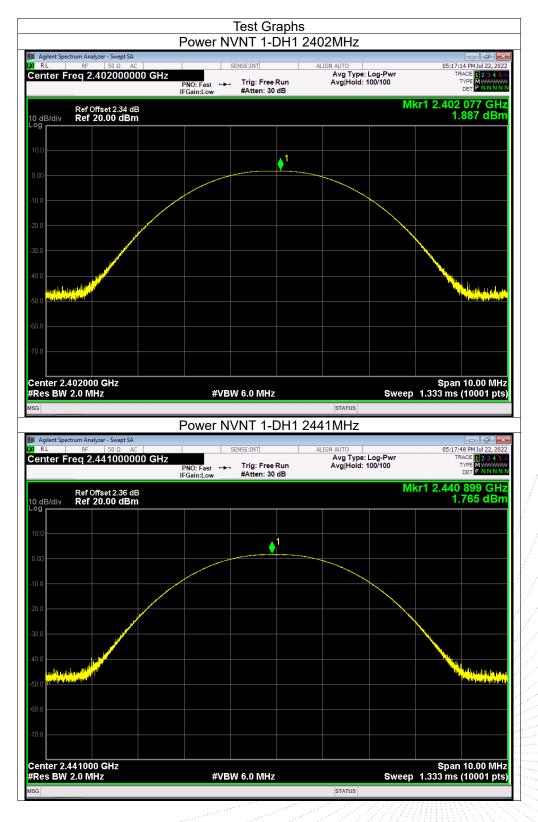
2. Set the spectrum analyzer: RBW = 3MHz. VBW = 3MHz. Sweep = auto; Detector Function = Peak.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

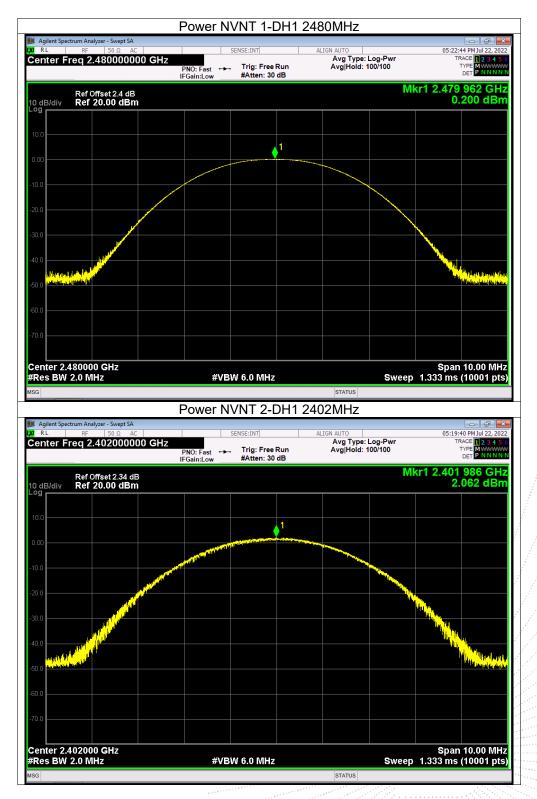
### 11.4 Test Result

Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Verdict
1-DH1	2402	1.89	21	Pass
1-DH1	2441	1.77	21	Pass
1-DH1	2480	0.20	21	Pass
2-DH1	2402	2.06	21	Pass
2-DH1	2441	1.58	21	Pass
2-DH1	2480	0.57	21	Pass
3-DH1		2.45	21	Pass
3-DH1	2441	1.77	21	Pass
3-DH1	2480	0.54	21	Pass
	1-DH1 1-DH1 2-DH1 2-DH1 2-DH1 3-DH1 3-DH1	Mode         (MHz)           1-DH1         2402           1-DH1         2441           1-DH1         2480           2-DH1         2402           2-DH1         2441           2-DH1         2441           3-DH1         2402           3-DH1         2402	Mode         (MHz)         Power (dBm)           1-DH1         2402         1.89           1-DH1         2441         1.77           1-DH1         2480         0.20           2-DH1         2402         2.06           2-DH1         2441         1.58           2-DH1         2480         0.57           3-DH1         2402         2.45           3-DH1         2441         1.77	Mode         (MHz)         Power (dBm)         (dBm)           1-DH1         2402         1.89         21           1-DH1         2441         1.77         21           1-DH1         2480         0.20         21           2-DH1         2402         2.06         21           2-DH1         2441         1.58         21           2-DH1         2480         0.57         21           3-DH1         2402         2.45         21           3-DH1         2441         1.77         21

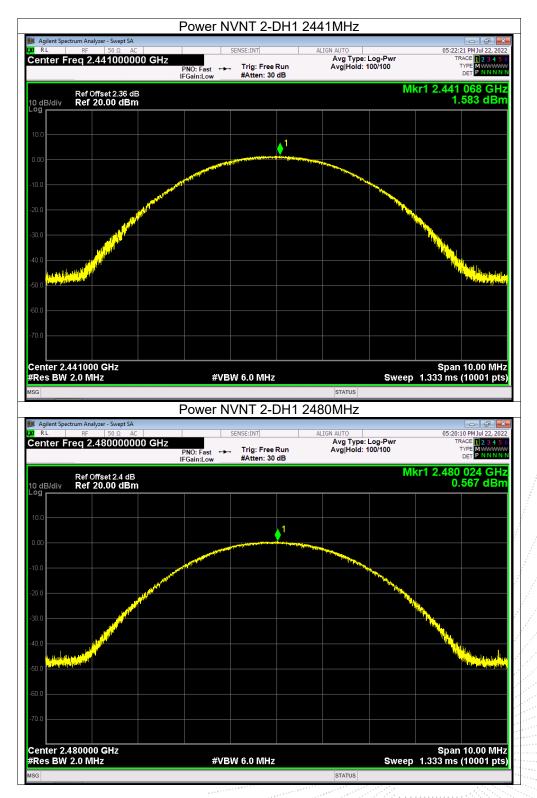




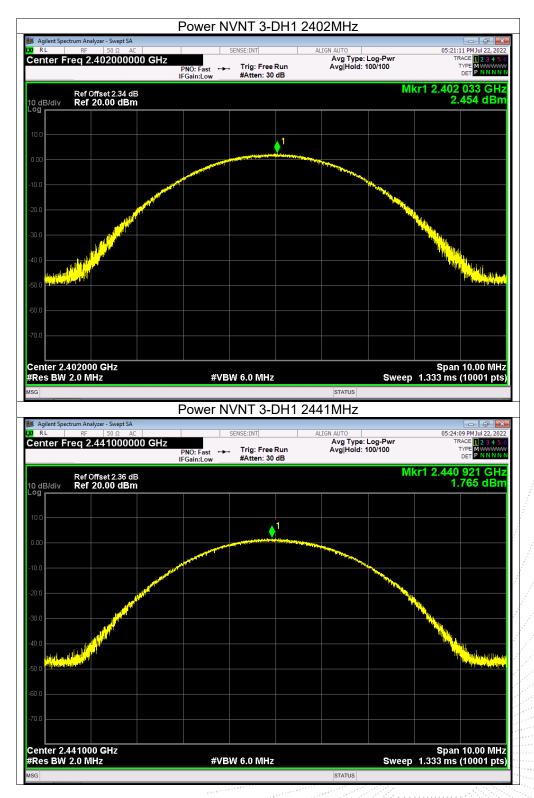
















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### 12. Hopping Channel Separation

### 12.1 Block Diagram Of Test Setup



#### 12.2 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 0.125W.

#### 12.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. 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.

Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH1	2401.966	2402.964	0.998	0.675	Pass
NVNT	1-DH1	2440.978	2441.968	0.990	0.699	Pass
NVNT	1-DH1	2478.976	2479.98	1.004	0.691	Pass
NVNT	2-DH1	2401.97	2402.968	0.998	0.889	Pass
NVNT	2-DH1	2440.964	2441.964	1.000	0.883	Pass
NVNT	2-DH1	2478.98	2479.976	0.996	0.897	Pass
NVNT	3-DH1	2401.966	2402.968	1.002	0.860	Pass
NVNT	3-DH1	2440.968	2441.97	1.002	0.881	Pass
NVNT	3-DH1	2478.968	2479.972	1.004	0.838	Pass

### 12.4 Test Result



Agilent Spectrum Analyzer - S	Swept SA	FS NVNT 1-D	-			- 6 -
RL RF 5 enter Freq 2.402		SENSE:INT		Type: Log-Pwr	TRACE	M Jul 22, 202
	PNC IFGa	D: Wide Trig: Free F ain:Low #Atten: 30		Hold:>100/100		PNNNN
Ref Offset dB/div Ref 20.0				Μ	kr1 2.401 90- 0.44-	66 GH: 19 dBn
2g 0.0	1			.,,		
.00	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~					
3.0		man -	a man		- man	0
3.0						
enter 2.402500 GH Res BW 30 kHz	Hz	#VBW 100 kHz		Swee	Span 2. p 2.133 ms (1	000 MH
R MODE TRC SCL	Х	Y FUNC	TION FUNCTION WID		FUNCTION VALUE	
1 N 1 f 2 N 1 f	2.401 966 GHz 2.402 964 GHz	-0.449 dBm -0.602 dBm				
3						
5						
7 8 9						
0						
						- F
				ITUS		F
		FS NVNT 1-D				
Agilent Spectrum Analyzer - S R L RF 5	Swept SA 0 Ω AC		H1 2441MH	<b>iz</b>	05:40:09 P	→
Agilent Spectrum Analyzer - S R L RF 5	Swept SA 0 Ω AC   500000 GHz PNC	FS NVNT 1-D	H1 2441MH ALIGN AUT Avg Run Avg	Iz	05:40:09 P TRACE	M Jul 22, 202
Agilent Spectrum Analyzer - 3 RL RF S enter Freq 2.441	Swept SA 0 Ω AC 500000 GHz PNC IFG	CFS NVNT 1-D	H1 2441MH ALIGN AUT Avg Run Avg	0 g Type: Log-Pwr  Hold:>100/100	05:40:09 P TRACE TYPE DET	M Jul 22, 202 1 2 3 4 5 M P N N N N
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0	Swept SA 0 Ω AC 5000000 GHz PNC IFG 12.36 dB	FS NVNT 1-D	H1 2441MH ALIGN AUT Avg Run Avg	0 g Type: Log-Pwr  Hold:>100/100	05:40:09 P TRACE TYPE DET Kr1 2.440 97	M Jul 22, 202 1 2 3 4 5 M P N N N N
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0	Swept SA 0 Ω AC 5000000 GHz PNC IFG 12.36 dB	FS NVNT 1-D	H1 2441MH ALIGN AUT Avg Run Avg	0 g Type: Log-Pwr  Hold:>100/100	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0 9 00 00	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH ALIGN AUT Avg Run Avg	0 g Type: Log-Pwr  Hold:>100/100	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0 00	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH ALIGN AUT Avg Run Avg	IZ Type: Log-Pwr Hold:>100/100 M	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 dB/div Ref 20.0	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH Align AUT Run Avg dB	IZ Type: Log-Pwr Hold:>100/100 M	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Aglient Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset Ref 20.0 00 00 00 00 00 00 00 00 00	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH Align AUT Run Avg	IZ Type: Log-Pwr Hold:>100/100 M	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 dB/div Ref 20.0	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH Align AUT Run Avg	IZ Type: Log-Pwr Hold:>100/100 M	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Ref Offset Ref 20.0 Ref	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH Align AUT Run Avg	IZ Type: Log-Pwr Hold:>100/100 M	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 dB/div Ref 20.0	Swept SA 0 Ω AC 500000 GHz PNC IFG 2.36 dB 0 dBm	FS NVNT 1-D	H1 2441MH Align AUT Run Avg	IZ Type: Log-Pwr Hold:>100/100 M	05:40:09 P TRACE TYPE DET Kr1 2.440 97	MJul 22, 202 1 2 3 4 5 MWWWW PNNNN 78 GH:
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset 0 dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 Q AC     500000 GHz   PNC IFGI 2.36 dB 0 dBm	CFS NVNT 1-DI SENSE:INT D: Wide Gin:Low Trig: Free F #Atten: 30	H1 2441MH Align AUT Run Avg	IZ туре: Log-Рwr  Hold:>100/100 М	05:40:09 Trace Tree Ikr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn
Agilent Spectrum Analyzer -3 RL RF S enter Freq 2.441 Ref Offset dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 Q AC       500000 GHz   PNC IFGI 2.36 dB 0 dBm 1     1    FS NVNT 1-DI SENSE:INT D: Wide Trig: Free F #Atten: 30	H1 2441MH	IZ Type: Log-Pwr IHold:>100/100 M	05:40:09 Trace Trype et (kr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn	
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 0.2 AC 500000 GHz PNC IFGI 2.36 dB 0 dBm 1 1 1 1 1 2.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	CFS NVNT 1-DI	H1 2441MH	IZ Type: Log-Pwr IHold:>100/100 M	05:40:09 Trace Tree Ikr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn
Agiient Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 Ω AC 500000 GHz PNC IFG 12.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	CFS NVNT 1-D	H1 2441MH	IZ Type: Log-Pwr IHold:>100/100 M	05:40:09 Trace Trype et (kr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset d B/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 0.2 AC 500000 GHz PNC IFGI 2.36 dB 0 dBm 1 1 1 1 1 2.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	CFS NVNT 1-DI	H1 2441MH	IZ Type: Log-Pwr IHold:>100/100 M	05:40:09 Trace Trype et (kr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn
Agilent Spectrum Analyzer - 3 RL RF 5 enter Freq 2.441 Ref Offset 0 dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 0.2 AC 500000 GHz PNC IFGI 2.36 dB 0 dBm 1 1 1 1 1 2.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	CFS NVNT 1-DI	H1 2441MH	IZ Type: Log-Pwr IHold:>100/100 M	05:40:09 Trace Trype et (kr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn
Agilent Spectrum Analyzer - 5 RL RF 5 enter Freq 2.441 Ref Offset dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0	Swept SA 0 0.2 AC 500000 GHz PNC IFGI 2.36 dB 0 dBm 1 1 1 1 1 2.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	CFS NVNT 1-DI	H1 2441MH	IZ Type: Log-Pwr IHold:>100/100 M	05:40:09 Trace Trype et (kr1 2.440 97 -0.58	MJUI 22, 202 1 2 3 4 5 1 9 NNNN 78 GH: 8 dBn

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Agilent Spectrum Analyzer - RL RF S enter Freq 2.47S	50 Ω AC 9500000 GHz PNO	SENSE:INT : Wide Trig: Free Run in:Low #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:46:27 PM Jul 22, 202 TRACE JL 2 3 4 5 TYPE M WWWW DET P N N N N
Ref Offse 0 dB/div Ref 20.0	t 2.4 dB		Μ	kr1 2.478 976 GHz -2.334 dBm
og 10.0	1			
20.0	m	month and a second seco	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	man and a second
50.0				
0.0				
enter 2.479500 G Res BW 30 kHz	Hz	#VBW 100 kHz	Swee	Span 2.000 MHz p 2.133 ms (1001 pts
KR MODE TRC SCL	× 2.478 976 GHz	Y FUNCTION -2.334 dBm	FUNCTION WIDTH	FUNCTION VALUE
2 N 1 f	2.479 980 GHz	-2.550 dBm		
4 5				=
6 7				
8 9 0				
11				
G			STATUS	•
	C	FS NVNT 2-DH1		
	0			
Agilent Spectrum Analyzer -	Swept SA			
RL RF 5	50 Ω AC	SENSE:INT	ALIGN AUTO	05:50:06 PM Jul 22, 202 TRACE 1 2 3 4 5
RL RF 5	50 Ω AC 2500000 GHz PNO	SENSE:INT		05:50:06 PM Jul 22, 202 TRACE 1 2 3 4 5
RL RF Senter Freq 2.402	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:50:06 PM Jul 22, 202 TRACE 1 2 3 4 5 TYPE MWWWW DET P NNNN kr1 2.401 970 GHz
enter Freq 2.402 Ref Offse	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:50:06 PM Jul 22, 202: TRACE 2 3 4 5 TYPE MWWWW DET P NNNN kr1 2.401 970 GHz
Ref Offse	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PM Jul 22, 202: TRACE 2 3 4 5 TYPE MWWWW DET P NNNN kr1 2.401 970 GHz
RL         RF         13           enter Freq 2.402         Ref Offse           0 dB/div         Ref Offse           9	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:50:06 PM Jul 22, 202 TRACE 12.34 5 TYPE 1
Ref Offse 0 dB/div Ref 20.0	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PM Jul 22, 202: TRACE 2 3 4 5 TYPE MWWWW DET P NNNN kr1 2.401 970 GHz
Ref Offse 0 dB/div Ref 20.0 9 10.0 0.00 0.00 0.00	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PM Jul 22, 202 TRACE 12, 3, 45 TYPE WINNIN bet PNNNN kr1 2.401 970 GHz -2.456 dBm
Ref Offse 0 dB/div Ref 20.0 90 10.0 200 000 000 000	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PM Jul 22, 202 TRACE 12, 3, 45 TYPE WINNIN bet PNNNN kr1 2.401 970 GHz -2.456 dBm
Ref Offse 0 dB/div Ref 20.0 90 10.0 200 000 000 000 000 000 000 000 000	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PM Jul 22, 202 TRACE 12, 3, 45 TYPE WINNIN bet PNNNN kr1 2.401 970 GHz -2.456 dBm
Ref Offse 0 dB/div 10 0 10	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PM Jul 22, 202 TRACE 12, 3, 45 TYPE WINNIN bet PNNNN kr1 2.401 970 GHz -2.456 dBm
RL RF 44 enter Freq 2.402 0 dB/div Ref 20.0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	50 Ω AC 2500000 GHz PNO IFGa t 2.34 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hoid:>100/100	05:50:06 PMJd 22, 202 TRACE 12, 3, 45 TYPE WINNIN ber PNNNN kr1 2.401 970 GHz -2.456 dBm
Ref Offse 0 dB/div Ref 20.0 0	2500000 GHz 2500000 GHz PNO IFGa t 2.34 dB 00 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:50:06 PM Jul 22, 202 TRACE 12, 23 45 TYPE DET PNNNN kr1 2.401 970 GH2 -2.456 dBm
Ref Offse anter Freq 2.402 Ref Offse a dB/div Ref 20.0 Ref 20.0 Ref 20.0 a dB/div Ref	E 2.34 dB 200 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SENSE:INT Wide Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:50:06 PH Jul 22.202 TRACE 12.3 45 TYPE PNNNN kr1 2.401 970 GH2 -2.456 dBm Span 2.000 MHz p 2.133 ms (1001 pts)
RL RF 15 enter Freq 2.402 0 dB/div Ref 20.0 0 dB	2500000 GHz 2500000 GHz PNO IFGa t 2.34 dB 00 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	SENSE:INT Wide Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:50:06 PM Jul 22, 202 TRACE 12, 3, 45 TYPE WINNIN bet PNNNN kr1 2.401 970 GHz -2.456 dBm
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enter Freq 2.441	PNO:	SENSE:INT Wide Trig: Free Run in:Low #Atten: 30 dB	ALIGN AUTO Avg Type: Log-F Avg Hold:>100/1	05:51:33 PM Jul 22 Wr TRACE 123 00 TYPE M DET P NN	, 202 4 5
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	Swept SA 10 Ω AC <b>0500000 GHz</b> PNO:			05:54:40 PM Jul 22, Wr TRACE 123	, 202
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RL RF 5 enter Freq 2.479 Ref Offset	Swept SA i0 Ω AC D5000000 GHz PNO: IFGai t2.4 dB	SENSE:INT	ALIGN AUTO Avg Type: Log-F Avg Hold:>100/1	05:54:40 PM Jul 22 Wr TRACE 1 23 TYPE 1 23 TYPE 1 24 PET PNN Mkr1 2.478 980 G -4.555 dl	, 202 4 5 N N
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Res BW 30 kHz	74	#VBW 100 kHz		Sweep	2.133 ms	
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enter Freq 2.441	wept SA 1 Ω AC     5000000 GHz PNO: IFGal	SENSE:INT	ALIGN AUTO Avg Type Run Avg Hold:	:>100/100	06:00:03 TRA TY D <b>r1 2.440 9</b>	3 PM Jul 22, 2023 CE 1 2 3 4 5 0 PPE P N N N N 968 GH2
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RL         RF         50           enter Freq 2.4415         Ref Offset:         Set offset:           0 dB/div         Ref 20.00         Ref 20.00           00         Ref 0ffset:         Set offset:           0 dB/div         Ref 20.00         Ref 20.00           00         Ref 0ffset:         Set offset:           0 dB/div         Ref 20.00         Ref 20.00           00         Ref 0ffset:         Set offset:           000         Set offset:         Set offset offset:	wept SA R AC FOR ACCIONAL STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STAT	SENSE:INT	ALIGN AUTO Avg Type Run Avg Hold: dB	>100/100 Mk	06:00:03 TRA TY C1 2.440 9 -2.9	9 PM Jul 22, 2022 (PE M 23 4 5 6 (PE M M M M M M M M M M M M M M M M M M M
RL         RF         50           enter Freq 2.4415         Ref Offset:         0           0 dB/div         Ref 20.00         0           0 00	wept SA 12 AC 500000 GHz PNO IFGal 2.36 dB 0 dBm 1 1 1 1 1 1 1 1 1 1 1 1 1	SENSE:INT Wide in:Low Trig: Free F #Atten: 30 of #Atten: 30 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 of #Atten: 40 o	ALIGN AUTO Avg Type Run Avg Hold: dB	>100/100 Mk	2.133 ms (	9 PM Jul 22, 2022 (PE M 23 4 5 6 (PE M M M M M M M M M M M M M M M M M M M
RL         RF         50           enter Freq 2.4415         Sector         Sector           0 dB/div         Ref Offset:         Sector           0 dB/div         Ref 20.00         Sector           0 dB/div         Sector         Sector           0 dB/div         Sector         Sector           0 dB/div         Sector         Sector           1 dB/div         1 f         Sector           2 N         1 f         Sector           3 Sector         Sector         Sector	wept SA R AC FOR ACCIONAL STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STAT	SENSE:INT	ALIGN AUTO Avg Type Run Avg Hold: dB	>100/100 Mk	2.133 ms (	9 PM Jul 22, 2022 (PE M 23 4 5 6 (PE M M M M M M M M M M M M M M M M M M M
RL         RF         50           enter Freq 2.4415         Second	wept SA R AC FOR ACCIONAL STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STAT	SENSE:INT	ALIGN AUTO Avg Type Run Avg Hold: dB	>100/100 Mk	2.133 ms (	2.000 MHz
RL         RF         50           enter Freq 2.4415         Ref Offset:         Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Second Seco	wept SA R AC FOR ACCIONAL STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STATES AND A STAT	SENSE:INT	ALIGN AUTO Avg Type Run Avg Hold: dB	>100/100 Mk	2.133 ms (	2.000 MHz



	CFS NVNT 3-DH1 2	2480MHz	
	SENSE:INT NO: Wide Trig: Free Run Gain:Low #Atten: 30 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	06:02:08 PM Jul 22, 202 TRACE 1 2 3 4 5 TYPE M WWWWW DET P N N N N
Ref Offset 2.4 dB 10 dB/div Ref 20.00 dBm		Mkı	1 2.478 968 GHz -5.326 dBm
Log 10.0 0.00 -10.0	Juning	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	m
-20.0			
-60.0			
Center 2.479500 GHz #Res BW 30 kHz	#VBW 100 kHz	Sweep	Span 2.000 MHz 2.133 ms (1001 pts)
MKR         MODE         TRC         SCL         X           1         N         1         f         2.478         968         GHz           2         N         1         f         2.479         972         GHz           3	Y FUNCTION -5.326 dBm -4.640 dBm	FUNCTION WIDTH FUN	CTION VALUE
4			
10 11 11 11 11 11 11 11 11 11 11 11 11 1	III	STATUS	•

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### 13. Number Of Hopping Frequency

### 13.1 Block Diagram Of Test Setup



#### 13.2 Limit

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

#### 13.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. 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. The limit is specified in one of the subparagraphs of this Section.

4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

#### 13.4 Test Result

Condition	Mode	Hopping Number	Limit	Verdict
NVNT	1-DH1	79	15	Pass
NVNT	2-DH1	79	15	Pass
NVNT	3-DH1	79	15	Pass



Agilent Spectrum Analyzer - Swept SA	Hopping	No. NVN	T 1-DH1 2	2441MHz		- ¢
RL RF 50 Ω AC enter Freq 2.44175000	0 GHz PNO: Fas	SENSE:INT	e Run	IGN AUTO Avg Type: Log-P Avg Hold:>100/10	wr	:40:36 PM Jul 22, 20 TRACE 1 2 3 4 5 TYPE MWWW DET P N N N
Ref Offset 2.36 dE	IFGain:Lo		30 dB		Mkr1 2.402	004 0 GH
dB/div Ref 20.00 dBm						1.131 dBr
<sup>1.0</sup> <mark>↓1</mark> <sup>00</sup> ААДАААААААА	ለብኪፈብስቢሲስሲስ	0.000000000000000000000000000000000000	AAAAAAAA	ላ በ ብ ቢ ብ ስ ስ እ እ በ በ	ותמת את את את ה	
┉╶┤ <del>╵╵╵╵╵╵╵╵╵╵╵╵</del>	<u>A A A A A A A A A A A A A A A A A A A </u>	<u> </u>	.AAAAAAAAA	MAMAAAAAAAAA	AAAAAAAAAAAA	VVVV
.0						
.0						
art 2.40000 GHz tes BW 100 kHz		#VBW 300 kH	z		Stop Sweep 8.000	2.48350 GH ms (1001 pts
N 1 f 2.40	× 2 004 0 GHz	1.131 dBm	INCTION FUNCT	TION WIDTH	FUNCTION VAL	JE
	30 160 0 GHz	-0.330 dBm				
		III		STATUS		•
	Hopping	No. NVN	Г 2-DH1 2	2441MHz		
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC enter Freg 2.44175000		SENSE:INT	AL	IGN AUTO Avg Type: Log-P		:52:36 PM Jul 22, 20 TRACE 1 2 3 4 5
	PNO: Fas			Avg Hold:>100/10	0	
	IFGain:Lo					503 0 GH
Ref Offset 2.36 dE	IFGain:Lo				Mkr1 2.401	
dB/div Ref 20.00 dBm	IFGain:Lo					-5.055 dBr
dB/div Ref 20.00 dBm 9 00 00 - 1 00 - 1	IFGain:Lo			የሁሉንሌን ቢሉንሌን ቢሉንሌን ቢሉንሌን ቢሉንሌን ቢሉንሌ		-5.055 dBr
dB/div Ref 20.00 dBm	IFGain:Lo			KANA JAA IAA		-5.055 dBr
dB/div Ref 20.00 dBm	IFGain:Lo			www.aaa		-5.055 dBr
Bildiv         Ref 20.00 dBm           9         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1	IFGain:Lo					-5.055 dBn
B/div Ref 20.00 dBm	IFGain:Lo					-5.055 dBr
dB/div Ref 20.00 dBm	IFGain:Lo	/አሉዋ/(ለ	Z		Sweep 8.000	5.055 dBr
dB/div         Ref 20.00 dBm           9         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           2         1           1         1           2         4	IFGain:Lo	/አሉዋ/(ለ	Z		۰ ۱۹۹۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰ ۲۰۰۰	5.055 dBr
dB/div         Ref 20.00 dBm           9         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           2         1           1         1           2         1           1         1           2         2	IFGain:Lo	<mark>∧ѧ</mark> ѧѧҲ҄ҲѧѧҝҀӍ #VBW 300 kH ≤.055 dBm	Z		Sweep 8.000	5.055 dBr
Bildiv         Ref 20.00 dBm           9         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	IFGain:Lo	<mark>∧ѧ</mark> ѧѧҲ҄ҲѧѧҝҀӍ #VBW 300 kH ≤.055 dBm	Z		Sweep 8.000	5.055 dBn



Нор	ping No. NVNT	3-DH1 2441N	1Hz	
	SENSE:INT PNO: Fast Trig: Free Gain:Low #Atten: 30	Run Avg Hol	e: Log-Pwr d:>100/100	06:00:49 PMJul 22, 2022 TRACE 1 2 3 4 5 6 TYPE MWWWWW DET P NNNN
Ref Offset 2.36 dB           10 dB/div         Ref 20.00 dBm           10 d         1           0 d0         1	whith water	MANNA WANNA		11 837 0 GHz -1.774 dBm
Start 2.40000 GHz #Res BW 100 kHz	#VBW 300 kH;	2	Sto Sweep 8.00	op 2.48350 GHz 0 ms (1001 pts)
MKR         MODE         TRC         SCL         X           1         N         1         f         2.401 837 0 GHz           2         N         1         f         2.401 837 0 GHz           3         4         5         5         6           6         7         8         9         9           9         9         10         10         11		ICTION FUNCTION WIDTH	FUNCTION V	ALUE
MSG		STATUS		

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### 14. Dwell Time

#### 14.1 Block Diagram Of Test Setup

EUT	SPECTRUM
	ANALYZER

#### 14.2 Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

#### 14.3 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

2. Set spectrum analyzer span = 0. Centred on a hopping channel;

3. Set RBW = 1MHz and VBW = 3MHz.Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.

4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

### 14.4 Test Result

DH5 Packet permit maximum 1600 / 79 / 6 hops per second in each channel (5 time slots RX, 1 time slot TX).

DH3 Packet permit maximum 1600 / 79 / 4 hops per second in each channel (3 time slots RX, 1 time slot TX).

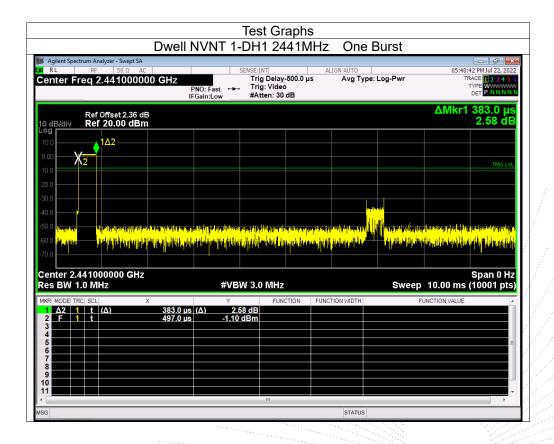
DH1 Packet permit maximum 1600 / 79 /2 hops per second in each channel (1 time slot RX, 1 time slot TX). So, the Dwell Time can be calculated as follows:

DH5:1600/79/6*0.4*79*(MkrDelta)/1000	
DH3:1600/79/4*0.4*79*(MkrDelta)/1000	
DH1:1600/79/2*0.4*79*(MkrDelta)/1000	
Remark: Mkr Delta is once pulse time.	

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Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	0.383	121.794	400	Pass
NVNT	1-DH3	2441	1.640	259.120	400	Pass
NVNT	1-DH5	2441	2.887	334.892	400	Pass
NVNT	2-DH1	2441	0.389	124.091	400	Pass
NVNT	2-DH3	2441	1.641	252.714	400	Pass
NVNT	2-DH5	2441	2.889	288.900	400	Pass
NVNT	3-DH1	2441	0.390	123.630	400	Pass
NVNT	3-DH3	2441	1.640	262.400	400	Pass
NVNT	3-DH5	2441	2.891	306.446	400	Pass



Edition: A.5

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	Dwell N	NVNT 1-DH	13 2441N	MHz One	Burst		
M Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω AC Center Freq 2.441000000	P	NO: Fast +++ Tr	int Pelay-500.0 rig: Video Atten: 30 dB	ALIGN AUTO µs Avg Typ	e: Log-Pwr	06:06:41 PM Ju TRACE TYPE W DET P	2 3 4 5
Ref Offset 2.36 dB 10 dB/div Ref 20.00 dBm						ΔMkr1 1.64 1.8	0 m 5 dl
10.0 0.00 X2	●1∆2						TRIG LV
20.0							
40.0 50.0 <b>High 4</b> 60.0 <b>High 4</b> 70.0	telleterterterterte Ally <sup>a</sup> letertertert			a ka na pika mana ka aka in na ka na pika na na na na na na na na na na na na na	Will land block of the post of Milling day we had a different of the	dalar da da sela angla ang ang Panang panang	
Center 2.441000000 GHz Res BW 1.0 MHz		#VBW 3.	.0 MHz		Sweep	Spar 10.00 ms (1000	
MKR MODE TRC SCL X 1 Δ2 1 t (Δ) 2 F 1 t 3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	1.640 ms 497.0 µs	Υ (Δ) 1.85 dE -5.17 dBm	FUNCTION B	FUNCTION WIDTH	FI	UNCTION VALUE	
5							
6 7 8 9 9							

	Dwell N	NVINI I-L		MHz One	Balot		
Agilent Spectrum Analyzer - Swept SA RL RF 50 Ω A( enter Freq 2.4410000	00 GHz	NO: Fast ↔ Gain:Low	ENSE:INT Trig Delay-500.0 Trig: Video #Atten: 30 dB	ALIGN AUTO	e: Log-Pwr	TR/ T	4 PM Jul 22, 20 ACE 1 2 3 4 5 YPE WWWWW DET P N N N
Ref Offset 2.36 d 0 dB/div Ref 20.00 dBr						ΔMkr1 2	2.887 m -1.89 d
		1Δ2					
0.00 X2							TRIG L
0.0							
0.0							
0.0 0.0 <mark>1. abs/ 0.0 <sup>1</sup>1 (4. by)</mark>		en en en en en en en en en en en en en e		un te <sup>1</sup> erre a di Antileri più d <sup>ell</sup> a internazione <mark>In petito en 11 petito in più den petito en 1</mark> 0 petito en 11 petito en 11 petito en 11 petito en 11 petito en 1			
0.0 1000 0.0 1000 0.0 1100 0.0 1100 enter 2.441000000 GHz		hinner.				nd Add (di pil <mark>kan</mark>	Span 0 H
0.0 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	X	#VBW	3.0 MHz		Sweep		Span 0 H
0.0 μμετη 0.0 μμετη		#VBW	3.0 MHz		Sweep	10.00 ms (	Span 0 H
0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη           0.0         μματη	× 2.887 ms	#VBW (Δ) -1.89	3.0 MHz		Sweep	10.00 ms (	Span 0 H
0.0         μαλα           0.0         μαλα           0.0         μαλα           0.0         μαλα           0.0         μαλα           enter 2.441000000 GHz           es BW 1.0 MHz           KRI MODE TRCI SCL           1         A2           2         F           1         t           3         4           5         5           6         6	× 2.887 ms	#VBW (Δ) -1.89	3.0 MHz		Sweep	10.00 ms (	Span 0 H
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Edition: A.5

No.: BCTC/RF-EMC-007



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Dwell	NVNT 3-DH5	5 2441MHz	: One B	urst		
Agilent Spectrum Analyzer - Swept SA         RL       RF       50 Ω       AC         enter Freq 2.441000000 GHz	PNO East ++++ Trig	IT A Delay-500.0 μs : Video ten: 30 dB	LIGN AUTO Avg Type: L	.og-Pwr	TF	25 PM Jul 22, 20 RACE 1 2 3 4 TYPE W
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enter 2.441000000 GHz	dunamentin Naminant #VBW 3.0	y ordy altern to adopt you get well on	1999,000,000,000,000,000 1999,000,000,000,000,000,000 1999,000,000,000,000,000,000,000,000,000	<mark>i</mark> biobacitifi p	10.00 ms	Span 0 H
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	#VBW 3.0	MHz		Sweep		Span 0 H
0.0 μμμμ 0.0 μμμμμ 0.0 μμμμ 0.0 μμμμμ 0.0 μμμμμ 0.0 μμμμμ 0.0 μμμμμ 0.0 μμμμμ 0.0 μμμμμ 0.0 μμμμμμ 0.0 μμμμμμ 0.0 μμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμμ	#VBW 3.0 γ 1s (Δ) 0.96 dB	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H
0.0 μματ 0.0 μ	#VBW 3.0 γ 0.96 dB	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H
0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0 <td>#VBW 3.0 γ 0.96 dB</td> <td>MHz</td> <td><mark>, (</mark>helver) Uh, (t.).</td> <td>Sweep</td> <td>10.00 ms</td> <td>Span 0 H</td>	#VBW 3.0 γ 0.96 dB	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H
300         μμ           center 2.441000000 GHz           ces BW 1.0 MHz           KR         MODE TRC SCL           1         Δ2           2         F           4         4           5         6           6         6	#VBW 3.0 γ 0.96 dB	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H
000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000         μημαμ           000 <td>#VBW 3.0 γ 0.96 dB</td> <td>MHz</td> <td><mark>, (</mark>helver) Uh, (t.).</td> <td>Sweep</td> <td>10.00 ms</td> <td>Span 0 H</td>	#VBW 3.0 γ 0.96 dB	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	#VBW 3.0 γ 0.96 dB	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H
0.0     0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0       0.0     0.0	#VBW 3.0 (Δ) 0.96 dB -10.67 dBm	MHz	<mark>, (</mark> helver) Uh, (t.).	Sweep	10.00 ms	Span 0 H



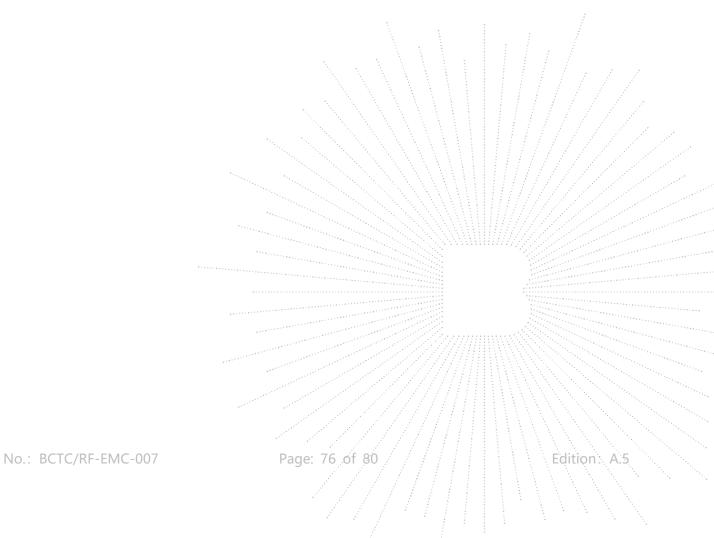
### 15. Antenna Requirement

### 15.1 Limit

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

### 15.2 Test Result

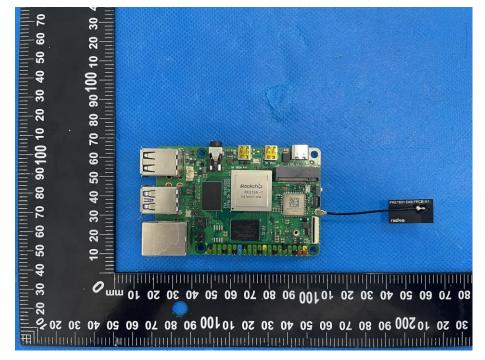
The EUT antenna is FPC antenna, fulfill the requirement of this section.





### 16. EUT Photographs

### EUT Photo

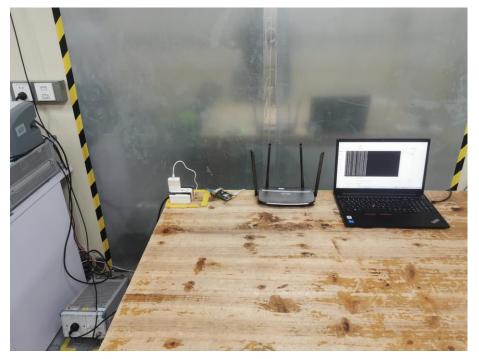


NOTE: Appendix-Photographs Of EUT Constructional Details



# 17. EUT Test Setup Photographs

Conducted emissions

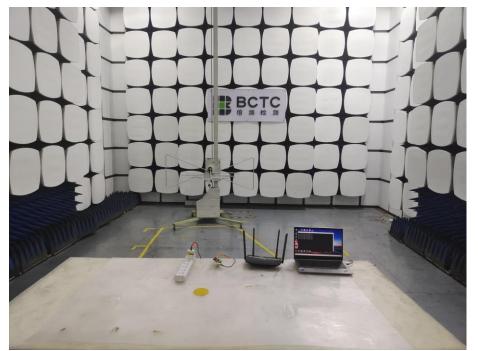


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#### Radiated Measurement Photos







# **STATEMENT**

1. The equipment lists are traceable to the national reference standards.

2. The test report can not be partially copied unless prior written approval is issued from our lab.

3. The test report is invalid without the "special seal for inspection and testing".

4. The test report is invalid without the signature of the approver.

5. The test process and test result is only related to the Unit Under Test.

6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.

7. The test report without CMA mark is only used for scientific research, teaching, enterprise product development and internal quality control purposes.

8. The quality system of our laboratory is in accordance with ISO/IEC17025.

9. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

#### Address:

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**\*\*\*\*\*\* END \*\*\*\*** 

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