

### RADIO TEST REPORT FCC ID: 2AV7T-PD1

Product:	: PuduBot	
Trade Mark:	Pudu	
Model No.:	PD1	
Family Model:	PD2, PD6, PD8, PD9	
Report No.:	S20031002107001	
Issue Date:	17 Apr. 2020	

### **Prepared for**

Shenzhen Pudu Technology Co., Ltd. Room301, Wearnes Science and Technology Mansion, No.10, Kefa Rd, Nanshan District, Shenzhen, Guangdong, China

#### Prepared by

Shenzhen NTEK Testing Technology Co., Ltd. 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District Shenzhen, Guangdong, China Tel.: +86-755-6115 6588 Fax.: +86-755-6115 6599 Website:http://www.ntek.org.cn



#### TABLE OF CONTENTS

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Certificate #4298.01

1	TES	ST RESULT CERTIFICATION	3		
2	2 SUMMARY OF TEST RESULTS				
3	3 FACILITIES AND ACCREDITATIONS				
	3.1 3.2 3.3	FACILITIES LABORATORY ACCREDITATIONS AND LISTINGS MEASUREMENT UNCERTAINTY	5		
4	GE	NERAL DESCRIPTION OF EUT	6		
5	DES	SCRIPTION OF TEST MODES	8		
6	SET	TUP OF EQUIPMENT UNDER TEST	10		
	6.1 6.2 6.3	BLOCK DIAGRAM CONFIGURATION OF TEST SYSTEM SUPPORT EQUIPMENT EQUIPMENTS LIST FOR ALL TEST ITEMS	11		
7	TES	ST REQUIREMENTS	14		
		CONDUCTED EMISSIONS TEST RADIATED SPURIOUS EMISSION NUMBER OF HOPPING CHANNEL HOPPING CHANNEL SEPARATION MEASUREMENT AVERAGE TIME OF OCCUPANCY (DWELL TIME) 20DB BANDWIDTH TEST PEAK OUTPUT POWER CONDUCTED BAND EDGE MEASUREMENT SPURIOUS RF CONDUCTED EMISSION ANTENNA APPLICATION REQUENCY HOPPING SYSTEM (FHSS) EQUIPMENT REQUIREMENTS	19 28 29 30 31 32 33 34 36		
8	TES	ST RESULTS			
	8.1 8.2 8.3 8.4 8.5 8.6 8.7	DWELL TIME MAXIMUM CONDUCTED OUTPUT POWER OCCUPIED CHANNEL BANDWIDTH CARRIER FREQUENCIES SEPARATION NUMBER OF HOPPING CHANNEL. BAND EDGE CONDUCTED RF SPURIOUS EMISSION	42 47 57 62 63		

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#### **1 TEST RESULT CERTIFICATION**

Applicant's name:	Shenzhen Pudu Technology Co., Ltd.	
Address:	Room301, Wearnes Science and Technology Mansion, No.10, Kefa Rd,	
	Nanshan District, Shenzhen, Guangdong, China	
Manufacturer's Name:	Shenzhen Pudu Technology Co., Ltd.	
Address:	: Room301, Wearnes Science and Technology Mansion, No.10, Kefa Rd, Nanshan District, Shenzhen, Guangdong, China	
Product description		
Product name:	PuduBot	
Model and/or type reference:	PD1	
Family Model:	PD2, PD6, PD8, PD9	

Certificate #4298.01

Measurement Procedure Used:

APPLICABLE STANDARDS		
STANDARD/ TEST PROCEDURE TEST RESULT		
FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02	Complied	

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

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The test results of this report relate only to the tested sample identified in this report.

Date of Test	:	10 Mar. 2020 ~ 13 Apr. 2020
Testing Engineer	:	Dollan Lin
		(Allen Liu)
Technical Manager	:	Jason chen
Ũ		(Jason Chen)
		Sam. Chen
Authorized Signatory	:	
		(Sam Chen)

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#### SUMMARY OF TEST RESULTS 2

FCC Part15 (15.247), Subpart C				
Standard Section	Test Item	Verdict	Remark	
15.207	Conducted Emission	PASS		
15.209 (a) 15.205 (a)	Radiated Spurious Emission	PASS		
15.247(a)(1)	Hopping Channel Separation	PASS		
15.247(b)(1)	Peak Output Power	PASS		
15.247(a)(iii)	Number of Hopping Frequency	PASS		
15.247(a)(iii)	Dwell Time	PASS		
15.247(a)(1)	Bandwidth	PASS		
15.247 (d)	Band Edge Emission	PASS		
15.247 (d)	Spurious RF Conducted Emission	PASS		
15.203	Antenna Requirement	PASS		

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Remark:

 "N/A" denotes test is not applicable in this Test Report.
All test items were verified and recorded according to the standards and without any deviation during the test.



#### **3 FACILITIES AND ACCREDITATIONS**

#### 3.1 FACILITIES

All measurement facilities used to collect the measurement data are located at

1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District

Shenzhen, Guangdong, China

The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.10 and CISPR Publication 22.

#### 3.2 LABORATORY ACCREDITATIONS AND LISTINGS

Site Description	
CNAS-Lab.	: The Laboratory has been assessed and proved to be in compliance with
	CNAS-CL01:2006 (identical to ISO/IEC 17025:2005)
	The Certificate Registration Number is L5516.
IC-Registration	The Certificate Registration Number is 9270A.
	CAB identifier:CN0074
FCC- Accredited	Test Firm Registration Number: 463705.
	Designation Number: CN1184
A2LA-Lab.	The Certificate Registration Number is 4298.01
	This laboratory is accredited in accordance with the recognized
	International Standard ISO/IEC 17025:2005 General requirements for
	the competence of testing and calibration laboratories.
	This accreditation demonstrates technical competence for a defined
	scope and the operation of a laboratory quality management system
	(refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009).
Name of Firm	: Shenzhen NTEK Testing Technology Co., Ltd.
Site Location	: 1/F, Building E, Fenda Science Park Sanwei, Xixiang, Bao'an District
	Shenzhen, Guangdong, China

#### 3.3 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y\pm U$ , where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	±2.80dB
2	RF power, conducted	±0.16dB
3	Spurious emissions, conducted	±0.21dB
4	All emissions, radiated(30MHz~1GHz)	±2.64dB
5	All emissions, radiated(1GHz~6GHz)	±2.40dB
6	All emissions, radiated(>6GHz)	±2.52dB
7	Temperature	±0.5°C
8	Humidity	±2%

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#### 4 GENERAL DESCRIPTION OF EUT

Product Feature and Specification			
Equipment	PuduBot		
Trade Mark	Pudu		
FCC ID	2AV7T-PD1		
Model No.	PD1		
Family Model	PD2, PD6, PD8, PD9		
Model Difference	All the model are the same circuit and RF module, except the Model names.		
Operating Frequency	2402MHz~2480MHz		
Modulation	GFSK, π/4-DQPSK, 8-DPSK		
Bluetooth Version	BT V4.2		
Number of Channels	79 Channels		
Antenna Type	Built-in helical antenna		
Antenna Gain	1.0dBi		
	DC supply: Battery Model:4110790114 DC 25.2V, 15.6AH		
Power supply	Adapter 1 supply: Model: FY2903500 Input: 100-240V~50-60Hz 1.5A Max Output: 29V3.5A		
HW Version	B04		
SW Version	4.6.2.2		

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Note: Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.



#### **Revision History**

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Certificate #4298.01

Report No.	Version	Description	Issued Date
S20031002107001	Rev.01	Initial issue of report	Apr 17, 2020



#### **5 DESCRIPTION OF TEST MODES**

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.

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

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

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

The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement -X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.

#### Carrier Frequency and Channel list:

Channel	Frequency(MHz)
0	2402
1	2403
39	2441
40	2442
77	2479
78	2480

Note: fc=2402MHz+k×1MHz k=0 to 78

The following summary table is showing all test modes to demonstrate in compliance with the standard.

For AC Conducted Emission		
Final Test Mode Description		
Mode 1	normal link mode	

Note: AC power line Conducted Emission was tested under maximum output power.

For Radiated Test Cases				
Final Test Mode	Description			
Mode 1	normal link mode			
Mode 2	CH00(2402MHz)			
Mode 3	CH39(2441MHz)			
Mode 4	CH78(2480MHz)			

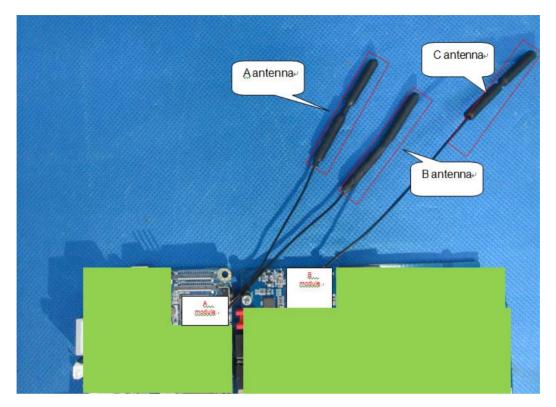
Note: For radiated test cases, the worst mode data rate 3Mbps was reported only, because this data rate has the highest RF output power at preliminary tests, and no other significantly frequencies found in conducted spurious emission.

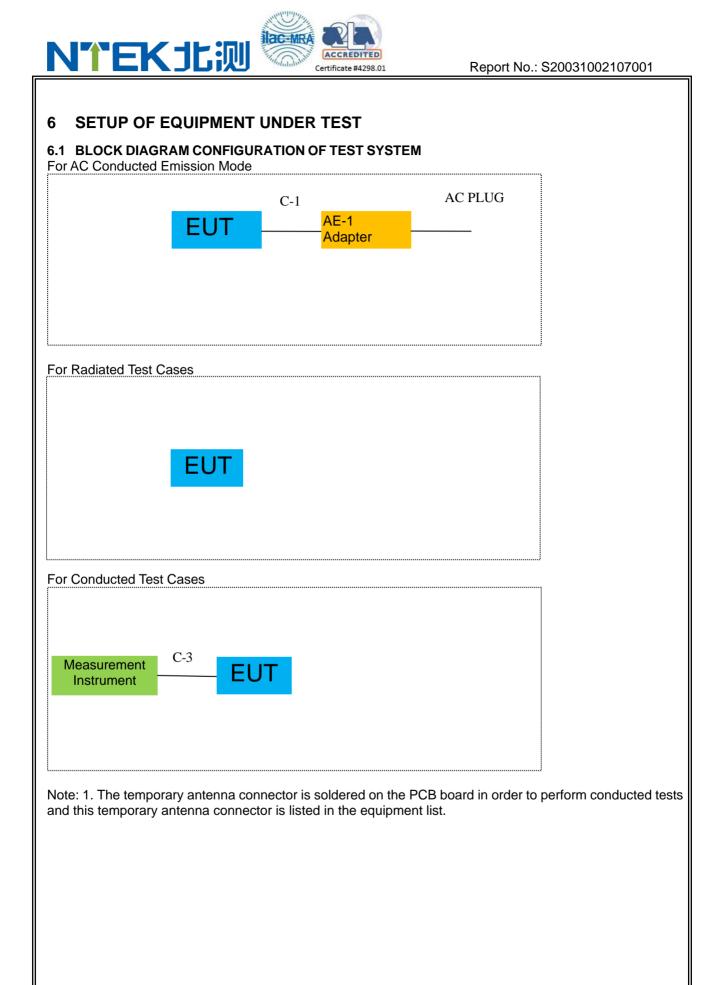
For Conducted Test Cases					
Final Test Mode Description					
Mode 2	CH00(2402MHz)				
Mode 3	CH39(2441MHz)				
Mode 4	CH78(2480MHz)				
Mode 5	Hopping mode				

Note: The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.



This EUT has two modules, A module supports Bluetooth, WIFI2.4G / 5G, A module has two antennas, A antenna supports Bluetooth, WIFI2.4G / 5G, B antenna supports WIFI2.4G / 5G. The B module only supports WIFI 2.4G. The B module has only one antenna,







#### 6.2 SUPPORT EQUIPMENT

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

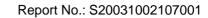
Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
AE-1	Adapter	N/A	FY2903500	N/A	Peripherals

Item	Cable Type	Shielded Type	Ferrite Core	Length
C-1	Power Cable	NO	NO	1.2m
C-3	RF Cable	YES	NO	0.1m

#### Notes:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in [Length] column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".

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#### 6.3 EQUIPMENTS LIST FOR ALL TEST ITEMS

#### Radiation& Conducted Test equipment

		estequipment					
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibrati on period
1	Spectrum Analyzer	Aglient	E4407B	MY45108040	2019.05.13	2020.05.12	1 year
2	Spectrum Analyzer	Agilent	N9020A	MY49100060	2019.08.28	2020.08.27	1 year
3	Spectrum Analyzer	R&S	FSV40	101417	2019.08.28	2020.08.27	1 year
4	Test Receiver	R&S	ESPI7	101318	2019.05.13	2020.05.12	1 year
5	Bilog Antenna	TESEQ	CBL6111D	31216	2019.04.15	2020.04.14	1 year
6	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	2018.05.19	2020.05.18	2 year
7	Horn Antenna	EM	EM-AH-1018 0	2011071402	2019.04.15	2020.04.14	1 year
8	Broadband Horn Antenna	SCHWARZBE CK	BBHA 9170	803	2019.12.11	2020.12.10	1 year
9	Amplifier	EMC	EMC051835 SE	980246	2019.08.06	2020.08.05	1 year
10	Active Loop Antenna	SCHWARZBE CK	FMZB 1519 B	055	2019.12.11	2020.12.10	1 year
11	Power Meter	DARE	RPR3006W	15I00041SN 084	2019.08.06	2020.08.05	1 year
12	Test Cable (9KHz-30MHz)	N/A	R-01	N/A	2017.04.21	2020.04.20	3 year
13	Test Cable (30MHz-1GHz)	N/A	R-02	N/A	2017.04.21	2020.04.20	3 year
14	High Test Cable(1G-40G Hz)	N/A	R-03	N/A	2017.04.21	2020.04.20	3 year
15	High Test Cable(1G-40G Hz)	N/A	R-04	N/A	2017.04.21	2020.04.20	3 year
16	Filter	TRILTHIC	2400MHz	29	2017.04.19	2020.04.18	3 year
17	temporary antenna connector (Note)	NTS	R001	N/A	N/A	N/A	N/A

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Note:

We will use the temporary antenna connector (soldered on the PCB board) When conducted test And this temporary antenna connector is listed within the instrument list



AC Co	AC Conduction Test equipment							
Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period	
1	Test Receiver	R&S	ESCI	101160	2019.05.13	2020.05.12	1 year	
2	LISN	R&S	ENV216	101313	2019.04.15	2020.04.14	1 year	
3	LISN	SCHWARZBE CK	NNLK 8129	8129245	2019.05.13	2020.05.12	1 year	
4	50Ω Coaxial Switch	ANRITSU CORP	MP59B	6200983704	2018.05.19	2020.05.18	2 year	
5	Test Cable (9KHz-30MH z)	N/A	C01	N/A	2017.04.21	2020.04.20	3 year	
6	Test Cable (9KHz-30MH z)	N/A	C02	N/A	2017.04.21	2020.04.20	3 year	
7	Test Cable (9KHz-30MH z)	N/A	C03	N/A	2017.04.21	2020.04.20	3 year	

Note: Each piece of equipment is scheduled for calibration once a year except the Aux Equipment & Test Cable which is scheduled for calibration every 2 or 3 years.



#### 7 TEST REQUIREMENTS

#### 7.1 CONDUCTED EMISSIONS TEST

#### 7.1.1 Applicable Standard

#### According to FCC Part 15.207(a)

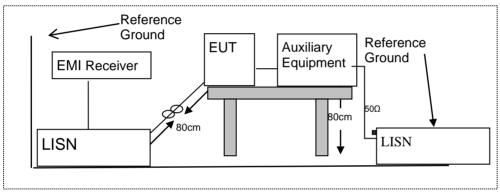
#### Conformance Limit

Frequency(MHz)	Conducted Emission Limit		
Frequency(IVILIZ)	Quasi-peak	Average	
0.15-0.5	66-56*	56-46*	
0.5-5.0	56	46	
5.0-30.0	60	50	

Note: 1. \*Decreases with the logarithm of the frequency

- 2. The lower limit shall apply at the transition frequencies
  - 3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

#### 7.1.2 Test Configuration



#### 7.1.3 Test Procedure

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

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room.
- 2. The EUT was placed on a table which is 0.8m above ground plane.
- 3. Connect EUT to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 4. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40cm long.
- 5. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- 6. LISN at least 80 cm from nearest part of EUT chassis.
- 7. The frequency range from 150KHz to 30MHz was searched.
- 8. Set the test-receiver system to Peak Detect Function and specified bandwidth(IF bandwidth=9KHz) with Maximum Hold Mode
- 9. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 7.1.4 Test Results

Pass

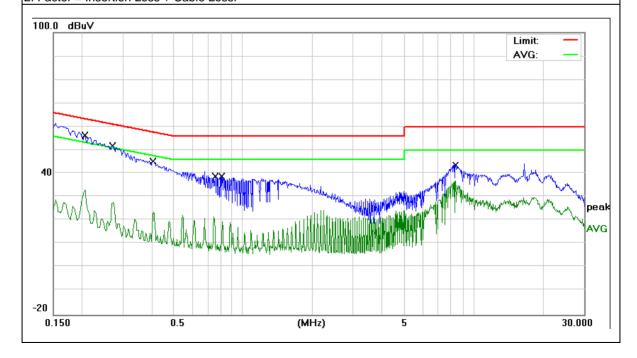


#### 7.1.5 Test Results

EUT:	PuduBot	Model Name :	PD1
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	DC 25.2V from Adapter AC 120V/60Hz	Test Mode:	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.2059	46.45	9.76	56.21	63.37	-7.16	QP
0.2059	23.16	9.76	32.92	53.37	-20.45	AVG
0.274	42.06	9.75	51.81	60.99	-9.18	QP
0.274	18.16	9.75	27.91	50.99	-23.08	AVG
0.4099	35.29	9.74	45.03	57.65	-12.62	QP
0.4099	13.78	9.74	23.52	47.65	-24.13	AVG
0.7539	28.77	9.74	38.51	56	-17.49	QP
0.7539	11.68	9.74	21.42	46	-24.58	AVG
0.81	29.06	9.74	38.8	56	-17.2	QP
0.81	9.83	9.74	19.57	46	-26.43	AVG
8.3658	33.52	9.95	43.47	60	-16.53	QP
8.3658	26.86	9.95	36.81	50	-13.19	AVG

Remark:



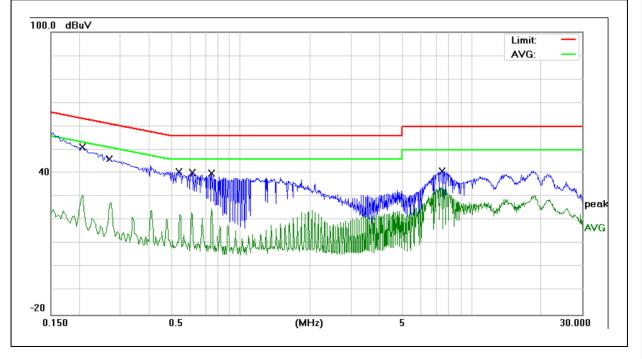




EUT:	PuduBot	Model Name :	PD1
Temperature:	26 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 25.2V from Adapter AC 120V/60Hz	Test Mode:	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Dement
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.2059	41.62	9.73	51.35	63.37	-12.02	QP
0.2059	20.71	9.73	30.44	53.37	-22.93	AVG
0.27	36.32	9.74	46.06	61.12	-15.06	QP
0.27	17.7	9.74	27.44	51.12	-23.68	AVG
0.546	30.51	9.75	40.26	56	-15.74	QP
0.546	12.83	9.75	22.58	46	-23.42	AVG
0.6139	30.33	9.75	40.08	56	-15.92	QP
0.6139	13.46	9.75	23.21	46	-22.79	AVG
0.7459	30.08	9.75	39.83	56	-16.17	QP
0.7459	15.08	9.75	24.83	46	-21.17	AVG
7.4739	30.74	9.98	40.72	60	-19.28	QP
7.4739	23.78	9.98	33.76	50	-16.24	AVG

Remark:





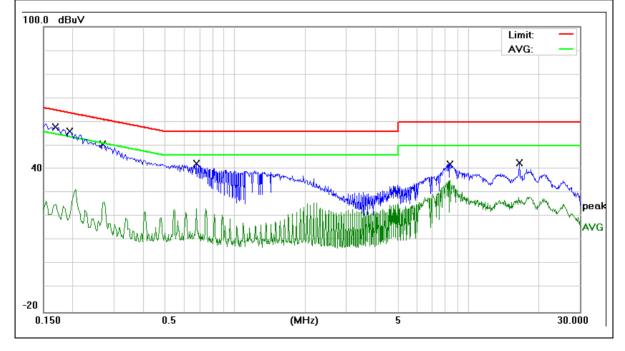
EUT:	PuduBot	Model Name :	PD1
Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
	DC 25.2V from Adapter AC 240V/60Hz	Test Mode:	Mode 1

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Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	
Trequency		Conect racio	weasure-ment	Linits	Margin	Remark
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	
0.1685	47.98	9.76	57.74	65.03	-7.29	QP
0.1685	38.26	9.76	48.02	55.03	-7.01	AVG
0.1965	45.78	9.76	55.54	63.75	-8.21	QP
0.1965	35.6	9.76	45.36	53.75	-8.39	AVG
0.27	40.72	9.75	50.47	61.12	-10.65	QP
0.27	30.5	9.75	40.25	51.12	-10.87	AVG
0.678	32.59	9.74	42.33	56	-13.67	QP
0.678	22.62	9.74	32.36	46	-13.64	AVG
8.3658	32.02	9.95	41.97	60	-18.03	QP
8.3658	21.1	9.95	31.05	50	-18.95	AVG
16.5059	32.27	10.14	42.41	60	-17.59	QP
0.1685	47.98	9.76	57.74	65.03	-7.29	AVG

Remark:





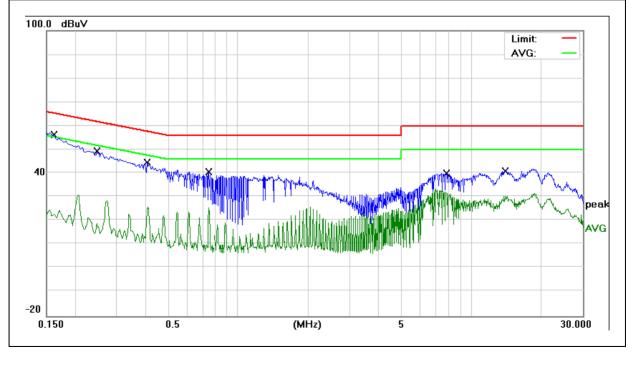


Report No.: S20031002107001

EUT:	PuduBot	Model Name :	PD1
Temperature:	<b>26</b> ℃	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	DC 25.2V from Adapter AC 240V/60Hz	Test Mode:	Mode 1

Frequency	Reading Level	Correct Factor	Measure-ment	Limits	Margin	Damarlı
(MHz)	(dBµV)	(dB)	(dBµV)	(dBµV)	(dB)	Remark
0.162	46.68	9.73	56.41	65.36	-8.95	QP
0.1621	36.6	9.73	46.33	55.35	-9.02	AVG
0.2467	39.74	9.74	49.48	61.86	-12.38	QP
0.2467	29.51	9.74	39.25	51.86	-12.61	AVG
0.406	34.91	9.75	44.66	57.73	-13.07	QP
0.406	24.9	9.75	34.65	47.73	-13.08	AVG
0.7459	30.58	9.75	40.33	56	-15.67	QP
0.7459	22.27	9.75	32.02	46	-13.98	AVG
7.8139	29.82	9.99	39.81	60	-20.19	QP
7.8139	20.57	9.99	30.56	50	-19.44	AVG
13.9379	30.8	10.09	40.89	60	-19.11	QP
13.9379	20.06	10.09	30.15	50	-19.85	AVG

Remark:





#### 7.2 RADIATED SPURIOUS EMISSION

#### 7.2.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and ANSI C63.10-2013

#### 7.2.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)). According to FCC Part15.205, Restricted bands

MHz	MHz	GHz
16.42-16.423	399.9-410	4.5-5.15
16.69475-16.69525	608-614	5.35-5.46
16.80425-16.80475	960-1240	7.25-7.75
25.5-25.67	1300-1427	8.025-8.5
37.5-38.25	1435-1626.5	9.0-9.2
73-74.6	1645.5-1646.5	9.3-9.5
74.8-75.2	1660-1710	10.6-12.7
123-138	2200-2300	14.47-14.5
149.9-150.05	2310-2390	15.35-16.2
156.52475-156.52525	2483.5-2500	17.7-21.4
156.7-156.9	2690-2900	22.01-23.12
162.0125-167.17	3260-3267	23.6-24.0
167.72-173.2	3332-3339	31.2-31.8
240-285	3345.8-3358	36.43-36.5
322-335.4	3600-4400	(2)
	MHz 16.42-16.423 16.69475-16.69525 16.80425-16.80475 25.5-25.67 37.5-38.25 73-74.6 74.8-75.2 123-138 149.9-150.05 156.52475-156.52525 156.7-156.9 162.0125-167.17 167.72-173.2 240-285	MHzMHz16.42-16.423399.9-41016.69475-16.69525608-61416.80425-16.80475960-124025.5-25.671300-142737.5-38.251435-1626.573-74.61645.5-1646.574.8-75.21660-1710123-1382200-2300149.9-150.052310-2390156.52475-156.525252483.5-2500156.7-156.92690-2900162.0125-167.173260-3267167.72-173.23332-3339240-2853345.8-3358

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.

Fr	Restricted requency(MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance
	0.009~0.490	2400/F(KHz)	20 log (uV/m)	300
	0.490~1.705	24000/F(KHz)	20 log (uV/m)	30
	1.705~30.0	30	29.5	30
	30-88	100	40	3
	88-216	150	43.5	3
	216-960	200	46	3
	Above 960	500	54	3

Limits of Radiated Emission Measurement(Above 1000MHz)

Frequency(MHz)	Class B (dBuV/m) (at 3M)		
Frequency(iviriz)	PEAK	AVERAGE	
Above 1000	74	54	

Remark :1. Emission level in dBuV/m=20 log (uV/m)

2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. For Frequency 9kHz~30MHz:

- Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
- Limit line=Specific limits(dBuV) + distance extrapolation factor.
- For Frequency above 30MHz:

Distance extrapolation factor =20log(Specific distance/ test distance)(dB);



Limit line=Specific limits(dBuV) + distance extrapolation factor.

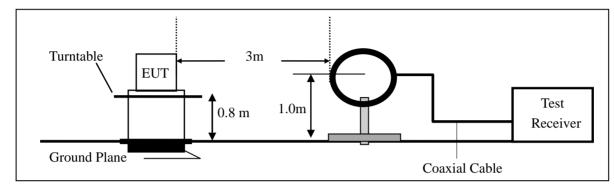
Certificate #4298.01

#### 7.2.3 Measuring Instruments

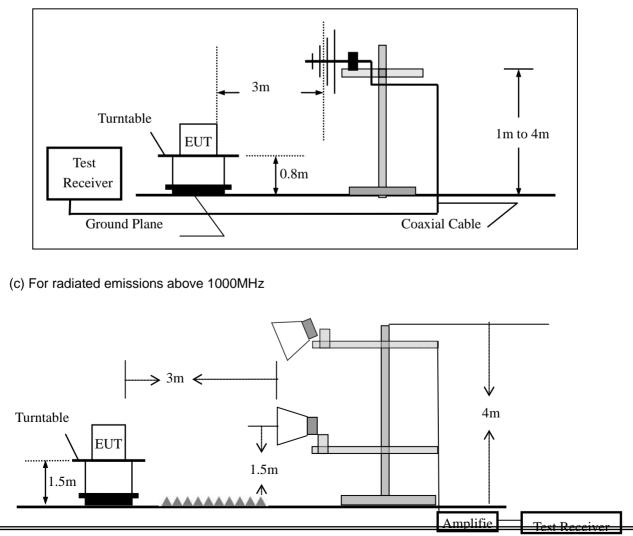
The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.2.4 Test Configuration

#### (a) For radiated emissions below 30MHz



#### (b) For radiated emissions from 30MHz to 1000MHz





#### 7.2.5 Test Procedure

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4 dB according to the standards: ANSI C63.10-2013. The test distance is 3m. The setup is according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 and CAN/CSA-CEI/IEC CISPR 22.

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	1000 MHz	
Stop Frequency	10th carrier harmonic	
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average	

Receiver Parameter	Setting	
Attenuation	Auto	
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP	
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP	
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP	

a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.

- b. The EUT was placed on the top of a rotating table 0.8 m for below 1GHz and 1.5m for above 1GHz the ground at a 3 meter. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m for below 1GHz and 1.5m for above 1GHz; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

- e. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- f. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- g. For the actual test configuration, please refer to the related Item -EUT Test Photos.

Note:

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



Frequency Band (MHz) Function		Resolution bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Ah awa 4000	Peak	1 MHz	1 MHz
Above 1000	Average	1 MHz	10 Hz

Note: for the frequency ranges below 30 MHz, a narrower RBW is used for these ranges but the measured value should add a RBW correction factor (RBWCF) where RBWCF [dB] =10\*lg(100 [kHz]/narrower RBW [kHz])., the narrower RBW is 1 kHz and RBWCF is 20 dB for the frequency 9 kHz to 150 kHz, and the narrower RBW is 10 kHz and RBWCF is 10 dB for the frequency 150 kHz to 30 MHz.

#### 7.2.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Allen Liu

Freq.	Ant.Pol.	Emission L	.evel(dBuV/m)	Limit 3	m(dBuV/m)	Over(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.



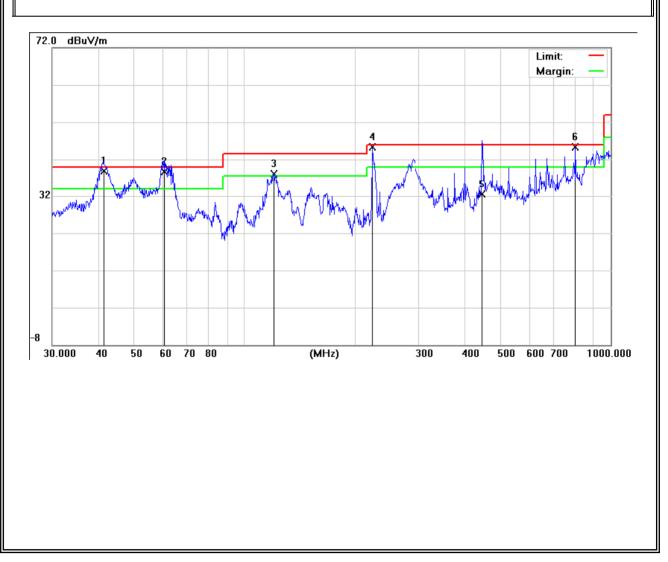
Spurious Emission below 1GHz (30MHz to 1GHz) All the modulation modes have been tested, and the worst result was report as below:

EUT:	PuduBot	Model Name :	PD1
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010hPa	Test Mode:	Mode 1
Test Voltage :	DC 25.2V		

Polar	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Remark
(H/V)	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	41.4215	25.82	13.08	38.9	40	-1.1	QP
V	60.4919	32.74	5.96	38.7	40	-1.3	QP
V	120.6991	25.76	12.39	38.15	43.5	-5.35	QP
V	223.7334	34.42	10.91	45.33	46	-0.67	QP
V	446.4141	13.94	18.56	32.5	46	-13.5	QP
V	801.7863	20.39	24.97	45.36	46	-0.64	QP

#### Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level - Limit





Polar	Freque	ency	Me Read		Factor	Emission Level	Limits	Margin	Remark
(H/V)	(MH	z)	(dB	uV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Н	222.9	502	23.	.09	10.91	34	46	-12	QP
Н	289.0	021	26.	.48	14.32	40.8	46	-5.2	QP
Н	375.9	385	24.	.12	16.97	41.09	46	-4.91	QP
Н	750.1	083	19.	.68	24.92	44.6	46	-1.4	QP
Н	782.3	453	10.	.75	24.95	35.7	46	-10.3	QP
Н	952.0	937	9.	.4	28.4	37.8	46	-8.2	QP
	e Level= F BuV/m	Reading	JLevel+	Facto	r, Margin=	Absolute Leve	el - Limit		
								Limit: Margin:	_
							8 3	4	
32	warmed we and	M	horauthan	s s	mμΛ	m	May Marker	My Marth	×
-8									



EUT:		PuduB	e 1GHz (10 ot		1	el No.:		PD	1		
Temperatu	ire:	20 °C			Rela	tive Humid	ity:	48%			
Test Mode	:	Mode2/Mode3/Mode4 Test By:					Allen Liu				
All the mod	All the modulation modes have been tested, and the worst result						ult was	rep	ort as belo	w:	
Frequenc y	Read Level	Cable loss	Antenna Factor	Prea Fac	mp	Emission Level	Limit		Margin	Remark	Comment
(MHz)	(dBµV)	(dB)	dB/m	(dE	3)	(dBµV/m)	(dBµV	/m)	(dB)		
		. ,	Low Char	nnel (2	402 ľ	MHz)(8-DP	SK)At	oove	e 1G		
4803.14	61.80	5.21	35.59	44.	30	58.30	74.0	0	-15.70	Pk	Vertical
4803.14	40.95	5.21	35.59	44.	30	37.45	54.0	0	-16.55	AV	Vertical
7205.5	61.95	6.48	36.27	44.	60	60.10	74.0	0	-13.90	Pk	Vertical
7205.5	42.04	6.48	36.27	44.	60	40.19	54.0	0	-13.81	AV	Vertical
4803.74	61.94	5.21	35.55	44.	30	58.40	74.0	0	-15.60	Pk	Horizontal
4803.74	41.35	5.21	35.55	44.:	30	37.81	54.0	0	-16.19	AV	Horizontal
7205.88	60.07	6.48	36.27	44.	52	58.30	74.0	0	-15.70	Pk	Horizontal
7205.88	40.52	6.48	36.27	44.	52	38.75	54.0	0	-15.25	AV	Horizontal
Mid Channel (2441 MHz)(8-DPSK)Above 1G											
4882.97	62.30	5.21	35.66	44.	20	58.97	74.0	0	-15.03	Pk	Vertical
4882.97	42.22	5.21	35.66	44.	20	38.89	54.0	0	-15.11	AV	Vertical
7323.62	62.38	7.10	36.50	44.	43	61.55	74.0	0	-12.45	Pk	Vertical
7323.62	42.81	7.10	36.50	44.	43	41.98	54.0	0	-12.02	AV	Vertical
4881.86	62.25	5.21	35.66	44.	20	58.92	74.0	0	-15.08	Pk	Horizontal
4881.86	40.21	5.21	35.66	44.	20	36.88	54.0	0	-17.12	AV	Horizontal
7323.08	62.14	7.10	36.50	44.	43	61.31	74.0	0	-12.69	Pk	Horizontal
7323.08	42.00	7.10	36.50	44.	-	41.17	54.0	-	-12.83	AV	Horizontal
			High Char	nnel (2	480 <b> </b>	MHz)(8-DP	SK) A	bov	e 1G		
4960.08	60.97	5.21	35.52	44.	21	57.49	74.0	0	-16.51	Pk	Vertical
4960.08	39.61	5.21	35.52	44.	21	36.13	54.0	0	-17.87	AV	Vertical
7439.71	60.80	7.10	36.53	44.	60	59.83	74.0	0	-14.17	Pk	Vertical
7439.71	42.17	7.10	36.53	44.	60	41.20	54.0	0	-12.80	AV	Vertical
4960.23	62.12	5.21	35.52	44.	21	58.64	74.0	0	-15.36	Pk	Horizontal
4960.23	41.14	5.21	35.52	44.	21	37.66	54.0	0	-16.34	AV	Horizontal
7440.48	61.23	7.10	36.53	44.	60	60.26	74.0	0	-13.74	Pk	Horizontal
7440.48	42.03	7.10	36.53	44.	60	41.06	54.0	0	-12.94	AV	Horizontal

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Note:

(1) Emission Level= Antenna Factor + Cable Loss + Read Level - Preamp Factor (2)All other emissions more than 20dB below the limit.





Spurio	ous Emissio	on in Restr	icted Band	2310-2	2390MHz a	nd 2483	8.5-25	00MHz		
EUT:		PuduBot		Mo	del No.:		PD1			
Temperatu	ure:	20 °C		Re	Relative Humidity:		48%			
Test Mode	):	Mode2/ M	Node4	Те	Fest By: Allen Liu					
All the mo	All the modulation modes have been tested, and the worst result							ort as belo	w:	
Frequenc	Meter	Cable	Antenna	Prean	np Emissi	on	nits	Margin	Detector	
у	Reading	Loss	Factor	Facto		1		-		Comment
(MHz)	(dBµV)	(dB)	dB/m	(dB)			JV/m)	(dB)	Туре	
				- <u>`</u> ``	-DPSK)-ho			1	1	
2310.00	59.83	2.97	27.80	43.8			74	-27.20	Pk	Horizontal
2310.00	42.99	2.97	27.80	43.8	) 29.9		54	-24.04	AV	Horizontal
2310.00	59.80	2.97	27.80	43.8			74	-27.23	Pk	Vertical
2310.00	40.02	2.97	27.80	43.8		9 !	54	-27.01	AV	Vertical
2390.00	60.01	3.14	27.21	43.8	J 46.5	6	74	-27.44	Pk	Vertical
2390.00	40.61	3.14	27.21	43.8	27.1	6 !	54	-26.84	AV	Vertical
2390.00	60.20	3.14	27.21	43.8	0 46.7	5	74	-27.25	Pk	Horizontal
2390.00	41.55	3.14	27.21	43.8	28.1	) (	54	-25.90	AV	Horizontal
2483.50	61.71	3.58	27.70	44.0	) 48.9	)	74	-25.01	Pk	Vertical
2483.50	40.80	3.58	27.70	44.0	28.0	3 !	54	-25.92	AV	Vertical
2483.50	61.01	3.58	27.70	44.0	) 48.2	9	74	-25.71	Pk	Horizontal
2483.50	39.91	3.58	27.70	44.0	) 27.1	) !	54	-26.81	AV	Horizontal
			3Mb	ps(8-DF	PSK)- Non-	hopping				
2310.00	59.89	2.97	27.80	43.8	0 46.8	6	74	-27.14	Pk	Horizontal
2310.00	40.35	2.97	27.80	43.8	) 27.3	2 !	54	-26.68	AV	Horizontal
2310.00	62.07	2.97	27.80	43.8	) 49.04	1 7	74	-24.96	Pk	Vertical
2310.00	42.62	2.97	27.80	43.8	) 29.5	) (	54	-24.41	AV	Vertical
2390.00	59.91	3.14	27.21	43.8	) 46.4	6	74	-27.54	Pk	Vertical
2390.00	41.30	3.14	27.21	43.8	27.8	5 !	54	-26.15	AV	Vertical
2390.00	61.56	3.14	27.21	43.8	) 48.1	1	74	-25.89	Pk	Horizontal
2390.00	42.45	3.14	27.21	43.8		) !	54	-25.00	AV	Horizontal
2483.50	60.96	3.58	27.70	44.0			74	-25.76	Pk	Vertical
2483.50	42.71	3.58	27.70	44.0	29.9	9 !	54	-24.01	AV	Vertical
2483.50	59.52	3.58	27.70	44.0			74	-27.20	Pk	Horizontal
2483.50	40.21	3.58	27.70	44.0	) 27.4	) !	54	-26.51	AV	Horizontal

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Note: (1) All other emissions more than 20dB below the limit.



UT:		Pud	uBot		Model N	Model No.:		1			
Гетр	erature:	20 °	C		Relative	Humidity:	48	48%			
Test I	Test Mode: Mode2/ Mode4			Test By	:	All	en Liu				
All th	e modulatic	n modes	have be	en tested	, and the v	worst resul	t was re	eport as b	elow:		
	Frequenc y	Readin g Level	Cable Loss	Antenn a	Preamp Factor	Emission Level	Limits	Margin	Detecto r	-	
	(MHz)	(dBµV)	(dB)	dB/m	(dB)	(dBµ V/m)	(dBµ V/m)	(dB)	Туре	Comment	
	3260	62.45	4.04	29.57	44.70	51.36	74	-22.64	Pk	Vertical	
	3260	50.86	4.04	29.57	44.70	39.77	54	-14.23	AV	Vertical	
	3260	60.14	4.04	29.57	44.70	49.05	74	-24.95	Pk	Horizontal	
	3260	51.94	4.04	29.57	44.70	40.85	54	-13.15	AV	Horizontal	
	3332	61.55	4.26	29.87	44.40	51.28	74	-22.72	Pk	Vertical	
	3332	51.32	4.26	29.87	44.40	41.05	54	-12.95	AV	Vertical	
	3332	59.97	4.26	29.87	44.40	49.70	74	-24.30	Pk	Horizontal	
	3332	50.94	4.26	29.87	44.40	40.67	54	-13.33	AV	Horizontal	
	17797	40.15	10.99	43.95	43.50	51.59	74	-22.41	Pk	Vertical	
	17797	30.14	10.99	43.95	43.50	41.58	54	-12.42	AV	Vertical	
	17788	40.92	11.81	43.69	44.60	51.82	74	-22.18	Pk	Horizontal	
	17788	30.14	11.81	43.69	44.60	41.04	54	-12.96	AV	Horizontal	

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Note: (1) All other emissions more than 20dB below the limit.



#### 7.3 NUMBER OF HOPPING CHANNEL

#### 7.3.1 Applicable Standard

According to FCC Part 15.247(a)(1) (iii)and ANSI C63.10-2013

#### 7.3.2 Conformance Limit

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

#### 7.3.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.3.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.3.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 7.8.3

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

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

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = the frequency band of operation

RBW : To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

VBW ≥ RBW

Sweep = auto

Detector function = peak Trace = max hold

#### 7.3.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode 5(1Mbps)	Test By:	Allen Liu



#### 7.4 HOPPING CHANNEL SEPARATION MEASUREMENT

#### 7.4.1 Applicable Standard

According to FCC Part 15.247(a)(1) and ANSI C63.10-2013

#### 7.4.2 Conformance Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band shall have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

#### 7.4.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.4.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.4.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 7.8.2 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. The EUT was operating in controlled its channel. Use the following spectrum analyzer settings: Span = Measurement Bandwidth or Channel Separation RBW: Start with the RBW set to approximately 3% of the channel spacing; adjust as necessary to best identify the center of each individual channel. VBW  $\geq$  RBW Sweep = auto Detector function = peak Trace = max hold

#### 7.4.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Allen Liu



#### 7.5 AVERAGE TIME OF OCCUPANCY (DWELL TIME)

#### 7.5.1 Applicable Standard

According to FCC Part 15.247(a)(1)(iii) and ANSI C63.10-2013

#### 7.5.2 Conformance Limit

The average time of occupancy on any channel shall not be greater than 0.4s within a period of 0.4s multiplied by the number of hopping channels employed.

#### 7.5.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.5.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.5.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 7.8.4

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

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

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

Span = zero span, centered on a hopping channel

 $RBW \ge 1MHz$ 

 $\mathsf{VBW} \geq \mathsf{RBW}$ 

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

Detector function = peak

Trace = max hold

Measure the maximum time duration of one single pulse.

Set the EUT for DH5, DH3 and DH1 packet transmitting.

Measure the maximum time duration of one single pulse.

#### 7.5.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 ℃	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Allen Liu



#### 7.6 20DB BANDWIDTH TEST

#### 7.6.1 Applicable Standard

According to FCC Part 15.247(a)(1) and ANSI C63.10-2013

#### 7.6.2 Conformance Limit

No limit requirement.

#### 7.6.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.6.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.6.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 6.9.2 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. Set to the maximum power setting and enable the EUT transmit continuously. The EUT was operating in controlled its channel. Use the following spectrum analyzer settings: Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel RBW  $\geq$  1% of the 20 dB bandwidth VBW  $\geq$  RBW Sweep = auto Detector function = peak Trace = max hold

#### 7.6.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Allen Liu



#### 7.7 PEAK OUTPUT POWER

#### 7.7.1 Applicable Standard

According to FCC Part 15.247(b)(1) and ANSI C63.10-2013

#### 7.7.2 Conformance Limit

The maximum peak conducted output power of the intentional radiator shall not exceed the following: (1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band 0.125 watts.

#### 7.7.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.7.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.7.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 7.8.5.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

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

The EUT was operating in controlled its channel.

Use the following spectrum analyzer settings:

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

 $RBW \ge the 20 dB$  bandwidth of the emission being measured

 $VBW \ge RBW$ 

Sweep = auto

Detector function = peak Trace = max hold

race = max noic

#### 7.7.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode2/Mode3/Mode4	Test By:	Allen Liu



#### 7.8 CONDUCTED BAND EDGE MEASUREMENT

#### 7.8.1 Applicable Standard

According to FCC Part 15.247(d) and ANSI C63.10-2013

#### 7.8.2 Conformance Limit

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 §15.209(a) (see §15.205(c)).

#### 7.8.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.8.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.8.5 Test Procedure

The testing follows ANSI C63.10-2013 clause 7.8.6.

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.

The path loss was compensated to the results for each measurement.

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

The EUT must have its hopping function enabled.

Use the following spectrum analyzer settings:

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

RBW = 100KHz

VBW = 300KHz

Band edge emissions must be at least 20 dB down from the highest emission level within the authorized band as measured with a 100kHz RBW. The attenuation shall be 30 dB instead of 20 dB when RMS conducted output power procedure is used.

Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

Repeat above procedures until all measured frequencies were complete.

#### 7.8.6 Test Results

EUT:	PuduBot	Model No.:	PD1
Temperature:	20 °C	Relative Humidity:	48%
Test Mode:	Mode2 /Mode4/ Mode 5	Test By:	Allen Liu



#### 7.9 SPURIOUS RF CONDUCTED EMISSION

#### 7.9.1 Applicable Standard

According to FCC Part 15.247(d) and ANSI C63.10-2013.

#### 7.9.2 Conformance Limit

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 §15.209(a) (see §15.205(c)).

#### 7.9.3 Measuring Instruments

The Measuring equipment is listed in the section 6.3 of this test report.

#### 7.9.4 Test Setup

Please refer to Section 6.1 of this test report.

#### 7.9.5 Test Procedure

Establish an emission level by using the following procedure:

- a) Set the center frequency and span to encompass frequency range to be measured.
- b) Set the RBW = 100 kHz.
- c) Set the VBW  $\geq$  [3 × RBW].
- d) Detector = peak.
- e) Sweep time = auto couple.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.

h) Use the peak marker function to determine the maximum amplitude level.

Then the limit shall be attenuated by at least 20 dB relative to the maximum amplitude level in 100 kHz.

#### 7.9.6 Test Results

Remark: The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions and bandege measurement data.



#### 7.10 ANTENNA APPLICATION

#### 7.10.1 Antenna Requirement

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 partyshall be used with the device.

#### 7.10.2 Result

The EUT antenna is permanent attached Built-in helical antenna (Gain: 1.0dBi). It comply with the standard requirement.



#### 7.11 FREQUENCY HOPPING SYSTEM (FHSS) EQUIPMENT REQUIREMENTS 7.11.1 Standard Applicable

According to FCC Part 15.247(a)(1), The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals. (g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section. (h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Certificate #4298.01

#### 7.11.2 Frequency Hopping System

This transmitter device is frequency hopping device, and complies with FCC part 15.247 rule. This device uses Bluetooth radio which operates in 2400-2483.5 MHz band. Bluetooth uses a radio technology called frequency-hopping spread spectrum, which chops up the data being sent and transmits chunks of it on up to 79 bands (1 MHz each: centred from 2402 to 2480 MHz) in the range 2,400-2,483.5 MHz. The transmitter switches hop frequencies 1,600 times per second to assure a high degree of data security. All Bluetooth devices participating in a given piconet are synchronized to the frequency-hopping channel for the piconet. The frequency hopping sequence is determined by the master's device address and the phase of the hopping sequence (the frequency to hop at a specific time) is determined by the master's internal clock. Therefore, all slaves in a piconet must know the master's device address and must synchronize their clocks with the master's clock. Adaptive Frequency Hopping (AFH) was introduced in the Bluetooth specification to provide an effective way for a Bluetooth radio to counteract normal interference. AFH identifies "bad" channels, where either other wireless devices are interfering with the Bluetooth signal or the Bluetooth signal is interfering with another device. The AFH-enabled Bluetooth device will then communicate with other devices within its piconet to share details of any identified bad channels. The devices will then switch to alternative available "good" channels, away from the areas of interference, thus having no impact on the bandwidth used.

This device was tested with an bluetooth system receiver to check that the device maintained hopping synchronization, and the device complied with these requirements for FCC Part 15.247 rule.

#### 7.11.3 EUT Pseudorandom Frequency Hopping Sequence

Pseudorandom Frequency Hopping Sequence Table as below: Channel: 08, 24, 40, 56, 40, 56, 72, 09, 01, 09, 33, 41, 33, 41, 65, 73, 53, 69, 06, 22, 04, 20, 36, 52, 38, 46, 70, 78, 68, 76, 21, 29, 10, 26, 42, 58, 44, 60, 76, 13, 03, 11, 35, 43, 37, 45, 69, 77, 55, 71, 08, 24, 08, 24, 40, 56, 40, 48, 72, 01, 72, 01, 25, 33, 12, 28, 44, 60, 42, 58, 74, 11, 05, 13, 37, 45 etc.

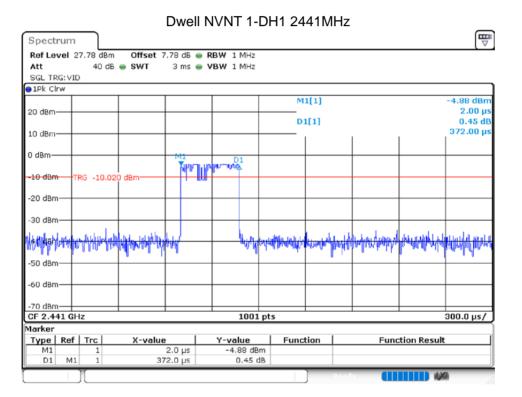
The system receiver have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shift frequencies in synchronization with the transmitted signals.



# 8 TEST RESULTS

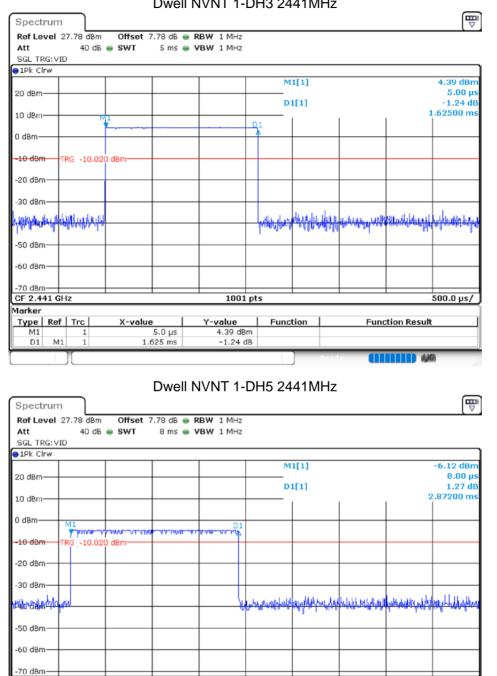
## 8.1 DWELL TIME

nditio	Mode	Frequency	Pulse Time	Total Dwell Time	Period	Limit	Verdict
n	mode	(MHz)	(ms)	(ms)	Time (ms)	(ms)	vertici
VNT	1-DH1	2441	0.372	119.04	31600	400	Pass
VNT	1-DH3	2441	1.625	260	31600	400	Pass
VNT	1-DH5	2441	2.872	306.347	31600	400	Pass
VNT	2-DH1	2441	0.381	121.92	31600	400	Pass
VNT	2-DH3	2441	1.625	260	31600	400	Pass
VNT	2-DH5	2441	2.87	306.133	31600	400	Pass
VNT	3-DH1	2441	0.375	120	31600	400	Pass
VNT	3-DH3	2441	1.62	259.2	31600	400	Pass
VNT	3-DH5	2441	2.872	306.347	31600	400	Pass
	n VNT VNT VNT VNT VNT VNT VNT	Mode       vNT     1-DH1       vNT     1-DH3       vNT     1-DH5       vNT     2-DH1       vNT     2-DH3       vNT     2-DH5       vNT     3-DH1       vNT     3-DH3	Mode     (MHz)       VNT     1-DH1     2441       VNT     1-DH3     2441       VNT     1-DH5     2441       VNT     2-DH1     2441       VNT     2-DH3     2441       VNT     2-DH3     2441       VNT     2-DH5     2441       VNT     3-DH1     2441       VNT     3-DH1     2441	Mode     (MHz)     (ms)       VNT     1-DH1     2441     0.372       VNT     1-DH3     2441     1.625       VNT     1-DH5     2441     2.872       VNT     2-DH1     2441     0.381       VNT     2-DH3     2441     1.625       VNT     2-DH3     2441     0.381       VNT     2-DH3     2441     0.375       VNT     3-DH1     2441     0.375       VNT     3-DH3     2441     1.62	Mode     (MHz)     (ms)     (ms)       VNT     1-DH1     2441     0.372     119.04       VNT     1-DH3     2441     1.625     260       VNT     1-DH5     2441     2.872     306.347       VNT     2-DH1     2441     0.381     121.92       VNT     2-DH3     2441     1.625     260       VNT     2-DH3     2441     1.625     260       VNT     2-DH5     2441     2.877     306.133       VNT     3-DH1     2441     0.375     120       VNT     3-DH3     2441     1.62     259.2	Mode     (MHz)     (ms)     Time (ms)       VNT     1-DH1     2441     0.372     119.04     31600       VNT     1-DH3     2441     1.625     260     31600       VNT     1-DH5     2441     2.872     306.347     31600       VNT     2-DH1     2441     0.381     121.92     31600       VNT     2-DH3     2441     1.625     260     31600       VNT     2-DH3     2441     1.625     260     31600       VNT     2-DH3     2441     1.625     260     31600       VNT     2-DH5     2441     2.87     306.133     31600       VNT     3-DH1     2441     0.375     120     31600       VNT     3-DH3     2441     1.62     259.2     31600	nMode(MHz)(ms)(ms)Time (ms)(ms)VNT1-DH124410.372119.0431600400VNT1-DH324411.62526031600400VNT1-DH524412.872306.34731600400VNT2-DH124410.381121.9231600400VNT2-DH324411.62526031600400VNT2-DH324410.381121.9231600400VNT2-DH324410.37512031600400VNT3-DH124410.37512031600400VNT3-DH324411.62259.231600400





### Dwell NVNT 1-DH3 2441MHz



1001 pts

Y-value

-6.12 dBm 1.27 dB

Function

CF 2.441 GHz

Type Ref Trc

1

X-value

, 8.0 µs

2.872 ms

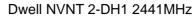
Marker

M1

D1 M1 800.0 µs/

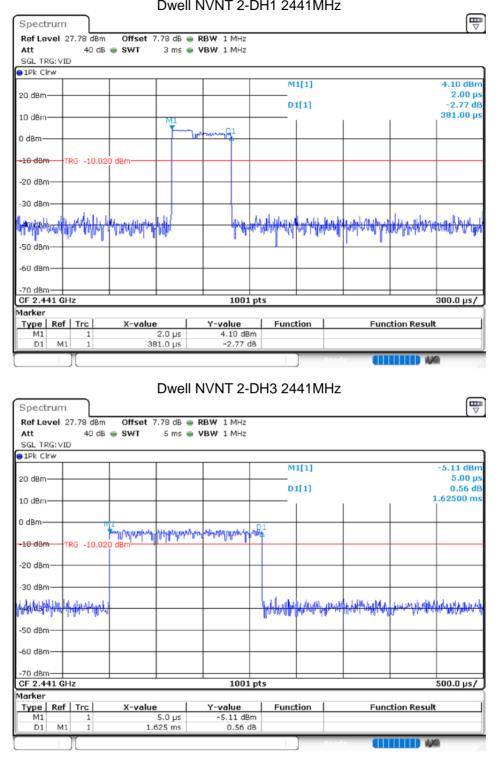
Function Result





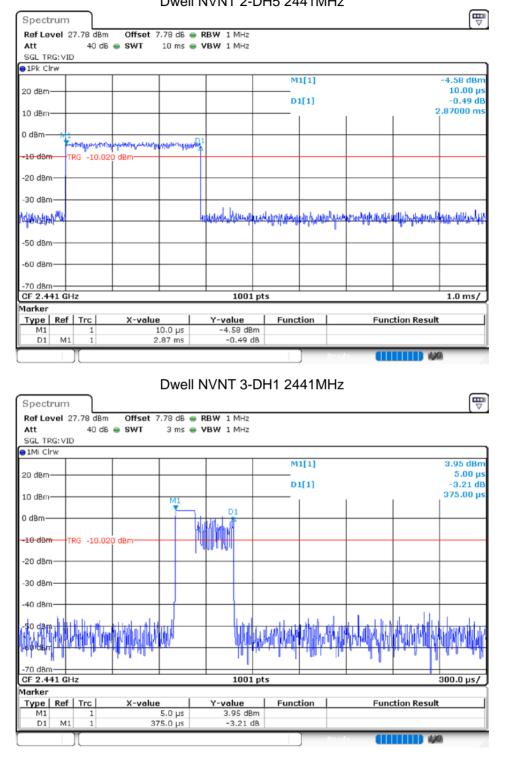
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Certificate #4298.01





#### Dwell NVNT 2-DH5 2441MHz





# Dwell NVNT 3-DH3 2441MHz

SGL TRG: VID		dB <b>● RBW</b> 1 MHz ns <b>● VBW</b> 1 MHz					
●1Pk Clrw			MI	[1]		-5.18	dBm
20 dBm						5.0	00 µs
10 dBm			D1	[1]		0.3 1.6200	0 dB 0 ms
0 dBm	1V1	aller and the second of the					
-10 dBm TRG -10.0		and a second all a	F 144				
-20 dBm			_				
-30 dBm							
kladingebiligtebiligtebiligebiligebiligebiligebiligebiligebiligebiligebiligebiligebiligebiligebiligebiligebilig	*		hand	halle	antin di Marini	http://www.and.com	had
-50 dBm				1.1	· ·		
-60 dBm							
-70 dBm							
CF 2.441 GHz Marker		1001	pts			500.0	µs/
Type   Ref   Trc	X-value	Y-value	Funct	ion	Fund	tion Result	
M1 1 D1 M1 1	5.0 µ 1.62 m						
Spectrum		vell NVNT 3-I		41MHz	v (II	496	E U U
Spectrum Ref Level 27.78 dBn Att 40 df	Dw • Offset 7.78 d			41MHz	× (11	4,45	
Ref Level 27.78 dBn Att 40 d8 SGL TRG:VID	Dw n Offset 7.78 d	<b>16 • RBW</b> 1 MH2		41MHz	~ •••	1990) 1990	
Ref Level 27.78 dBn Att 40 dB	Dw n Offset 7.78 d	<b>16 • RBW</b> 1 MH2	DH5 244		· (11	-4.24	
Ref Level 27.78 dBn Att 40 d8 SGL TRG:VID	Dw n Offset 7.78 d	<b>16 • RBW</b> 1 MH2	DH5 244	41MHz	× (11	-4.34 8.(	
Ref Level 27.78 dBn Att 40 da SGL TRG: VID 1Pk Cirw 20 dBm	Dw n Offset 7.78 d	<b>16 • RBW</b> 1 MH2	DH5 244		× (11	8.0 -0.6	dBm )0 µs i0 dB
Ref Level 27.78 dBn Att 40 da SGL TRG:VID 1Pk Clrw	Dw n Offset 7.78 d	<b>16 • RBW</b> 1 MH2	DH5 244	[1]	× (1)	8.0	dBm )0 µs i0 dB
Ref Level     27.78 dBm       Att     40 d8       SGL     TRG:VID       1Pk Cirw     20 dBm       10 dBm     Mt	Dw offset 7.78 c s swr 8 m	Vell NVNT 3-I	DH5 244	[1]		8.0 -0.6	dBm D0 µs i0 dB
Ref Level     27.78 dBm       Att     40 d8       SGL     TRG:VID       1Pk Cirw     20 dBm       10 dBm     Mt	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.0 -0.6	dBm D0 µs i0 dB
Ref Level     27.78 dBn       Att     40 di       SGL TRG: VID     10 dBm       10 dBm     0 dBm       0 dBm     10 dBm       10 dBm     TRG -10.0	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.0 -0.6	dBm D0 µs i0 dB
Ref Level     27.78 dBm       Att     40 df       SGL TRG: VID     10 dBm       10 dBm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.0 -0.6	dBm D0 µs i0 dB
Ref Level     27.78 dbn       Att     40 db       SGL TRG: VID     10 dbm       1Pk Clrw     20 dbm       10 dBm     10 dbm       0 dbm     M1       -10 dbm     TRG -10.0       -20 dbm     -30 dbm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.( -0.6 2.8720	dBm 00 µs i0 dB 0 ms
Ref Level     27.78 dbn       Att     40 dl       SGL TRG: VID     10 dbm       10 dBm     10 dBm       0 dBm     M1       -10 dBm     TRG -10.0       -20 dBm     -30 dBm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]	yhydicybyar pr	8.( -0.6 2.8720	dBm 00 µs i0 dB 0 ms
Ref Level     27.78 dBn       Att     40 dl       SGL TRG: VID     10 dBm       10 dBm     10 dBm       0 dBm     10 dBm       -20 dBm     7.40 dBm       -20 dBm     7.86 -10.0       -20 dBm     7.86 -10.0       -30 dBm     4.00 dBm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.0 -0.6	dBm 00 µs i0 dB 0 ms
Ref Level 27.78 dbn       Att     40 di       SGL TRG: VID       IPk Clrw       20 dBm       10 dBm       0 dBm       -10 dBm       70 dBm       -20 dBm       -30 dBm       -30 dBm       -50 dBm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.( -0.6 2.8720	dBm 00 µs i0 dB 0 ms
Ref Level     27.78 dbn       Att     40 dl       SGL TRG: VID     10 dbm       1Pk Clrw     20 dbm       10 dBm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.( -0.6 2.8720	dBm 00 µs i0 dB 0 ms
Ref Level 27.78 dbn       Att     40 di       SGL TRG: VID       IPk Clrw       20 dBm       10 dBm       0 dBm       -10 dBm       70 dBm       -20 dBm       -30 dBm       -30 dBm       -50 dBm	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]	4)11/4/6-1/2-0-2-2-4	8.( -0.6 2.8720	dBm 00 µs i0 dB 0 ms
Ref Level 27.78 dbn       Att     40 df       SGL TRG: VID       IPk Cirw       20 dBm       10 dBm       0 dBm       10 dBm       70 dBm       70 dBm       -20 dBm       -30 dBm       -30 dBm       -50 dBm       -60 dBm       -70 dBm       CF 2.441 GHz	Dw o Offset 7.78 c s e SWT 8 m	Vell NVNT 3-I	DH5 244	[1]		8.( -0.6 2.8720	dBm 00 µs 0 dB 0 ms
Ref Level     27.78 dbn       Att     40 di       SGL TRG: VID     10 dbm       1Pk Clrw     20 dbm       10 dbm	Dw o Offset 7.78 c s e SWT 8 m	rell NVNT 3-I	DH5 244	[1] [1]		8.1 -0.6 2.8720	dBm 00 µs 0 dB 0 ms



# 8.2 MAXIMUM CONDUCTED OUTPUT POWER

	Mada		Antonio		Line it (dDire)	Vardiat
Condition	Mode	Frequency (MHz)	Antenna	Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant 1	5.692	21	Pass
NVNT	1-DH5	2441	Ant 1	4.48	21	Pass
NVNT	1-DH5	2480	Ant 1	4.824	21	Pass
NVNT	2-DH5	2402	Ant 1	5.358	21	Pass
NVNT	2-DH5	2441	Ant 1	4.154	21	Pass
NVNT	2-DH5	2480	Ant 1	4.428	21	Pass
NVNT	3-DH5	2402	Ant 1	5.706	21	Pass
NVNT	3-DH5	2441	Ant 1	4.457	21	Pass
NVNT	3-DH5	2480	Ant 1	4.686	21	Pass

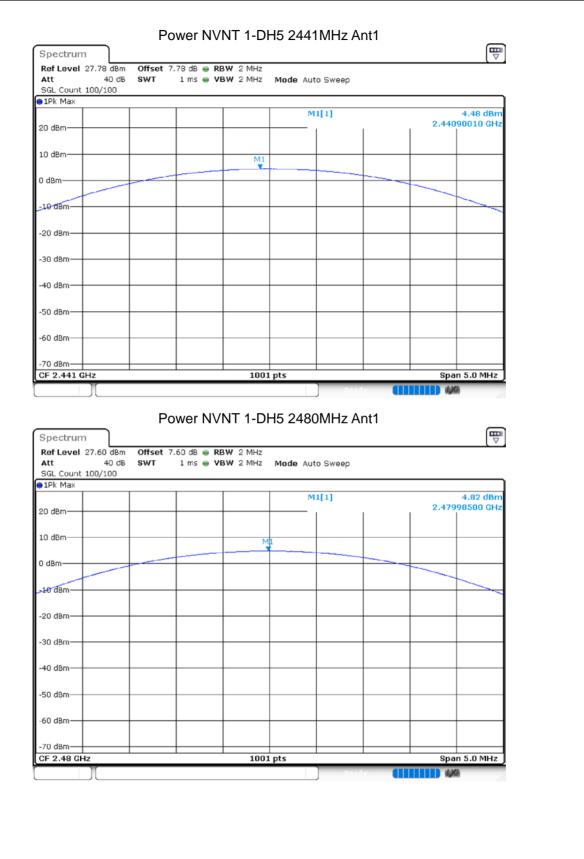
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Certificate #4298.01

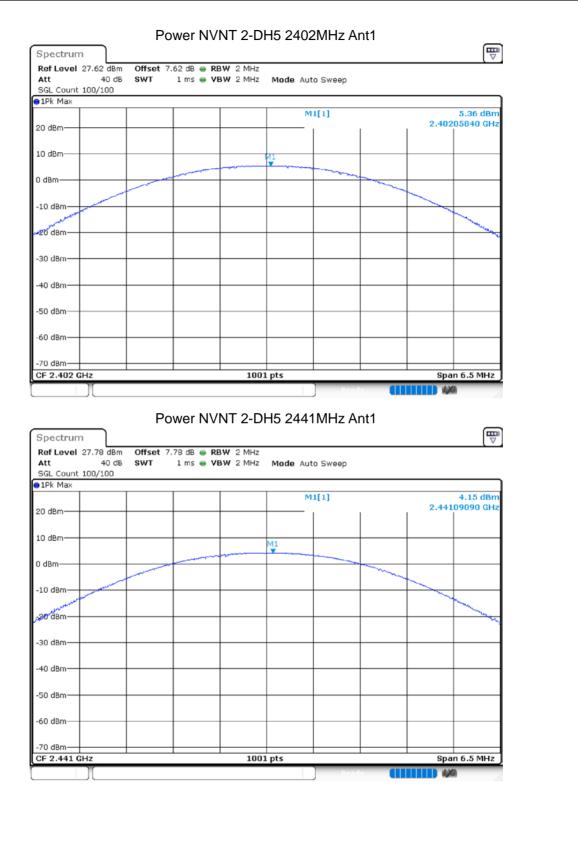
# Power NVNT 1-DH5 2402MHz Ant1



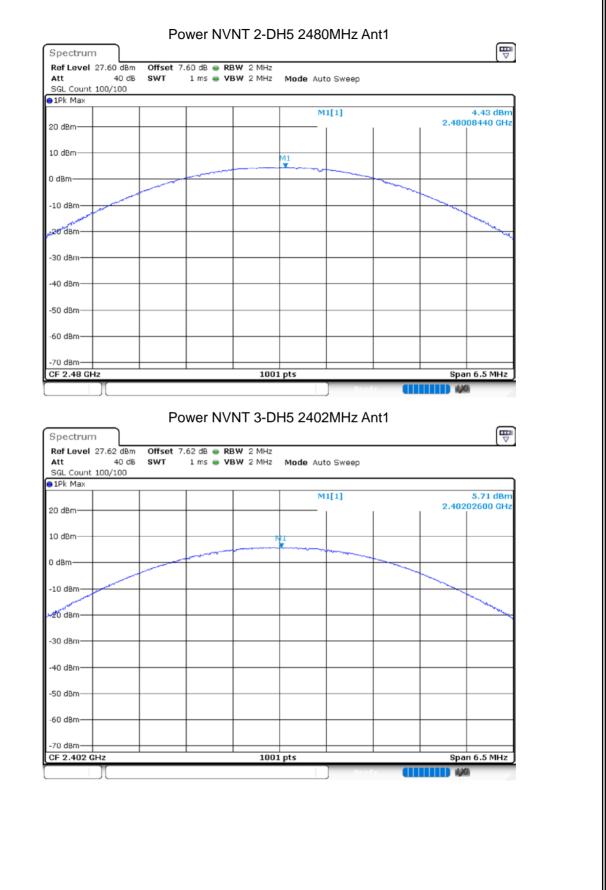




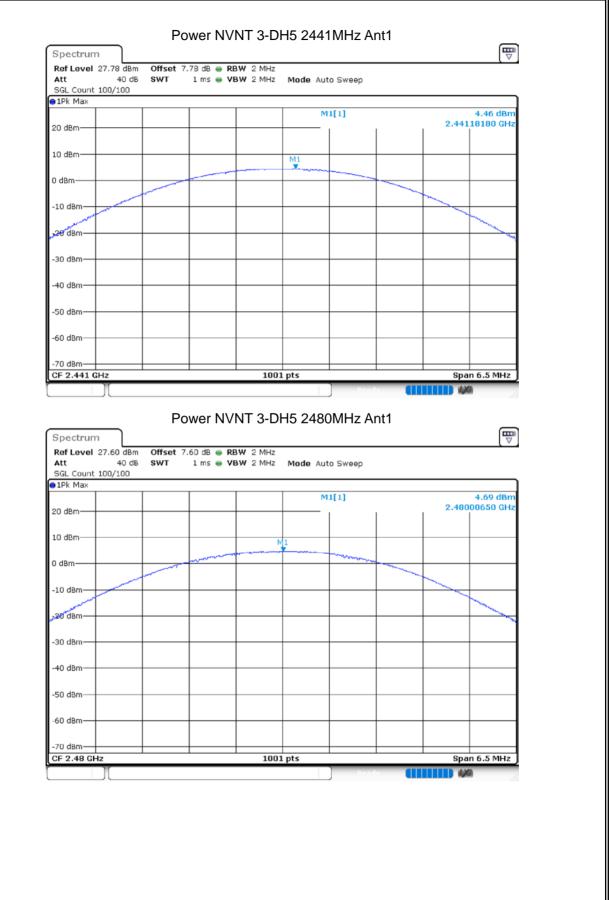


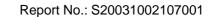










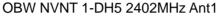




# 8.3 OCCUPIED CHANNEL BANDWIDTH

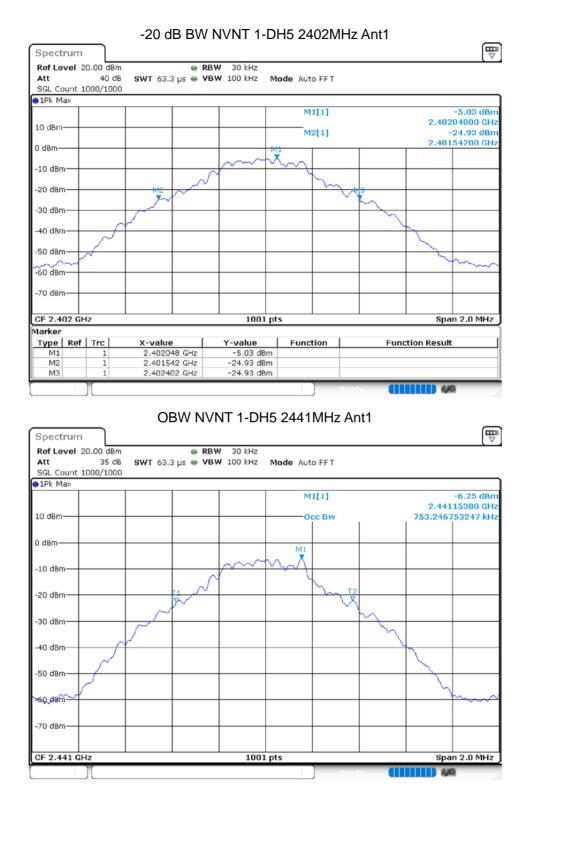
Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)	-20 dB Bandwidth (MHz)	Limit -20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant 1	0.7572	0.86	0	Pass
NVNT	1-DH5	2441	Ant 1	0.7532	0.86	0	Pass
NVNT	1-DH5	2480	Ant 1	0.7572	0.86	0	Pass
NVNT	2-DH5	2402	Ant 1	1.1469	1.25	0	Pass
NVNT	2-DH5	2441	Ant 1	1.1449	1.272	0	Pass
NVNT	2-DH5	2480	Ant 1	1.1469	1.252	0	Pass
NVNT	3-DH5	2402	Ant 1	1.1469	1.262	0	Pass
NVNT	3-DH5	2441	Ant 1	1.1469	1.266	0	Pass
NVNT	3-DH5	2480	Ant 1	1.1429	1.248	0	Pass

ACCREDITED

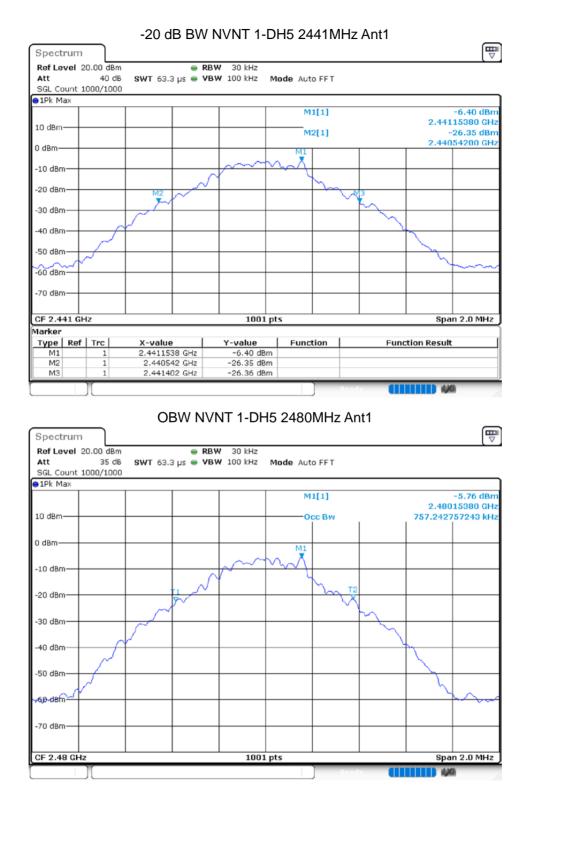




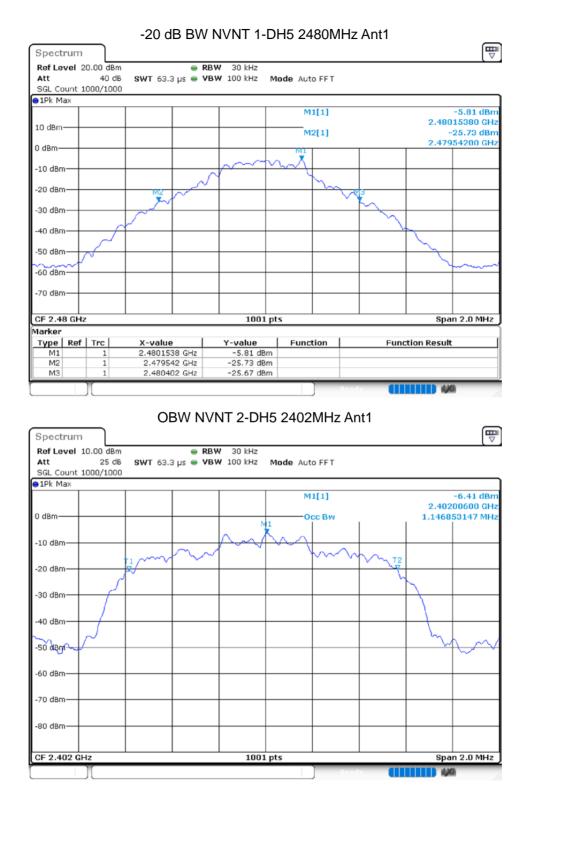












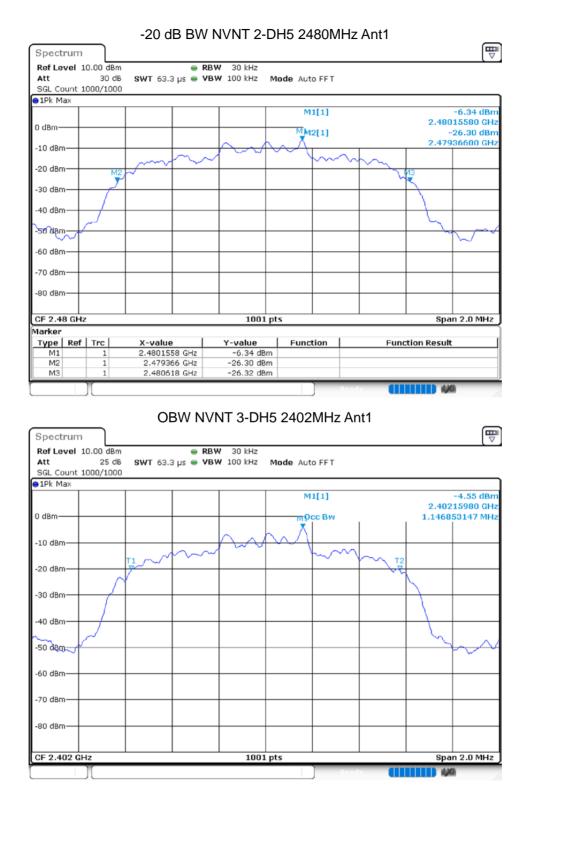






















#### -20 dB BW NVNT 3-DH5 2480MHz Ant1 Spectrum Ref Level 10.00 dBm RBW 30 kHz Att 30 dB SWT 63.3 µs 👄 VBW 100 kHz Mode Auto FFT SGL Count 1000/1000 ●1Pk Max M1[1] -5.41 dBm 2.48015580 GHz 0 dBm-M2[1] -25.22 dBm 2.47936200 GHz -10 dBm -20 dBm 7 -30 dBm--40 dBm -50 d8m -60 dBm -70 dBm -80 dBm CF 2.48 GHz 1001 pts Span 2.0 MHz Marker Type | Ref | Trc X-value Y-value Function Function Result -5.41 dBm -25.22 dBm 2.4801558 GHz M1 1 M2 1 2.479362 GHz MЗ 2.48061 GHz -25.25 dBm 1.00

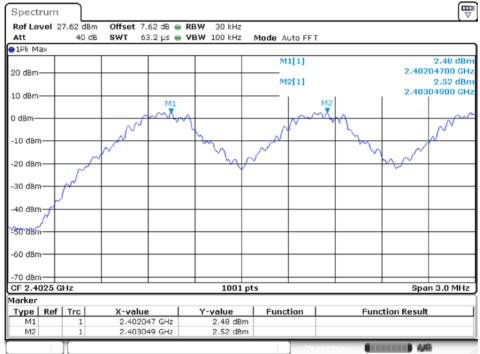


# **NTEK北**测

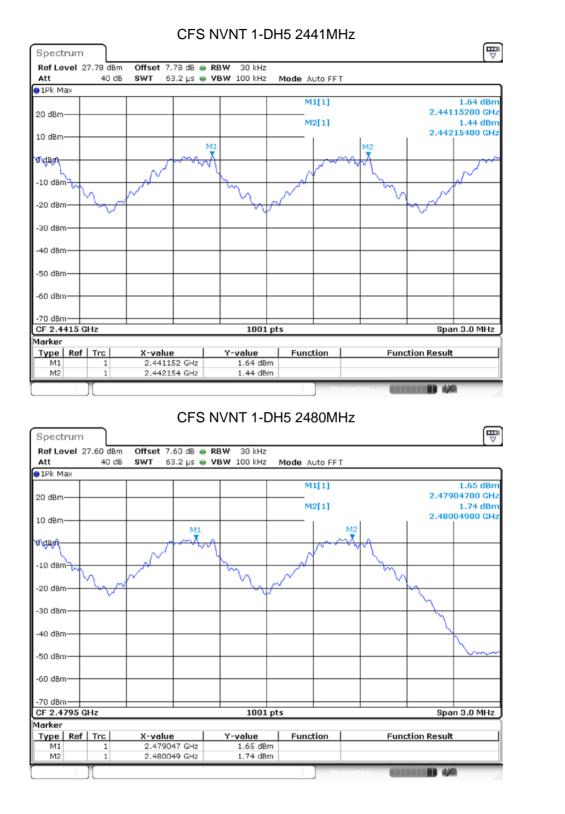
# 8.4 CARRIER FREQUENCIES SEPARATION

	INEQUEN					
Condition	Mode	Hopping Freq1 (MHz)	Hopping Freq2 (MHz)	HFS (MHz)	Limit (MHz)	Verdict
NVNT	1-DH5	2402.047	2403.049	1.002	0.86	Pass
NVNT	1-DH5	2441.152	2442.154	1.002	0.86	Pass
NVNT	1-DH5	2479.047	2480.049	1.002	0.86	Pass
NVNT	2-DH5	2402.005	2403.007	1.002	0.833	Pass
NVNT	2-DH5	2441.155	2442.157	1.002	0.835	Pass
NVNT	2-DH5	2479.155	2480.157	1.002	0.835	Pass
NVNT	3-DH5	2402.161	2403.16	0.999	0.841	Pass
NVNT	3-DH5	2441.161	2442.157	0.996	0.844	Pass
NVNT	3-DH5	2479.155	2480.157	1.002	0.832	Pass

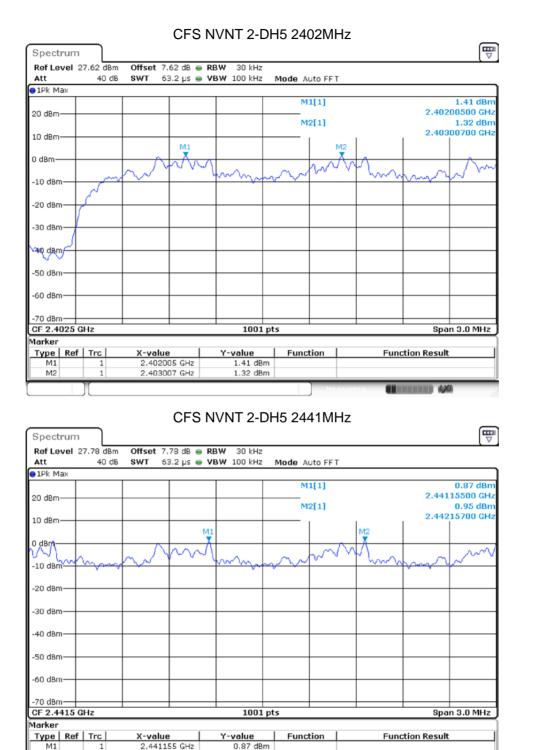
# CFS NVNT 1-DH5 2402MHz











Type Ref Trc

1

M1

M2

X-value 2.441155 GHz

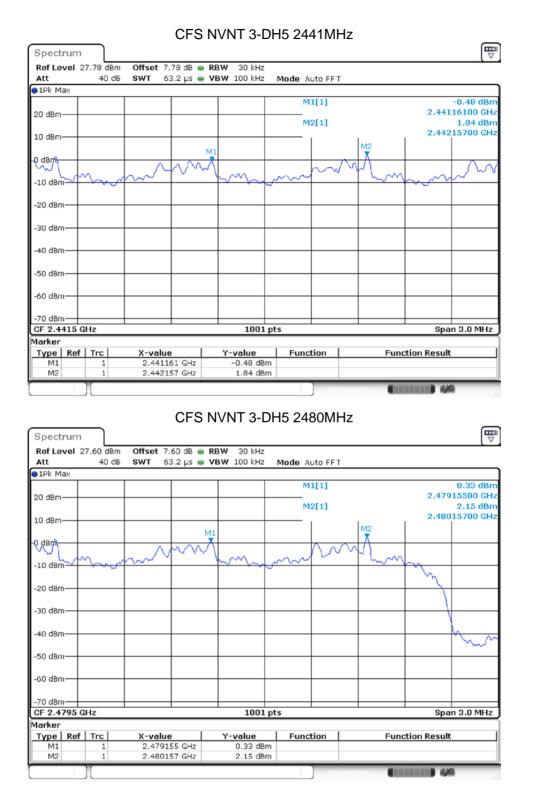
2.442157 GHz

0.95 dBm











#### 8.5 NUMBER OF HOPPING CHANNEL Hopping Number Limit Verdict Condition Mode NVNT 1-DH5 15 Pass 79 Hopping No. NVNT 1-DH5 2402MHz ₽ Spectrum Ref Level 27.62 dBm Offset 7.62 dB 👄 RBW 100 kHz Att 40 dB SWT 1 ms 👄 VBW 300 kHz Mode Auto Sweep SGL Count 1000/1000 ●1Pk Max M1[1] 4.12 dBn 2.4020875 GHz 20 dBm· M2[1] 2.95 dBm 2.4801600 GHz 10 dBmμĨ o dad H -10 060 VIVIV **TATATA** 14140 1441174 YYYU YYTYYD 404440 20 dBm 30 dBm 40 dBm∙ -50 dBm -60 dBm--70 dBm Start 2.4 GHz Stop 2.4835 GHz 1001 pts Marker Type Ref Trc M1 1 X-value 2.4020875 GHz Y-value 4.12 dBm Function Function Result 1 M2 2.48016 GHz 2.95 dBm

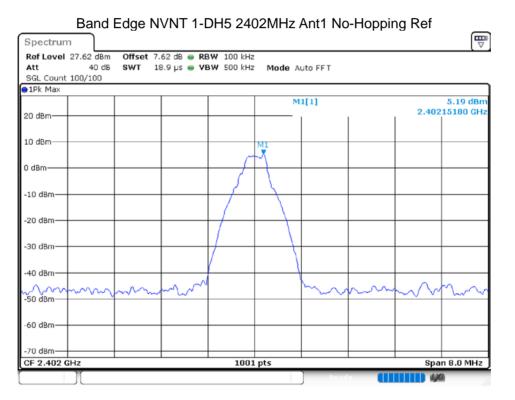
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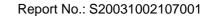
Certificate #4298.01



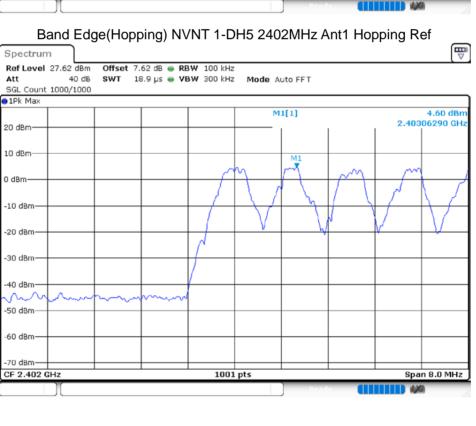
# 8.6 BAND EDGE

0.0 DAND LL	JGE .						
Condition	Mode	Frequency (MHz)	Antenna	Hopping Mode	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant 1	No-Hopping	-47.55	-20	Pass
NVNT	1-DH5	2402	Ant 1	Hopping	-45.76	-20	Pass
NVNT	1-DH5	2480	Ant 1	No-Hopping	-45.72	-20	Pass
NVNT	1-DH5	2480	Ant 1	Hopping	-45.3	-20	Pass
NVNT	2-DH5	2402	Ant 1	No-Hopping	-46.55	-20	Pass
NVNT	2-DH5	2402	Ant 1	Hopping	-44.88	-20	Pass
NVNT	2-DH5	2480	Ant 1	No-Hopping	-46.28	-20	Pass
NVNT	2-DH5	2480	Ant 1	Hopping	-45.77	-20	Pass
NVNT	3-DH5	2402	Ant 1	No-Hopping	-45.83	-20	Pass
NVNT	3-DH5	2402	Ant 1	Hopping	-42.23	-20	Pass
NVNT	3-DH5	2480	Ant 1	No-Hopping	-47.43	-20	Pass
NVNT	3-DH5	2480	Ant 1	Hopping	-44.67	-20	Pass





					Spectrum
		RBW 100 kHz	Offset 7.62 dB	7.62 dB	Ref Level 2
	Mode Auto FFT	• VBW 500 kHz	SWT 227.5 µs (	40 c	Att
				00/100	SGL Count 1
					1Pk Max
4.92 dBn	M1[1]				
2.40195000 GH					20 dBm —
-46.67 dBn	M2[1]				10 dBm
2.4000000016H					
					0 dBm —
			+		-10 dBm
			9 dBm	1 -14.8	-20 dBm
					-20 UBIII
					-30 dBm
		M4			
M3 M2			NAME OF		-40 dBm
ununununununununununununununununununun	Philosophia and the state of the second	and an an around the server	Marshar Marshar and and	walking	50 dBm
					-30 ubiii
					-60 dBm
		1001		<u></u>	-70 dBm
Stop 2.406 GHz		1001 pts		GHZ	Start 2.306 Jarker
Function Result	Function	Y-value	X-value	Trol	Type   Ref
Function Result	Function	4.92 dBm	2.40195 GHz	1	M1
		-46.67 dBm	2.4 GHz	1	M2
		-45.39 dBm	2.39 GHz	1	MЗ
		-42.37 dBm	2.3513 GHz	1	M4

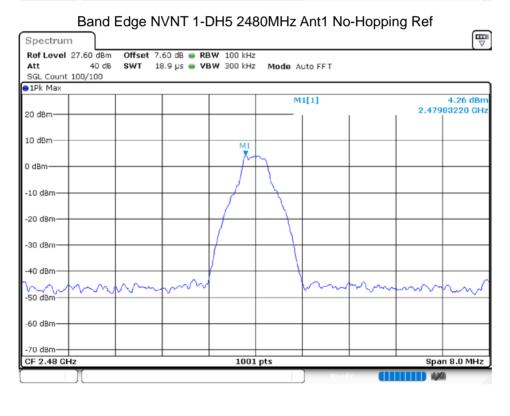




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# Band Edge(Hopping) NVNT 1-DH5 2402MHz Ant1 Hopping Emission

Spectrum						
Ref Level 2			RBW 100 kHz			
Att	40 c		🛢 VBW 300 kHz	Mode Auto FR	Τ	
SGL Count 1	.000/100	00				
∋1Pk Max						
20 dBm				M1[1]		4.64 dBr 2.40495000 GH
				M2[1]		-45.12 dBr
10 dBm				[12[1]		2.40000000 GN
				1		
0 dBm						
-10 dBm		an dam				1910
-20 dBm	1 -15.3	96 dBm				
20 0.0						
-30 dBm						
I		M4				
-40 dBm		a 1000 at 1970	hund Hardhard and	0.10.		M3 M2
-50 dBm	annada	we were the weather and the area		and Anna to and a second	A. W.	a mala mala han sa haran sa h
-50 UBIII						
-60 dBm						
-70 dBm						
Start 2.306	GHz		1001 pt	5		Stop 2.406 GHz
Marker						
	Trc	X-value	Y-value	Function	Fun	ction Result
M1	1	2.40495 GHz	4.64 dBm			
M2	1	2.4 GHz 2.39 GHz	-45.12 dBm			
M3 M4	1	2.39 GHz 2.3416 GHz	-43.87 dBm -41.17 dBm			
171-4		2.3410 002	-+1.1r ubili		1	







∋1Pk Max							
					M1[1]		4.04 dBi
20 dBm					MOLT		2.47995000 GH
10 <mark>.d</mark> @m				_	M2[1]		-45.09 dBi 2.48350000 GF
Ţ					1	1	
0 d8 <mark>m</mark>			-				
10000							
-10 dBm							
-20 dBm-	D1 -15.738	dBm-					
-30 cBm—							
	M4						
-40 dBm12-		MB	a set algorithment	Jack was and		No. No. of Street Street	henry thore was a provident of the second
-50 dBm	Chill House on Mr. N.Y.	Marada Preside	ward		what the street	and the second states of the s	analy an construction
-60 dBm				++			
-70 dBm	6 0113			1001 p	+ c		Stop 2.576 GHz
Marker				1001			Stop 2.370 GH2
	f   Trc	X-val	ue	Y-value	Function	L Euro	ction Result
Tuno   Do	1		7995 GHz	4.04 dBm		Fun	CLIOIT RESUL
			4835 GHz	-45.09 dBm			
Type Re M1 M2	1						
M1	1		2.5 GHz	-45.32 dBm			

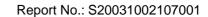






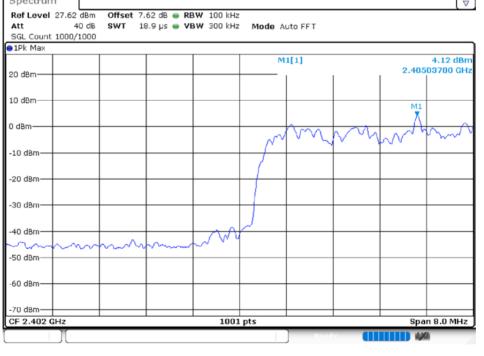
EK北测	Certificate #4298.01



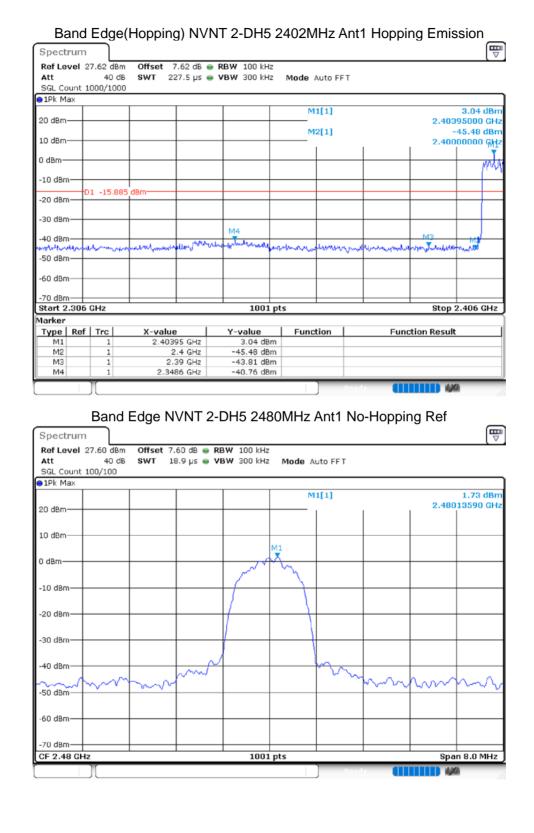


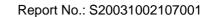


		40 d 00/100	B SWT 227.5 µs	● <b>VBW</b> 300 kHz	Mode Auto F	F I		
∎1Pk M	ax				M1[1]		4.54 d	Bm
20 dBm	+						2.40215000 0	
10 dBm	$\rightarrow$				M2[1]		-47.22 d 2.400000000	
					1			
0 dBm-								
-10 dBr								
-20 dBr		1 -15.16	57 dBm					
-30 dBr	∩++							
-40 dBr	∩——			M4			M3 M9	┢
-50 dBr	Marten	lyund	where where we wanted where where we wanted the second sec	all and the second of the	union of the second	wednesdown	der word hill but har hard	be
-60 dBr	∩+							
-70 dBr								
Start 2		GHz		1001 pt	S		Stop 2.406 G	Hz
larker Type		Tre	X-value	Y-value	Function	L Eup	ction Result	_
M1		1	2.40215 GHz	4.54 dBm	, unocioni			
M2		1	2.4 GHz	-47.22 dBm				
M3 M4		1	2.39 GHz 2.3489 GHz	-46.21 dBm -41.73 dBm				_
		1				Ready		











Ref Level 27	.60 dBm	Offset 7.60 dB	👄 RBW 100 kHz					
Att	40 dB	SWT 227.5 μs	👄 <b>VBW</b> 300 kHz	Mode Auto FR	т			
SGL Count 10	0/100							
1Pk Max								
20 dBm				M1[1]		1.79 dBm 2.47995000 GHz		
				M2[1]		2.47995000 GHz -46.13 dBm		
10 dBm						2.48350000 GHz		
-10 dBm								
	-18.271 d	9.00						
-20 cBm 01	-10.271 u	bin						
30 dBm								
		M3	all de la comme		1. H. A	ana biralle and bracks you made		
50 dBm	and the same and	hand the second second second	a manal where on the	mounderstand	Contra and the former and the	and the second of the second of the second		
-60 dBm								
.70 dBm								
Start 2.476 G	Hz		1001 p	ts	•	Stop 2.576 GHz		
larker								
Type Ref		X-value	Y-value	Function	Fund	tion Result		
M1 M2	1	2.47995 GHz 2.4835 GHz	1.79 dBm -46.13 dBm					
M3	1	2.4033 GHz	-46.59 dBm					
	1	2.4845 GHz	-44.55 dBm					
M4								



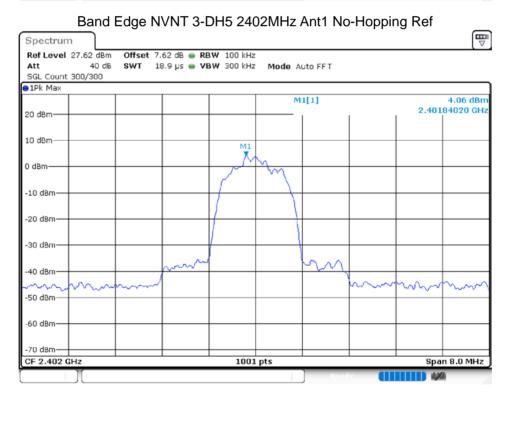


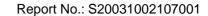
EK北测	Certificate #4298.01

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# Band Edge(Hopping) NVNT 2-DH5 2480MHz Ant1 Hopping Emission

Spectrum Ref Level (		m Offset 7.60 dB	RBW 100 kHz					
Att	40 (		VBW 300 kHz	Mode Auto F	FТ			
SGL Count :				Hode Hater				
1Pk Max								
				M1[1]		1.57 dBn		
20 dBm —						2.47905000 GH		
				M2[1]		-45.36 dBn		
10 dBm						2.48350000 GH		
-10 dBm								
	01 -17.2	:09_d8m						
-20 cBm								
-30 dBm								
-40 dBm <u>2</u>	IV	14 M3	Andrea			under Malerander yelkenerer		
-50 dBm	at Anton De	and a second and the second second		per an		and Anarona		
-50 UBIII								
-60 dBm								
-70 dBm								
Start 2.476	GHz		1001 pt	s		Stop 2.576 GHz		
larker	1 - 1							
	Trc	X-value	Y-value	Function	Fun	ction Result		
M1 M2	1	2.47905 GHz 2.4835 GHz	1.57 dBm -45.36 dBm					
M3	1	2.4035 GHz	-44.57 dBm					
M4	1	2.4937 GHz	-42.99 dBm		1			





Band Edge NVNT 3-DH5 2402MHz Ant1 No-Hopping Emission
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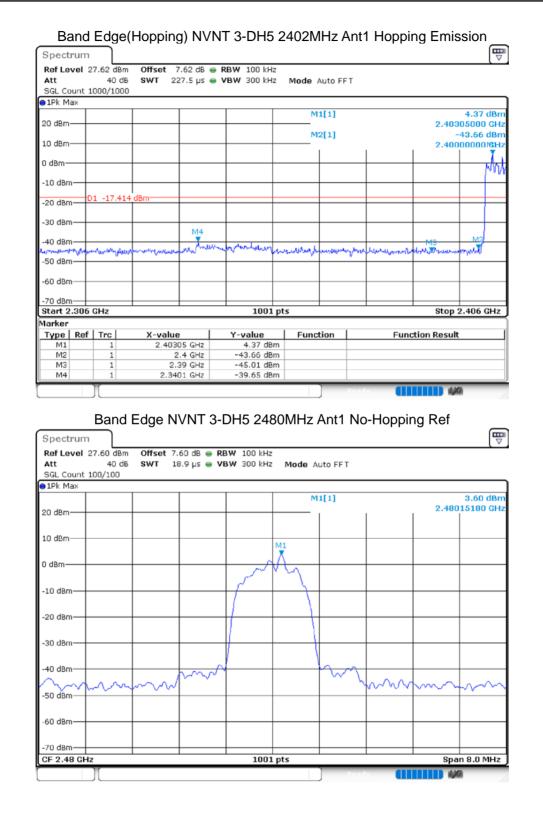
Spectr	um										
Ref Lev	<b>/el</b> 2	7.62 dBr	m Offset	7.62 dB	RBW 100 kł	Hz					
Att		40 d	B SWT	227.5 µs	🔵 VBW 300 kł	Hz Mode	Auto FF	т			
SGL Co	unt 1	00/100									
∋1Pk Ma	зx										
						M	1[1]			4.66 dBm	
20 dBm-	+		-		_	M2[1]			2.40215000 GHz -47.14 dBm		
10 dBm-	+								2.400	00000000GHz	
0 dBm—										1	
u asm—										L U	
-10 dBm	$\rightarrow$		_								
20 00.00		1 -15.93									
-20 dBm	$-\mu$	1 -15.93	So ubm	_						<u> </u>	
-30 dBm	+					+	<u> </u>			+ ++-	
				м	4					1 16	
-40 dBm	+			And	and a passa and				MB	i m2 t	
-50 dBm	way the	manum	mound	Ana was	and some a second	Yuunhunh	Hoperter	hellow here in protocol	reenstrance	www. un	
-50 aBm											
-60 dBm											
00 0011											
-70 dBm	+		_	_							
Start 2.	.306	GHz			100	1 pts			Stop	2.406 GHz	
Marker											
Type	Ref	Trc	X-va	lue	Y-value	Fund	tion	Fur	nction Resul	t	
M1		1		0215 GHz	4.66 d						
M2		1		2.4 GHz	-47.14 d	Bm					
MЗ		1		2.39 GHz	-45.35 d						
M4		1	2.	3427 GHz	-41.78 d	Bm					
		1						Peady		64	

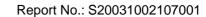




#### Report No.: S20031002107001



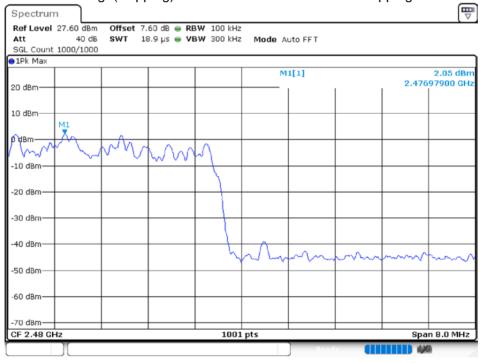


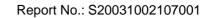




Spect	rum	)								l □ □
Ref Le	vel 2	7.60 dBr	n Offset 7	'.60 dB 👄	RBW 100 kHz					
Att		40 di	B SWT 22	27.5 µs 🧉	<b>VBW</b> 300 kHz	Mode Auto	0 FFT			
SGL Co	ount 1	00/100								
1Pk M	ах									
							3.70 dBn			
0 dBm	+							2.48015000 GH		
0 <mark>d</mark> Bm						M2[1	1			45.62 dBn 50000 GH:
						1			Z.483	auuuu GH. 
døm-	+									
10 cBn										
20 aBn		1 -16.39	6 dBm							
30 dBn	∩+-									
40 dBn		14	Ma							
+ <b>y</b> ubi	3	Abald. A	. A start and a start and	ma demands	un vouvantor ou	i de la coloridad		a data data ha		March almaha
50 dBn		the and a startful	and the second second	V - VV		when the second second	www.	allo allano a	Prov D	Adv-Man Row
50 dBn	י+-י									
70 dBn										
tart 2		GHz			1001 pt	5			Stop	2.576 GHz
arker						-				
Type	Ref	Trc	X-value	.	Y-value	Function	n	Fund	tion Result	
M1		1	2.48015 GHz		3.70 dBm					
M2		1		35 GHz	-45.62 dBm					
MЗ		1		.5 GHz	-44.27 dBm					







|--|

# Band Edge(Hopping) NVNT 3-DH5 2480MHz Ant1 Hopping Emission

Spect	rum											
Ref Le	vel 2	7.60 dB	m Offset	7.60 dB	👄 RBW 100 kH	lz						
Att		40 0	db SWT	227.5 µs	👄 <b>VBW</b> 300 kH	Iz Mode	Auto FR	т				
SGL Co	ount 1	.000/10	00									
●1Pk M	ax											
						1	M1[1]				3.08 dBm	
20 dBm	+					M2[1]				2.47695000 GHz		
10 40-									-44.50 dBm			
10 dBm							1	1	1	2.483	50000 GHz	
d dBm-	$\rightarrow$		_			<u> </u>						
AMA												
-10 cBn	∩——					+	+					
		1 -17.9	45 d8m									
-20 cBn	n-t	· · · · · · · · · · · · · · · · · · ·				<u> </u>						
-30 dBn												
-30 abii	.											
-40 dBri	M2	M4	M3		•	<u> </u>				adala ar 1		
- hu	et for h	outout	marint	when	and person	moundered	month	water	holometric	hell and read	Marchalog Marchall	
-50 dBn	∩+			-								
60 d0-	.											
-60 dBn												
-70 dBn	∩											
Start 2		GHz	_	-	100:	1 pts	-			Stop 2	2.576 GHz	
Marker						-						
Туре	Ref	Trc	X-value		Y-value		Function		Function Result			
M1		1		695 GHz	3.08 dt							
M2		1	2.4	835 GHz	-44.50 dE							
M3 M4		1	2.4	2.5 GHz 901 GHz	-44.43 dB -42.62 dB							
1/14			2.4	HUL GHZ	-42.02 Qt							
		Л						Ready			N /	

## Report No.: S20031002107001

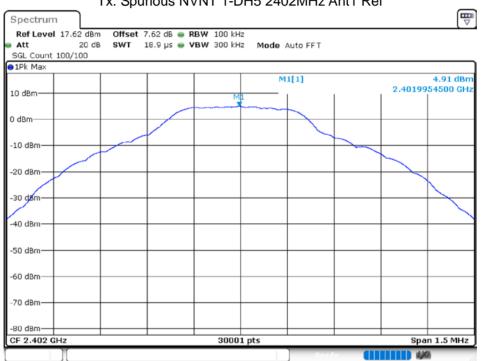


## 8.7 CONDUCTED RF SPURIOUS EMISSION

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	1-DH5	2402	Ant 1	-59.29	-20	Pass
NVNT	1-DH5	2441	Ant 1	-57.81	-20	Pass
NVNT	1-DH5	2480	Ant 1	-58.75	-20	Pass
NVNT	2-DH5	2402	Ant 1	-59.48	-20	Pass
NVNT	2-DH5	2441	Ant 1	-54.96	-20	Pass
NVNT	2-DH5	2480	Ant 1	-56.72	-20	Pass
NVNT	3-DH5	2402	Ant 1	-59.46	-20	Pass
NVNT	3-DH5	2441	Ant 1	-57.15	-20	Pass
NVNT	3-DH5	2480	Ant 1	-58.59	-20	Pass

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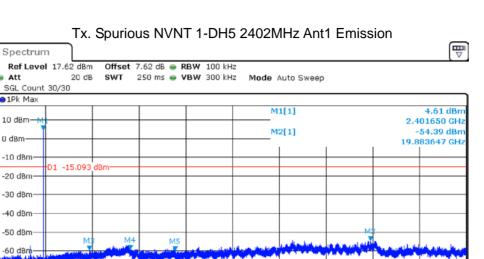


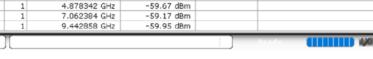
#### Tx. Spurious NVNT 1-DH5 2402MHz Ant1 Ref



Stop 25.0 GHz

Function Result





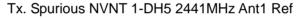
30001 pts

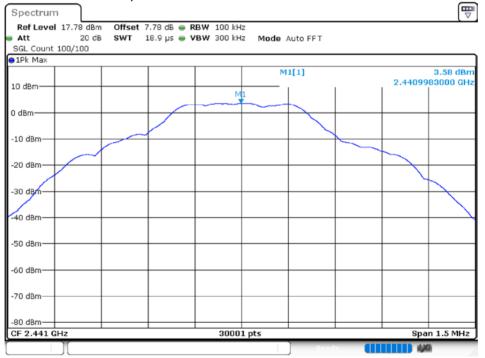
4.61 dBm

-54.39 dBm

Y-value

Function





-70 dBm -80 dBm

M1

M2

ΜЗ

M4

M5

Start 30.0 MHz Marker

Type Ref Trc

1

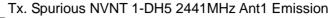
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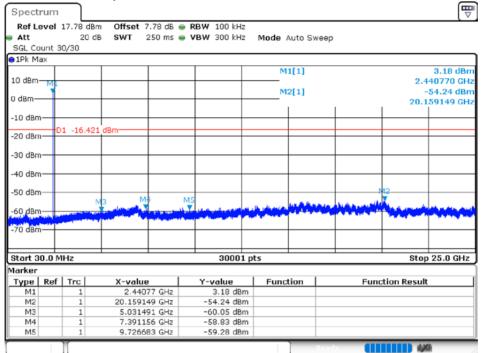
X-value

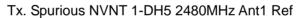
2.40165 GHz

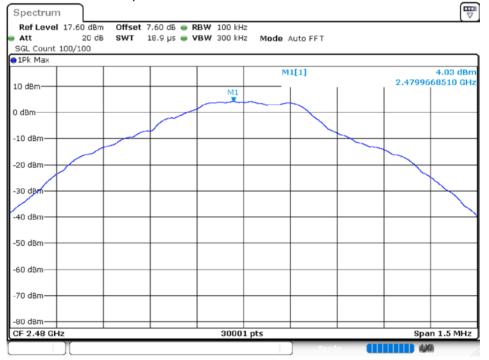
19.883647 GHz



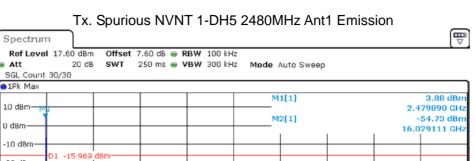




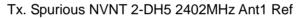


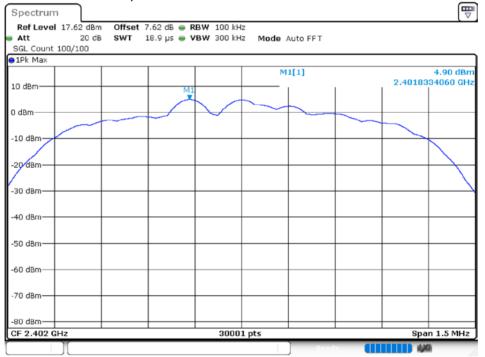






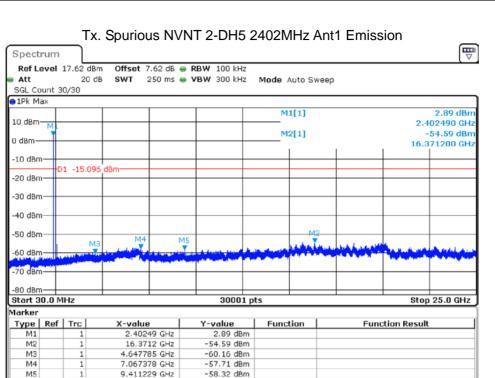
#### -20 dBm -30 dBm -40 dBm -50 dBm T M N -60 dBm -70 dBm -80 dBm Stop 25.0 GHz 30001 pts Start 30.0 MHz Marker Type Ref Trc Function Function Result X-value Y-value 2.47989 GHz 3.88 dBm M1 M2 16.029111 GHz -54.73 dBm ΜЗ 1 4.905809 GHz -60.01 dBm M4 1 7.393653 GHz -59.89 dBm M5 1 9.795767 GHz -60.23 dBm 1.00

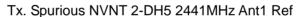


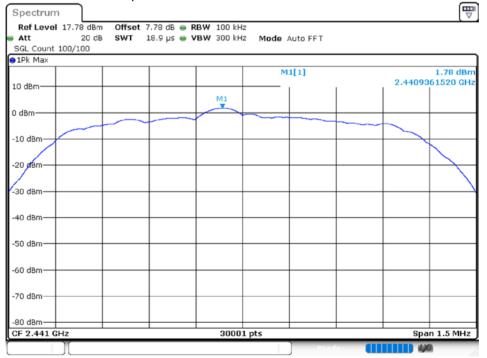




1.00

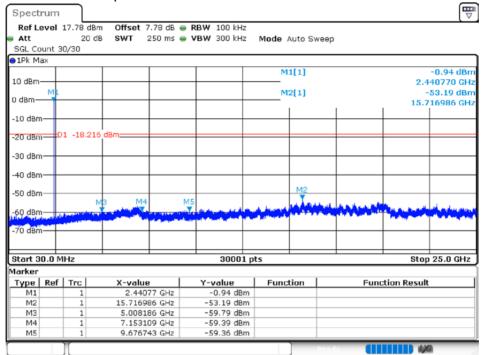




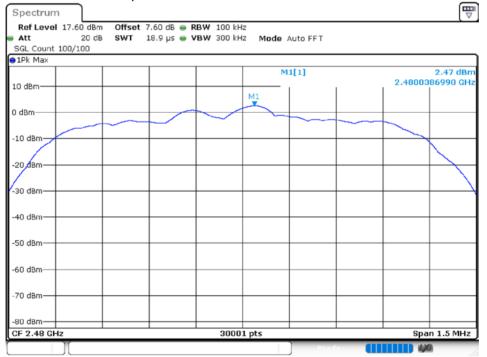




# Tx. Spurious NVNT 2-DH5 2441MHz Ant1 Emission

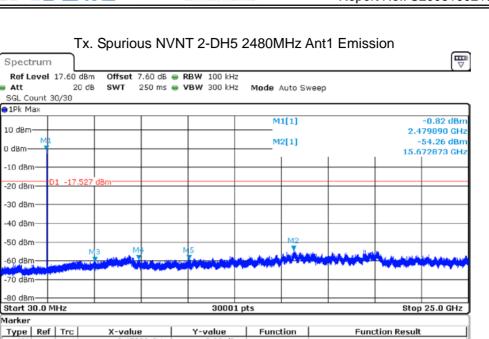


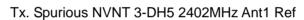






1.00





-0.82 dBm

-54.26 dBm

-60.20 dBm

-59.45 dBm

-59.17 dBm

2.47989 GHz

15.672873 GHz

5.041479 GHz

7.403641 GHz

10.077928 GHz

M1

M2

ΜЗ

M4

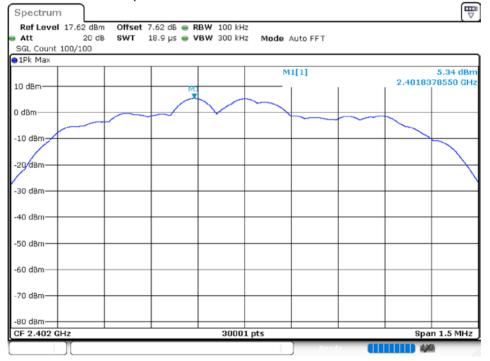
M5

1

1

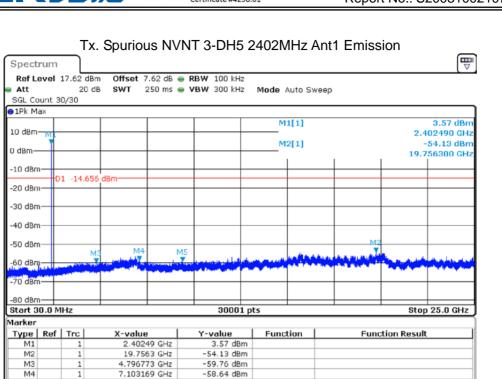
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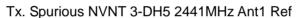
1





1.00



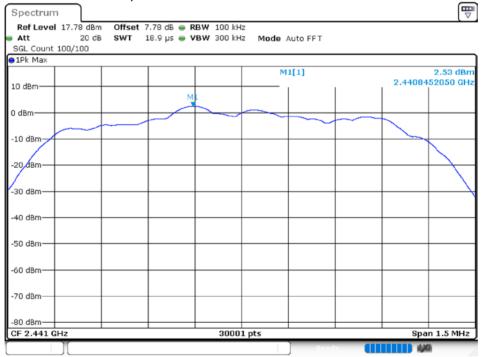


-59.38 dBm

9.417055 GHz

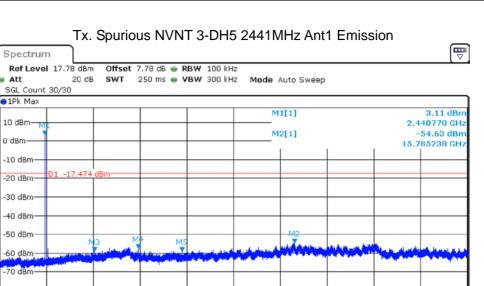
M5

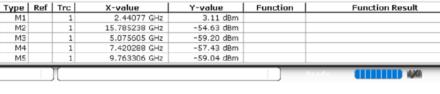
1





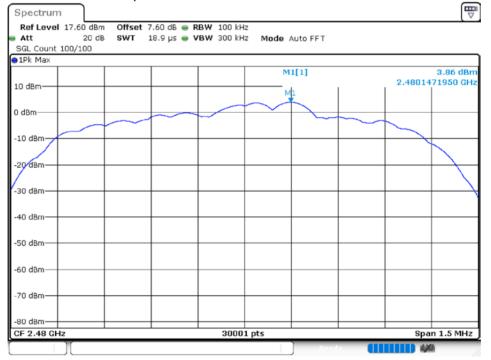
Stop 25.0 GHz





30001 pts

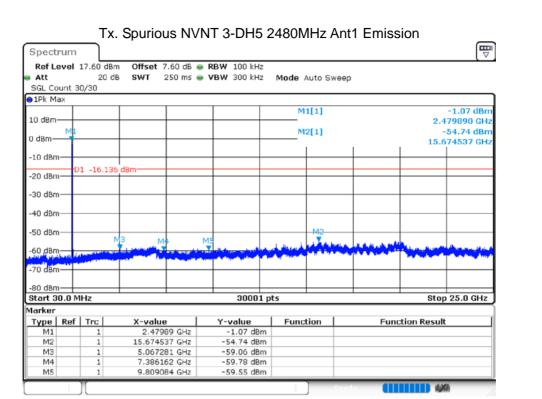




Start 30.0 MHz

Marker





END OF REPORT

Version.1.3