

RADIO TEST REPORT

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Report No: STS1812296W01

Issued for

Shandong Bittel Intelligent Technology Co., Ltd.

No.1 Rizhao N Rd, Rizhao, Shandong, P.R.China

Product Name:	MODA
Brand Name:	Bittel
Model Name:	MODA-B
Series Model:	N/A
FCC ID:	2ASTDMODA-B
Test Standard:	FCC Part 15.247

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TEST RESULT CERTIFICATION

Applicant'sname	Shandong Bittel Intelligent Technology Co., Ltd.
Address	No.1 Rizhao N Rd, Rizhao, Shandong, P.R.China
Manufacture's Name	Shandong Bittel Intelligent Technology Co., Ltd.
Address	No.1 Rizhao N Rd, Rizhao, Shandong, P.R.China
Product description	
Product Name	MODA
Brand Name	Bittel
Model Name	MODA-B
Series Model	N/A
Test Standards	FCC Part15.247
Test procedure:	ANSI C63.10-2013

This device described above has been tested by STS, 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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Date of Test.....

Date (s) of performance of tests : 20 Mar. 2019 ~ 28 Mar. 2019

Date of Issue: 02 Apr. 2019

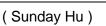
Test Result Pass

Testing Engineer

(Chris Chen)

Technical Manager

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APPROVAL

Authorized Signatory :

(Vita Li)

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Revision History

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	02 Apr. 2019	STS1812296W01	ALL	Initial Issue



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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: KDB 558074 D01 15.247 Meas Guidance v05r01

FCC Part 15.247,Subpart C				
Standard Section	Test Item	Judgment	Remark	
15.207	Conducted Emission	PASS		
15.247(a)(1)	Hopping Channel Separation	PASS		
15.247(a)(1)&(b)(1)	Output Power	PASS		
15.247(c)	Radiated Spurious Emission	PASS		
15.247(d)	Conducted Spurious & Band Edge Emission	PASS		
15.247(a)(iii)	Number of Hopping Frequency	PASS		
15.247(a)(iii)	Dwell Time	PASS		
15.247(a)(1)	Bandwidth	PASS		
15.205	Restricted Band Edge Emission	PASS		
Part 15.247(d)/part 15.209(a)	Band Edge Emission	PASS		
15.203	Antenna Requirement	PASS		

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013

Shenzhen STS Test Services Co., Ltd.



1.1 TEST FACTORY

Shenzhen STS Test Services Co., Ltd. Add. : 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China FCC test Firm Registration Number: 625569 A2LA Certificate No.: 4338.01;

1.2 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	RF output power, conducted	±0.71dB
2	Unwanted Emissions, conducted	±0.63dB
3	All emissions, radiated 30-200MHz	±3.43dB
4	All emissions, radiated 200MHz-1GHz	±3.57dB
5	All emissions, radiated>1G	±4.13dB
6	Conducted Emission(9KHz-150KHz)	±3.18dB
7	Conducted Emission(150KHz-30MHz)	±2.70dB



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	MODA
Trade Name	Bittel
Model Name	MODA-B
Series Model	N/A
Model Difference	N/A
Channel List	Please refer to the Note 2.
Bluetooth	Frequency:2402 – 2480 MHz Modulation: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8DPSK(3Mbps)
Bluetooth Version	4.0 BR+EDR
Power Rating	Input:DC 12V, 4A
Hardware version number	N/A
Software version number	N/A
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.





2.

		Chanr	nel List		
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	Bittel	MODA-B	PCB	N/A	0 dBi	BT Antenna



2.2 DESCRIPTION OF THE 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.

Worst Mode	Description	Data Rate/Modulation	
Mode 1	TX CH00	1Mbps/GFSK	
Mode 2	TX CH39	1Mbps/GFSK	
Mode 3	TX CH78	1Mbps/GFSK	
Mode 4	TX CH00	2 Mbps/π/4-DQPSK	
Mode 5	TX CH39	2 Mbps/π/4-DQPSK	
Mode 6	TX CH78	2 Mbps/π/4-DQPSK	
Mode7	TX CH00	3 Mbps/8DPSK	
Mode 8	TX CH39	3 Mbps/8DPSK	
Mode 9	TX CH78	3 Mbps/8DPSK	

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

(2) We have be tested for all avaiable U.S. voltage and frequencies(For 120V,50/60Hz

and 240V, 50/60Hz) for which the device is capable of operation, and the worst case of 120V/ 60Hz is shown in the report

For AC Conducted Emission

	Test Case
AC Conducted	Mode 10 : Keeping BT TX
Emission	

2.3 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 of FHSS.

Test software Version	Test program: Bluetooth				
Frequency	2402 MHz 2441 MHz 2480 MH				
(Power control software) Parameters(1/2/3Mbps)	Power class: 1 M rate:4:27 2 M rate:11:183 3 M rate:15:339	Power class: 1 M rate:4:27 2 M rate:11:183 3 M rate:15:339	Power class: 1 M rate:4:27 2 M rate:11:183 3 M rate:15:339		



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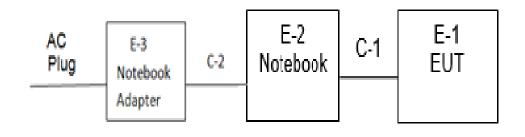
2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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 of FHSS

Radiated Spurious Emission Test



Conducted Emission Test



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2.5 DESCRIPTION OF NECESSARY ACCESSORIES AND SUPPORT UNITS

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	r/Brand Model/Type No.		Note
N/A	N/A	N/A	N/A	N/A	N/A

Necessary accessories

Support units

Item	Equipment	Mfr/Brand Model/Type No.		Serial No.	Note
E-2	Notebook	HP	500-320cx	N/A	N/A
E-3	Notebook Adapter	HP	HSTNN-CA15	N/A	N/A
C-1	USB Cable	N/A	100cm	N/A	N/A
C-2	DC Cable	N/A	100cm	N/A	N/A

Note:

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



2.6 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY51110105	2019.03.02	2020.03.01
Active loop Antenna	ZHINAN	ZN30900C	16035	2018.03.11	2021.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.01
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier(0.1M-3G Hz)	EM	EM330	060665	2018.10.13	2019.10.12
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK201808090 1	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
LISN	R&S	ENV216	101242	2018.10.11	2019.10.10
LISN	EMCO	3810/2NM	23625	2018.10.11	2019.10.10
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15100041SNO03	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY49100060	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

	Conducted Emissionlimit (dBuV)		
FREQUENCY (MHz)	Quasi-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	

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

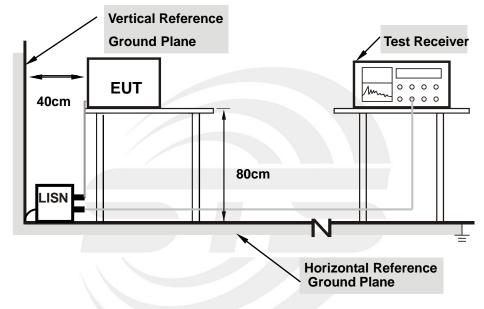
The following table is the setting of the receiver

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



3.1.2 TEST PROCEDURE

- a. The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected 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.
- b. 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 40 cm long.
- c. 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.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.



3.1.3 TEST SETUP

Note: 1.Support units were connected to second LISN. 2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 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.



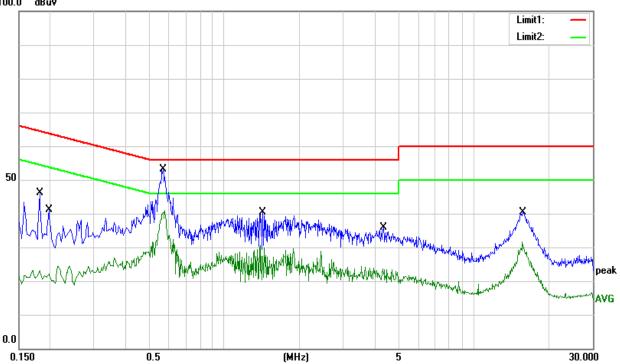
3.1.5 TEST RESULT

Temperature:	23.3 ℃	Relative Humidity:	62%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 10		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1820	25.85	20.23	46.08	64.39	-18.31	QP
2	0.1820	2.78	20.23	23.01	54.39	-31.38	AVG
3	0.1980	20.90	20.23	41.13	63.69	-22.56	QP
4	0.1980	4.26	20.23	24.49	53.69	-29.20	AVG
5	0.5700	32.41	20.40	52.81	56.00	-3.19	QP
6	0.5700	20.54	20.40	40.94	46.00	-5.06	AVG
7	1.4260	20.19	20.12	40.31	56.00	-15.69	QP
8	1.4260	9.61	20.12	29.73	46.00	-16.27	AVG
9	4.3540	15.96	19.95	35.91	56.00	-20.09	QP
10	4.3540	3.40	19.95	23.35	46.00	-22.65	AVG
11	15.7220	20.49	19.98	40.47	60.00	-19.53	QP
12	15.7220	11.54	19.98	31.52	50.00	-18.48	AVG

Remark:

- 1. All readings are Quasi-Peak and Average values.
- 2. Margin = Result (Result = Reading + Factor)–Limit
- 100.0 dBuV



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Temperature:	23.3 ℃	Relative Humidity:	62%
Test Voltage:	AC 120V/60Hz	Phase:	Ν
Test Mode:	Mode 10		

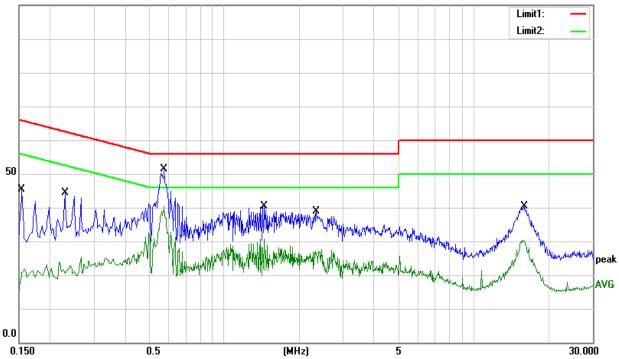
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1540	25.22	20.23	45.45	65.78	-20.33	QP
2	0.1540	2.84	20.23	23.07	55.78	-32.71	AVG
3	0.2300	23.97	20.38	44.35	62.45	-18.10	QP
4	0.2300	5.05	20.38	25.43	52.45	-27.02	AVG
5	0.5740	30.93	20.40	51.33	56.00	-4.67	QP
6	0.5740	19.97	20.40	40.37	46.00	-5.63	AVG
7	1.4460	20.36	20.11	40.47	56.00	-15.53	QP
8	1.4460	10.52	20.11	30.63	46.00	-15.37	AVG
9	2.3420	18.73	20.04	38.77	56.00	-17.23	QP
10	2.3420	7.47	20.04	27.51	46.00	-18.49	AVG
11	15.9340	20.38	19.98	40.36	60.00	-19.64	QP
12	15.9340	10.41	19.98	30.39	50.00	-19.61	AVG

Remark:

1. All readings are Quasi-Peak and Average values.

2. Margin = Result (Result = Reading + Factor)-Limit

100.0 dBuV



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3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

Frequencies	Field Strength	Measurement Distance
(MHz)	(micorvolts/meter)	(meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)		
	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).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted	
band)	PK=1MHz / 1MHz, AV=1 MHz /10 Hz

For Band edge

Spectrum Parameter	Setting		
Detector	Peak		
	Lower Band Edge: 2300 to 2403 MHz		
Start/Stop Frequency	Upper Band Edge: 2479 to 2500 MHz		
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz		

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Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
Start ~ Stop Frequency	90kHz~110kHz / RB 200Hz for QP
Start ~ Stop Frequency	110kHz~490kHz / RB 200Hz/9kHz for PK & AV
Start ~ Stop Frequency	490kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

- a. The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz,and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 meters(above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment shall be 0.8 m(above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. 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 QuasiPeak detector mode re-measured.
- e. 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.
- f. 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

3.2.3 DEVIATION FROM TEST STANDARD

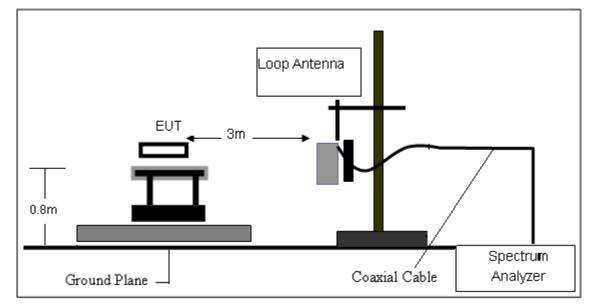
No deviation

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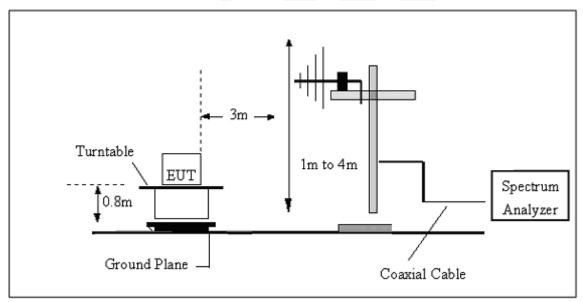


3.2.4 TESTSETUP

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



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

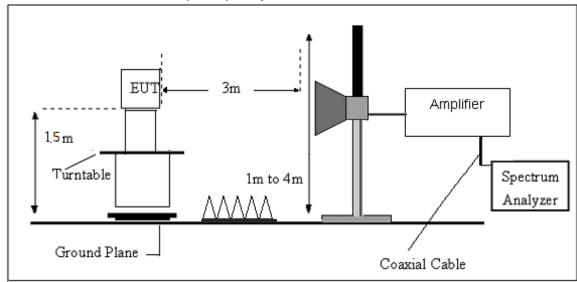




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(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CL - AG

Where

FS = Field Strength

CL = Cable Attenuation Factor (Cable Loss)

RA = Reading Amplitude

- AG = Amplifier Gain
- AF = Antenna Factor

For example

Frequency	FS	RA	AF	CL	AG	Factor
(MHz)	(dBµV/m)	(dBµV/m)	(dB)	(dB)	(dB)	(dB)
300	40	58.1	12.2	1.6	31.9	-18.1

Factor=AF+CL-AG



3.2.7 TEST RESULTS

(9KHz-30MHz)

Temperature:	23.9℃	Relative Humidity:	50%
Test Voltage:	DC 12V	Test Mode:	TX Mode

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





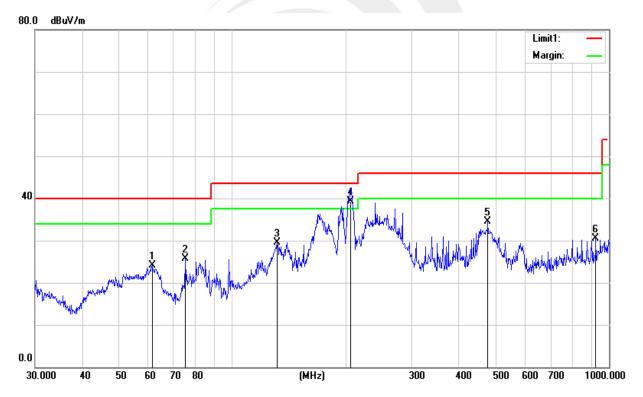
(30MHz-1000MHz)

Temperature:	23.9 ℃	Relative Humidity:	50%	
Test Voltage:	DC 12V	Phase:	Horizontal	
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 3 worst mode)			

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	61.3462	48.38	-24.31	24.07	40.00	-15.93	QP
2	75.1821	49.07	-23.37	25.70	40.00	-14.30	QP
3	131.7572	46.99	-17.54	29.45	43.50	-14.05	QP
4	206.1392	59.11	-19.90	39.21	43.50	-4.29	QP
5	477.1693	44.02	-9.59	34.43	46.00	-11.57	QP
6	922.5157	32.02	-1.47	30.55	46.00	-15.45	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit



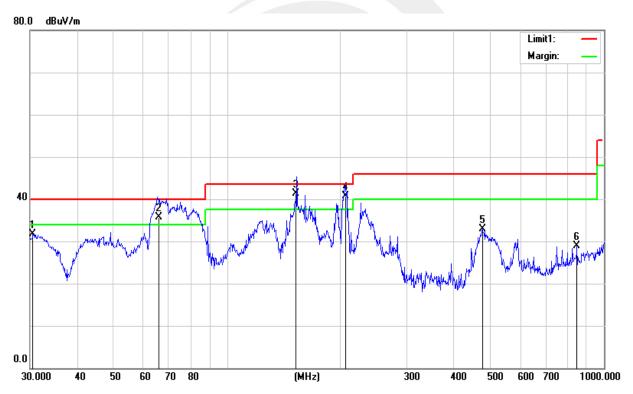


Temperature:	23.9℃	Relative Humidity:	50%	
Test Voltage:	DC 12V	Phase:	Vertical	
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 3 worst mode)			

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	30.5304	43.19	-11.47	31.72	40.00	-8.28	QP
2	65.5731	59.94	-24.21	35.73	40.00	-4.27	QP
3	152.2315	59.42	-18.08	41.34	43.50	-2.16	QP
4	205.7216	60.55	-19.92	40.63	43.50	-2.87	QP
5	475.4990	42.56	-9.57	32.99	46.00	-13.01	QP
6	848.0561	31.60	-2.73	28.87	46.00	-17.13	QP

Remark:

1. Margin = Result (Result = Reading + Factor)-Limit



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(1GHz~25GHz) Restricted band and Spurious emission Requirements

					GFSK					
Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Orrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
				Low Ch	nannel (2402 M	//Hz)				
3264.61	61.33	44.70	6.70	28.20	-9.80	51.53	74.00	-22.47	PK	Vertical
3264.61	50.00	44.70	6.70	28.20	-9.80	40.20	54.00	-13.80	AV	Vertical
3264.61	61.20	44.70	6.70	28.20	-9.80	51.40	74.00	-22.60	PK	Horizontal
3264.61	50.30	44.70	6.70	28.20	-9.80	40.50	54.00	-13.50	AV	Horizontal
4804.29	59.23	44.20	9.04	31.60	-3.56	55.67	74.00	-18.33	PK	Vertical
4804.29	49.19	44.20	9.04	31.60	-3.56	45.63	54.00	-8.37	AV	Vertical
4804.34	59.60	44.20	9.04	31.60	-3.56	56.04	74.00	-17.96	PK	Horizontal
4804.34	49.25	44.20	9.04	31.60	-3.56	45.69	54.00	-8.31	AV	Horizontal
5359.75	48.75	44.20	9.86	32.00	-2.34	46.41	74.00	-27.59	PK	Vertical
5359.75	39.72	44.20	9.86	32.00	-2.34	37.38	54.00	-16.62	AV	Vertical
5359.57	48.11	44.20	9.86	32.00	-2.34	45.77	74.00	-28.23	PK	Horizontal
5359.57	38.95	44.20	9.86	32.00	-2.34	36.61	54.00	-17.39	AV	Horizontal
7205.71	53.60	43.50	11.40	35.50	3.40	57.00	74.00	-17.00	PK	Vertical
7205.71	43.88	43.50	11.40	35.50	3.40	47.28	54.00	-6.72	AV	Vertical
7205.74	53.64	43.50	11.40	35.50	3.40	57.04	74.00	-16.96	PK	Horizontal
7205.74	44.00	43.50	11.40	35.50	3.40	47.40	54.00	-6.60	AV	Horizontal
				Middle (Channel (2441	MHz)				
3264.81	62.00	44.70	6.70	28.20	-9.80	52.20	74.00	-21.80	PK	Vertical
3264.81	51.74	44.70	6.70	28.20	-9.80	41.94	54.00	-12.06	AV	Vertical
3264.79	62.10	44.70	6.70	28.20	-9.80	52.30	74.00	-21.70	PK	Horizontal
3264.79	50.29	44.70	6.70	28.20	-9.80	40.49	54.00	-13.51	AV	Horizontal
4882.44	58.27	44.20	9.04	31.60	-3.56	54.71	74.00	-19.29	PK	Vertical
4882.44	49.59	44.20	9.04	31.60	-3.56	46.03	54.00	-7.97	AV	Vertical
4882.56	59.38	44.20	9.04	31.60	-3.56	55.82	74.00	-18.18	PK	Horizontal
4882.56	50.09	44.20	9.04	31.60	-3.56	46.53	54.00	-7.47	AV	Horizontal
5359.76	48.89	44.20	9.86	32.00	-2.34	46.55	74.00	-27.45	PK	Vertical
5359.76	39.81	44.20	9.86	32.00	-2.34	37.47	54.00	-16.53	AV	Vertical
5359.76	47.21	44.20	9.86	32.00	-2.34	44.87	74.00	-29.13	PK	Horizontal
5359.76	38.07	44.20	9.86	32.00	-2.34	35.73	54.00	-18.27	AV	Horizontal
7323.95	54.69	43.50	11.40	35.50	3.40	58.09	74.00	-15.91	PK	Vertical
7323.95	44.81	43.50	11.40	35.50	3.40	48.21	54.00	-5.79	AV	Vertical
7323.71	53.48	43.50	11.40	35.50	3.40	56.88	74.00	-17.12	PK	Horizontal
7323.71	44.19	43.50	11.40	35.50	3.40	47.59	54.00	-6.41	AV	Horizontal



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	High Channel (2480 MHz)										
3264.74	61.35	44.70	6.70	28.20	-9.80	51.55	74.00	-22.45	PK	Vertical	
3264.74	50.26	44.70	6.70	28.20	-9.80	40.46	54.00	-13.54	AV	Vertical	
3264.81	61.92	44.70	6.70	28.20	-9.80	52.12	74.00	-21.88	PK	Horizontal	
3264.81	50.06	44.70	6.70	28.20	-9.80	40.26	54.00	-13.74	AV	Horizontal	
4960.55	59.29	44.20	9.04	31.60	-3.56	55.73	74.00	-18.27	PK	Vertical	
4960.55	49.69	44.20	9.04	31.60	-3.56	46.13	54.00	-7.87	AV	Vertical	
4960.35	59.16	44.20	9.04	31.60	-3.56	55.60	74.00	-18.40	PK	Horizontal	
4960.35	50.25	44.20	9.04	31.60	-3.56	46.69	54.00	-7.31	AV	Horizontal	
5359.79	49.07	44.20	9.86	32.00	-2.34	46.73	74.00	-27.27	PK	Vertical	
5359.79	40.22	44.20	9.86	32.00	-2.34	37.88	54.00	-16.12	AV	Vertical	
5359.60	48.09	44.20	9.86	32.00	-2.34	45.75	74.00	-28.25	PK	Horizontal	
5359.60	38.69	44.20	9.86	32.00	-2.34	36.35	54.00	-17.65	AV	Horizontal	
7439.78	54.81	43.50	11.40	35.50	3.40	58.21	74.00	-15.79	PK	Vertical	
7439.78	44.60	43.50	11.40	35.50	3.40	48.00	54.00	-6.00	AV	Vertical	
7439.81	54.22	43.50	11.40	35.50	3.40	57.62	74.00	-16.38	PK	Horizontal	
7439.81	44.01	43.50	11.40	35.50	3.40	47.41	54.00	-6.59	AV	Horizontal	

Note:

1) Scan with GFSK, π /4-DQPSK,8DPSK,the worst case is GFSK Mode

2) Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Emission Level = Reading + Factor

The frequency emission of peak points that did not show above the forms are at least 20dB below the limit, the frequency

emission is mainly from the environment noise.

Shenzhen STS Test Services Co., Ltd.

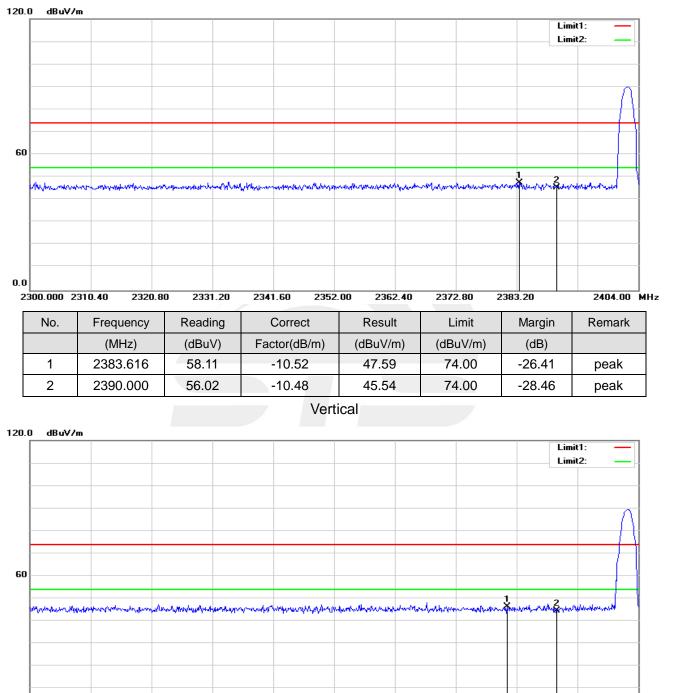
 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

 Tel: + 86-755
 3688
 6277
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



Restricted band Requirements

GFSK-Low Horizontal



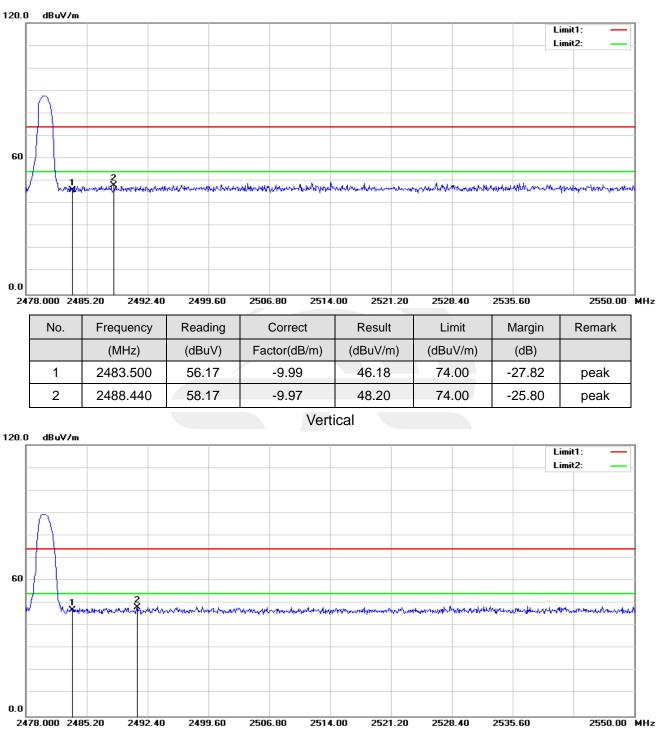
2	300.000 23	310.40 2320.80) 2331.20	2341.60 2352	.00 2362.40	2372.80	2383.20	2404.00 M	MHz
	No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark	
		(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)		
	1	2381.536	57.13	-10.54	46.59	74.00	-27.41	peak	
	2	2390.000	55.36	-10.48	44.88	74.00	-29.12	peak	



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GFSK-High Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	56.95	-9.99	46.96	74.00	-27.04	peak
2	2491.176	58.19	-9.95	48.24	74.00	-25.76	peak

Note: GFSK, $\pi/4$ -DQPSK,8DPSK of the nohopping and hopping mode all have been test, the worst case is GFSK of the nohopping mode, this report only show the worst case.



4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting				
Detector	Peak				
Start/Stop Frequency	30 MHz to 10th carrier harmonic				
RB / VB (emission in restricted band)	100 KHz/300 KHz				
Trace-Mode:	Max hold				

For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stan Fraguanay	Lower Band Edge: 2300– 2403 MHz
Start/Stop Frequency	Upper Band Edge: 2479 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

Remark : Hopping on and Hopping off mode all have been tested, only worst case hopping off is reported.

4.3 TEST SETUP



The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 500hm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.4 EUT OPERATION CONDITIONS

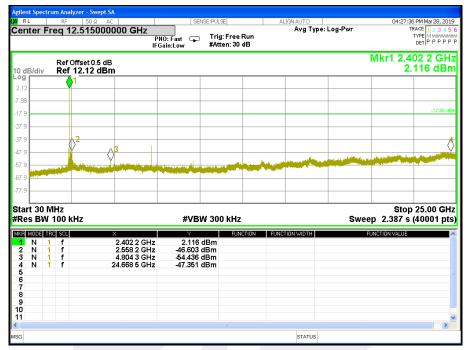
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



4.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	GFSK(1Mbps)-00/39/78 CH	Test Voltage:	DC 12V

00 CH



39 CH

ailent Spe	ectrum A	nalyzer - Swep	t SA							
RL	R		AC	SENSE	PULSE	AL	IGNAUTO		04:31:	25 PM Mar 28, 20
enter	Freq	12.51500			Trig: Free Run #Atten: 30 dB		Avg Type:	Log-Pwr		TRACE 1 2 3 4 TYPE MWMM DET P P P P
0 dB/di		f Offset 0.5 d f 14.91 dE							Mkr1 2.4 4	l40 9 GH .909 dB
og 1.91		1								
.09										
5.1										-15.09
5.1				3						
5.1		A ²	Y							0
5.1		Y							and a second second second	a state and
5.1					and the second second	الترينيان				
5.1										
	0 MHz W 100	kHz		#VBW	300 kHz			Swe	Stoj ep 2.387 s	o 25.00 G (40001 p
r Mode	TRC SO	u	× 2.440.9 GHz	4.909 dE	FUNCTION	FUNC	TION WIDTH		FUNCTION VALUE	
2 N 3 N	1 f		2.545 1 GHz 7.322 5 GHz	-48.184 dE -38.557 dE	m					
4 N 5	1 f		24.264 0 GHz	-47.403 dE						
5 7										
3										
5 D										
1))



78 CH

	um Analyzer - Sw								
RL	RF 50 Ω		SENSE:F	PULSE	AL	IGNAUTO Avg Type:	Dum		00 PM Mar 28, 201 TRACE 1 2 3 4 5
nter Fr	eq 12.515			Frig: Free Run Atten: 30 dB		Avg Type:	Log-Pwr		TYPE MWWWW DET P P P P
dB/div	Ref Offset 0. Ref 15.01							Mkr1 2.4 5	179 6 GH .009 dBi
g 01	•1								
99									-14.99 d
.0									-14.35 0
.0	2		3						
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° 📃 👘									
art 30 M	1Hz 100 kHz		#VBW 3	300 kHz			Swe	Stop ep 2.387 s	
art 30 M es BW	100 kHz	× 2 479 6 GHz	Y	FUNCTION	FUNCT	ION WIDTH			
art 30 M es BW N 1 N 1 N 1 N 1 N 1	100 kHz f f f	× 2.479 6 GHz 2.532 0 GHz 7.439 8 GHz 24.296 5 GHz		FUNCTION m m m	FUNCT	ION WIDTH		ep 2.387 s	
art 30 M es BW N 1 N 1 N 1 N 1 N 1	100 kHz f f f	2.479 6 GHz 2.532 0 GHz 7.439 8 GHz	5.009 dBi -41.479 dBr -38.078 dBr	FUNCTION m m m	FUNCT	ION WIDTH		ep 2.387 s	
art 30 M es BW N 1 N 1 N 1 N 1	100 kHz f f f	2.479 6 GHz 2.532 0 GHz 7.439 8 GHz	5.009 dBi -41.479 dBr -38.078 dBr	FUNCTION m m m	FUNCT			ep 2.387 s	
art 30 M tes BW N 1 N 1 N 1 N 1	100 kHz f f f	2.479 6 GHz 2.532 0 GHz 7.439 8 GHz	5.009 dBi -41.479 dBr -38.078 dBr	FUNCTION m m m	FUNCT	ION WIDTH		ep 2.387 s	o 25.00 GH



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Shenzhen STS Test Services Co., Ltd.

 1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China

 Tel: + 86-755 3688 6288
 Fax:+ 86-755 3688 6277
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



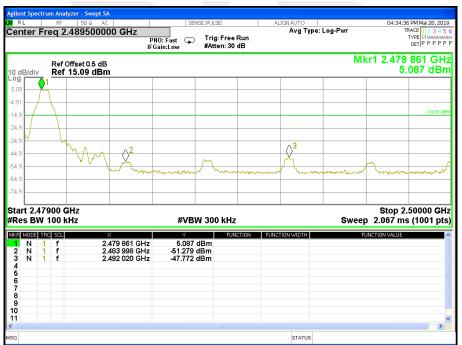


For Band edge

00 CH

RL	rum Analyzer							
	_R ⊧ req 2.35	50 Ω AC 51500000 GHz	PNO: Fast IFGain:Low	NSE:PULSE) Trig: Free Run #Atten: 30 dB	ALIGN AUTO Avg Type:		TR T	PM Mar 28, 20 ACE <u>1 2 3 4 1</u> YPE M WAARAA DET P P P I
dB/div		et 0.5 dB .57 dBm				MI	kr1 2.402 2.5	073 GH 574 dB
57								
43								-17.43 d
.4								
4							2	03
	apor a	- Lungway Maranger	al your agent have	manley Good	when here were	and and and	hour and have	1
.4								
	0000 GHz 100 kHz		#VB	W 300 kHz		Swee	Stop 2.4 p 9.867 ms	(1001 pi
R MODE T	f f	× 2.402 073 GF 2.390 022 GF 2.399 189 GF	lz -52.199	dBm	FUNCTION WIDTH	F	UNCTION VALUE	
N								
N 1								

78 CH



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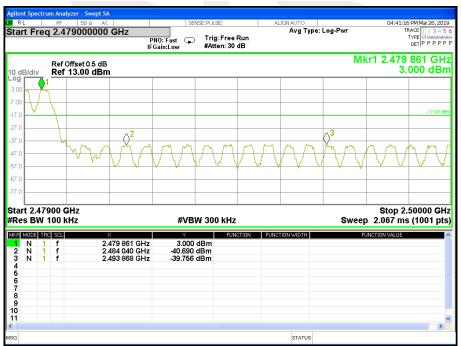


For Hopping Band edge

00 CH

		yzer - Swept S/								
tart Fred	RF 1 2.30	50 Ω AC	GHz	PNO: Fast Gain:Low	NSE:PULSE Trig: Free #Atten: 30	Run	IGNAUTO Avg Type:	-	Т	4 PM Mar 28, 2019 RACE 1 2 3 4 5 TYPE M WWWWW DET P P P P P
I0 dB/div)ffset 0.5 dB 11.73 dBm	ı					M		000 GHz 730 dBm
1.73										1.
8.27										-18.27 dBr
28.3										-18.27 dph
38.3									<u>^2</u>	3
48.3					N	Annanna	168466666	100000000000000000000000000000000000000	nnannan	
	hh	งบองงงจงงง	northoor	wwwwww	MMMMM	<u>AAAAAAAAAA</u>	<u>tanannarra</u> r	<u> </u>	<u> </u>	Antstation –
68.3 78.3										
tart 2.300	000 0	U 7							Stop 2	.40300 GHz
Res BW				#VB	W 300 kHz	:		Swee	p 9.867 m	
1 N 1 2 N 1	f f	2.	403 000 GHz 390 022 GHz	1.730 -45.945	dBm	ICTION FUNC	TION WIDTH	ł	UNCTION VALUE	
3 N 1 4	f		398 880 GHz	-46.049						
5 6										
7										
9										
1										
G							STATUS			

78 CH



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Temperature:	25 ℃	Relative Humidity:	50%
	π/4-DQPSK(2Mbps)– 00/39/78 CH	Test Voltage:	DC 12V

RL		RF	50 Q A0		SE	NSE:PULSE		ALIG	NAUTO		04:50	:22 PM Mar 28, 20
enter	Fre	eq 1	2.515000	P	NO: Fast 🖵 Gain:Low	Trig: Free #Atten: 30	Run dB		Avg Type:	Log-Pwr		TRACE 1 2 3 4 1 TYPE MWWWW DET P P P P
dB/di	v		Offset 0.5 dB									402 2 GH 1.995 dBi
			1									
.0												
.0												-24.98 d
0			-				-					
.0			<u>}</u> 2									
			Υ							an and a statistic and	and the second second second	and the second second
	dheaddh						No.		Landar De Consert			
.0												
.0												
art 30 es B			kHz	1 1	#VB	W 300 kHz	<u>.</u>			Swe	Sto ep 2.387	p 25.00 GH s (40001 pt
R MODE	TRC	SCL		×	Y	FUI	ICTION	FUNCTIO	IN WIDTH		FUNCTION VALUE	
N N N	1 1 1	f f f		2.402 2 GHz 2.558 2 GHz 7.205 8 GHz 24.307 1 GHz	-1.995 -49.888 -54.450 -46.978	dBm dBm						
												>

00 CH

39	CH
00	OIT

um Analyzer	- Swept SA			39	СН	/				
RF	50 Q AC	PN	IO: Fast 😱	Trig: Fr		ALI		Log-Pwr	04:5	3:06 PM Mar 28, 2 TRACE 1 2 3 4 TYPE M WAMA DET P P P P
										.440 9 GI 0.968 dB
1										
										-20.97
2 ²		۸3 .								
		¥-			and the second					
			#VB	W 300 ki	Hz			Swe		op 25.00 G s (40001 p
f f f	2. 6.	518 9 GHz 046 5 GHz	-50.792 -56.097	dBm dBm dBm	FUNCTION	FUNCT	ON WIDTH		FUNCTION VALU	E
•	24.	515 0 GHZ	-47.521							
	Ref Offse Ref 9.0: 1 2 2 MHz 100 kHz	Ref Offset 0.5 dB Ref 9.03 dBm	Ref 50.0 AC req 12.515000000 GHz PP Ref Offset 0.5 dB Ref 9.03 dBm 1 1 1 <t< td=""><td>Ref Offset 0.5 dB PRO: Fast FEGain:Low Ref Offset 0.5 dB Pro: Fast FEGain:Low 0 1 0 1 0 1 0 2 0 3 0 1 0</td><td>um Analyzer - Swept 5A RF 50 @ AC SENSE PU.SE req 12.515000000 GHz PN0: Fast Trig: Fr PN0: Fast Trig: Fr Ref 0ffset 0.5 dB Trig: Fr Ref 9.03 dBm 1 1 1</td><td>RF 50.0 AC SENSE.PULSE IPO: Fast IFGain:Low Trig: Free Run IFGain:Low Trig: Free Run IFGain:Low Trig: Free Run IFGain:Low Trig: Free Run IFGain:Low Offset 0.5 dB Ref 9.03 dBm 1</td><td>um Analyzer - Swept 5A RF 50 @ AC SENSE PULSE ALT PNO: Fast Trig: Free Run PNO: Fast Trig: Free Run #Atten: 30 dB</td><td>um Analyzer - Swept SA RF 50 @ AC SENSE FULSE ALIONAUTO req 12.515000000 GHz From Figs and Figs and</td><td>um Analyzer - Swept SA RF 50 @ AC SENSE PULSE ALIGNAUTO Trig: Free Run IFGain:Low Trig: Free Run #Atten: 30 dB Ref Offset 0.5 dB Ref Offset 0.5 dB PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB 1 Avg Type: Log-Pwr Avg Type: Log-Pwr PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB 1</td><td>um Analyzer - Swept SA RF 50 @ AC SENSE-PLLSE ALISNAUTO 04/5 req 12.515000000 GHz Trig: Free Run IFGain:Low Trig: Free Run #Atten: 30 dB Mkr1 2 Ref Offset 0.5 dB Mkr1 2 Ref 9.03 dBm </td></t<>	Ref Offset 0.5 dB PRO: Fast FEGain:Low Ref Offset 0.5 dB Pro: Fast FEGain:Low 0 1 0 1 0 1 0 2 0 3 0 1 0	um Analyzer - Swept 5A RF 50 @ AC SENSE PU.SE req 12.515000000 GHz PN0: Fast Trig: Fr PN0: Fast Trig: Fr Ref 0ffset 0.5 dB Trig: Fr Ref 9.03 dBm 1 1 1	RF 50.0 AC SENSE.PULSE IPO: Fast IFGain:Low Trig: Free Run IFGain:Low Trig: Free Run IFGain:Low Trig: Free Run IFGain:Low Trig: Free Run IFGain:Low Offset 0.5 dB Ref 9.03 dBm 1	um Analyzer - Swept 5A RF 50 @ AC SENSE PULSE ALT PNO: Fast Trig: Free Run PNO: Fast Trig: Free Run #Atten: 30 dB	um Analyzer - Swept SA RF 50 @ AC SENSE FULSE ALIONAUTO req 12.515000000 GHz From Figs and	um Analyzer - Swept SA RF 50 @ AC SENSE PULSE ALIGNAUTO Trig: Free Run IFGain:Low Trig: Free Run #Atten: 30 dB Ref Offset 0.5 dB Ref Offset 0.5 dB PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB 1 Avg Type: Log-Pwr Avg Type: Log-Pwr PNO: Fast IFGain:Low Trig: Free Run #Atten: 30 dB 1	um Analyzer - Swept SA RF 50 @ AC SENSE-PLLSE ALISNAUTO 04/5 req 12.515000000 GHz Trig: Free Run IFGain:Low Trig: Free Run #Atten: 30 dB Mkr1 2 Ref Offset 0.5 dB Mkr1 2 Ref 9.03 dBm

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78 CH

		ilyzer - Swept	t SA							
RL	RF		AC	SE	NSE:PULSE	AL	.IGN AUTO	L Down	04:55	:43 PM Mar 28, 20:
enter F	req 1	2.51500	0000 GHz	NO: Fast 🕠	Trig: Free R	un	Avg Type:	Log-Pwr		TYPE M WARNAW
				Gain:Low	#Atten: 30 d					DETPPPF
									Mkr1 2	480 2 GH
dB/div		Offset 0.5 d								.463 dB
g	- 100	1								
16										
.5										
.5										-21.46 d
.5										
	(2								.4
.5		w	3							
5						astro free little	and the second	ALL BORN		
5							and the second second second			-
5										
.5										
art 30 I									Sto	p 25.00 GH
es BW	100	kHz		#VB	W 300 kHz			Swe	eep 2.387	s (40001 pi
R MODE T			×	Y	FUNC	FUNC	TION WIDTH		FUNCTION VALUE	
N N	1 f 1 f		2.480 2 GHz 2.532 0 GHz	-1.463 -43.387						
N 1	1 f		5.785 6 GHz	-55.916	dBm					
	1 f		24.093 0 GHz	-48.132	dBm					
										>
							STATUS			



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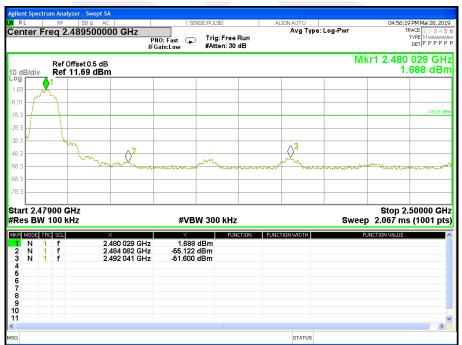


For Band edge

00 CH

		alyzer - Swep								
enter l	Freq 2	50 Ω 2.351500	0000 GHz	PNO: Fast	ENSE:PULSE Trig: Free #Atten: 30		ALIGN AUTO Avg 1	Type: Log-Pwr		8 PM Mar 28, 2019 RACE 1 2 3 4 5 TYPE MWWWWW DET P P P P P
0 dB/div		Offset 0.5 f 8.89 dB						Γ	/lkr1 2.402 -1.	073 GH 103 dBn
1.1 1.1										-21.12 dB
.1										
1.1 1.1					A					$\sqrt{3}$
	analan kata	ann gul a dhaar	March Anne	aprover and the second s	with worksourd }	and the	mohnda	mother when the	man	Manna
1.1 <u> </u>										
art 2.3 Res BV				#VE	300 kHz			Swe	Stop 2 ep 9.867 m	.40300 GH s (1001 pts
F MODE 1 N 2 N 3 N	TRC SCL 1 f 1 f 1 f		× 2.402 073 GH 2.390 022 GH	z -56.79	3 dBm 7 dBm	ICTION	FUNCTION WIDTH	H	FUNCTION VALUE	
5	1 T		2.399 601 GH	z -53.72	4 dBm					
5 7 8										
9										
										>
							STAT	us		

78 CH



Page 37 of 68 Report No.: STS1812296W01

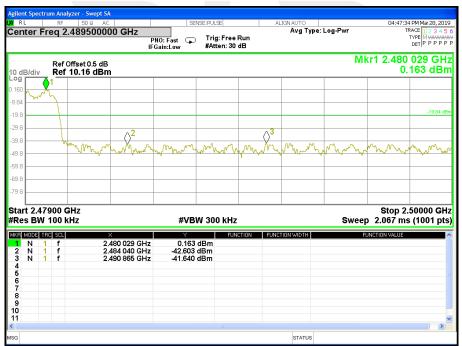


For Hopping Band edge

00 CH

e <mark>nt Spe</mark> R L	ectrun	n Analy RF	zer - Swe																		
	Fre		50 Ω 35150	AC 0000) GHz	Р	NO: Fa Gain:L	ist 🗔		g: Free ten: 30		AI	LIGN A		e: L	.og-Pw	r		04:45:1	TYPE	1 2 3 4 1 2 3 4 M WWW P P P F
B/di			ffset 0.5 7 .59 dE														М	kr1 :	2.403 -2		0 G 1 dE
1																					
4																				-	-22.41
4																					
4																			() ²		$-\diamond$
4	m	e mod	www.ww	inne	shew	uu	un	when	ahara	mil	When	MM	ŴŶ	U MA	NN	<i>\</i> ∕~∕√	N	ww	www.	w	nfwfy
4																					
		00 G 00 kl						#VE	3W 30	0 kHz	:					s	wee		Stop 2 867 m		
	TRC			Х				Y			ICTION	FUNC	TION V	VIDTH					N VALUE	- (
N N N	1 1 1	f f f		2.39	03 000 90 022 98 880	GHz		49.38	ldBm 5dBm 5dBm												
													5	STATUS							

78 CH





Page 38 of 68 Report No.: STS1812296W01

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	8DPSK(3Mbps) -00/39/78 CH	Test Voltage:	DC 12V

00 CH

L	RF 50 Ω	AC	SEN	SE:PULSE		IAUTO		04:59	:19 PM Mar 28, 20
nter Fre	q 12.5150		IO: Fast 😱 iain:Low	Trig: Free Run #Atten: 30 dB		Avg Type:	Log-Pwr		TRACE 1 2 3 4 TYPE MWAAAA DET P P P P
	Ref Offset 0.6 Ref 7.45 di								402 2 GH 2.551 dB
	1								
i									
; 									-22.55
6 	•								
5 5						. 64			Y
6 Secolution	and the second			and the second second	all shares and				
6									
rt 30 MH es BW 1			#VBV	V 300 kHz			Swe	Sto ep 2.387	op 25.00 Gi s (40001 p
MODE TRC N 1 N 1 N 1 N 1	SCL f f f	× 2.402 2 GHz 2.558 2 GHz 7.206 4 GHz 24.319 6 GHz	-2.551 c -51.439 c -49.264 c -46.954 c	lBm IBm	FUNCTION	1 WIDTH		FUNCTION VALUE	

39 CH

RL	RF 50 Ω	AC	SENSE:PUL	9E	ALIGNAUTO		05:38:13	PM Mar 28, 20
enter Fre		00000 GHz	NO East Trig	g:FreeRun ten:30 dB	Avg Type	: Log-Pwr	TR	ACE 1 2 3 4 YPE MWMMM DET P P P P
dB/div	Ref Offset 0.5 Ref 11.32 d						Mkr1 2.44 1.3	10 9 GH 323 dB
32	1							
68								-18.68
.7								
.7	2	0ª	3					0
.7			فريد بدرا والمرور المالية والمرور	A				
.7								
.7								
art 30 M	Hz 100 kHz		#VBW 30	0 kHz		Swee	Stop p 2.387 s(25.00 G 40001 p
es BW 1								
N 1	f sa	× 2.440 9 GHz	۲ 1.323 dBm	FUNCTION	FUNCTION WIDTH	FL	UNCTION VALUE	
MODE TRON N 1 N 1 N 1	SCL f f f	2.440 9 GHz 2.545 1 GHz 7.322 5 GHz	-48.460 dBm -49.865 dBm	FUNCTION	FUNCTION WIDTH	FL	JNCTION VALUE	
N 1 N 1 N 1 N 1 N 1 N 1	SCL f f	2.440 9 GHz 2.545 1 GHz	-48.460 dBm	FUNCTION	FUNCTION WIDTH	FL	UNCTION VALUE	
8 Mode TFC N 1 N 1 N 1 N 1 N 1	SCL f f f	2.440 9 GHz 2.545 1 GHz 7.322 5 GHz	-48.460 dBm -49.865 dBm	FUNCTION	FUNCTION WIDTH	FL	JNCTION VALUE	
R Mode Tro N 1 N 1 N 1	SCL f f f	2.440 9 GHz 2.545 1 GHz 7.322 5 GHz	-48.460 dBm -49.865 dBm	FUNCTION	FUNCTION WIDTH	FL	JNCTION VALUE	

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78 CH

	Analyzer - Swe		SE	NSE:PULSE	AL	.IGN AUTO		05:41	10 PM Mar 28,
		000000 GHz	PNO: Fast 🖵	Teles Freed	Run	Avg Type:	Log-Pwr		TRACE 1 2 3 TYPE MWW DET P P F
	tef Offset 0.6 tef_11.64_0							Mkr1 2.	480 2 C .638 d
	1								
									-18.3
		/	3						
	²		2						
and the first of the	a real and the second							and the state of the	
(and get a second s			halls dans						
t 30 MHz s BW 10			#VB	W 300 kHz			Swe	Sto ep 2.387 s	p 25.00 (s (40001
N 1 1	f f f f	× 2.480 2 GHz 2.532 0 GHz 7.439 8 GHz 24.296 5 GHz	1.638 -43.159 -39.676 -47.209	dBm dBm dBm	CTION FUNC	TION WIDTH		FUNCTION VALUE	



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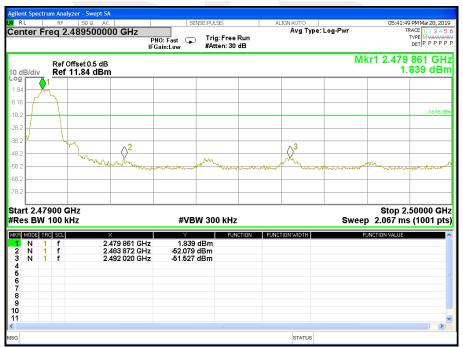


For Band edge

00 CH

ilent Specti R L		zer - Swept SA									
	RF req 2.3	50 Ω AC 35150000		PNO: Fast Gain:Low	D Trig: Fre #Atten: \$		AL.	IGNAUTO Avg Type:	Log-Pwr	TF	5 PM Mar 28, 201 RACE 1 2 3 4 5 TYPE M WANNA DET P P P P P
) dB/div		fset 0.5 dB .96 dBm							M	lkr1 2.402 -1.	073 GH 045 dBr
.04											(
1.0											~~~~
											-21.04 d
.0						A					
.0	والمربا المحاورين	- ale all a second	Mar Mannaham		when work had	handre	ng sha part	Summer and the	man	monten	when whet
.0											
1.0											
art 2.30 Res BW				#VE	SW 300 kH	Iz			Swee	Stop 2. p 9.867 ms	40300 GH ; (1001 pts
R MODE T		2	< 402 073 GHz	-1 045	dBm	UNCTION	FUNCT	ION WIDTH		FUNCTION VALUE	
2 N 7 3 N 7 4	f	2.3	390 022 GHz 399 601 GHz	-55.114 -54.333	dBm						
;											
7 3)											
3											>

78 CH



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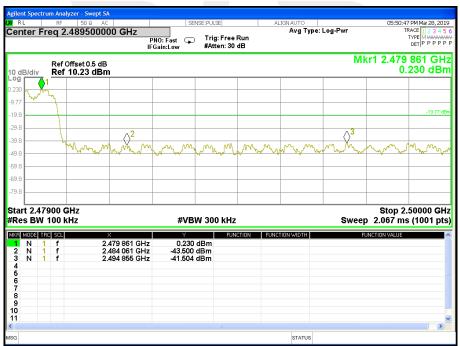


For Hopping Band edge

00 CH

	rum Analyzer												
nter F	_R ⊧ req 2.35	50 Ω AC 150000		PNO: Fast IFGain:Low		ULSE rig: Free Atten: 30		AL	IGNAUTO Avg Typ	e: Log-Pwr			25 PM Mar 28, 20 TRACE 1 2 3 4 TYPE MWWW DET P P P P
dB/div	Ref Offs Ref 8.0										М		3 000 GH .961 dB
96													
2.0													-21.96 c
.0													
												. 0	
20	mound	man	mundur	unne	marga	mont		(m)	VLAN ULAN	MMMM	WVV	www.www	ANN MAN
2.0													
	0000 GHz 100 kHz			#	≠VBW 3	00 kHz	1			S	weep		2.40300 GI Is (1001 pi
R MODE TH		×			Y		CTION	FUNCT	ION WIDTH		H	UNCTION VALUE	
N 1 2 N 1 3 N 1	f	2.3	103 000 GHz 390 022 GHz 399 807 GHz	-48	.961 dBn .227 dBn .296 dBn	1							
													>
													2

78 CH





5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

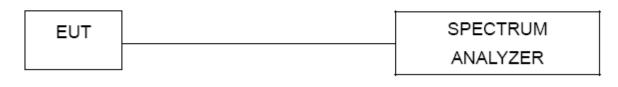
	FCC Part 15.247,Subpart C										
Section	Test Item	Limit	FrequencyRange (MHz)	Result							
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS							

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating FrequencyRange
RB	100KHz
VB	100KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW=100KHz, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



5.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Test Mode:	Hopping Mode -GFSK Mode	Test Voltage:	DC 12V

Number of Hopping Channel

79

Hopping channel

RL RF	50 Q AC	SENSE:PULSE	ALIGNAUTO	04:36:33 PM Mar 28, 20
art Freq 2.4000	PNC	:: Fast 🖵 Trig: Free Run in:Low #Atten: 30 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 TYPE MWMMM DET P P P P
Ref Offs dB/div Ref 15.	et 0.5 dB 11 dBm		Mk	r2 2.479 909 5 GF 3.11 dB
				2
	*****			Junior
9				
9				
9				
9				
9				
9				
9				
art 2.40000 GHz es BW 300 kHz		#VBW 300 kHz	Swee	Stop 2.48350 GF ep 1.000 ms (1001 pt
MODE TRC SCL N 1 f N 1 f	× 2.402 254 5 GHz	Y FUNCTION 0.58 dBm	FUNCTION WIDTH	FUNCTION VALUE
N 1 f	2.479 909 5 GHz	3.11 dBm		

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6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

	FCC Part 15.247,Subpart C											
Section	Test Item	Limit	FrequencyRange (MHz)	Result								
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS								

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW =1MHz/VBW =3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- \tilde{h} . Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). Sothe dwell time is the time duration of the pulse times 3.37 x 31.6 = 106.6 within 31.6 seconds.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So he dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
- k. DH1 Packet permit maximum 1600 / 79 /2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So the dwell time is the time duration of the pulse times 10.12 x 31.6 = 320 within 31.6 seconds.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	GFSK(1Mbps)-DH1/DH3/DH5	Test Voltage:	DC 12V

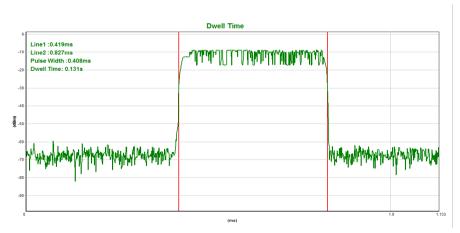
Data Packet	Channel	Channel pulse time(ms)		Limits(s)
DH1	middle	0.408	0.131	0.4
DH3	middle	1.669	0.267	0.4
DH5	middle	2.916	0.311	0.4



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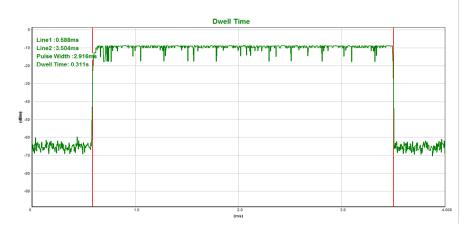
CH39-DH1



CH39-DH3



CH39-DH5



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Temperature:	25 ℃	Relative Humidity:	50%
	π/4-DQPSK(2Mbps)– 2DH1/2DH3/2DH5	Test Voltage:	DC 12V

Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
2DH1	middle	0.421	0.135	0.4
2DH3	middle	1.673	0.268	0.4
2DH5	middle	2.924	0.312	0.4



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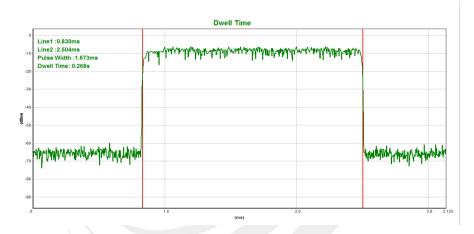
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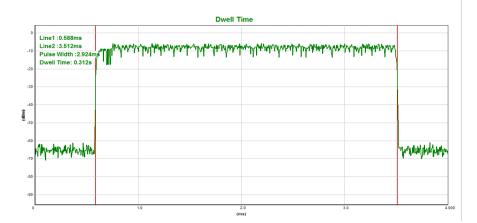
CH39-2DH1



CH39-2DH3



CH39-2DH5





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Temperature:	25 ℃	Relative Humidity:	50%
	8DPSK(3Mbps)– 3DH1/3DH3/3DH5	Test Voltage:	DC 12V

Data Packet	Channel	pulse time(ms)	Dwell Time(s)	Limits(s)
3DH1	middle	0.421	0.135	0.4
3DH3	middle	1.674	0.268	0.4
3DH5	middle	2.924	0.312	0.4



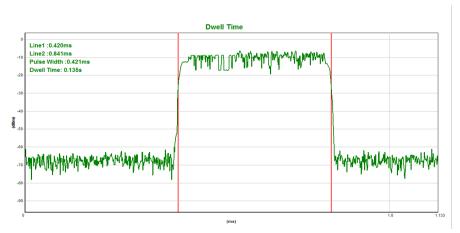
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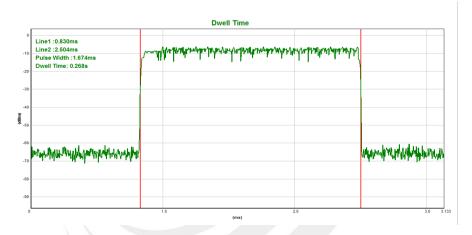
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 Fax:+ 86-755 3688 6277
 Http://www.stsapp.com
 E-mail: sts@stsapp.com



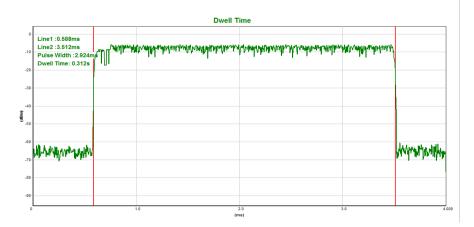
CH39-3DH1



CH39-3DH3



CH39-3DH5



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 3688
 6287
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 E-mail: sts@stsapp.com



7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 LIMIT

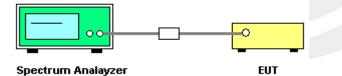
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that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

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency > 20 dB Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time Auto	

7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.



7.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	CH00 / CH39 / CH78 (GFSK(1Mbps) Mode)	Test Voltage:	DC 12V

Frequency	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	1.002	0.909	Complies
2441 MHz	1.002	0.879	Complies
2480 MHz	1.002	0.867	Complies

For GFSK: Ch. Separation Limits: > 20dB bandwidth

4:29:04 PM Mar 28, 2019 TRACE 1 2 3 4 5 6 TYPE M WWWWW DET P P P P F R I Center Freq 2.402500000 GHz Avg Type: Log-Pwr PNO: Wide Trig: Free Run IFGain:Low #Atten: 30 dB Mkr2 2.403 019 GHz 2.557 dBm Ref Offset 0.5 dB Ref 11.30 dBm 10 dB/div ****2 18. 28. 48. Center 2.402500 GHz #Res BW 30 kHz Span 3.000 MHz Sweep 3.200 ms (1001 pts) #VBW 100 kHz MKS MODE TRC SCI 1 N 1 f 2 N 1 f 3 4 f f 5 6 f 7 9 9 10 11 FUNCTION WIDTH 1.30 dBm 2.56 dBm 2.402 017 GHz 2.403 019 GHz STATUS

CH00 -1Mbps

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CH39 -1Mbps



CH78 -1Mbps



Shenzhen STS Test Services Co., Ltd.

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Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	CH00 / CH39 / CH78 (π/4-DQPSK(2Mbps) Mode)	Test Voltage:	DC 12V

Frequency	Ch. Separation (MHz)	Limit (MHz)	Result
2402 MHz	0.999	0.797	Complies
2441 MHz	0.999	0.811	Complies
2480 MHz	0.999	0.811	Complies

For π /4-DQPSK(2Mbps): Ch. Separation Limits: > two-thirds 20dB bandwidth

		zer - Swept SA								
RL	RF	50 Ω AC		SE	NSE:PULSE	AL	IGNAUTO Avg Type:	Lan Dum		3 PM Mar 28, 20: RACE 1 2 3 4 5
enter Fi	req 2.4	10250000	F	PNO: Wide 🖵 FGain:Low	Trig: Free R #Atten: 30 di		Avg Type:	Log-Pwr		TYPE MWAAAAA DET P P P P
dB/div		ffset 0.5 dB 8.35 dBm						Mk	r2 2.403 -0.	016 GH 352 dBi
65				1			2			
		~~~	$\sim \sim$	$\sim$		$\sim$	$\Lambda \sim$	how	$\sim$	
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enter 2. tes BW				#VB	W 100 kHz		-	Sweep	Span 3.200 ms	3.000 MH s (1001 pt
r mode tr			× 402 017 GHz	Y 4 CE	dBm	TION FUNCT	TION WIDTH	FU	NCTION VALUE	
N 1			403 016 GHz		dBm					
3										
3										
5 7 8										
5 7 3										
5 7 8 9 0										>

### CH00 -2Mbps

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#### CH39 -2Mbps



#### CH78 -2Mbps



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Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	CH00 / CH39 / CH78 (8DPSK(3Mbps)Mode)	Test Voltage:	DC 12V

Frequency	equency Ch. Separation Limit (MHz)		Result
2402 MHz	0.999	0.804	Complies
2441 MHz	1.002	0.805	Complies
2480 MHz	0.999	0.804	Complies

For 8DPSK(3Mbps):Ch. Separation Limits: > two-thirds 20dB bandwidth

	rum Analyzer - S	Swept SA					
RL		DΩ AC	SEM	ISE:PULSE	ALIGNAUTO		05:00:27 PM Mar 28, 2
nter F	req 2.402	500000 GHz	PNO: Wide 🖵 IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Type:	Log-Pwr	TRACE 1 2 3 TYPE M WMM DET P P P
dB/div	Ref Offset Ref 8.36					MI	r2 2.403 016 G -0.306 dE
4			1		2		
			$\sim\sim\sim\sim$		$\sim$	m	
		~~~~~		v~~ ~			· ~
							- Von
<u>~~</u>							
; 							
; 							
i							
L	402500 GH	17					Span 3.000 M
	30 kHz	12	#VB\	N 100 kHz		Sweep	o 3.200 ms (1001 p
MODE T		×	Y	FUNCTION	FUNCTION WIDTH	F	JNCTION VALUE
N 1 N 1	l f f	2.402 017 G 2.403 016 G					
) (

CH00 -3Mbps



CH39 -3Mbps



CH78 -3Mbps



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8. BANDWIDTH TEST

8.1 LIMIT

FCC Part15 15.247,Subpart C						
Section Test Item Limit FrequencyRange (MHz) Result						
15.247 (a)(1)	Bandwidth	(20dB bandwidth)	2400-2483.5	PASS		

Spectrum Parameter	Setting	
Attenuation	Auto	
Span Frequency	> Measurement Bandwidth or Channel Separation	
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)	
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)	
Detector	Peak	
Trace	Max Hold	
Sweep Time Auto		

8.2 TEST PROCEDURE

a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

b. Spectrum Setting : RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP

EUT	SPECTRUM
	ANALYZER

8.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



8.5 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	50%
Test Mode:	GFSK(1Mbps) CH00 / CH39 / C78	Test Voltage:	DC 12V

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	0.909	PASS
2441 MHz	0.879	PASS
2480 MHz	0.867	PASS

CH00 -1Mbps

gilent Spectrum Analyzer - Occupied B RL RF 50 Ω AC		ENSE:PULSE	ALIGNAUTO	04:26:52 PM Mar 28, 2019
enter Freq 2.40200000		Center Freq: 2.402000		Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold:>10/10	Radio Device: BTS
dB/div Ref 20.00 dBn	ı			
og				
0.0				
).00		m		
0.0				
0.0	~~~~~~			~
0.0	/			- Jung
0.0				
0.0				
0.0				
0.0				
0.0				
enter 2.402 GHz	·		· · ·	Span 2 MH
Res BW 30 kHz		#VBW 100 k	Hz	Sweep 2.733 m
Occupied Bandwidt	h	Total Power	9.07 dBm	
	38.15 kHz			
0	50. 15 KHZ			
Transmit Freq Error	21.608 kHz	OBW Power	99.00 %	
x dB Bandwidth	909.4 kHz	x dB	-20.00 dB	
	303.4 KHZ	A GD	-20.00 00	
1				
G			STATUS	

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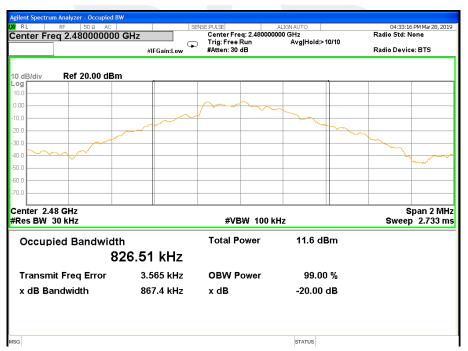
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CH39 -1Mbps



CH78 -1Mbps



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Temperature:	25 ℃	Relative Humidity:	50%
	π/4-DQPSK(2Mbps) CH00 / CH39 / C78	Test Voltage:	DC 12V

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.195	PASS
2441 MHz	1.217	PASS
2480 MHz	1.216	PASS

CH00 -2Mbps

Agilent Spectrum Analyzer - Occupied BV				
X RL RF 50 Ω AC Center Freq 2.402000000		Center Freq: 2.402000		04:49:38 PM Mar 28, 2019 Radio Std: None
· · · · · · · · · · · · · · · · · · ·	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold:>10/10	Radio Device: BTS
10 dB/div Ref 20.00 dBm	1			
Log 10.0				
0.00				
-10.0		h		
-20.0	$\sim\sim$			~
-30.0				
-40.0				
-50.0				
-60.0				
-70.0				
Center 2.402 GHz			···	Span 2 MHz
#Res BW 30 kHz		#VBW 100 k	Hz	Sweep 2.733 ms
Occupied Bandwidt	h	Total Power	5.39 dBm	
1.1	1544 MHz			
Transmit Freq Error	12.170 kHz	OBW Power	99.00 %	
x dB Bandwidth	1.195 MHz	x dB	-20.00 dB	
MSG			STATUS	

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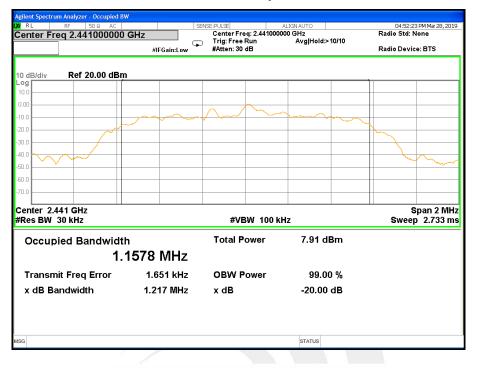
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CH39 -2Mbps



CH78 -2Mbps





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Temperature:	25 ℃	Relative Humidity:	50%
LOST MICODO.	8DPSK(3Mbps) CH00 / CH39 / CH78	Test Voltage:	DC 12V

Frequency	20dB Bandwidth (MHz)	Result	
2402 MHz	1.206	PASS	
2441 MHz	1.207	PASS	
2480 MHz	1.206	PASS	

CH00 -3Mbps

Agilent Spectrum Analyzer - Occupied B				
M RL RF 50 Ω AC Center Freq 2.402000000		ENSE:PULSE Center Freq: 2.402000		04:58:35 PM Mar 28, 2019 Radio Std: None
	#IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Hold:>10/10	Radio Device: BTS
10 dB/div Ref 20.00 dBr	n			
10.0				
0.00				
-10.0			m	
-20.0				n h
-30.0				
-50.0				
-60.0				
-70.0				
Center 2.402 GHz				Span 2 MHz
#Res BW 30 kHz		#VBW 100 k	(Hz	Sweep 2.733 ms
Occupied Bandwidt	h	Total Power	5.65 dBm	
1.	1430 MHz			
Transmit Freq Error	26.283 kHz	OBW Power	99.00 %	
x dB Bandwidth	1.206 MHz	x dB	-20.00 dB	
MSG			STATUS	
			11	

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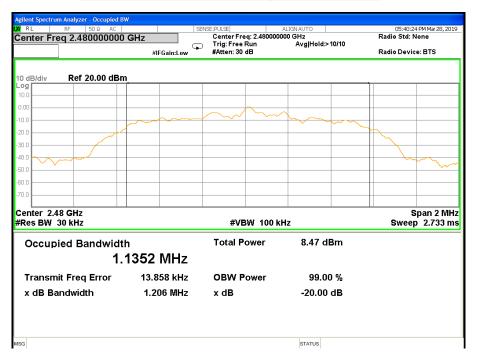
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9. OUTPUT POWER TEST

9.1 LIMIT

FCC Part 15.247,Subpart C					
Section	Test Item	Limit	FrequencyRange (MHz)	Result	
15.247	Output	1 W or 0.125W if channel separation >	2400-2483.5	PASS	
(a)(1)&(b)(1) Power	Power	2/3 bandwidthprovided thesystems operatewith an output power no greater than125 mW(20.97dBm)	2100 2100.0		

9.2 TEST PROCEDURE

a. The EUT was directly connected to the Power Sensor&PC

9.3 TEST SETUP

EUT Power s	ensor PC
-------------	----------

9.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



9.5 TEST RESULTS

Temperature:	25℃	Relative Humidity:	60%
Test Voltage:	DC 12V		

Mode	Channel	Frequency	Peak Power	Average Power	Limit
	Number (MHz)	(dBm)	(dBm)	(dBm)	
	0	2402	3.91	-1.58	30.00
GFSK(1M)	39	2441	5.01	-1.01	30.00
	78	2480	5.11	1.23	30.00

Note: the channel separation >20dB bandwidth

Mode	Channel	Frequency	Peak Power	Average Power	Limit
	Number (MHz)	(dBm)	(dBm)	(dBm)	
π/4-DQPSK(2bps)	0	2402	1.17	-5.88	20.97
	39	2441	1.75	-5.38	20.97
	78	2480	2.42	-4.69	20.97

Note: the channel separation >2/3 20dB bandwidth

Mode	Channel		Peak Power	Average Power	Limit
	Number		(dBm)	(dBm)	(dBm)
	0	2402	1.82	-5.95	20.97
8-DPSK(3Mb ps)	39	2441	2.21	-5.52	20.97
, po)	78	2480	2.90	-4.78	20.97

Note: the channel separation >2/3 20dB bandwidth



10. ANTENNA REQUIREMENT

10.1 STANDARD 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 party shall be used with the device.

10.2 EUT ANTENNA

The EUT antenna is PCB Antenna. It comply with the standard requirement.



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APPENDIX-PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

* * * * * END OF THE REPORT * * * * *



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