

# **RADIO TEST REPORT**

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# Report No:STS1806138W03

Issued for

# KINGTA TECHNOLOGY CO., LTD

4F, Building 2, HaoJingDa Science Park, Shangmugu, Shenzhen, China

Product Name:	Bluetooth Speaker
Brand Name:	N/A
Model Name:	F2
Series Model:	TY-WSP200, TY-WSP201, OWL-BTSP06, BLG-SPLASH, Pro Sound, EPIC 3
FCC ID:	N7KF2
Test Standard:	FCC Part 15.247

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# **TEST RESULT CERTIFICATION**

Applicant'sname	KINGTA TECHNOLOGY CO., LTD
Address	4F, Building 2, HaoJingDa Science Park,Shangmugu,Shenzhen, China
Manufacture's Name:	KINGTA TECHNOLOGY CO., LTD
Address	4F, Building 2, HaoJingDa Science Park,Shangmugu,Shenzhen, China
Product description	
Product Name:	Bluetooth Speaker
Brand Name:	N/A
Model Name:	F2
Series Model	TY-WSP200, TY-WSP201, OWL-BTSP06, BLG-SPLASH, Pro Sound, EPIC 3
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 .: 14 June 2018 ~21 June 2018

Date of Issue ..... 25 June 2018

Test Result ..... Pass

Testing Engineer

(Chris chen)

Technical Manager

Jean Sh



APPROVAL APPROVAL

Authorized Signatory :

(Vita Li)

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# **Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	25 June 2018	STS1806138W03	ALL	Initial Issue



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# 1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: DA 00-705

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

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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 CNAS Registration No.: L7649; FCC Registration No.: 625569 IC Registration No.: 12108A; 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** % °

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No.	Item	Uncertainty
1	Conducted Emission (9KHz-150KHz)	±2.88dB
2	Conducted Emission (150KHz-30MHz)	±2.67dB
3	RF power,conducted	±0.71dB
4	Spurious emissions, conducted	±0.63dB
5	All emissions,radiated (9KHz-30MHz)	±3.02dB
6	All emissions,radiated (30MHz-200MHz)	±3.80dB
7	All emissions,radiated (200MHz-1000MHz)	±3.97dB
8	All emissions,radiated(>1G)	±3.03dB

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# 2. GENERAL INFORMATION

# 2.1 GENERAL DESCRIPTION OF EUT

Product Name	Bluetooth Speaker
Trade Name	N/A
Model Name	F2
Series Model	TY-WSP200,TY-WSP201,OWL-BTSP06, BLG-SPLASH, Pro Sound, EPIC 3
Model Difference	Only different in model name
Channel List	Please refer to the Note 2.
Bluetooth	Frequency:2402 – 2480 MHz Modulation: GFSK(1Mbps), π/4-DQPSK(2Mbps), 8DPSK(3Mbps)
Battery	Battery(rating): Rated Voltage: 3.7V Charge Limit: 4.2V Capacity: 2000mAh
Hardware version number	F2-3260-2725-MAIN-V4
Software version number	F2-V1.3
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.

Channel 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	N/A	F2	PCB Antenna	N/A	0	BT Antenna

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### 2.2 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.

Description	Data Rate/Modulation
TX CH00	1Mbps/GFSK
TX CH39	1Mbps/GFSK
TX CH78	1Mbps/GFSK
TX CH00	2 Mbps/π/4-DQPSK
TX CH39	2 Mbps/π/4-DQPSK
TX CH78	2 Mbps/π/4-DQPSK
TX CH00	3 Mbps/8DPSK
TX CH39	3 Mbps/8DPSK
TX CH78	3 Mbps/8DPSK
	TX CH00         TX CH39         TX CH78         TX CH00         TX CH39         TX CH39         TX CH78         TX CH78         TX CH78         TX CH78         TX CH78         TX CH78         TX CH39         TX CH78         TX CH39

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 MHz				
(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		



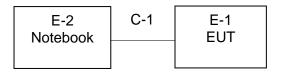
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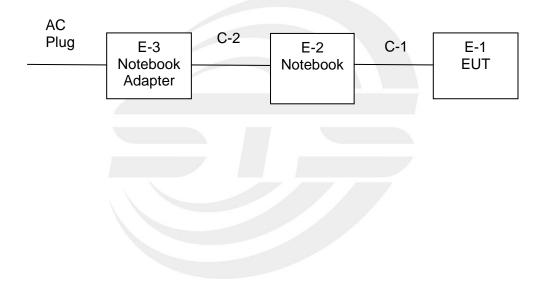
### 2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

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 EmissionTest



# Conducted Emission Test



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# 2.5 DESCRIPTION OF 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	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

Item	Shielded Type	Ferrite Core	Length	Note
C-1	USB Cable	NO	100cm	N/A
C-2	DC Cable	NO	90cm	N/A

Note:

- (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 <sup>r</sup> Length <sup>a</sup> column.
- (3) "YES" is means "shielded" "with core"; "NO" is means "unshielded" "without core".



# 2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

#### Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until			
EMI Test Receiver	R&S	ESCI	102086	2017.10.15	2018.10.14			
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2018.11.01			
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-1343	2017.10.27	2018.10.26			
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	N/A	2018.03.11	2019.03.10			
Temperature & Humitidy	HH660	Mieo	N/A	2017.10.15	2018.10.14			
Temperature & Humitidy	HH660	Mieo	N/A	2017.10.15	2018.10.14			
Pre-mplifier (0.1M-3GHz)	EM	EM330	60538	2018.03.11	2019.03.10			
PreAmplifier (1G-26.5GHz)	Agilent	8449B	60538	2017.10.15	2018.10.14			
Passive Loop (9K30MHz)	ZHNAN	ZN3090C	16035	2018.03.11	2019.03.10			
Low frequency cable	EM	R01	N/A	2018.03.11	2019.03.10			
Low frequency cable	EM	R06	N/A	2018.03.11	2019.03.10			
High frequency cable	SCHWARZBECK	R04	N/A	2018.03.11	2019.03.10			
High frequency cable	SCHWARZBECK	R02	N/A	2018.03.11	2019.03.10			
Semi-anechoic chamber	Changling	966	N/A	2017.10.15	2018.10.14			
trun table	EM	SC100_1	60531	N/A	N/A			
Antnna mast	EM	SC100	N/A	N/A	N/A			
Max-full Antenna Corp	MF	MFA-440H	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	2017.10.15	2018.10.14
LISN	R&S	ENV216	101242	2017.10.15	2018.10.14
conduction Cable	EM	C01	N/A	2018.03.11	2019.03.10
Temperature & Humitidy	Mieo	HH660	N/A	2017.10.15	2018.10.14

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### **RF** Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15100041SNO03	2017.10.15	2018.10.14
Power Meter	R&S	NRP	100510	2017.10.15	2018.10.14
Spectrum Analyzer	Agilent	N9020A	MY51110105	2018.03.08	2019.03.07
Signal Analyzer	Agilent	N9020A	MY49100060	2017.10.15	2018.10.14



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### **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.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)		
	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

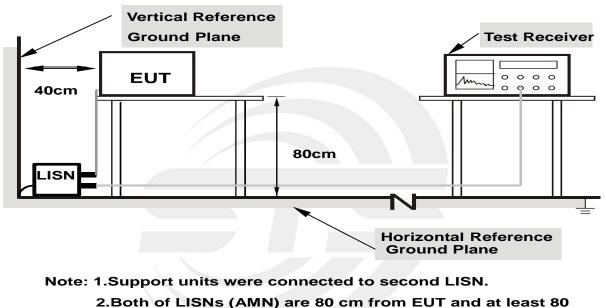
Receiver Parameters	Setting		
Attenuation	10 dB		
Start Frequency	0.15 MHz		
Stop Frequency	30 MHz		
IF Bandwidth	9 kHz		

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# 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

### 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.

from other units and other metal planes



# 3.1.5 TEST RESULT

Temperature:	<b>25.5℃</b>	Relative Humidity:	63%
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 10		

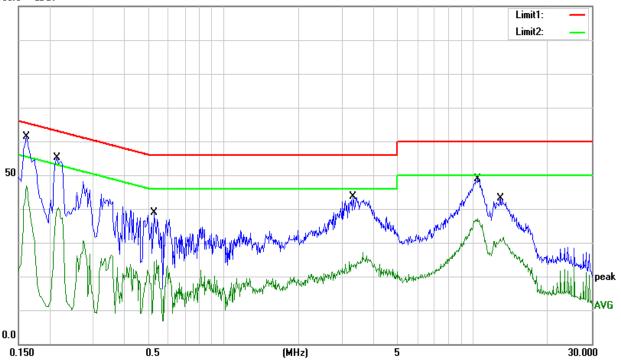
Frequency	Reading	Correct	Result	Limit	Margin	Domorik
(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	Remark
0.1620	51.47	9.79	61.26	65.36	-4.10	QP
0.1620	37.02	9.79	46.81	55.36	-8.55	AVG
0.2140	45.25	9.84	55.09	63.05	-7.96	QP
0.2140	30.57	9.84	40.41	53.05	-12.64	AVG
0.5260	28.88	10.01	38.89	56.00	-17.11	QP
0.5260	14.78	10.01	24.79	46.00	-21.21	AVG
3.2980	33.83	9.82	43.65	56.00	-12.35	QP
3.2980	13.40	9.82	23.22	46.00	-22.78	AVG
10.4940	38.64	10.21	48.85	60.00	-11.15	QP
10.4940	26.07	10.21	36.28	50.00	-13.72	AVG
12.9020	32.85	10.22	43.07	60.00	-16.93	QP
12.9020	20.08	10.22	30.30	50.00	-19.70	AVG

### Remark:

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

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

100.0 dBu¥



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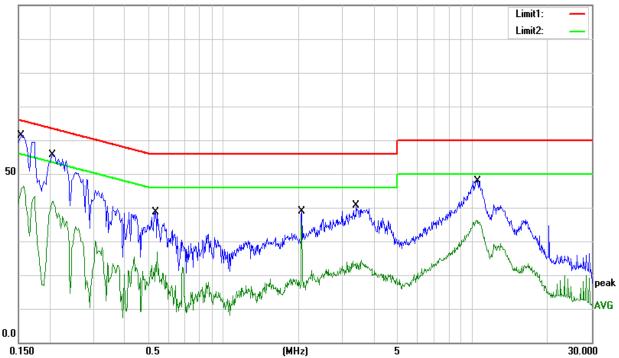
Temperature:	23.5 °C	Relative Humidity:	63%
Test Voltage:	AC 120V/60Hz	Phase:	Ν
Test Mode:	Mode 10		

Frequency	Reading	Correct	Result	Limit	Margin	Domork
(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	Remark
0.1540	51.57	9.79	61.36	65.78	-4.42	QP
0.1540	36.59	9.79	46.38	55.78	-9.40	AVG
0.2083	45.61	9.82	55.43	63.27	-7.84	QP
0.2083	31.33	9.82	41.15	53.27	-12.12	AVG
0.5340	28.62	10.00	38.62	56.00	-17.38	QP
0.5340	16.79	10.00	26.79	46.00	-19.21	AVG
2.0580	28.99	9.79	38.78	56.00	-17.22	QP
2.0580	25.93	9.79	35.72	46.00	-10.28	AVG
3.4020	30.73	9.82	40.55	56.00	-15.45	QP
3.4020	12.60	9.82	22.42	46.00	-23.58	AVG
10.4820	37.70	10.21	47.91	60.00	-12.09	QP
10.4820	25.08	10.21	35.29	50.00	-14.71	AVG

### Remark:

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

100.0 dBuV





# 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 Dist	
(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 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

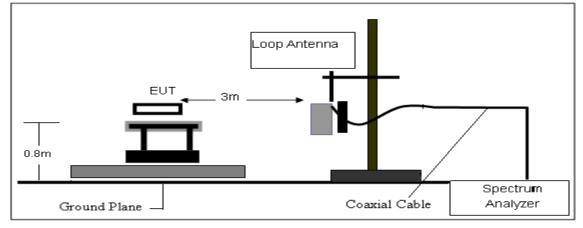
No deviation



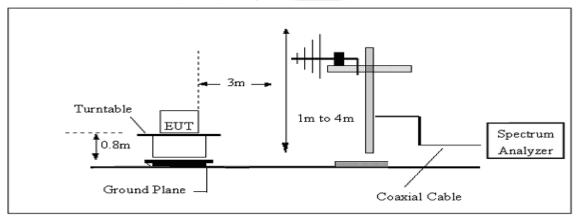


# 3.2.4 TESTSETUP

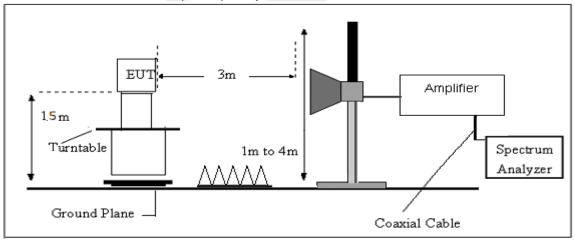
# (A) Radiated Emission Test-Up Frequency Below 30MHz



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



(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.

Shenzhen STS Test Services Co., Ltd.



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# 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



Shenzhen STS Test Services Co., Ltd.



Report No.: STS1806138W03

# 3.2.7 TEST RESULTS

### (9KHz-30MHz)

Temperature:	<b>25.5</b> ℃	Relative Humidity:	63%
Test Voltage:	DC 3.7V from battery	Test Mode:	TX Mode

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





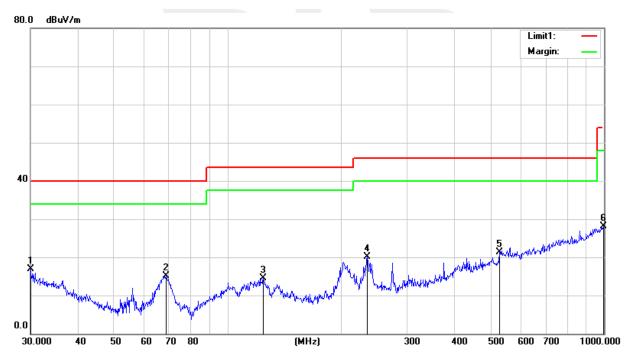
# (30MHz-1000MHz)

Temperature:	<b>25.5</b> ℃	Relative Humidity:	62%	
Test Voltage:	DC 3.7V from battery	Phase:	Horizontal	
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode 7-3M worst mode)			

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
30.0000	28.18	-11.19	16.99	40.00	-23.01	QP
68.6310	39.24	-24.14	15.10	40.00	-24.90	QP
124.5690	32.13	-17.63	14.50	43.50	-29.00	QP
234.9910	38.25	-18.12	20.13	46.00	-25.87	QP
528.2458	29.41	-8.09	21.32	46.00	-24.68	QP
996.4996	28.14	-0.09	28.05	54.00	-25.95	QP

#### Remark:

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



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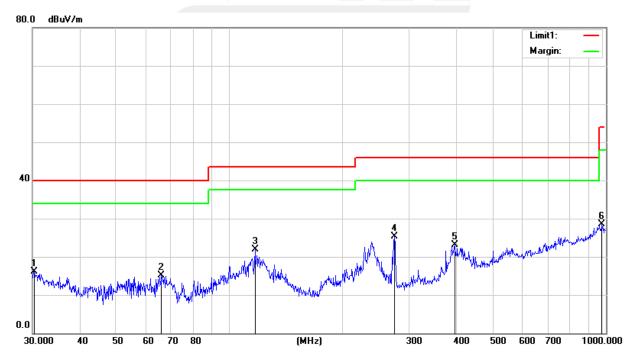
Report No.: STS1806138W03

Temperature:	<b>25.5</b> ℃	Relative Humidity:	62%
Test Voltage:	DC 3.7V from battery	Phase:	Vertical
Test Mode:	Mode 1/2/3/4/5/6/7/8/9(Mode	7-3M worst mode)	

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
30.3173	27.52	-11.35	16.17	40.00	-23.83	QP
66.0342	39.37	-24.20	15.17	40.00	-24.83	QP
116.9495	39.80	-17.88	21.92	43.50	-21.58	QP
274.1940	40.99	-15.61	25.38	46.00	-20.62	QP
396.2415	34.61	-11.48	23.13	46.00	-22.87	QP
975.7530	28.60	-0.14	28.46	54.00	-25.54	QP

### Remark:

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





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Report No.: STS1806138W03

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

# **GFSK Low Channel**

				Antenna	Corrected	Emission				
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	( <b>dB</b> )	(dB)	( <b>dB/m</b> )	( <b>dB</b> )	(dBµV/m)	(dBµV/m)	(dB)	Туре	
				Low	Channel (2402 I	//Hz)				
3264.77	48.94	44.70	6.70	28.20	-9.80	39.14	74.00	-34.86	PK	Vertical
3264.77	38.40	44.70	6.70	28.20	-9.80	28.60	54.00	-25.40	AV	Vertical
3264.58	48.78	44.70	6.70	28.20	-9.80	38.98	74.00	-35.02	PK	Horizontal
3264.58	37.86	44.70	6.70	28.20	-9.80	28.06	54.00	-25.94	AV	Horizontal
4804.42	59.52	44.20	9.04	31.60	-3.56	55.96	74.00	-18.04	PK	Vertical
4804.42	38.15	44.20	9.04	31.60	-3.56	34.59	54.00	-19.41	AV	Vertical
4804.42	59.18	44.20	9.04	31.60	-3.56	55.62	74.00	-18.38	PK	Horizontal
4804.42	38.17	44.20	9.04	31.60	-3.56	34.61	54.00	-19.39	AV	Horizontal
5359.89	46.10	44.20	9.86	32.00	-2.34	43.76	74.00	-30.24	PK	Vertical
5359.89	37.67	44.20	9.86	32.00	-2.34	35.33	54.00	-18.67	AV	Vertical
5359.75	45.97	44.20	9.86	32.00	-2.34	43.63	74.00	-30.37	PK	Horizontal
5359.75	37.14	44.20	9.86	32.00	-2.34	34.80	54.00	-19.20	AV	Horizontal
7205.78	51.45	43.50	11.40	35.50	3.40	54.85	74.00	-19.15	PK	Vertical
7205.78	33.40	43.50	11.40	35.50	3.40	36.80	54.00	-17.20	AV	Vertical
7205.85	51.37	43.50	11.40	35.50	3.40	54.77	74.00	-19.23	PK	Horizontal
7205.85	33.58	43.50	11.40	35.50	3.40	36.98	54.00	-17.02	AV	Horizontal

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# **GFSK Mid Channel**

				Antenna	Corrected	Emission				
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBµV)	(dB)	(dB)	( <b>dB/m</b> )	( <b>dB</b> )	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment
				Mid	Channel (2441 M	//Hz)				
3264.81	48.06	44.70	6.70	28.20	-9.80	38.26	74.00	-35.74	PK	Vertical
3264.81	39.67	44.70	6.70	28.20	-9.80	29.87	54.00	-24.13	AV	Vertical
3264.82	48.63	44.70	6.70	28.20	-9.80	38.83	74.00	-35.17	PK	Horizontal
3264.82	38.69	44.70	6.70	28.20	-9.80	28.89	54.00	-25.11	AV	Horizontal
4882.40	58.55	44.20	9.04	31.60	-3.56	54.99	74.00	-19.01	PK	Vertical
4882.40	39.19	44.20	9.04	31.60	-3.56	35.63	54.00	-18.37	AV	Vertical
4882.45	58.85	44.20	9.04	31.60	-3.56	55.29	74.00	-18.71	PK	Horizontal
4882.45	38.97	44.20	9.04	31.60	-3.56	35.41	54.00	-18.59	AV	Horizontal
5359.70	45.53	44.20	9.86	32.00	-2.34	43.19	74.00	-30.81	PK	Vertical
5359.70	38.02	44.20	9.86	32.00	-2.34	35.68	54.00	-18.32	AV	Vertical
5359.73	45.38	44.20	9.86	32.00	-2.34	43.04	74.00	-30.96	PK	Horizontal
5359.73	37.36	44.20	9.86	32.00	-2.34	35.02	54.00	-18.98	AV	Horizontal
7313.95	51.76	43.50	11.40	35.50	3.40	55.16	74.00	-18.84	PK	Vertical
7313.95	32.64	43.50	11.40	35.50	3.40	36.04	54.00	-17.96	AV	Vertical
7313.77	51.65	43.50	11.40	35.50	3.40	55.05	74.00	-18.95	PK	Horizontal
7313.77	33.61	43.50	11.40	35.50	3.40	37.01	54.00	-16.99	AV	Horizontal

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# **GFSK High Channel**

				Antenna	Corrected	Emission				
Frequency	Reading	Amplifier	Loss	Factor	Factor	Level	Limits	Margin	Detector	
(MHz)	(dBµV)	( <b>dB</b> )	(dB)	( <b>dB/m</b> )	( <b>dB</b> )	(dBµV/m)	(dBµV/m)	(dB)	Туре	Comment
				High	Channel (2480	MHz)				
3264.65	48.11	44.70	6.70	28.20	-9.80	38.31	74.00	-35.69	PK	Vertical
3264.65	38.13	44.70	6.70	28.20	-9.80	28.33	54.00	-25.67	AV	Vertical
3264.64	47.91	44.70	6.70	28.20	-9.80	38.11	74.00	-35.89	PK	Horizontal
3264.64	37.88	44.70	6.70	28.20	-9.80	28.08	54.00	-25.92	AV	Horizontal
4960.43	58.26	44.20	9.04	31.60	-3.56	54.70	74.00	-19.30	PK	Vertical
4960.43	38.38	44.20	9.04	31.60	-3.56	34.82	54.00	-19.18	AV	Vertical
4960.50	58.80	44.20	9.04	31.60	-3.56	55.24	74.00	-18.76	PK	Horizontal
4960.50	38.96	44.20	9.04	31.60	-3.56	35.40	54.00	-18.60	AV	Horizontal
5359.83	46.37	44.20	9.86	32.00	-2.34	44.03	74.00	-29.97	PK	Vertical
5359.83	37.23	44.20	9.86	32.00	-2.34	34.89	54.00	-19.11	AV	Vertical
5359.57	45.53	44.20	9.86	32.00	-2.34	43.19	74.00	-30.81	PK	Horizontal
5359.57	38.13	44.20	9.86	32.00	-2.34	35.79	54.00	-18.21	AV	Horizontal
7439.82	50.53	43.50	11.40	35.50	3.40	53.93	74.00	-20.07	PK	Vertical
7439.82	33.74	43.50	11.40	35.50	3.40	37.14	54.00	-16.86	AV	Vertical
7439.72	50.75	43.50	11.40	35.50	3.40	54.15	74.00	-19.85	PK	Horizontal
7439.72	32.98	43.50	11.40	35.50	3.40	36.38	54.00	-17.62	AV	Horizontal

Note:

3)

- 1) Scan with GFSK,  $\pi$ /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.

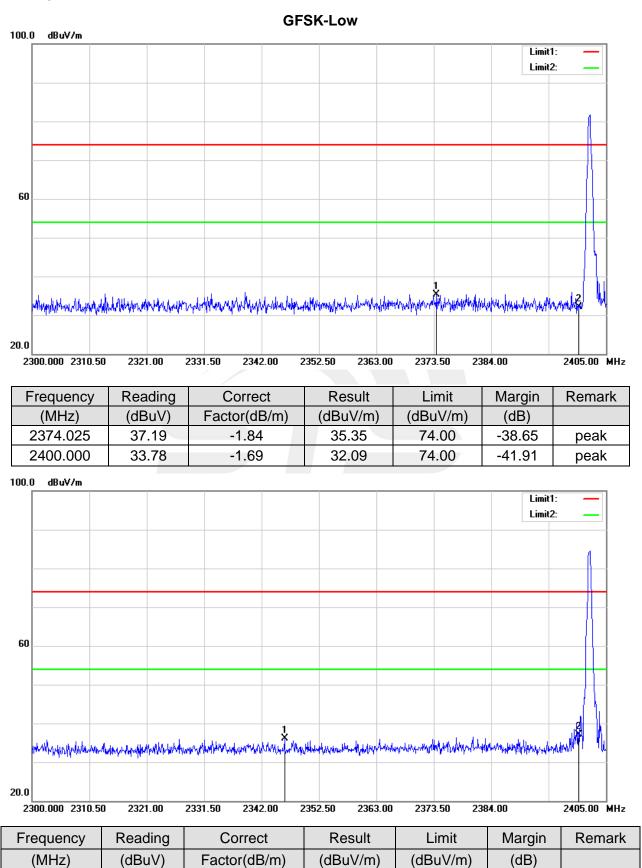
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### Band edge Requirements



V:

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38.35

39.02

-2.27

-1.97

36.08

37.05

2346.200

2400.000

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

-37.92

-36.95

peak

peak

74.00

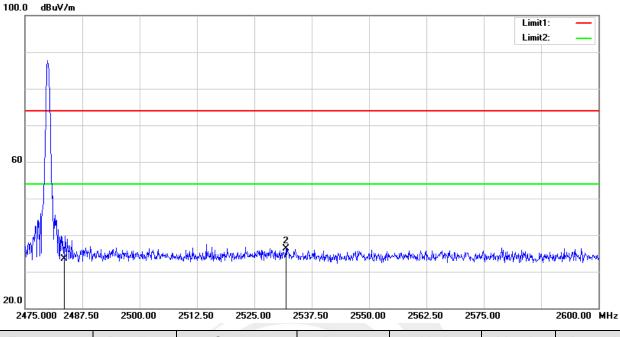
74.00



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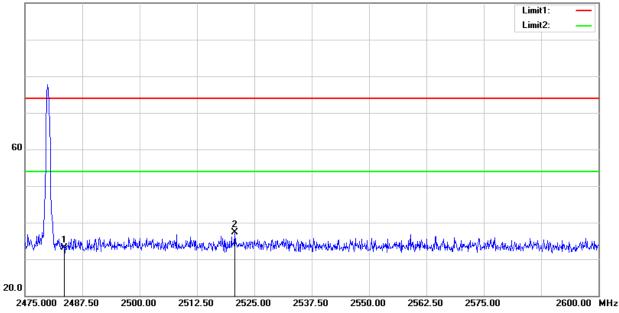
Report No.: STS1806138W03

### **GFSK-High**



Frequency	Reading	Correct	Result	Limit	Margin	Remark				
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)					
2483.500	34.77	-1.20	33.57	74.00	-40.43	peak				
2531.875	37.29	-0.98	36.31	74.00	-37.69	peak				

100.0 dBuV/m



V	•
v	

H:

2473.000 2407.30	2300.00	2312.30 2323.00 2	.337.30 2330.00	2302.30 2.	11 3.00	2000.00 MI12
Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
2483.500	34.59	-1.50	33.09	74.00	-40.91	peak
2520.750	38.57	-1.34	37.23	74.00	-36.77	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.

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# 4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

### 4.1 REQUIREMENT

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

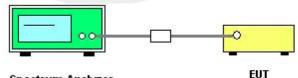
Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

### For Band edge

Spectrum Parameter	Setting				
Detector	Peak				
Stort/Stop Fragueney	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



### Spectrum Analyzer

The EUT is coupled 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

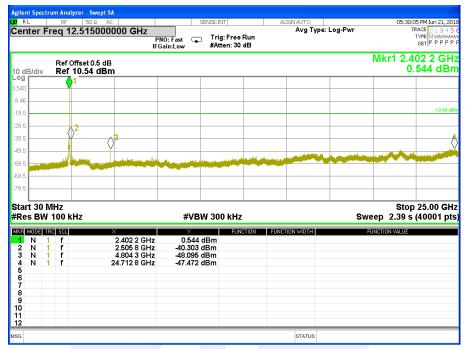
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.



# 4.5 TEST RESULTS

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Test Mode:	GFSK(1Mbps)-00/39/78 CH	Test Voltage:	DC 3.7V

# 00 CH



# 39 CH

RL	RF	e <mark>r - Swept SA</mark> 50 Ω AC		S	ENSE:INT		ALIGN AUTO		05:32	:38 PM Jun 21.
		51500000	PN	0: Fast 😱 ain:Low	Trig: Free #Atten: 30			e: Log-Pwr		TRACE 1 2 3 4 TYPE M WWW DET P P P
dB/div		set 0.5 dB 41 dBm							Mkr1 2.4	140 9 G 0.232 di
	<b>\</b> 1									
i										-20.5
	2									
	<u> </u>									
			lation of the state						a share a shar	
rt 30 M es BW	1Hz 100 kH	z		#VBV	V 300 kHz	:		Sv	Sto /eep 2.39 s	p 25.00 C
MODE TR		×		Y		CTION FUI	NCTION WIDTH		FUNCTION VALUE	
N 1 N 1 N 1	f f f	2.	440 9 GHz 545 1 GHz 322 5 GHz 681 6 GHz	-0.232 c -43.052 c -47.585 c -48.338 c	IBm IBm					

П



# 78 CH

t L	RF		AC		SENSE:INT	AL	IGN AUTO			33 PM Jun 21
nter F	req ′	12.51500		PNO: Fast Gain:Low	Trig: Free #Atten: 30		Avg Type:	Log-Pwr		TYPE MWW DET P P F
IB/div		Offset 0.5 d							Mkr1 2.4 0.	80 2 C .419 d
	(	1								
										-19.3
		2		3						
í 📃		Y					a second a	an an an an Antonia (1977)		
i										
rt 30 es BW	MHz / 100	kHz	·	#VB	W 300 kHz		·	Swe	Stop ep 2.39 s	25.00 (40001
	TRC SCL		×	Y		CTION FUNCT	TION WIDTH	FL	JNCTION VALUE	
N	1 f 1 f		2.480 2 GHz 2.502 0 GHz	0.419 -46.121						
	1 f 1 f		7.439 2 GHz 24.657 9 GHz	-43.939 -46.910						



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### For Band edge

00 CH

Tria: Free Run	
Ref Offset 0.5 dB         Mkr1 2.401 97           0 dB/div         Ref 11.33 dBm         1.326           13         1         1         1           13         1         1         1         1           13         1         1         1         1         1           13         1         1         1         1         1         1           137         1	1 Jun 21, 2
0 B/div       Ref 11.33 dBm       1.328         03       1       1         03       1       1         04       1       1         05       1       1         06       1       1         07       1       1         08       1       1         07       1       1         08       1       1         09       1       1         09       1       1         09       1       1         100       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1         110       1       1	PPPP
33	
ar 2.30000 GHz Stop 2.403	
77     <	
77     2 </td <td>-1863</td>	-1863
7.7         1	Å
7.7 .7.7 art 2.30000 GHz Stop 2.403	and the
7.7 .7.7 art 2.30000 GHz Stop 2.403	
art 2.30000 GHz Stop 2.403	
R MODE TRC SCL X Y FUNCTION FUNCTION WIDTH FUNCTION VALUE	p
N 1 f 2.401 970 GHz 1.328 dBm 2 N 1 f 2.390 022 GHz -41.584 dBm 3 N 1 f 2.398 365 GHz -25.203 dBm	
STATUS	

78 CH



=



# For Hopping Band edge

00 CH

gilent Spec															
enter			50 Ω AC 15000(	00 GHz		10: Fast jain:Low		SE:INT Trig: Free #Atten: 30	Run dB	AL	IGNAUTO Avg Tyj	pe: Log-Pv			I3:08 PM Jun 21, 2 TRACE 1 2 3 4 TYPE M WAWA DET P P P P
0 dB/div		ef Offset ef 11.1	t0.5 dB   <b>4 dBm</b>	ı									M		)2 897 GI 1.143 dB
.og 1.14															
8.86															-103
18.9	0000	0.060.00	0.000.00	0000000			_							<u> </u>	2 http
18.9 <b>         </b> 18.9	<b>WW</b>	VV VV	WWW	WWW	WW W		ANA	MMM	WWW	ከለለአሳ	Varman	wymater allo	verytyner	44 martine	
8.9															
8.9															
tart 2.3 Res BV						#	VBW	300 kHz					Swe		2.40300 G ns (1001 p
86 MODE 1 N 2 N 3 N 4 5	TRC S 1 1 1 1 1 1	,	2. 2.	8 402 897 G 390 022 G 398 159 G	Hz	-40.9	143 dB 950 dB 581 dB	m m	CTION	FUNCT	ION WIDTH		FL	UNCTION VALUE	
6 7 8 9 0 1															
<b>2</b> G											STATUS				

78 CH

RL	RF	lyzer - Swept SA 50 Ω AC			SENSE:INT		ALIGN	IAUTO			2 PM Jun 21, 2
enter F	req 2	.48950000		PNO: Fast 🕞 FGain:Low	Trig: Free #Atten: 30			Avg Type:	Log-Pwr		RACE 1 2 3 4 TYPE M WAW DET P P P P
dB/div		Offset 0.5 dB 10.77 dBm	I						MI	(r1 2.479 0.	966 GI 768 dB
.2		Mary Mary 10	$\langle \rangle^2 \wedge$	.3							-19.23
.2	Un/	r was way	Www.www.	mann	LVMmov	man	www.	ᢦᢦᡊ <sub>ᠣ</sub> ᡘᢦ᠇ᠬᡐᡐᢦ	mm	n. Annanana	h
2	-										
.2											
art 2.47 es BW				#VB	W 300 kH:	z			Swee	Stop 2. p 2.07 ms	50000 G s (1001 p
r Mode Tr	f		479 966 GHz		dBm	NCTION	FUNCTION	I WIDTH	FL	NCTION VALUE	
N 1 N 1			483 809 GHz 485 069 GHz								
1											



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### Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Test Mode:	π/4-DQPSK(2Mbps)– 00/39/78 CH	Test Voltage:	DC 3.7V

RE RF 50	Ω AC	SENSE: INT		ALIGN AUTO	05:47:35 PM Jun 21
ter Freq 12.515	5000000 GHz	0: East 🕞 Trig:	Free Run n: 30 dB	Avg Type: Log	
Ref Offset 0					Mkr1 2.401 5 C -1.082 d
IB/div Ref 8.92					
					-21.
<sup>2</sup>					
all second se					
1 30 MHz					Stop 25.00
es BW 100 kHz		#VBW 300	kHz		Sweep 2.39 s (40001
MODE TRC SCL	× 2.401 5 GHz	-1.082 dBm	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
N 1 f N 1 f N 1 f N 1 f	2.401 5 GHz 2.610 0 GHz 4.803 6 GHz 24.439 4 GHz	-1.082 dBm -52.226 dBm -45.533 dBm -48.492 dBm			
				STATUS	
			СН		

### 00 CH

39	CH
00	OIT

	50 Ω AC		SENSE:INT	 ALIGN AUTO			36 PM Jun 21, 2
enter Freq 12	2.515000000 0	GHz PNO: Fa IFGain:Lo		Avg Type:	Log-Pwr	Т	RACE 1 2 3 4 TYPE MWAAA DET P P P P
	ffset 0.5 dB 6. <b>68 dBm</b>					Mkr1 2.4 -3.	40 9 G 316 dE
3							
.3							-23.32
3							
3	$\sqrt{2}$			an ability of	to to collisitude		
a malantalahali							
3				 			
.3				 			
						Stor	25.00 G
art 30 MHz	_				_		
es BW 100 kl			#VBW 300 kH			eep 2.39 s	
es BW 100 kl MODE TRC SCL N 1 f N 1 f	× 2.440 3.327 4.881	9 GHz -		CTION WIDTH			
es BW 100 kl MODE TEC SCL N 1 f N 1 f N 1 f	× 2.440 3.327 4.881	9 GHz -	-3.316 dBm 52.104 dBm 48.578 dBm	CTION WIDTH		eep 2.39 s	
es BW 100 kl MODE TEC SCL N 1 f N 1 f N 1 f	× 2.440 3.327 4.881	9 GHz -	-3.316 dBm 52.104 dBm 48.578 dBm	CTION WIDTH		eep 2.39 s	
es BW 100 kl 100e TEC SCL N 1 f N 1 f N 1 f	× 2.440 3.327 4.881	9 GHz -	-3.316 dBm 52.104 dBm 48.578 dBm	CTION WIDTH		eep 2.39 s	

Shenzhen STS Test Services Co., Ltd.



# 78 CH

RL	RF	l <b>yzer - Swept</b> 9 50 Ω A	C		SENSE:INT		ALIGNAUTO			19 PM Jun 21, 2
enter I	Freq 1	2.515000		PNO: Fast 🕞 Gain:Low	Trig: Free #Atten: 30		Avg Type	: Log-Pwr	1	RACE 1 2 3 4 TYPE MWAAA DET P P P P
dB/div		Offset 0.5 dB							Mkr1 2.4 -0	80 2 GI 899 dB
90	(	1								
).9										
1.9										-20.90
0.9	(	2	1	3						
1.9		ľ		(						
.9	Byel and an an	lautele states								
1.9										
).9										
art 30 Res BV		kHz		#VB	W 300 kH	z		Sw	Stop eep 2.39 s	25.00 G (40001 p
R MODE			Х	Y		NCTION FUI	NCTION WIDTH	f	UNCTION VALUE	
1 N 2 N	1 f 1 f		2.480 2 GHz 2.502 7 GHz	-0.899 -43.249						
3 N 4 N	1 f 1 f		7.439 8 GHz 24.728 5 GHz	-44.936 -47.514						
5			24.720 5 GHZ	-47.514	ubiii					
5										
3										
3										
3 9 0										



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## For Band edge

00 CH

		lyzer - Swept SA								
RL	RF	50 Ω AC			SENSE:INT		ALIGNAUTO Avg Type:	Lan Dum		09 PM Jun 21, 20 RACE 1 2 3 4 5
enter F	req 2	.351500000	P	NO: Fast 🕞 Gain:Low	Trig: Free #Atten: 30	Run dB	Avg Type.	Log-P wr	'	TYPE MWAWA DET P P P P F
0 dB/div		Offset 0.5 dB 10.25 dBm						N	1kr1 2.401 0.	970 GH 248 dBr
og 250										
9.75										
19.8										-{\ <mark>}</mark>
9.8									^ <b>2</b>	A
9.8							de anonaly market and	man and a second	mound	www.W-lear
9.8				mannan	whenamalenewiter	and the second states	ياسى بىلىك تىلىمى يوالۇ <sup>مىرى</sup> بىرىكى تەركەر كەركەرلەر		-	
9.8	- Morrie	and the second	http://philosofic.							
9.8										
tart 2.30	0000 C	GHz							Stop 2	.40300 GH
Res BW				#VB	W 300 kHz			Swe	eep 9.87 m	
KR MODE T		Х		Y		TION F	UNCTION WIDTH		FUNCTION VALUE	
1 N 2 N 3 N	f	2.39	01 970 GHz 90 022 GHz 98 056 GHz	0.248 -40.444 -24.602	dBm					
4 5 6 7										
7 3										
9 0										
1										
G							STATUS			
							STATUS			

78 CH



=



# For Hopping Band edge

00 CH

ent Spectrum Analy RL RF						
	50 Ω AC   .351500000 GH;	Z PNO: Fast IFGain:Low	SENSE:INT Trig: Free Rur #Atten: 30 dB	ALIGNAUTO Avg Type:		07:09:51 PM Jun 21, 2 TRACE 1 2 3 4 TYPE M WWW DET P P P P
	9.96 dBm				Mki	1 2.402 794 GH -0.042 dB
14						
.0						-20 A
0						<u>~</u> 2
0 <del>NYNYVYYYVN,</del> 0	man	www.wthmwww.	mmmm	Muna war war and the strange had	manadown	her what and a would
0						
0						
art 2.30000 G es BW 100 k		#VE	3W 300 kHz		Sweep	Stop 2.40300 G 9.87 ms (1001 p
NODE TRC SCL	×	A A A A A A A A A A A A A A A A A A A	FUNCTION	FUNCTION WIDTH	FUN	CTION VALUE
N 1 f N 1 f N 1 f	2.402 794 2.390 022 2.399 189	GHz -40.245				

78 CH

		ΟΩ ΑΟ		SENSE:INT	ALIGNAUTO	_		PM Jun 21,
ter F	req 2.489	500000 GHz	PNO: Fast G IFGain:Low	Trig: Free Run #Atten: 30 dB	Avg Type: L	.og-Pwr	Т	ACE 1 2 3 YPE M WAAA DET P P P
B/div	Ref Offset Ref 9.55					Mk	r1 2.479 -0.4	000 G 146 di
	~							
-	home a se	1h	A.3					-20.4
		and the second	$\nabla$	anon and the second	all and an and and	2-Paranosolwow	war and a start and a start and a start	mahar
	'900 GHz 100 kHz		#VI	BW 300 kHz		Swee	Stop 2.5 p 2.07 ms	
MODE  TF	f	× 2.479 000 0 2.483 536 0		FUNCTION 6 dBm 5 dBm	FUNCTION WIDTH	FUN	NCTION VALUE	
N 1		2.485 489 0						
	f							
N 1								
N 1	T							

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## Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Test Mode:	8DPSK(3Mbps) -00/39/78 CH	Test Voltage:	DC 3.7V

# 00 CH

RL		RF 50	Ω AC		SENSE:INT	A	LIGNAUTO		07:14:	56 PM Jun 21, 20
enter	Fre	q 12.515	5000000 GHz	PNO: Fast IFGain:Low	⊃ Trig: Free #Atten: 30	eRun )dB	Avg Type	: Log-Pwr		RACE 1 2 3 4 5 TYPE MWWWW DET P P P P F
dB/di		Ref Offset 0 Ref 8.98 (							Mkr1 2.4 -1	01 5 GH .016 dBr
.02		- <b>P</b> 1								
1.0										-21.02 d
1.0		- A2	<u>3</u>							
.0										
.0	a katala marka sa	and build		a state of the state				des anticipation of the second	and the second second	
.0										
1.0										
art 3										25 00 01
		z )0 kHz		#VE	300 kH	z		Sw	Stop eep 2.39 s	
Res B	W 10	00 kHz	× 2 401 5 CH	Y	FU	_	CTION WIDTH			25.00 GH (40001 pt
E MODE N N N N N N N N	W 10	0 kHz	X 2.401 5 GH 2.506 4 GH 4.803 0 GH 24.759 7 GH	z -1.016 z -42.521 z -45.193	dBm dBm dBm	_	CTION WIDTH		eep 2.39 s	
tes B N N N N N N N N	W 10 1 1 1	DOKHZ	2.401 5 GH 2.506 4 GH 4.803 0 GH	z -1.016 z -42.521 z -45.193	dBm dBm dBm	_	CTION WIDTH		eep 2.39 s	
Res B 1 N 2 N 3 N 4 N 5 7 3 9 0	W 10 1 1 1	DOKHZ	2.401 5 GH 2.506 4 GH 4.803 0 GH	z -1.016 z -42.521 z -45.193	dBm dBm dBm	_	CTION WIDTH		eep 2.39 s	
Res B N N N N N N N N N N N N N N N N N N N	W 10 1 1 1	DOKHZ	2.401 5 GH 2.506 4 GH 4.803 0 GH	z -1.016 z -42.521 z -45.193	dBm dBm dBm	_	STATUS		eep 2.39 s	

# 39 CH

		.nalyzer - Sv								
RL		KF 50 :			SENSE:INT		ALIGNAUTO Avg Type			12 PM Jun 21, 21 RACE 1 2 3 4
enter	Freq	12.515	6000000 GHz	PNO: Fast G	⊃ Trig: Free F #Atten: 30 o		Avg type	. Log-Pwr		TYPE MWAAMA DET P P P P
dB/div		ef Offset 0 ef 8.82 (							Mkr1 2.4 -1.	40 9 GI 178 dB
18		<b>1</b>								
.2										-21.18
.2			03							
.2		$\langle \rangle^2$								(Instantion of the second
.2		al horses,								
.2										
art 30 tes BV				#VB	W 300 kHz			Sv	Stop /eep 2.39 s	25.00 G (40001 p
R MODE	TRC SO		× 2.440 9 GH	z -1.178	dBm	TION FUN	CTION WIDTH		FUNCTION VALUE	
N N N	1 f 1 f 1 f		2.648 7 GH 4.881 7 GH 21.606 6 GH	z -52.349 z -47.723	dBm dBm					
i -										
1										
2							STATUS			



# 78 CH

	RE	a <mark>lyzer - Swept S</mark> 50 Ω Ad							07-10/	5 DM 3 04 - 00
enter		12.515000	000 GHz	PNO: Fast Gain:Low	ENSE:INT Trig: Free #Atten: 30	Run	IGNAUTO Avg Type:	Log-Pwr	т	85 PM Jun 21, 20 RACE 1 2 3 4 9 TYPE MWAAWA DET P P P P
0 dB/div		Offset 0.5 dB 8.02 dBm							Mkr1 2.4 -1.	80 2 GF .980 dB
. <b>og</b> 1.98	(	1								
2.0										-21.98 c
2.0										
2.0		2		3						(
2.0		-	وربي والمربع والمربية فالمتحرب والمرب		-	And the other sectors of				
2.0						na hAllin anific an a li				
2.0										
tart 30 Res Bl	MHz N 100	kHz		#VBI	N 300 kHz			Sw	Stop eep 2.39 s	25.00 Gi (40001 p
	TRC SCL		X	Y		TION FUNC	TION WIDTH	F	UNCTION VALUE	
1 N 2 N 3 N 4 N	TRC SCL 1 f 1 f 1 f 1 f		2.480 2 GHz 2.503 3 GHz 7.439 8 GHz 24.422 6 GHz	-1.980 ( -46.812 ( -44.646 ( -47.824 (	dBm dBm dBm	CTION FUNC	TION WIDTH	F	UNCTION VALUE	
1 N 2 N 3 N 4 N 5 7 3	1 f 1 f 1 f		2.480 2 GHz 2.503 3 GHz 7.439 8 GHz	-46.812 ( -44.646 (	dBm dBm dBm	CTION FUNC	TION WIDTH	F	UNCTION VALUE	
1 N 2 N 3 N	1 f 1 f 1 f		2.480 2 GHz 2.503 3 GHz 7.439 8 GHz	-46.812 ( -44.646 (	dBm dBm dBm	CTION FUNCT	TION WIDTH	F	UNCTION VALUE	



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## For Band edge

00 CH

		lyzer - Swept Si								
RL enter F	RF	50 Ω AC			SENSE:INT		ALIGNAUTO Avg Type:	Log-Pwr		29 PM Jun 21, 2 RACE 1 2 3 4
	1092			PNO: Fast 🕞 Gain:Low	Trig: Free #Atten: 30	Run dB		-		DET P P P P
dB/div		Offset 0.5 dB 10.29 dBn						N	1kr1 2.401 0	970 GI 285 dB
71										A3
.7										-16)2
.7									() <sup>2</sup>	- and V
07						man	en and the second	Hermonenter	velin hay be able the	
	-	American		method man house	way and a free for the second					
.7										
0.7										
art 2.30 tes BW				#VB	W 300 kHz			Swe	Stop 2 eep 9.87 m	.40300 G s (1001 p
R MODE T	RC SCL		x	Y		CTION	FUNCTION WIDTH		FUNCTION VALUE	
N 1	1 f 1 f	2.	.401 970 GHz .390 022 GHz	0.285 -40.976	dBm					
	1 f	2.	.398 571 GHz	-21.394	dBm					
1										
)										
:										

78 CH



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## For Hopping Band edge

00 CH

	RF	l <mark>lyzer - Swep</mark> 50 Ω	AC			SENSE:INT		ALIGNAUTO			27 PM Jun
er Fr	req 2	2.351500	0000 GH	Z PNO: I IFGain:		Trig: Free #Atten: 30	Run dB	Avg Type	: Log-Pwr	1	RACE 1 2 TYPE MY DET P F
/div		Offset 0.5 ( 10.16 di							N	/lkr1 2.402 0	073 159
											1
										^ <b>2</b>	÷,
গ্ৰহণ	ryhryw.n	-	Norman 1	A	d			an particular and a second		mallowman	A CONTRACT
			Lad Looks	ALL ALL	ጉሥትንላቀ	rowanglager	harmen	muphiner			
	000 Q 100 H				#VB	W 300 kHz			Sw	Stop 2 eep 9.87 m	
ODE TR			х		Y		TION	FUNCTION WIDTH		FUNCTION VALUE	
N 1 N 1 N 1	f		2.402 073 2.390 022 2.398 674	GHz	0.159 -39.758 -22.768	dBm					

78 CH



П



# 5. NUMBER OF HOPPING CHANNEL

# 5.1 APPLIED PROCEDURES / LIMIT

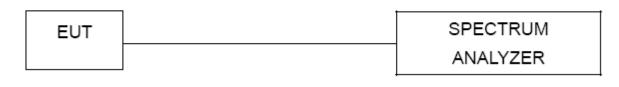
	FCC Part 15.247,Subpart C									
Section	Test Item	Limit	FrequencyRange (MHz)	Result						
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS						

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:	<b>25</b> ℃	Relative Humidity:	60%
Test Mode:	Hopping Mode	Test Voltage:	DC 3.7V

# Number of Hopping Channel

# 79

# Hopping channel

	RF	50 Ω AC	SENSE:IN	r	ALIGN AUTO			):54 PM Jun 21, 20
ente	r Freq 2.		:Fast Trig in:Low #Atte	Free Run en: 30 dB	Ауд Тур	e: Log-Pwr		TYPE MWAAAAA
0 dB/c		ffset 0.5 dB 11.43 dBm				Mk	r2 2.479	742 5 GH 1.07 dB
.og 1.43	<b>⊘</b> 1							2
1.57								
18.6								
8.6								1
18.6								
18.6								
58.6								
58.6								
78.6								
	2.40000 G BW 1.0 MI		#VBW 1.0	MHz		Swe	Stop: eep 1.00 n	2.48350 G ns (1001 p
IKR MOT	DE TRC SOL	× 2.402 087 5 GHz	Y 1.46 dBm	FUNCTION	FUNCTION WIDTH		FUNCTION VALUE	
		2.402 087 5 GHz	1.46 dBm					
2 N								
2 N 3 4 5								
2 N 3 4 5 6 7								
2 N 3 4 5 6 7 8								
2 N 3 4 5 6 7								

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# 6. AVERAGE TIME OF OCCUPANCY

## 6.1 APPLIED PROCEDURES / 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  $10.12 \times 31.6 = 320$  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.



Report No.: STS1806138W03

# 6.5 TEST RESULTS

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
Test Mode:	GFSK(1Mbps)-DH1/DH3/DH5	Test Voltage:	DC 3.7V

Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)
DH1	2441 MHz	0.370	0.118	0.4
DH3	2441 MHz	1.630	0.261	0.4
DH5	2441 MHz	2.880	0.307	0.4

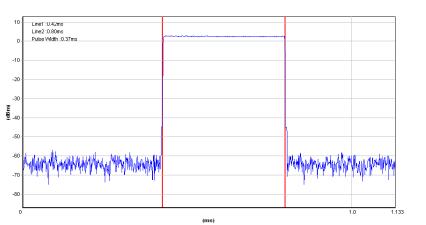


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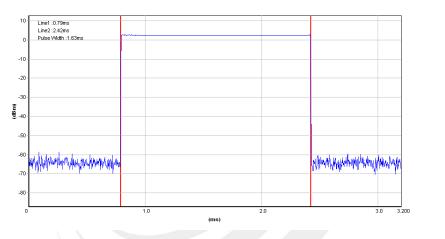
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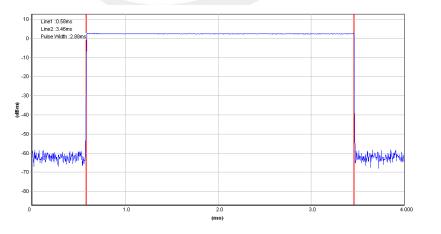
## CH39-DH1







CH39-DH5



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Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	π/4-DQPSK(2Mbps)– 2DH1/2DH3/2DH5	Test Voltage:	DC 3.7V

Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)
2DH1	2441 MHz	0.380	0.122	0.4
2DH3	2441 MHz	1.640	0.262	0.4
2DH5	2441 MHz	2.880	0.307	0.4

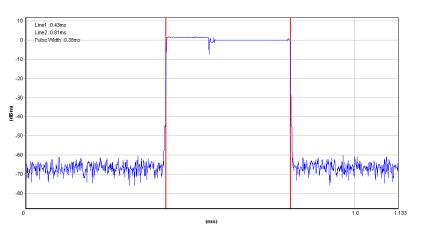


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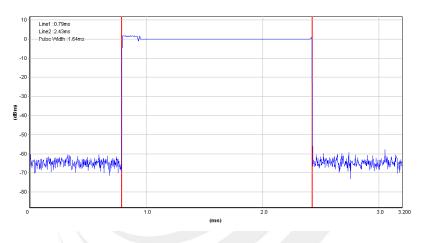
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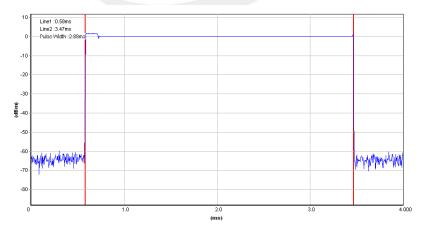
## CH39-2DH1











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Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	8DPSK(3Mbps)– 3DH1/3DH3/3DH5	Test Voltage:	DC 3.7V

Data Packet	Frequency	Pulse Duration(ms)	Dwell Time(s)	Limits(s)
3DH1	2441 MHz	0.380	0.122	0.4
3DH3	2441 MHz	1.640	0.262	0.4
3DH5	2441 MHz	2.890	0.308	0.4

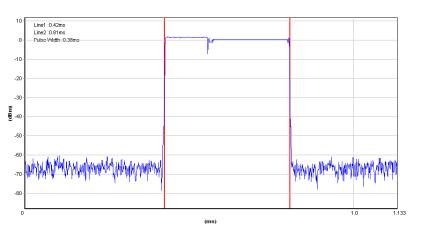


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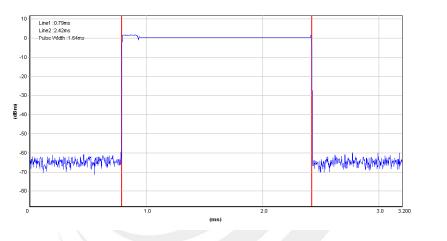
1/F., Building B, Zhuoke Science Park, No.190, Chongqing Road, Fuyong Street, Bao'an District, Shenzhen, Guangdong, China Tel: +86-755 3688 6288 Fax:+86-755 3688 6277 Http://www.stsapp.com E-mail: sts@stsapp.com



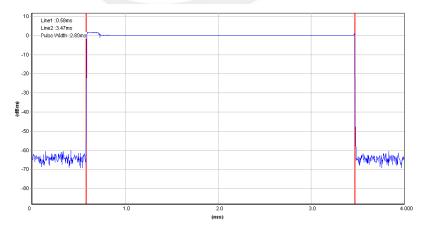
## CH39-3DH1











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# 7. HOPPING CHANNEL SEPARATION MEASUREMEN

# 7.1 APPLIED PROCEDURES / LIMIT

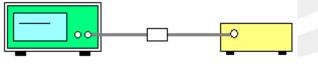
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that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



Spectrum Analayzer

EUT

# 7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.



Report No.: STS1806138W03

## 7.5 TEST RESULTS

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	CH00 / CH39 / CH78 (GFSK(1Mbps) Mode)	Test Voltage:	DC 3.7V

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	0.960	0.642	Complies
2441 MHz	1.002	0.681	Complies
2480 MHz	1.002	0.679	Complies

# For GFSK: Ch. Separation Limits: > two-thirds 20dB bandwidth

			g: Free Run ten: 30 dB			DET P P
	fset 0.5 dB <b>.92 dBm</b>				Mkr2	2 2.402 890 -1.046 (
	~			2		
	$\sim$	m	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sqrt{-1}$	$\sim$	
	~~~~	~	$\sim$		$\sim$	
	1					man -
mm						
ter 2.402500	011-					0
s BW 30 kHz		#VBW 10	0 kHz		Sweep	Span 3.000 3.20 ms (100
NODE TRC SCL	×	Y	FUNCTION F	UNCTION WIDTH	FUNCT	ION VALUE
N 1 f N 1 f	2.401 930 GHz 2.402 890 GHz					

## CH00 -1Mbps



# CH39 -1Mbps

PNO IFGa	: Wide 😱 Trig: Free Run in:Low #Atten: 30 dB		
Ref Offset 0.5 dB		n	4kr2 2.441 890 1.780-
()1		2	
	$\sim$	~~~~~	
	- mar	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim$
			~~~
2.441500 GHz			Span 3.00
2.44 1500 GH2 SW 30 kHz	#VBW 100 kHz	Sw	eep 3.20 ms (10
E TRC SCL X	Y FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1 f 2.440 888 GHz 1 f 2.441 890 GHz	-1.78 dBm -1.78 dBm		

#### CH78 -1Mbps



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Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	CH00 / CH39 / CH78 (π/4-DQPSK(2Mbps) Mode)	Test Voltage:	DC 3.7V

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.047	0.909	Complies
2441 MHz	1.110	0.910	Complies
2480 MHz	1.002	0.910	Complies

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

enter		RF   50 Ω <b>2.40250</b> (		Mide .	SE:INT	ALIGNAUTO Avg Type	: Log-Pwr	T	58 PM Jun 21, 21 RACE 1 2 3 4 TYPE M WAWA
			IF	Gain:Low	#Atten: 30 dB		M	kr2 2.402	DET PPPP
0 dB/di		ef Offset 0.5 ef 5.19 dB							901 dB
og 1.81						2	0 0		
4.8			, ~~ ~		man .				
4.8		<u>۲</u>							
4.8	m							<u> </u>	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
4.8									
4.8									
4.8									
4.8									
34.8									
enter Res B		2500 GHz		#VBW	100 kHz		Swe	Span ep 3.20 ms	3.000 M
KR MODE			х	Y	FUNCTION	FUNCTION WIDTH		INCTION VALUE	- ( p
1 N 2 N		f f	2.401 738 GHz 2.402 785 GHz	-4.81 dB -4.90 dB					
3	1	T	2.402 / 85 GHZ	-4.90 dB	m				
4 5 6									
6 7									
8									
9									
0									
0 1 2									

## CH00 -2Mbps

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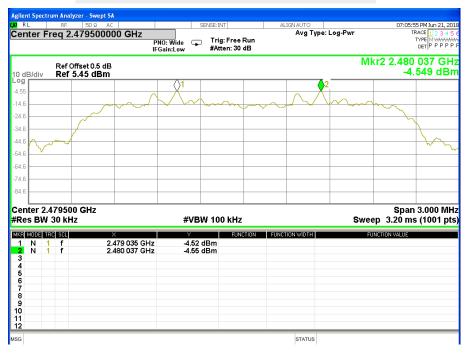
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## CH39 -2Mbps

r Freq 2.44	50 Ω AC 41500000 GHz	SENSE:INT	ALIGNAUTO Avg Type: Log-Pwr	07:02:25 PM Ju TRACE 1
	PNC	): Wide 😱 Trig: Free Run ain:Low #Atten: 30 dB		TYPE M DET P
	set 0.5 dB			Mkr2 2.441 896 -5.445
iv Ref 4.	56 dBm		2	-5.445
	march	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	min	~
	·			·
~~~				- wind
2.441500	GHz		_	Span 3.00
SW 30 kHz		#VBW 100 kHz	Si	veep 3.20 ms (10
E TRC SCL	× 2.440 786 GHz	FUNCTION -5.37 dBm	FUNCTION WIDTH	FUNCTION VALUE
1 f 1 f	2.440 786 GHz 2.441 896 GHz	-5.45 dBm		

#### CH78 -2Mbps



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Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	CH00 / CH39 / CH78 (8DPSK(3Mbps)Mode)	Test Voltage:	DC 3.7V

Frequency	Ch. Separation (MHz)	Limit	Result
2402 MHz	1.005	0.902	Complies
2441 MHz	1.002	0.902	Complies
2480 MHz	1.002	0.901	Complies

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

gilent Spect	rum Analyzer RF	- Swept SA 50 Ω AC	000	PER-IN-IT	ALIGNAUTO		07.10.0	0 DM 1 01 - 02
		2500000 GHz	SENS	SE:INT		: Log-Pwr		13 PM Jun 21, 20 RACE 1 2 3 4 5
Periler I	169 2.40		PNO: Wide 😱 i IFGain:Low i	Trig: Free Run ≇Atten: 30 dB				DET P P P P
I0 dB/div	Ref Offse Ref 6.2					М	kr2 2.403 -3.	046 G⊦ 853 dB
- <b>og</b> 3.78			()1			2		
13.8		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	have	$\sim$	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	$\sim\sim$		
23.8	$\mathcal{A}$						~	
33.8							L.	
43.8								m
53.8								
3.8								
/3.8								
33.8								
	402500 G	Hz				-		3.000 MI
Res BW				100 kHz			ep 3.20 m	s (1001 p
ikr mode ti 1 N	RC SCL	× 2.402 041 GHz	-3.74 dB	FUNCTION	FUNCTION WIDTH	ł	UNCTION VALUE	
2 N '	1 f	2.403 046 GHz		m				
3 4								
5 6								
7								
8								
10								
10 11 12								

# CH00 -3Mbps

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## CH39 -3Mbps

RF 50 Ω AC	SENSE:INT	ALIGNAUTO	07:18:02 PM Ju
r Freq 2.441500000 G	Hz PNO: Wide 🍙 Trig: Fre IFGain:Low #Atten: 3		NY TRACE 1 TYPE M DET P
Ref Offset 0.5 dB liv Ref 5.53 dBm			Mkr2 2.442 043 -4.525
	1	2	
~~~~			m l
~~~~			
r 2.441500 GHz BW 30 kHz	#VBW 100 ki	łz	Span 3.00 Sweep 3.20 ms (100
DE TRC SCL X		UNCTION FUNCTION WIDTH	FUNCTION VALUE
1 f 2.441 0 1 f 2.442 0			
1 2.442 0	45 GHZ -4.52 dBm		

#### CH78 -3Mbps



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# 8. BANDWIDTH TEST

# 8.1 APPLIED PROCEDURES / 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.



Report No.: STS1806138W03

## 8.5 TEST RESULTS

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	GFSK(1Mbps) CH00 / CH39 / C78	Test Voltage:	DC 3.7V

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	0.962	PASS
2441 MHz	1.021	PASS
2480 MHz	1.019	PASS

# CH00 -1Mbps



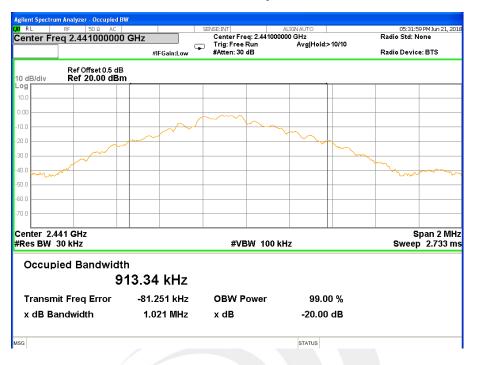
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## CH39 -1Mbps



### CH78 -1Mbps



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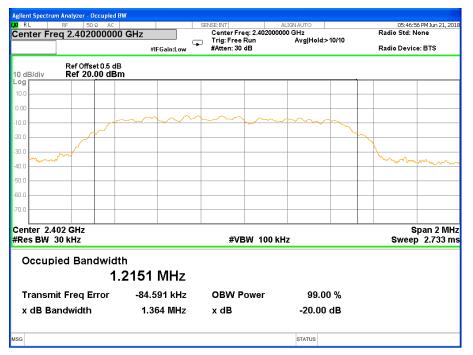
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Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	π/4-DQPSK(2Mbps) CH00 / CH39 / C78	Test Voltage:	DC 3.7V

Frequency	20dB Bandwidth(MHz)	Result
2402 MHz	1.364	PASS
2441 MHz	1.365	PASS
2480 MHz	1.365	PASS

## CH00 -2Mbps



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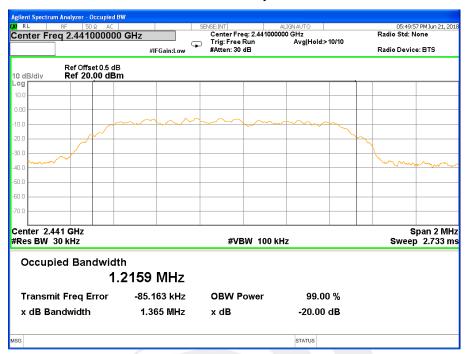
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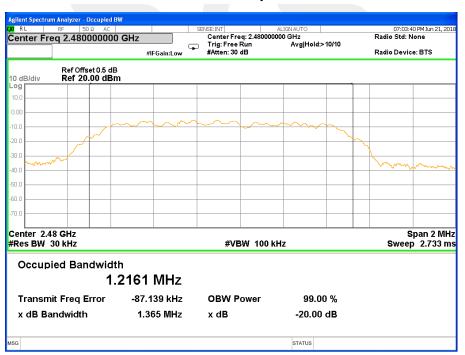
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## CH39 -2Mbps



#### CH78 -2Mbps



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Report No.: STS1806138W03

Temperature:	<b>25</b> ℃	Relative Humidity:	50%
	8DPSK(3Mbps) CH00 / CH39 / CH78	Test Voltage:	DC 3.7V

Frequency	20dB Bandwidth (MHz)	Result
2402 MHz	1.353	PASS
2441 MHz	1.353	PASS
2480 MHz	1.351	PASS

## CH00 -3Mbps

RL RF 50Ω AC		SENSE:INT	ALIGNAUTO	07:14:16 PM Jun 21, 2
nter Freq 2.40200000		Center Freq: 2.402000 Trig: Free Run #Atten: 30 dB	000 GHz Avg Hold:>10/10	Radio Std: None Radio Device: BTS
Ref Offset 0.5 dE dB/div Ref 20.00 dBr				
9				
0				
		mm	man	
	~			
' month				
, <b></b>				- mar ma
0				
0				
nter 2.402 GHz es BW 30 kHz		#VBW 100 k	Hz	Span 2 Mi Sweep 2.733 r
Occupied Bandwid	:h			
1.	2033 MHz			
Transmit Freq Error	-80.133 kHz	OBW Power	99.00 %	
x dB Bandwidth	1.353 MHz	x dB	-20.00 dB	

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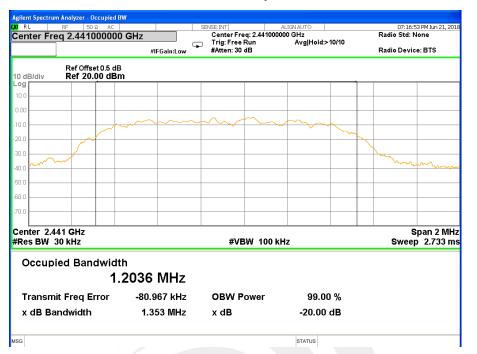
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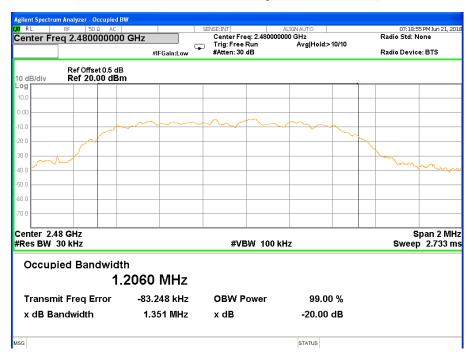
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#### CH39 -3Mbps



#### CH78 -3Mbps



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# 9. OUTPUT POWER TEST

# 9.1 APPLIED PROCEDURES / LIMIT

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

#### 9.2 TEST PROCEDURE

a. The EUT was directly connected to the Power Meter

### 9.3 TEST SETUP

EUT	Power meter	

## 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.



Report No.: STS1806138W03

## 9.5 TEST RESULTS

Temperature:	<b>25</b> ℃	Relative Humidity:	60%
Test Voltage:	DC 3.7V		

GFSK(1Mbps)					
Test Channel	Frequency	Conducted	Output Power	LIMIT	
	(MHz)	Peak (dBm)	AVG (dBm)	dBm	
CH00	2402	2.94	-1.75	20.97	
CH39	2441	2.25	-2.45	20.97	
CH78	2480	1.67	-3.18	20.97	

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

π/4QPSK(2Mbps)							
Test Channel	Frequency	Conducted Output Power		LIMIT			
	(MHz)	Peak (dBm)	AVG (dBm)	dBm			
CH00	2402	3.84	-1.18	20.97			
CH39	2441	3.25	-1.74	20.97			
CH78	2480	2.76	-2.36	20.97			

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

8DPSK(3Mbps)							
Test Channel	Frequency	Conducted Output Power		LIMIT			
	(MHz)	Peak (dBm)	AVG (dBm)	dBm			
CH00	2402	3.94	-1.17	20.97			
CH39	2441	3.35	-1.75	20.97			
CH78	2480	2.81	-2.36	20.97			

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

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# 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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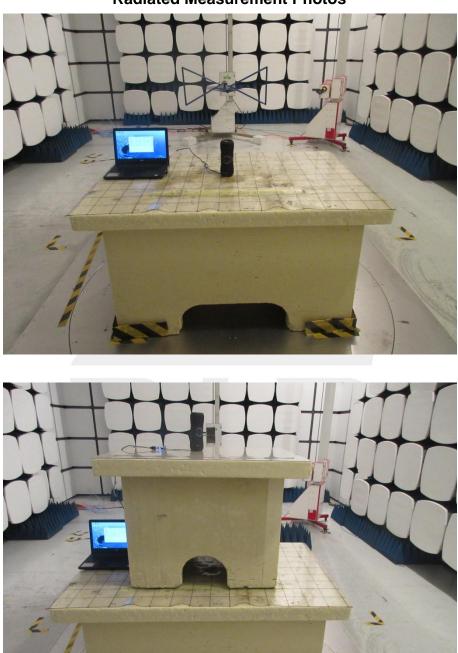
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# **APPENDIX-PHOTOS OF TEST SETUP**



**Radiated Measurement Photos** 

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# **Conducted Measurement Photos**



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