

RADIO TEST REPORT

Report No.:STS2108107W02

Issued for

HANK SMART TECH CO., LTD

201, Bldg 15, Asia Industrial Park, Fengmen Rd., Gangtou Community, Bantian St., Longgang Dist., Shenzhen, China, 518129

Product Name:	Door/Window Sensor
Brand Name:	N/A
Model Name:	HKSWL-DWS08
Series Model:	HKWL-DWS02W
FCC ID:	2AXIE-DWS08
Test Standard:	FCC Part 15.247

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TEST RESULT CERTIFICATION

Applicant's Name	HANK SMART TECH CO., LTD
Address:	201, Bldg 15, Asia Industrial Park, Fengmen Rd., Gangtou Community, Bantian St., Longgang Dist., Shenzhen, China, 518129
Manufacturer's Name	HANK SMART TECH CO., LTD
Address	201, Bldg 15, Asia Industrial Park, Fengmen Rd., Gangtou Community, Bantian St., Longgang Dist., Shenzhen, China, 518129
Product Description	
Product Name:	Door/Window Sensor
Brand Name:	N/A
Model Name:	HKSWL-DWS08
Series Model	HKWL-DWS02W
Test Standards	FCC Part 15.247
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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Testing Engineer (Chris Chen) Technical Manager (Sean she) Authorized Signatory :



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Revision History

Rev.	Issue Date	Report No.	Effect Page	Contents
00	30 Aug. 2021	STS2108107W02	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 v05r02.

FCC Part 15.247,Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	PASS	
15.247 (a)(2)	6dB Bandwidth	PASS	
15.247 (b)(3)	Output Power	PASS	
15.209	Radiated Spurious Emission	PASS	
15.247 (d)	Conducted Spurious & Band Edge Emission	PASS	
15.247 (e)	Power Spectral Density	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.



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District,Bao'an District, Shenzhen, Guang Dong, China FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 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 %.

No.	Item	Uncertainty
1	RF output power, conducted	±0.68dB
2	Unwanted Emissions, conducted	±2.988dB
3	All emissions, radiated 9K-30MHz	±2.68dB
4	All emissions, radiated 30M-1GHz	±4.39dB
5	All emissions, radiated 1G-6GHz	±5.10dB
6	All emissions, radiated>6G	±5.48dB
7	Conducted Emission (9KHz-150KHz)	±2.79dB
8	Conducted Emission (150KHz-30MHz)	±2.80dB



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Door/Window Sens	Door/Window Sensor		
Trade Name	N/A			
Model Name	HKSWL-DWS08			
Series Model	HKWL-DWS02W			
Model Difference	Only different in mo	odel names.		
Product Description	Only different in moder names.The EUT is a Door/Window SensorOperation Frequency:802.11b/g/n 20: 2412~2462 MHzModulation Type:802.11b(DSSS):CCK,DQPSK,DBPSK 802.11g(OFDM):BPSK,QPSK,16-QAM,64-0 802.11n(OFDM):BPSK,QPSK,16-QAM,64-0 802.11b:11/5.5/2/1 MbpsBit Rate of 802.11g:54/48/36/24/18/12/9/6Mbps Transmitter:802.11g:54/48/36/24/18/12/9/6Mbps 802.11n(20MHz): 65/58.5/52/39/26/19.5/13/6.5MbpsNumber of Channel:802.11b/g/n20: 11CHAntenna Designation:Please refer to see Note 3.AntennaGain (dBi):0dBi			
Channel List	Please refer to the	Please refer to the Note 2.		
Rating	Input: DC 3V from AAA*2 Battery			
Battery	Rated Voltage:1.5V			
Hardware version number	V1.1			
Software version number	V1.0.3			
Connecting I/O Port(s)	Please refer to the Note 1.			

Note:

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



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2.

Operation Frequency of channel		
802.11b/g/n(20MHz)		
Channel	Frequency	
01	2412	
02	2417	
03	2422	
04	2427	
05	2432	
06	2437	
07	2442	
08	2447	
09	2452	
10	2457	
11	2462	

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, themiddle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below: Carrier Frequency Channel

2.4GHz Test Frequency:

For 802.11b/g/n (HT20)		
Channel Freq.(MHz)		
01	2412	
06	2437	
11	2462	

3.

Ant.	Brand	Model Name	Antenna Type	Connect or	Gain (dBi)	NOTE
1	N/A	HKSWL-DWS08	РСВ	N/A	0dBi	WLAN Antenna

Note: The antenna information refer the manufacturer provide report, applicable only to the tested sample identified in the report.



2.2 DESCRIPTION OF THE TEST MODES

Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Worst Mode	Description	Data Rate
Mode 1	TX IEEE 802.11b CH1	1 Mbps
Mode 2	TX IEEE 802.11b CH6	1 Mbps
Mode 3	TX IEEE 802.11 b CH11	1 Mbps
Mode 4	TX IEEE 802.11g CH1	6 Mbps
Mode 5	TX IEEE 802.11g CH6	6 Mbps
Mode 6	TX IEEE 802.11g CH11	6 Mbps
Mode 7	TX IEEE 802.11n HT20 CH1	MCS 0
Mode 8	TX IEEE 802.11n HT20 CH6	MCS 0
Mode 9	TX IEEE 802.11n HT20 CH11	MCS 0

Note:

(1) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported. (2) We tested for all available 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.

(3) The battery is fully-charged during the radiated and RF conducted test.

AC Conducted Emission

	Test Case
AC Conducted Emission	Mode10: Keeping WIFI TX

2.3 TEST SOFTWARE AND POWER LEVEL

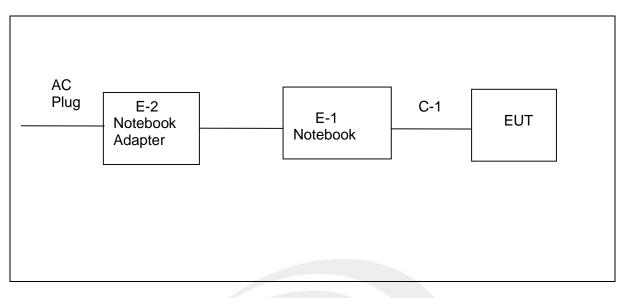
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level.

RF Function	Туре	Mode Or Modulation type	ANT Gain(dBi)	Power Class	Software For Testing
		802.11b		40	
WIFI(2.4G)	2.4G WIFI	802.11g	0	40	ESP_RF_test_tool_v2.5
		802.11n(HT20)		40	

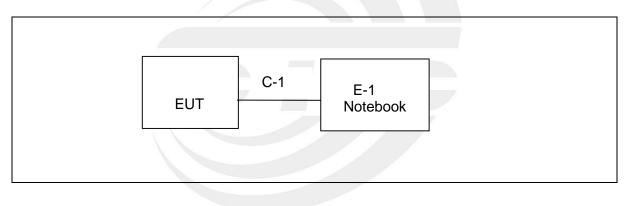


2.4 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiation Test Set



Conduction Test Set



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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	Model/Type No.	Length	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Length	Note
E-2	Notebook Adapter	LENOVO	ADLX45DLC3A	N/A	N/A
E-1	Notebook	LENOVO	Think Pad E470	N/A	N/A
C-1	USB Cable	N/A	N/A	150cm	NO

Note:

- (1) For detachable type I/O cable should be specified the length in cm in ^r Length ^a column.
- (2) "YES" is means "with core"; "NO" is means "without core".



2.6 EQUIPMENTS LISTS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	
Test Receiver	R&S	ESCI	101427	2020.10.12	2021.10.11	
Signal Analyzer	R&S	FSV 40-N	101823	2020.10.10	2021.10.09	
Active loop Antenna	ZHINAN	ZN30900C	16035	2021.04.11	2022.04.10	
Bilog Antenna	TESEQ	CBL6111D	34678	2020.10.12	2022.10.11	
Horn Antenna	SCHWARZBECK	BBHA 9120D	02014	2019.10.15	2021.10.14	
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2020.10.12	2022.10.11	
Pre-Amplifier (0.1M-3GHz)	EM	EM330	060665	2020.10.12	2021.10.11	
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK2018080901	2020.10.12	2021.10.11	
Pre-Amplifier (18G-40GHz)	SKET	LNPA-1840-50	SK2018101801	2020.10.10	2021.10.09	
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12	
Turn table	EM	SC100_1	60531	N/A	N/A	
Antenna mast	EM	SC100	N/A	N/A	N/A	
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)				

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2020.10.12	2021.10.11
LISN	R&S	ENV216	101242	2020.10.12	2021.10.11
LISN	EMCO	3810/2NM	23625	2020.10.12	2021.10.11
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			



RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until		
			MY55520005	2020.10.10	2021.10.09		
Dawar Canaar			MY55520006	2020.10.10	2021.10.09		
Power Sensor	Keysight	U2021XA	MY56120038	2020.10.10	2021.10.09		
			MY56280002	2020.10.10	2021.10.09		
Signal Analyzer	Agilent	N9020A	MY51110105	2021.03.04	2022.03.03		
Temperature & Humidity	HH660	Mieo	N/A	2020.10.13	2021.10.12		
MIMO Power	Kousisht		MYEEEOOOE	2020 40 40	2021 10 00		
measurement test Set	Keysight	U2021XA	MY55520005	2020.10.10	2021.10.09		
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)					



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3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

The radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table.

	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 is 0.8 m from the horizontal ground plane and 0.4 m from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments are powered from additional LISN(s). The LISN provides 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 is at least 80 cm from the nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.
 - Vertical Reference Ground Plane EUT 40cm EUT 80cm N Horizontal Reference Ground Plane

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 cm from other units and other metal planes support units.

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.



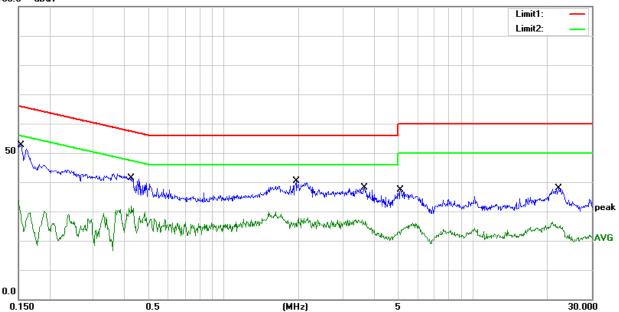
3.1.5 TEST RESULT

Temperature:	26.4(C)	Relative Humidity:	58%RH
Test Voltage:	AC 120V/60Hz	Phase:	L
Test Mode:	Mode 10		

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(d B)	(dBuV)	(dBuV)	(dB)	
1	0.1540	32.34	20.33	52.67	65.78	-13.11	QP
2	0.1540	13.65	20.33	33.98	55.78	-21.80	AVG
3	0.4260	20.89	20.54	41.43	57.33	-15.90	QP
4	0.4260	11.29	20.54	31.83	47.33	-15.50	AVG
5	1.9500	20.00	20.30	40.30	56.00	-15.70	QP
6	1.9500	8.81	20.30	29.11	46.00	-16.89	AVG
7	3.6700	17.69	20.38	38.07	56.00	-17.93	QP
8	3.6700	6.84	20.38	27.22	46.00	-18.78	AVG
9	5.1380	16.86	20.47	37.33	60.00	-22.67	QP
10	5.1380	5.76	20.47	26.23	50.00	-23.77	AVG
11	22.1540	14.99	22.77	37.76	60.00	-22.24	QP
12	22.1540	3.66	22.77	26.43	50.00	-23.57	AVG

Remark:

- 1. All readings are Quasi-Peak and Average values
- 2. Margin = Result (Result = Reading + Factor)-Limit
- 3. Factor=LISN factor+Cable loss+Limiter (10dB)
- 100.0 dBu¥



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Temperature:	26.4(C)	Relative Humidity:	58%RH
Test Voltage:	AC 120V/60Hz	Phase:	Ν
Test Mode:	Mode 10		

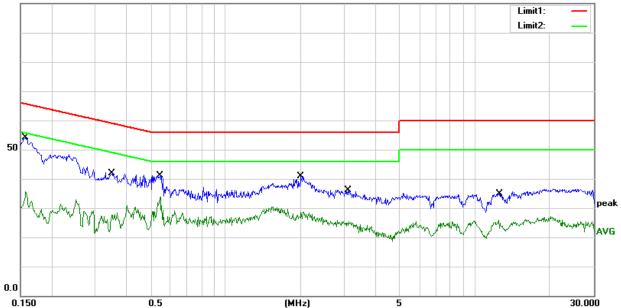
No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(d B)	(dBuV)	(dBuV)	(dB)	
1	0.1580	33.75	20.33	54.08	65.57	-11.49	QP
2	0.1580	15.18	20.33	35.51	55.57	-20.06	AVG
3	0.3502	21.23	20.64	41.87	58.96	-17.09	QP
4	0.3502	7.73	20.64	28.37	48.96	-20.59	AVG
5	0.5463	20.60	20.50	41.10	56.00	-14.90	QP
6	0.5463	13.33	20.50	33.83	46.00	-12.17	AVG
7	2.0060	20.63	20.30	40.93	56.00	-15.07	QP
8	2.0060	9.22	20.30	29.52	46.00	-16.48	AVG
9	3.1020	15.89	20.35	36.24	56.00	-19.76	QP
10	3.1020	5.13	20.35	25.48	46.00	-20.52	AVG
11	12.5820	13.51	21.47	34.98	60.00	-25.02	QP
12	12.5820	4.30	21.47	25.77	50.00	-24.23	AVG

Remark:

1. All readings are Quasi-Peak and Average values

- 2. Margin = Result (Result = Reading + Factor)-Limit
- 3. Factor=LISN factor+Cable loss+Limiter (10dB)

100.0 dBu¥



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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 (1000MHz-25GHz)

	(dBuV/m) (at 3M)		
FREQUENCY (MHz)	PEAK	AVERAGE	
Above 1000	74	54	

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RESTRICTED FREQUENCY BANDS

FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (MHz)	FREQUENCY (GHz)
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

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For Radiated Emission

Spectrum Parameter	Setting		
Attenuation	Auto		
Detector	Peak/QP/AV		
Start Frequency	9 KHz/150KHz(Peak/QP/AV)		
Stop Frequency	150KHz/30MHz(Peak/QP/AV)		
	200Hz (From 9kHz to 0.15MHz)/		
RB / VB (emission in restricted	9KHz (From 0.15MHz to 30MHz);		
band)	200Hz (From 9kHz to 0.15MHz)/		
	9KHz (From 0.15MHz to 30MHz)		

Spectrum Parameter	Setting	
Attenuation	Auto	
Detector	Peak/QP	
Start Frequency	30 MHz(Peak/QP)	
Stop Frequency	1000 MHz (Peak/QP)	
RB / VB (emission in restricted band)	120 KHz / 300 KHz	

Spectrum Parameter	Setting		
Attenuation	Auto		
Detector	Peak/AV		
Start Frequency	1000 MHz(Peak/AV)		
Stop Frequency	10th carrier hamonic(Peak/AV)		
RB / VB (emission in restricted	1 MHz / 3 MHz(Peak)		
band)	1 MHz/1/T MHz(AVG)		

For Restricted band

Spectrum Parameter	Setting		
Detector	Peak/AV		
0, 1/0, 5	Lower Band Edge: 2300 to 2403 MHz		
Start/Stop Frequency	Upper Band Edge: 2479 to 2500 MHz		
	1 MHz / 3 MHz(Peak)		
RB / VB	1 MHz/1/T MHz(AVG)		

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Receiver Parameter	Setting
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

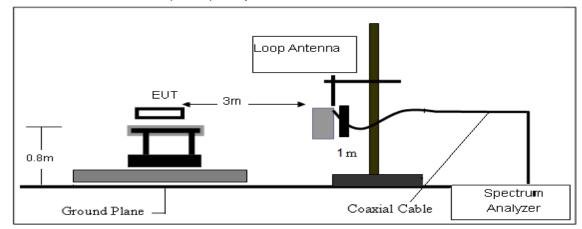
- a. The measuring distance at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- b. The EUT was placed on the top of a rotating table 0.8 m (above 1GHz is 1.5 m) above the ground at a 3 m anechoic chamber test site. The table was rotated 360 degree to determine the 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 polarization 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 QuasiPeak detector mode will be re-measured.
- e. If the Peak Mode measured value is compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and no additional QP Mode measurement was 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.

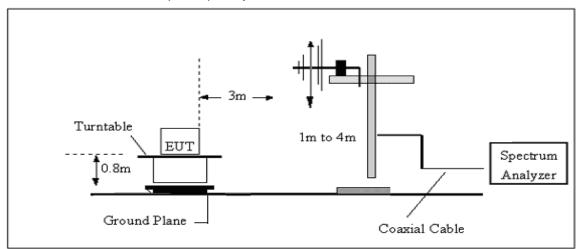


3.2.3 TEST SETUP

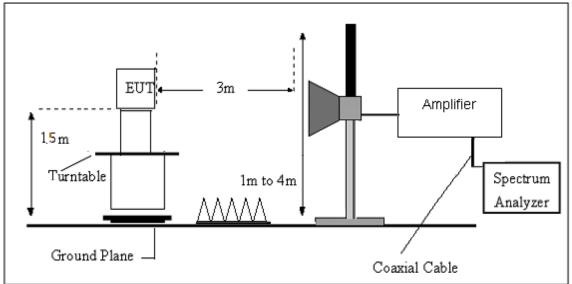
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



^{3.2.4} EUT OPERATING CONDITIONS Please refer to section 3.1.4 of this report.



3.2.5 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 - AGWhere 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



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3.2.6 TEST RESULT

9KHz-30MHz

Temperature:	23.1(C)	Relative Humidtity:	60%RH
Test Voltage:	DC 3V	Polarization:	
Test Mode:	TX Mode		

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





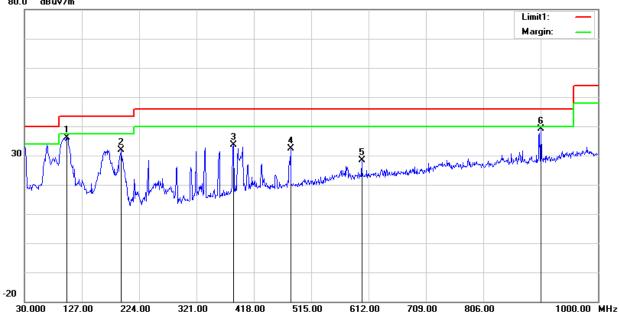
(30MHz - 1000MHz)

Temperature:	23.1(C)	Relative Humidtity:	60%RH	
Test Voltage:	DC 3V	Phase:	Horizontal	
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/ (Mode 5 worst mode)			

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/ m)	(dBuV/m)	(dBuV/m)	(dB)	
1	101.7800	55.99	-19.94	36.05	43.50	-7.45	QP
2	192.9600	53.07	-21.08	31.99	43.50	-11.51	QP
3	384.0500	45.73	-11.99	33.74	46.00	-12.26	QP
4	480.0800	41.06	-8.65	32.41	46.00	-13.59	QP
5	600.3600	34.14	-5.84	28.30	46.00	-17.70	QP
6	903.0000	39.62	-0.37	39.25	46.00	-6.75	QP

Remark:

- 1. Margin = Result (Result = Reading + Factor)-Limit
- 2. Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain





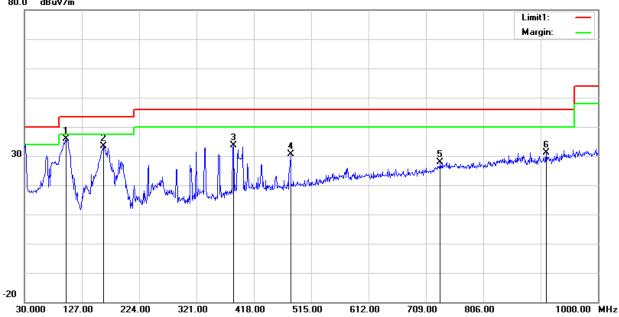
Temperature:	23.1(C)	Relative Humidtity:	60%RH	
Test Voltage:	DC 3V	Phase:	Vertical	
Test Mode:	Mode 1/2/3/4/5/6/7/8/9/ (Mode 5 worst mode)			

No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/ m)	(dBuV/m)	(dBuV/m)	(dB)	
1	100.8100	55.84	-20.04	35.80	43.50	-7.70	QP
2	163.8600	52.51	-19.22	33.29	43.50	-10.21	QP
3	384.0500	45.62	-11.99	33.63	46.00	-12.37	QP
4	480.0800	39.25	-8.65	30.60	46.00	-15.40	QP
5	733.2500	30.22	-2.35	27.87	46.00	-18.13	QP
6	912.7000	31.25	-0.14	31.11	46.00	-14.89	QP

Remark:.

- Margin = Result (Result = Reading + Factor)–Limit
 Factor= Antenna factor+Cable attenuation factor(cable loss)-Amplifier gain

80.0 dBuV/m





(1000MHz-25GHz) Restricted band and Spurious emission Requirements

Frequency	Meter Reading	Amplifier	Loss	Antenna Factor	Corrected Factor	Emission Level	Limits	Margin	Detector	Comment
(MHz)	(dBµV)	(dB)	(dB)	(dB/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)	Туре	
				Low Ch	annel (802.11g	/2412 MHz)				
3264.60	62.12	44.70	6.70	28.20	-9.80	52.32	74.00	-21.68	PK	Vertical
3264.60	51.10	44.70	6.70	28.20	-9.80	41.30	54.00	-12.70	AV	Vertical
3264.72	61.50	44.70	6.70	28.20	-9.80	51.70	74.00	-22.30	PK	Horizontal
3264.72	50.58	44.70	6.70	28.20	-9.80	40.78	54.00	-13.22	AV	Horizontal
4824.57	59.01	44.20	9.04	31.60	-3.56	55.45	74.00	-18.55	PK	Vertical
4824.57	50.27	44.20	9.04	31.60	-3.56	46.71	54.00	-7.29	AV	Vertical
4824.53	59.31	44.20	9.04	31.60	-3.56	55.75	74.00	-18.25	PK	Horizontal
4824.53	50.51	44.20	9.04	31.60	-3.56	46.95	54.00	-7.05	AV	Horizontal
5359.60	48.40	44.20	9.86	32.00	-2.34	46.06	74.00	-27.94	PK	Vertical
5359.60	40.16	44.20	9.86	32.00	-2.34	37.82	54.00	-16.18	AV	Vertical
5359.63	48.47	44.20	9.86	32.00	-2.34	46.13	74.00	-27.87	PK	Horizontal
5359.63	38.28	44.20	9.86	32.00	-2.34	35.94	54.00	-18.06	AV	Horizontal
7235.78	53.61	43.50	11.40	35.50	3.40	57.01	74.00	-16.99	PK	Vertical
7235.78	43.86	43.50	11.40	35.50	3.40	47.26	54.00	-6.74	AV	Vertical
7235.71	54.42	43.50	11.40	35.50	3.40	57.82	74.00	-16.18	PK	Horizontal
7235.71	43.97	43.50	11.40	35.50	3.40	47.37	54.00	-6.63	AV	Horizontal
			×.	Middle C	hannel (802.11	g/2437 MHz)				
3264.82	60.95	44.70	6.70	28.20	-9.80	51.15	74.00	-22.85	PK	Vertical
3264.82	49.82	44.70	6.70	28.20	-9.80	40.02	54.00	-13.98	AV	Vertical
3264.68	61.53	44.70	6.70	28.20	-9.80	51.73	74.00	-22.27	PK	Horizontal
3264.68	51.00	44.70	6.70	28.20	-9.80	41.20	54.00	-12.80	AV	Horizontal
4874.40	59.19	44.20	9.04	31.60	-3.56	55.63	74.00	-18.37	PK	Vertical
4874.40	50.10	44.20	9.04	31.60	-3.56	46.54	54.00	-7.46	AV	Vertical
4874.47	58.91	44.20	9.04	31.60	-3.56	55.35	74.00	-18.65	PK	Horizontal
4874.47	50.44	44.20	9.04	31.60	-3.56	46.88	54.00	-7.12	AV	Horizontal
5359.87	49.16	44.20	9.86	32.00	-2.34	46.82	74.00	-27.18	PK	Vertical
5359.87	40.06	44.20	9.86	32.00	-2.34	37.72	54.00	-16.28	AV	Vertical
5359.63	47.60	44.20	9.86	32.00	-2.34	45.26	74.00	-28.74	PK	Horizontal
5359.63	39.42	44.20	9.86	32.00	-2.34	37.08	54.00	-16.92	AV	Horizontal
7310.71	54.52	43.50	11.40	35.50	3.40	57.92	74.00	-16.08	PK	Vertical
7310.71	44.04	43.50	11.40	35.50	3.40	47.44	54.00	-6.56	AV	Vertical
7310.66	54.40	43.50	11.40	35.50	3.40	57.80	74.00	-16.20	PK	Horizontal
7310.66	44.86	43.50	11.40	35.50	3.40	48.26	54.00	-5.74	AV	Horizontal

802.11 g



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				High Chan	nel (802.11g	/2462 MHz)				
3264.86	61.96	44.70	6.70	28.20	-9.80	52.16	74.00	-21.84	PK	Vertical
3264.86	51.35	44.70	6.70	28.20	-9.80	41.55	54.00	-12.45	AV	Vertical
3264.68	62.18	44.70	6.70	28.20	-9.80	52.38	74.00	-21.62	PK	Horizontal
3264.68	50.13	44.70	6.70	28.20	-9.80	40.33	54.00	-13.67	AV	Horizontal
4924.29	59.40	44.20	9.04	31.60	-3.56	55.84	74.00	-18.16	PK	Vertical
4924.29	50.27	44.20	9.04	31.60	-3.56	46.71	54.00	-7.29	AV	Vertical
4924.60	59.33	44.20	9.04	31.60	-3.56	55.77	74.00	-18.23	PK	Horizontal
4924.60	49.40	44.20	9.04	31.60	-3.56	45.84	54.00	-8.16	AV	Horizontal
5359.63	48.74	44.20	9.86	32.00	-2.34	46.40	74.00	-27.60	PK	Vertical
5359.63	40.09	44.20	9.86	32.00	-2.34	37.75	54.00	-16.25	AV	Vertical
5359.70	47.99	44.20	9.86	32.00	-2.34	45.65	74.00	-28.35	PK	Horizontal
5359.70	38.11	44.20	9.86	32.00	-2.34	35.77	54.00	-18.23	AV	Horizontal
7385.78	53.69	43.50	11.40	35.50	3.40	57.09	74.00	-16.91	PK	Vertical
7385.78	44.92	43.50	11.40	35.50	3.40	48.32	54.00	-5.68	AV	Vertical
7385.85	54.37	43.50	11.40	35.50	3.40	57.77	74.00	-16.23	PK	Horizontal
7385.85	44.35	43.50	11.40	35.50	3.40	47.75	54.00	-6.25	AV	Horizontal

Remark:

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

2. Scan with 802.11b, 802.11g, 802.11n (HT-20), the worst case is 802.11 g. Emission Level = Reading + Factor

Margin = Limit - Emission Level

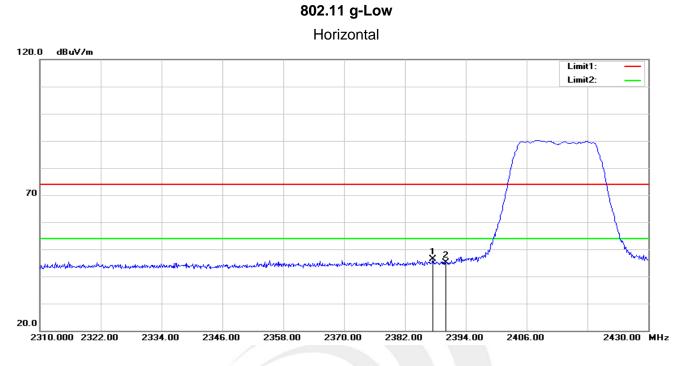
3. The frequency emission of peak points that did not show above the forms are at least 20dB below

the limit, the frequency emission is mainly from the environment noise.

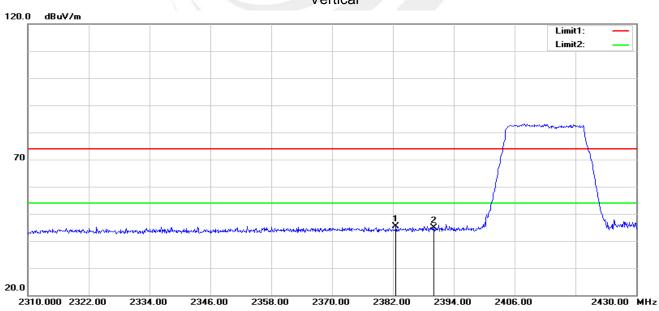




3.2.6 TEST RESULTS(Band edge Requirements)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2387.520	42.11	4.31	46.42	74.00	-27.58	peak
2	2390.000	40.82	4.34	45.16	74.00	-28.84	peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2382.600	41.06	4.23	45.29	74.00	-28.71	peak
2	2390.000	40.65	4.34	44.99	74.00	-29.01	peak

Vertical

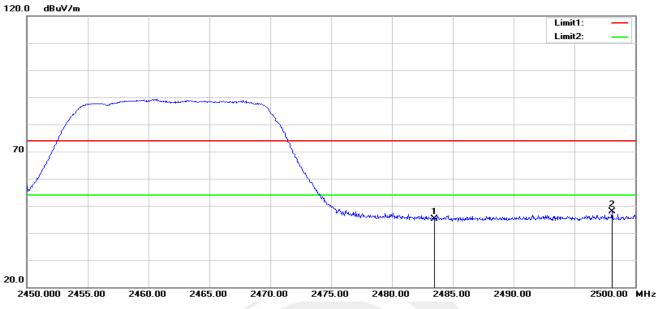
Shenzhen STS Test Services Co., Ltd.

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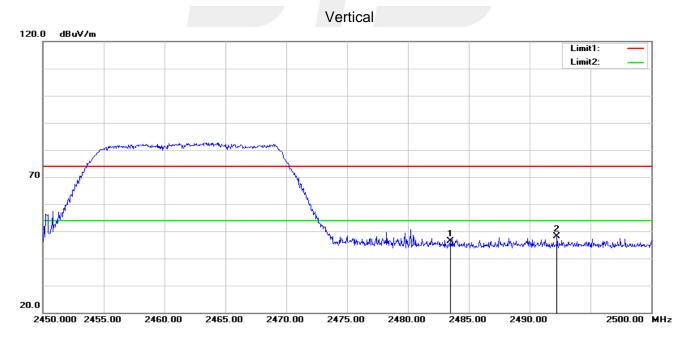
Report No.:STS2108107W02

802.11 g-High





No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	40.54	4.60	45.14	74.00	-28.86	peak
2	2498.100	43.16	4.64	47.80	74.00	-26.20	peak



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	2483.500	41.68	4.60	46.28	74.00	-27.72	peak
2	2492.250	43.48	4.63	48.11	74.00	-25.89	peak

Note: 802.11b, 802.11g, 802.11n (HT-20) mode all have been tested, the worst case is 802.11 g, only show the worst case.

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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/Stop Eroguapov	Lower Band Edge: 2300 to 2412 MHz
Start/Stop Frequency	Upper Band Edge: 2462 to 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

4.3 DEVIATION FROM STANDARD

No deviation.

4.4 TEST SETUP



The EUT which is powered by the DC Power, 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.

4.5 EUT OPERATION CONDITIONS Please refer to section 3.1.4 of this report.

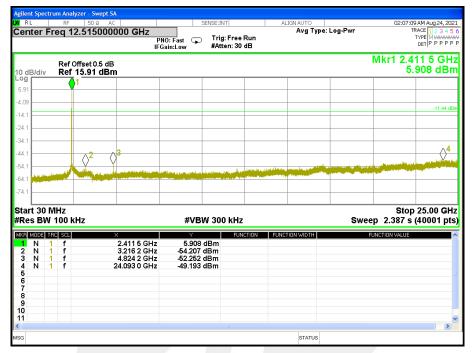
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4.6 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX b Mode /CH01, CH06, CH11

CH 01



CLL	00
CH	06

	RF	50 Ω AC		SEI	ISE:INT	ALIGN AUTO		02:10:23 A	M Aug 24, 200
enter F	Freq 12	2.515000	P	NO: Fast 😱 Gain:Low	Trig: Free Run #Atten: 30 dB	Avg Type	: Log-Pwr	TRA T\ [CE 1 2 3 4 5 (PE M WAANAA DET P P P P F
) dB/div)ffset 0.5 dB 17 <mark>.50 dB</mark> n						Vkr1 2.43 7.5	5 9 GH 04 dB
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art 30		H7		#VBW	300 kHz		Swee	Stop 2 p 2.387 s (4	25.00 Gi 10001 pi
art 50 tes BW	V 100 k	112							
es BW	TRC SCL		× 2 435 9 GHz	7 504 di	RUNCTION	FUNCTION WIDTH	FL	INCTION VALUE	
es BW Mode N	TRC SCL 1 f 1 f		2.435 9 GHz 3.249 3 GHz	7.504 dl -54.025 dl -53.361 dl	3m 3m	FUNCTION WIDTH	FL	NCTION VALUE	
Res BW	TRC SCL		2.435 9 GHz		3m 3m 3m	FUNCTION WIDTH	FL	NCTION VALUE	
es BV	TRC SCL 1 f 1 f 1 f		2.435 9 GHz 3.249 3 GHz 4.874 2 GHz	-54.025 di -53.361 di	3m 3m 3m	FUNCTION WIDTH	FL	NCTION VALUE	
es BV	TRC SCL 1 f 1 f 1 f		2.435 9 GHz 3.249 3 GHz 4.874 2 GHz	-54.025 di -53.361 di	3m 3m 3m	FUNCTION WIDTH	FL	INCTION VALUE	
Res BW	TRC SCL 1 f 1 f 1 f		2.435 9 GHz 3.249 3 GHz 4.874 2 GHz	-54.025 di -53.361 di	3m 3m 3m	FUNCTION WIDTH	FL	INCTION VALUE	



CH 11

	trum Analyzer - S							
(RL Center I		5000000 GHz	SENSE:IN	T	ALIGNAUTO Avg Type	: Log-Pwr		4 AM Aug 24, 202: RACE 1 2 3 4 5
Jointon	109 12.01	PN		: Free Run en: 30 dB	• //			DET PPPP
10 dB/div	Ref Offset Ref 14.38						Mkr1 2.4 4.	60 8 GHz 383 dBrr
4.38	1							
5.62								
15.6								-14.15 dB
25.6								
35.6								
45.6	2							
55.6	. Auto		dention of the state of the second days	(an bill strength and a state of the	and the state of the state		
65.6 14				And a state of the				
75.6								
start 30								25.00 GH
	V 100 kHz		#VBW 300) kHz			ep 2.387 s	(40001 pts
4 KF MODE 1 N 2 N 3 N 4 N	TRC SCL 1 f 1 f 1 f 1 f 1 f	× 2.460 8 GHz 2.519 5 GHz 6.014 1 GHz 24.026 8 GHz	4.383 dBm -53.812 dBm -56.360 dBm -49.561 dBm	FUNCTION	FUNCTION WIDTH		FUNCTION VALUE	
5		24.020 0 0112	40.001 UDIII					
7								
9								
1								
G					STATUS			>
~					514105			



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11



Band edge(it's also the reference level for conducted spurious emission)



CH 01

CH 06



Shenzhen STS Test Services Co., Ltd.



CH 11





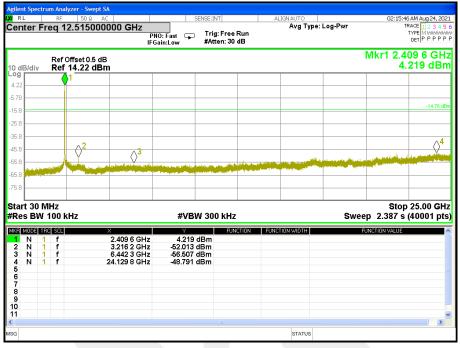
Shenzhen STS Test Services Co., Ltd.



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Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX g Mode /CH01, CH06, CH11

CH 01



CH06

	ectrur		lyzer - Swept S								
RL		RF	50 Ω A			SENSE:INT		ALIGN AUTO	<u> </u>		54 AM Aug 24, 20
enter	r Fre	eq 1	2.515000	PI	NO: Fast 😱 Gain:Low	Trig: Free #Atten: 30	Run dB	Avg Typ	e: Log-Pwr		TYPE MWWWWW DET P P P P
dB/di			Offset 0.5 dE 11.33 dBr							Mkr1 2.4 1	140 2 GH .329 dB
g		<	1								
33											
57		_									-14.60
.7 —											
.7											
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7			2								
7					den de seu a	المراجع المراجع	allowed and	and the second second	No I water what we had a		
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les B			KHZ		#VB	W 300 kHz			Swe	ep 2.387 s	
r Mode	E TRC	SCL		×	Y		ICTION	FUNCTION WIDTH		FUNCTION VALUE	
N 2 N	1	f		2.440 2 GHz 2.508 9 GHz	1.329						
N	1	f		7.263 8 GHz	-54.043						
Ν	1	f		23.714 0 GHz	-49.740	dBm					
3											
1											
											>

11



CH 11

L	RF		AC	S	ENSE:INT	AL	.IGN AUTO		02:21	:55 AM Aug 24,
nter F	req	12.5150	00000 GHz PN IFG	IO: Fast 🖵 iain:Low	Trig: Free R #Atten: 30 d		Avg Type:	Log-Pwr		TRACE 1 2 3 TYPE MWW DET P P P
B/div		f Offset 0.5 f 11.66 d							Mkr1 2.	455 8 G 1.655 dl
		1								
_										
										-17.3
		2	.3							
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-										
rt 30 es BW		kHz		#VBV	V 300 kHz			Swe	Sto ep 2.387	op 25.00 C s (40001
MODE N	1 f		× 2.455 8 GHz	Y 1.655 (ION FUNC	TION WIDTH		FUNCTION VALUE	
N N N	1 f 1 f 1 f		2.517 0 GHz 5.784 3 GHz 23.961 2 GHz	-53.458 (-56.055 (-49.462 (dBm					
					ш)
							STATUS			



Shenzhen STS Test Services Co., Ltd.

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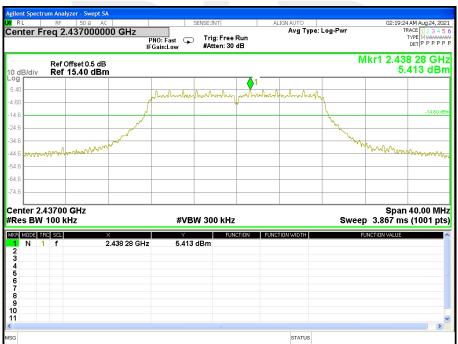


Band edge(it's also the reference level for conducted spurious emission)



CH 01

CH06





CH11

		yzer - Swept S/								
nter F	_R ⊧ Freq 2	50 Ω AC .4710000	00 GHz	PNO: Fast Gain:Low	SENSE:INT Trig: Free #Atten: 30	Run	LIGN AUTO Avg Type:	Log-Pwr		21:25 AM Aug 24, 2 TRACE 1 2 3 4 TYPE MWAAAAA DET P P P P
dB/div		Dffset 0.5 dB 12.68 dBn							Mkr1 2.4	63 286 GH 2.675 dB
g 68			al marked barbon	1 سامہامی رسامیں	Mucharly					
32		1		4						-17.33
.3						$\lambda_{\rm v}$				
	hulm	Nunn				Jon Maria	and when the the the	2 manuna	3	4
.3										
.3										
1										
art 2.44 tes BW				#VB	W 300 kHz	:		Swe		p 2.50000 G ms (1001 p
es BW R MODE T N 2 N	100 k	(Hz 2. 2.	× 463 286 GHz 483 528 GHz 489 328 GHz	#VB 2.675 -50.048 -50.037	dBm dBm		TION WIDTH	Swe		ms (1001 p
es BW N N N N	100 k RC SCU 1 f 1 f	2. 2. 2. 2.	463 286 GHz 483 528 GHz	¥ 2.675 -50.048	dBm dBm dBm		TION WIDTH	Swe	eep 5.600	ms (1001 p
es BW	100 k RC SCL 1 f 1 f 1 f	2. 2. 2. 2.	.463 286 GHz .483 528 GHz .489 328 GHz	2.675 -50.048 -50.037	dBm dBm dBm		TION WIDTH	Swe	eep 5.600	ms (1001 p
es BW	100 k RC SCL 1 f 1 f 1 f	2. 2. 2. 2.	.463 286 GHz .483 528 GHz .489 328 GHz	2.675 -50.048 -50.037	dBm dBm dBm		TION WIDTH	Swe	eep 5.600	ms (1001 p



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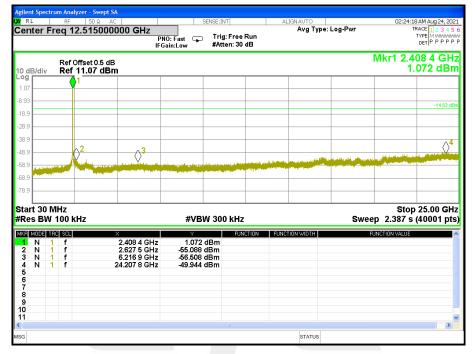
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Page 40 of 64 Report No.:STS2108107W02

Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX n Mode(20M) /CH01, CH06, CH11

CH 01



	rum Analyzer - S						
XI RL		Ω AC 5000000 GHz	SENSE:IN	T	ALIGNAUTO Avg Type: Lo	a-Pwr	02:26:27 AM Aug 24, 202 TRACE 1 2 3 4 5
Centerr		PN		: Free Run en: 30 dB		g · ···	DET P P P P
10 dB/div	Ref Offset (Ref 13.19					Mkr	1 2.438 4 GHz 3.192 dBm
3.19	1						
-6.81							
-16.8							-14.44 dBn
-26.8							
-36.8							
-46.8	\wedge^2		3				
-56.8							
-66.8							
-76.8							
Start 30 I #Res BW	VIHz 100 kHz		#VBW 300) kHz		Sweep 2.	Stop 25.00 GHz 387 s (40001 pts)
MKR MODE T	RC SCL	× 2.438 4 GHz	ĭ 3.192 dBm	FUNCTION	FUNCTION WIDTH	FUNCTIO	N VALUE
2 N	1 f	3.249 3 GHz	-54.379 dBm				
4 N	1 f 1 f	9.145 9 GHz 24.033 0 GHz	-56.697 dBm -49.215 dBm				
5 6 7 8 9							
7							
9 10							
11							~

CH 06

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

STATUS



CH 11

		nalyzer - Swe								
RL enter			AC 000000 GHz	NO: Fast	ENSE:INT		IGN AUTO Avg Type:	Log-Pwr		D9 AM Aug 24, 20 TRACE 1 2 3 4 5 TYPE MWAMAN
			IF	Gain:Low	#Atten: 30 c					DETPPPI
dB/div		ef Offset 0.5 ef 10.48 c								157 1 GH .479 dBi
80		1								
52		_								
.6		_								-17.26 d
.5		_								
.5		h2								0
.5		X		deleter i estanter	and the local second second	ومستحدث والروان	and the second second second			
1.5						and a grant state of the state				
9.5										
art 30) MH7								Stor	p 25.00 GH
les Bl				#VB	N 300 kHz			Swe	ep 2.387 s	
R MODE			X	Y 0. 170	FUNC	TION FUNC	TION WIDTH		FUNCTION VALUE	
N 2 N 3 N 4 N	1 f 1 f 1 f	• •	2.457 1 GHz 2.583 8 GHz 6.388 6 GHz 24.227 2 GHz	0.479 -53.827 -57.769 -49.171	dBm dBm					
5										
7 3										
)										
										>
							STATUS			

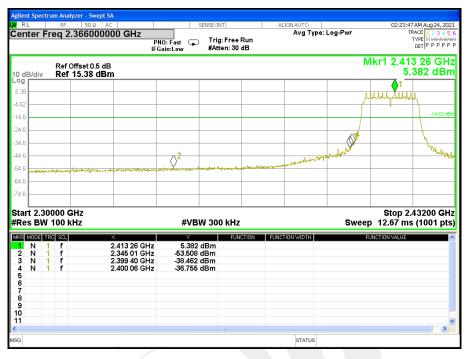


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Band edge(it's also the reference level for conducted spurious emission)



CH 01

CH 06





CH 11

	r Freq 2	50 Ω AC 2.4710000	00 GHz	PNO: Fast	SENSE:INT		ALIGN AUTO Avg Type	e: Log-Pwr		39 AM Aug 24, 20 TRACE 1 2 3 4 5 TYPE MWWWW
				Gain:Low	#Atten: 30					DETPPPF
dB/di		Offset 0.5 dB f 12.74 dBn						М	kr1 2.463 2	3 286 GH 1.738 dBi
				1						
.74			Martinaharhor	horn where	halushaly					
26 —		1	· · · · · · · · · · · · · · · · · · ·	- V						-17.26 dl
.3						6				-17.20 u
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	44000	CH-							Oten (50000 CL
art 2	.44200 3W 100			#VB	W 300 kHz	:		Swee	Stop 2 p 5.600 m	
art 2 Res B		kHz	×	Y	FUN		NCTION WIDTH			
art2. ResB	SW 100 E TEC SCL	kHz 2	.463 286 GHz	Y 2.738	FUN dBm		NCTION WIDTH		p 5.600 m	
art 2. Res B R MOD N N N N N	3W 100 E TEC SCI 1 f 1 f 1 f	kHz 2 2 2 2	.463 286 GHz .483 528 GHz .484 456 GHz	2.738 -49.550 -48.979	B dBm dBm dBm dBm		NCTION WIDTH		p 5.600 m	2.50000 GH is (1001 pt
art 2. Res B Roman N N N	3W 100 E TRC SCI 1 f 1 f	kHz 2 2 2 2	.463 286 GHz .483 528 GHz	¥ 2.738 -49.550	B dBm dBm dBm dBm		NCTION WIDTH		p 5.600 m	
art 2. Res B MODI N N N N N N N	3W 100 E TEC SCI 1 f 1 f 1 f	kHz 2 2 2 2	.463 286 GHz .483 528 GHz .484 456 GHz	2.738 -49.550 -48.979	B dBm dBm dBm dBm		NCTION WIDTH		p 5.600 m	
art 2 Res B MOD N N N N N N N N N N	3W 100 E TEC SCI 1 f 1 f 1 f	kHz 2 2 2 2	.463 286 GHz .483 528 GHz .484 456 GHz	2.738 -49.550 -48.979	B dBm dBm dBm dBm		NCTION WIDTH		p 5.600 m	
art 2 tes B N N N N N N N N N N N N	3W 100 E TEC SCI 1 f 1 f 1 f	kHz 2 2 2 2	.463 286 GHz .483 528 GHz .484 456 GHz	2.738 -49.550 -48.979	B dBm dBm dBm dBm		NCTION WIDTH		p 5.600 m	
art 2 Res B MOD N N N N N N N N	3W 100 E TEC SCI 1 f 1 f 1 f	kHz 2 2 2 2	.463 286 GHz .483 528 GHz .484 456 GHz	2.738 -49.550 -48.979	B dBm dBm dBm dBm		NETION WIDTH		p 5.600 m	



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5. POWER SPECTRAL DENSITY TEST

5.1 LIMIT

	FCC Part15.247 , Subpart C							
Section	Test Item	Limit	Frequency Range (MHz)	Result				
15.247(e)	Power Spectral Density	≤8 dBm (RBW ≥3KHz)	2400-2483.5	PASS				

5.2 TEST PROCEDURE

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. Set the span to 1.5 times the DTS channel bandwidth.
- 3. Set the 100 kHz \ge RBW \ge 3 kHz.
- 4. Set the VBW \geq 3 x RBW.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.
- 10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 DEVIATION FROM STANDARD No deviation.

5.4 TEST SETUP



5.5 EUT OPERATION CONDITIONS Please refer to section 3.1.4 of this report.



5.6 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX b Mode /CH01, CH06, CH11

Fraguanay	Power Density	Limit (dBm/3KHz)	Result	
Frequency	(dBm/3kHz)		Result	
2412 MHz	-6.415	≤8	PASS	
2437 MHz	-6.433	≤8	PASS	
2462 MHz	-8.839	≤8	PASS	





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TX CH11



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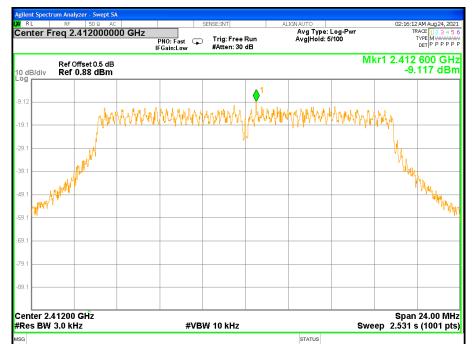


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Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX g Mode /CH01, CH06, CH11

Frequency	Power Density	Limit (dPm/2KHz)	Docult	
Frequency	(dBm/3kHz)	Limit (dBm/3KHz)	Result	
2412 MHz	-9.1170	≤8	PASS	
2437 MHz	-8.9620	≤8	PASS	
2462 MHz	-10.9300	≤8	PASS	

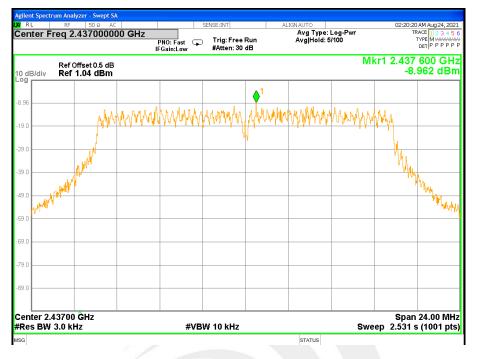




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TX CH11



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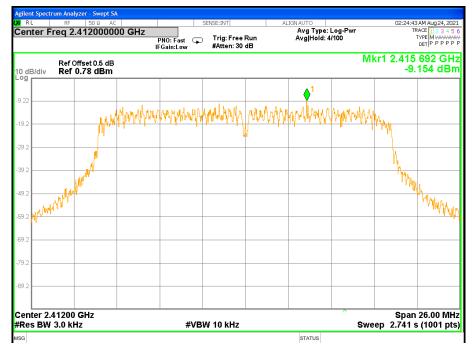


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Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX n Mode(20M) /CH01, CH06, CH11

Frequency	Power Density	Limit (dPm/2KHz)	Popult	
Frequency	(dBm/3kHz)	Limit (dBm/3KHz)	Result	
2412 MHz	-9.1540	≤8	PASS	
2437 MHz	-9.1850	≤8	PASS	
2462 MHz	-11.6330	≤8	PASS	





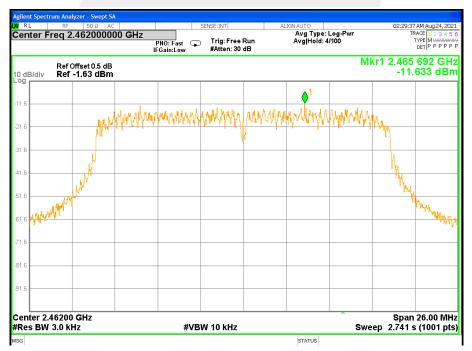
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TX CH11



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6. BANDWIDTH TEST

6.1 LIMIT

FCC Part15.247,Subpart C					
Section	Test Item	Limit	Frequency Range (MHz)	Result	
15.247(a)(2)	Bandwidth	≥500KHz (6dB bandwidth)	2400-2483.5	PASS	

6.2 TEST PROCEDURE

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW \geq 3RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \geq 6 dB.

6.3 DEVIATION FROM STANDARD No deviation.

6.4 TEST SETUP



6.5 EUT OPERATION CONDITIONS Please refer to section 3.1.4 of this report.

Shenzhen STS Test Services Co., Ltd.



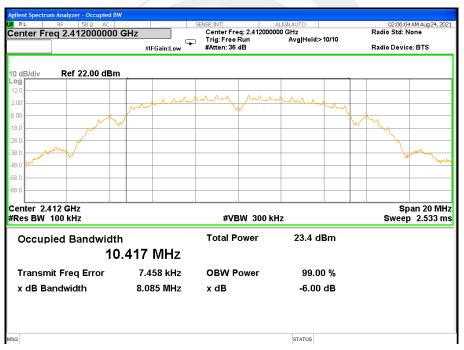
6.6 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX b Mode /CH01, CH06, CH11

Remark: PEAK DETECTOR IS USED

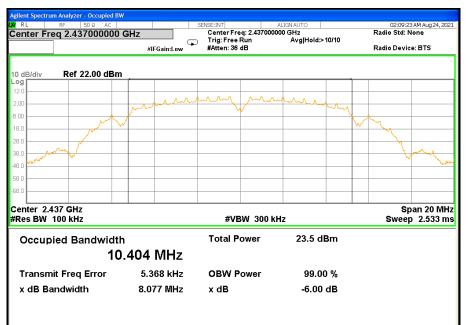
Fraguanay	6dB Bandwidth	Limit	Result
Frequency	(MHz)	(KHz)	Result
2412 MHz	8.085	≥500KHz	PASS
2437 MHz	8.077	≥500KHz	PASS
2462 MHz	8.079	≥500KHz	PASS

TX CH 01



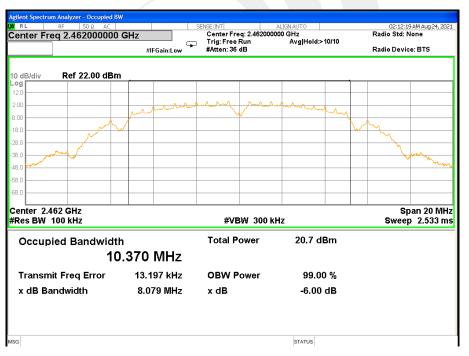
Shenzhen STS Test Services Co., Ltd.





TX CH 11

STATUS





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Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX g Mode /CH01, CH06, CH11

Fraguaday	6dB Bandwidth	Limit	Booult
Frequency	(MHz)	(KHz)	Result
2412 MHz	16.02	≥500KHz	PASS
2437 MHz	16.02	≥500KHz	PASS
2462 MHz	15.79	≥500KHz	PASS

TX CH 01

	ım Analyzer - Occupied BV	V			
Center Fr	RF 50 Q AC	GHz	SENSE:INT Center Freq: 2.412000		02:14:42 AM Aug 24, 202 Radio Std: None
]	#IEGain:Low	Trig: Free Run #Atten: 36 dB	Avg Hold>10/10	Radio Device: BTS
		FII Gail.20W			
10 dB/div	Ref 22.00 dBm				
Log 12.0					
2.00	A	- A A		manna	
-8.00	min	a many pour throw	and and have not		VMV W
-18.0					- War
-28.0	www.www.				- mon
-38.0 ~~~					
-48.0					
-58.0					
-68.0					
Center 2.4					Span 24 MHz
#Res BW	100 KHZ		#VBW 300 k	HZ	Sweep 3 ms
Occup	ied Bandwidth	า	Total Power	21.7 dBm	
	16	.276 MHz			
Transm	nit Freq Error	-1.859 kHz	OBW Power	99.00 %	
x dB Ba	andwidth	16.02 MHz	x dB	-6.00 dB	
MSG				STATUS	

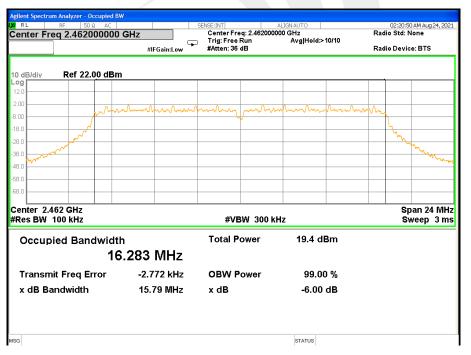
Shenzhen STS Test Services Co., Ltd.



	n Analyzer - Occupied B	w			
Center Fre	RF 50 Ω AC	GHz	SENSE:INT Center Freq: 2.437000		02:18:54 AM Aug 24, 2021 Radio Std: None
	-	#IFGain:Low) Trig: Free Run #Atten: 36 dB	Avg Hold:>10/10	Radio Device: BTS
10 dB/div	Ref 22.00 dBr	n			
Log 12.0					
2.00		Amortin Another		alwarten Amart	
-8.00	- min	ing hand been the man	mus mus mis	a carba and and a compart	mun
-18.0	/				
-28.0					"Vn
-38.0	~				mage
-48.0					
-58.0					
-68.0					
Center 2.4	37 GH7				Span 24 MHz
#Res BW			#VBW 300 k	Hz	Sweep 3 ms
Occup	ied Bandwidt	h	Total Power	21.8 dBm	
	16	6.275 MHz			
Transm	it Freq Error	1.651 kHz	OBW Power	99.00 %	
x dB Ba	ndwidth	16.02 MHz	x dB	-6.00 dB	

TX CH 11

STATUS



Shenzhen STS Test Services Co., Ltd.



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Temperature:	25 °C	Relative Humidity:	60%
Test Voltage:	DC 3V	Test Mode:	TX n Mode(20M) /CH01, CH06, CH11

Fraguaday	6dB Bandwidth	Limit	Popult
Frequency	(MHz)	(KHz)	Result
2412 MHz	15.78	≥500KHz	PASS
2437 MHz	15.79	≥500KHz	PASS
2462 MHz	16.28	≥500KHz	PASS

TX CH 01

ilent Spectrur	m Analyzer - Occupied RF 50 Ω AC		SENSE:INT	ALIGNAUTO	02:23:13 AM Aug 24, 20
	aq 2.41200000		Center Freq: 2.412000	000 GHz	Radio Std: None
		#IFGain:Low	Trig: Free Run #Atten: 36 dB	Avg Hold:>10/10	Radio Device: BTS
) dB/div pg	Ref 22.00 dE	3m			
2.0					
00		Andreader		Amana	
	- Mart	0.0000000000000000000000000000000000000			
0					
.0	- North N				"hand
0 wwwww	~/ [/] /*				
.0					
.0					
.0					
enter 2.4	12 GHz				Span 26 Mł
tes BW ∕	100 kHz		#VBW 300 k	Hz	Sweep 3.267 n
Occupi	ied Bandwid	ith	Total Power	21.7 dBm	
		7.208 MHz			
Transmi	it Freq Error	-11.085 kHz	OBW Power	99.00 %	
x dB Ba	ndwidth	15.78 MHz	x dB	-6.00 dB	
1				STATUS	

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enter Fr	RF 50 Ω AC eq 2.437000000		Center Freq: 2.4370000	ALIGN AUTO DOD GHz AvglHold:>10/10	02:25:27 AM Aug 24, 20 Radio Std: None
]	#IFGain:Low	⊃ Trig: Free Run #Atten: 36 dB	Avg Hold:>10/10	Radio Device: BTS
dB/div	Ref 22.00 dBn	ı			
2.0					
		an ul more dans mar an	money produce	Amanda	. A.
10	- And			a man a state state state	www.
.0					
.0					
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.0					
.0					
enter 2.4					Span 26 MH
Res BW	100 kHz		#VBW 300 k	Hz	Sweep 3.267 m
Occup	ied Bandwidt	h	Total Power	21.8 dBm	
-	17	.207 MHz			
Transm	nit Freq Error	-9.155 kHz	OBW Power	99.00 %	
x dB Ba	andwidth	15.79 MHz	x dB	-6.00 dB	

TX CH 11

STATUS





7. PEAK OUTPUT POWER TEST

7.1 LIMIT

	F	CC Part15.247,Subpa	rt C	
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Output Power	1 watt or 30dBm	2400-2483.5	PASS

7.2 TEST PROCEDURE

One of the following procedures may be used to determine the maximum peak conducted output power of a DTS EUT.

 $RBW \ge DTS$ bandwidth

The following procedure shall be used when an instrument with a resolution bandwidth that is greater than the DTS bandwidth is available to perform the measurement:

a) Set the RBW \geq DTS bandwidth.

b) Set VBW \geq [3 × RBW].

c) Set span \geq [3 \times RBW].

d) Sweep time = auto couple.

e) Detector = peak.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

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

Integrated band power method://

The following procedure can be used when the maximum available RBW of the instrument is less than the

DTS bandwidth:

a) Set the RBW = 1 MHz.

b) Set the VBW \geq [3 × RBW].

c) Set the span \geq [1.5 × DTS bandwidth].

d) Detector = peak.

e) Sweep time = auto couple.

f) Trace mode = max hold.

g) Allow trace to fully stabilize.

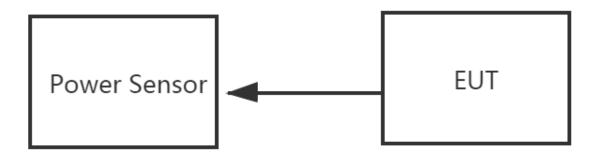
h) Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select the peak detector). If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS channel bandwidth.

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

7.3 DEVIATION FROM STANDARD No deviation.





7.5 EUT OPERATION CONDITIONS Please refer to section 3.1.4 of this report.



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7.6 TEST RESULTS

Temperature:	25 ℃	Relative Humidity:	60%
Test Voltage:	DC 3V		

Mode	Test Channel	Frequency	Peak Conducted Output Power	Average Conducted Output Power	LIMIT
	onannor	(MHz)	(dBm)	(dBm)	dBm
	CH01	2412	14.14	10.51	30
TX 802.11b	CH06	2437	13.65	9.94	30
	CH11	2462	11.23	7.50	30
	CH01	2412	15.89	8.97	30
TX 802.11g	CH06	2437	15.91	8.86	30
	CH11	2462	15.35	6.69	30
	CH01	2412	15.81	8.95	30
TX 802.11n20	CH06	2437	15.87	8.75	30
	CH11	2462	15.33	6.45	30

Note: Our power sensor test AVG power has no duty cycle display. The power sensor measures AVG power is Burst power. The software has considered the factor of the duty cycle factor, so it is unnecessary to add it again.



		Duty Cyci	C	
Mode	Ton	Тр	Duty cycle(%)	Duty factor(dB)
802.11b	4.240	4.800	88.33%	0.54
802.11g	0.696	0.795	87.55%	0.58
802.11n20	0.663	0.759	87.35%	0.59

Duty cycle

802.11b

RL		RF	50 Ω AC				SENSE: IN	П	AL	IGN AUT			02	2:40:33 AM Aug 24,
enter	Fre	eq 2	.43700000	F	PNO: Fa Gain:L	ist ↔ ow		: Free Run en: 40 dB		Avç	Type: Lo	og-Pwr		TRACE 1 2 3 TYPE WWWW DET P N N
dB/div	1	Ref	30.00 dBm	1									ΔMł	(r3 4.700) 1.35 (
						(\)	3∆4 _							
٥L			×2			Vino							bun.	
enter es BW			00000 GHz Hz			VBV	V 1.0 I	MHz				Sweep	20.00	Span 0 0 ms (1001 p
R MODE	TRC		>			Y		FUNCTION	FUNC	TION WID	TH	FU	NCTION VA	LUE
Δ2 F		t	(Δ)	4.240 ms 3.120 ms	(Δ)	-22.67	08 dB dBm							
∆4 F		t	(Δ)	4.700 ms 3.120 ms	(Δ)	1.3	35 dB							
				J. 120 IIIS		-22.07	ubm							

802.11g

gilent Spectrum Analyzer - Swept SA			
RL RF 50 Q AC	SENSE:INT	ALIGNAUTO	02:40:33 AM Aug 24, 20
enter Freq 2.437000000 GH	Z PNO: Fast Trig: Free Run IFGain:Low Atten: 40 dB	Avg Type: Log-Pwr	TRACE 1 2 3 4 TYPE WWWWWW DET P N N N
0 dB/div Ref 30.00 dBm			∆Mkr3 4.700 m 1.35 d
0.0			
0.0			
.00			
0.0	10304		
.0			
.0			
.0			
enter 2.437000000 GHz			Span 0
es BW 1.0 MHz	VBW 1.0 MHz	Swe	ep 20.00 ms (1001 p
R MODE TRC SCL X	Y FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
PF 1 t 3.1	40 ms (∆) 0.08 dB 20 ms -22.67 dBm		
F 1 t 3.1	00 ms (∆) 1.35 dB 20 ms -22.67 dBm		
3			
í l			
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802.11n(HT20)

RL	RF	zer - Swept S/ 50 Ω AC			SENSE:I	NT	AL	IGN AUTO		02:44:21	AM Aug 24, 2
nter Fr	req 2.4	4370000		PNO: Fast FGain:Low		g: Free Ru :en: 40 dE		Avg Type	: Log-Pwr	TR	ACE 1 2 3 4
dB/div	Ref 3	30.00 dBn	n							ΔMkr3	759.0 0.55 c
.0 .0 1411/4/14	ryanogle	matral	for her representation	wa-441va-14vara	ntr a t	wanner	HELMEN AND AND AND AND AND AND AND AND AND AN	unputant	Jor Mar Martin	www.	nt pr
.0					14	3∆4			×		
.0 .0 .0											
nter 2.4		0000 GHz		v	BW 1.0	MHz			Swee	p 3.000 ms	Span 0
MODE TE Δ2 1 F 1			× 663.0 µs 582.0 µs	i (Δ)	-1.83 dB .69 dBm	FUNCT	ON FUNCI	TION WIDTH		UNCTION VALUE	(
Γ Δ4 1 F 1		۵)	582.0 μs 759.0 μs 582.0 μs	i (Δ)	0.55 dB .69 dBm						
											>



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8. ANTENNA REQUIREMENT

8.1 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 partyshall be used with the device.

8.2 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 * * * * *



Shenzhen STS Test Services Co., Ltd.