

TEST REPORT

FCC ID: 2AG86-SS912ZB

Product: Slim Door/window Sensor

Model No.: SAU2CD1

Additional Model No.: SS912ZB, HDW10ZB, SAU2CH1

Trade Mark: N/A

Report No.: TCT171017E034

Issued Date: Oct. 20, 2017

Issued for:

**Salus North America, Inc.
850 Main Street, Redwood City, California 94063**

Issued By:

**Shenzhen Tongce Testing Lab.
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Appendix A: Photographs of Test Setup**Appendix B: Photographs of EUT**

1. Test Certification

Product:	Slim Door/window Sensor
Model No.:	SAU2CD1
Additional Model No.:	SS912ZB, HDW10ZB, SAU2CH1
Trade Mark:	N/A
Applicant:	Salus North America, Inc.
Address:	850 Main Street, Redwood City, California 94063
Manufacturer:	Salus North America, Inc.
Address:	850 Main Street, Redwood City, California 94063
Factory 1:	Computime Electronics(shenzhen) Company Limited
Address of Factory 1:	Yuekenguangyu Industrial Park, kangqiao Road 88#, Danzhutou Community, Nanwan Street Office, Longgang District, Shenzhen 518114
Factory 2:	Asia Electronic Dongguan
Address of Factory 2:	Zhen'an Science and Technology Industrial Park, Chang'an Dongguan Guangdong, PRC
Date of Test:	Jul. 03, 2017 –Jul. 05, 2017
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 KDB 558074 D01 DTS Meas Guidance v04

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Beryl Zhao

Date:

Jul. 05, 2017

Beryl Zhao

Reviewed By:

Zen Zhou

Date:

Oct. 20, 2017

Approved By:

Joe Zhou
Tomsin

Date:

Oct. 20, 2017



2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	N/A
Conducted Peak Output Power	§15.247 (b)(3) §2.1046	PASS
6dB Emission Bandwidth	§15.247 (a)(2) §2.1049	PASS
Power Spectral Density	§15.247 (e)	PASS
Band Edge	1§5.247(d) §2.1051, §2.1057	PASS
Spurious Emission	§15.205/§15.209 §2.1053, §2.1057	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

3. EUT Description

Product:	Slim Door/window Sensor
Model No.:	SAU2CD1
Additional Model No.:	SS912ZB, HDW10ZB, SAU2CH1
Trade Mark:	N/A
Operation Frequency:	2405MHz~2480MHz
Channel Separation:	5MHz
Number of Channel:	16
Modulation Technology:	O-QPSK
Antenna Type:	Ceramics Antenna
Antenna Gain:	2.0dBi
Power Supply:	DC 3V 1*CR2 battery
Remark:	All above models are identical in the same PCB layout, interior structure and electrical circuits. The only differences are the model name and color for commercial purpose.

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2405MHz	5	2425MHz	9	2445MHz	13	2465MHz
2	2410MHz	6	2430MHz	10	2450MHz	14	2470MHz
3	2415MHz	7	2435MHz	11	2455MHz	15	2475MHz
4	2420MHz	8	2440MHz	12	2460MHz	16	2480 MHz

Remark: Channel 1, 8 & 16 have been tested.

4. General Information

4.1. Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 98.46%) with Fully-charged battery.
The sample was placed (0.1m below 1GHz, 1.5m above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.	

4.2. 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.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 6dB Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

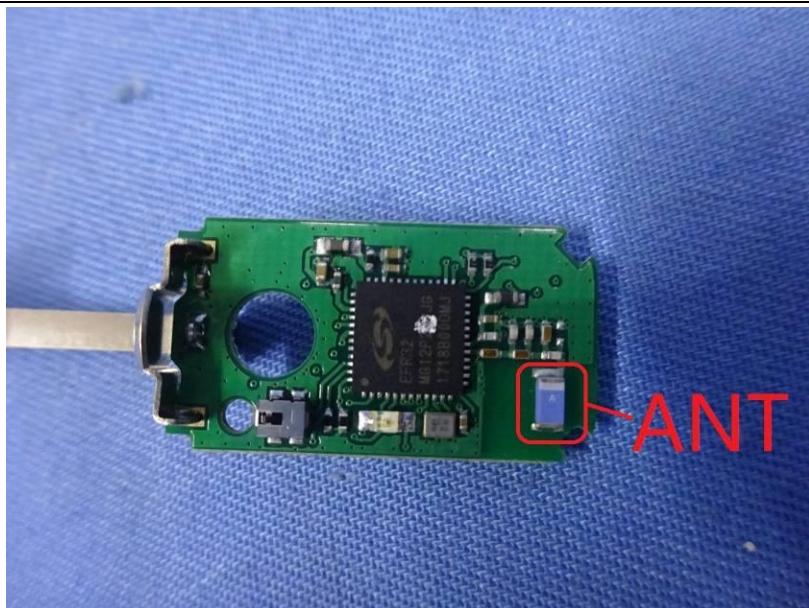
The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission	$\pm 2.56\text{dB}$
2	RF power, conducted	$\pm 0.12\text{dB}$
3	Spurious emissions, conducted	$\pm 0.11\text{dB}$
4	All emissions, radiated(<1G)	$\pm 3.92\text{dB}$
5	All emissions, radiated(>1G)	$\pm 4.28\text{dB}$
6	Temperature	$\pm 0.1^\circ\text{C}$
7	Humidity	$\pm 1.0\%$

6. Test Results and Measurement Data

6.1. Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
The antenna is a Ceramics antenna which permanently attached, and the best case gain of the antenna is 2.0dBi.	



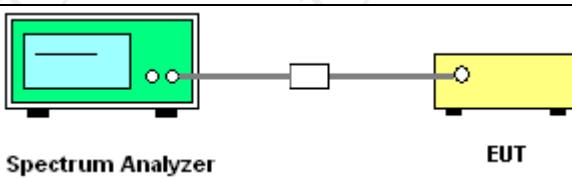
6.2. Conducted Emission

6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207														
Test Method:	ANSI C63.10:2013														
Frequency Range:	150 kHz to 30 MHz														
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto														
Limits:	<table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table>	Frequency range (MHz)	Limit (dBuV)		Quasi-peak	Average	0.15-0.5	66 to 56*	56 to 46*	0.5-5	56	46	5-30	60	50
Frequency range (MHz)	Limit (dBuV)														
	Quasi-peak	Average													
0.15-0.5	66 to 56*	56 to 46*													
0.5-5	56	46													
5-30	60	50													
Test Setup:	<p>Reference Plane</p> <p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p>														
Test Mode:	Charging + Transmitting Mode														
Test Procedure:	<ol style="list-style-type: none"> 1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. 														
Test Result:	N/A; The EUT is powered by battery, so the item is not applicable.														

6.3. Conducted Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	KDB558074
Limit:	30dBm
Test Setup:	
Test Mode:	Refer to item 4.1
Test Procedure:	<ol style="list-style-type: none"> 1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04. 2. Set spectrum analyzer as following: <ol style="list-style-type: none"> a) Set the RBW \geq DTS bandwidth. b) Set VBW $\geq 3 \times$ 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.
Test Result:	PASS

6.3.2. Test Instruments

Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF cable (9kHz-26.5GHz)	TCT	RE-06	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018

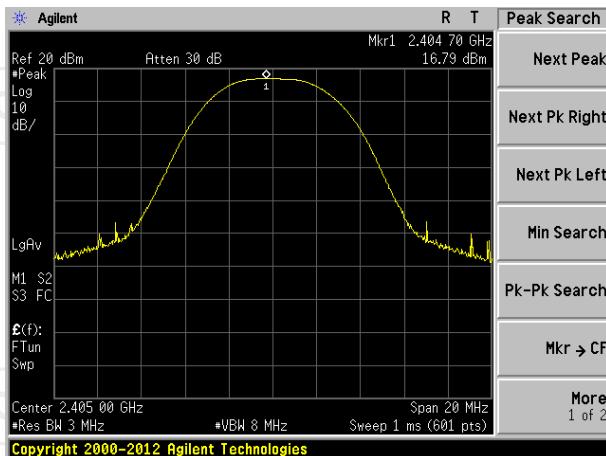
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.3.3. Test Data

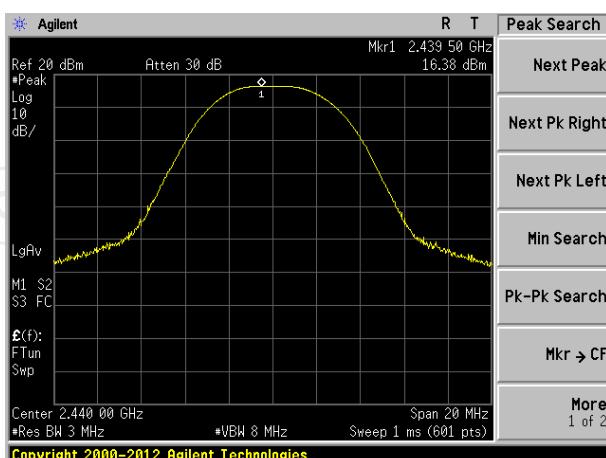
Test channel	PK Conducted Output Power (dBm)	Limit (dBm)	Result
Lowest	16.79	30.00	PASS
Middle	16.38	30.00	PASS
Highest	15.95	30.00	PASS

Test plots as follows:

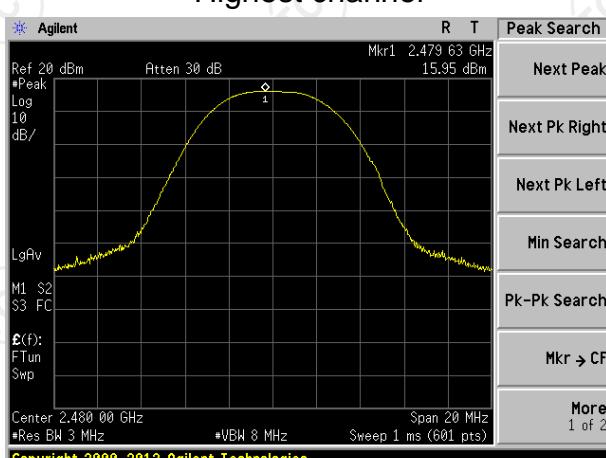
Lowest channel



Middle channel



Highest channel



6.4. Emission Bandwidth

6.4.1. Test Specification

6.4.2. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF cable (9kHz-26.5GHz)	TCT	RE-06	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.4.3. Test data

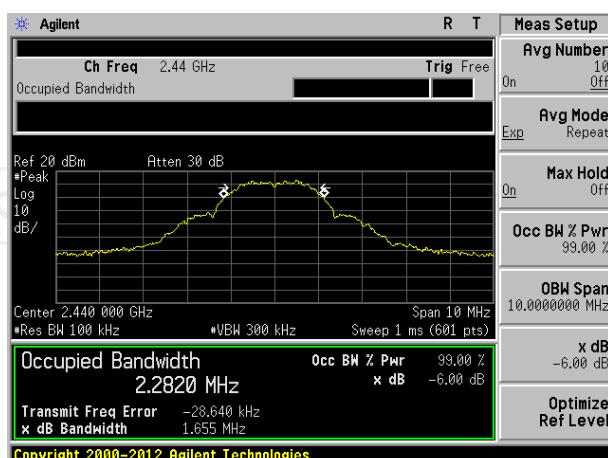
Test channel	6dB Emission Bandwidth (kHz)		
	O-QPSK mode	Limit	Result
Lowest	1664.00	>500k	PASS
Middle	1665.00	>500k	
Highest	1762.00	>500k	

Test plots as follows:

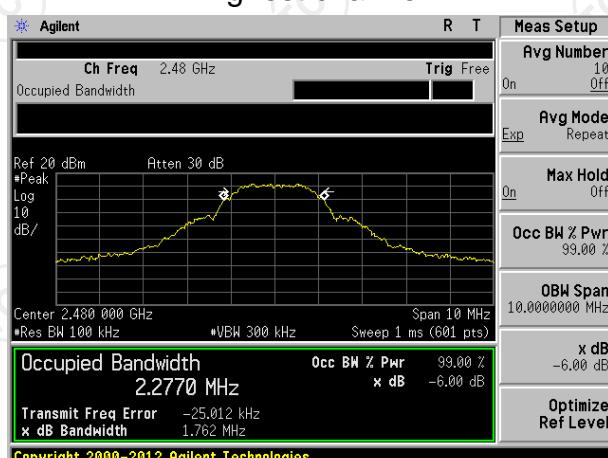
Lowest channel



Middle channel

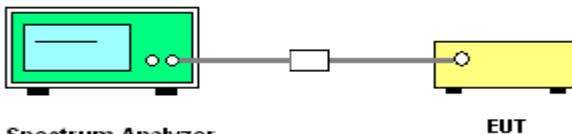


Highest channel



6.5. Power Spectral Density

6.6. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (e)
Test Method:	KDB558074
Limit:	The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.
Test Setup:	 <p>Spectrum Analyzer EUT</p>
Test Mode:	Refer to item 4.1
Test Procedure:	<ol style="list-style-type: none"> 1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No.558074 D01 DTS Meas. Guidance v04 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW): $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$. Video bandwidth VBW $\geq 3 \times \text{RBW}$. In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW) 5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level. 6. Measure and record the results in the test report.
Test Result:	PASS

6.6.1. Test Instruments

RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
RF cable (9kHz-26.5GHz)	TCT	RE-06	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018

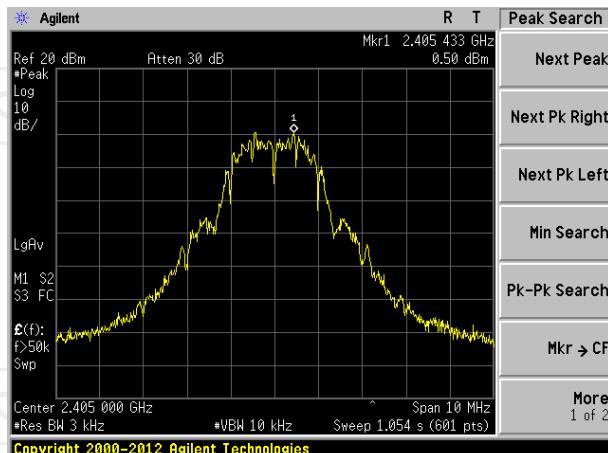
Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.6.2. Test data

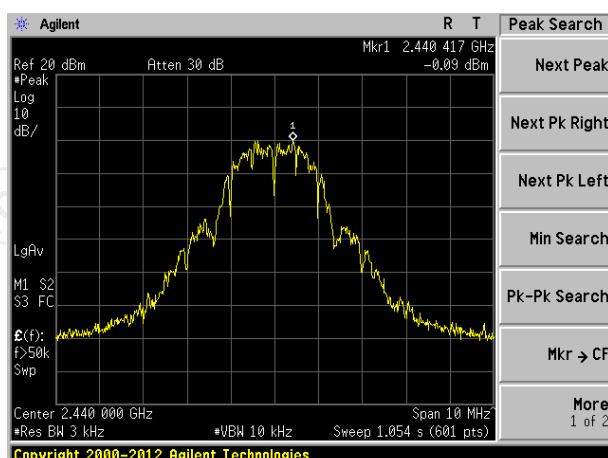
Test channel	Power Spectral Density (dBm/3kHz)		
	O-QPSK mode	Limit	Result
Lowest	0.50	8 dBm/3kHz	PASS
Middle	-0.09	8 dBm/3kHz	
Highest	0.36	8 dBm/3kHz	

Test plots as follows:

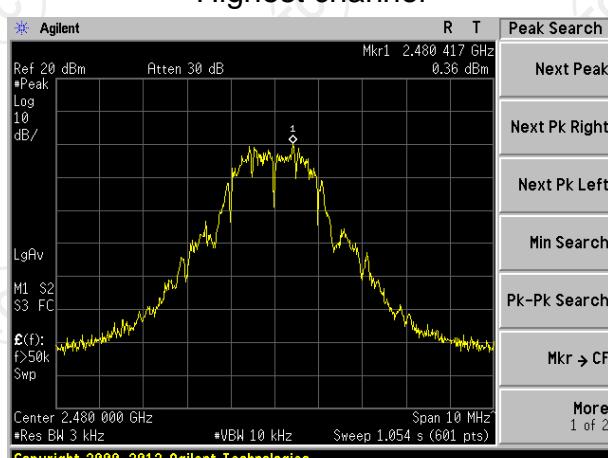
Lowest channel



Middle channel

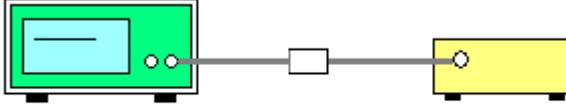


Highest channel



6.7. Conducted Band Edge and Spurious Emission Measurement

6.7.1. Test Specification

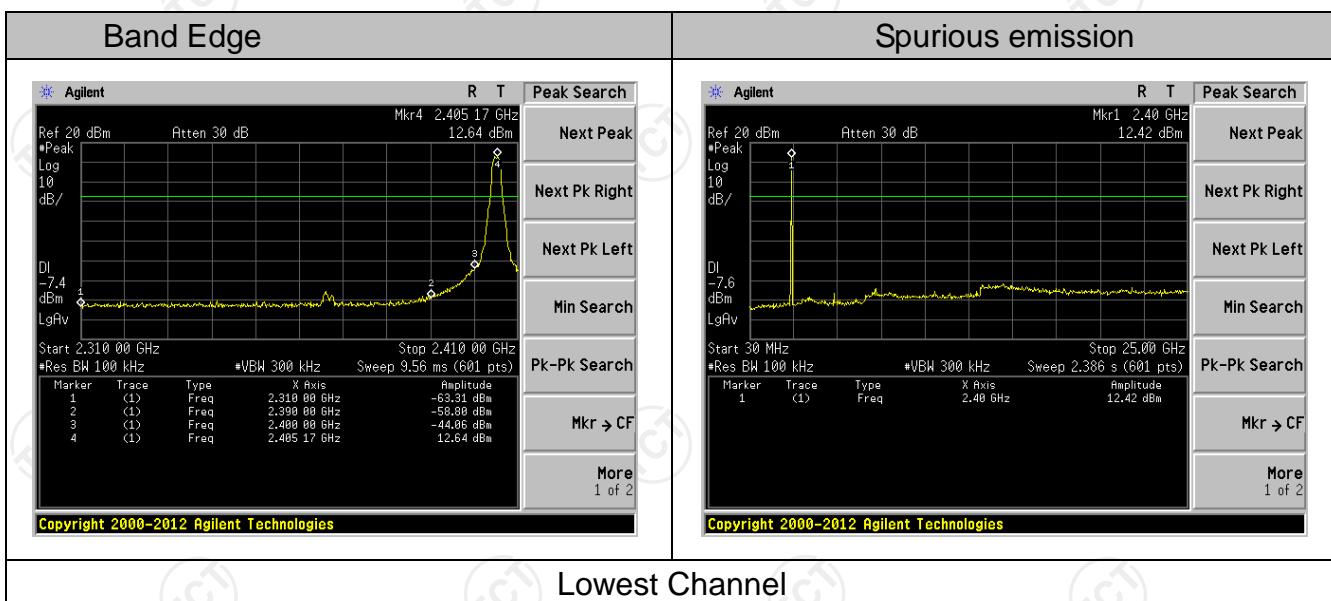
Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074
Limit:	In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).
Test Setup:	 <p>The diagram illustrates the test setup. A green 'Spectrum Analyzer' is connected to a yellow 'EUT' (Equipment Under Test) through a grey 'RF cable'. A small white rectangular component, labeled 'Attenuator', is placed between the spectrum analyzer and the EUT.</p>
Test Mode:	Refer to item 4.1
Test Procedure:	<ol style="list-style-type: none"> 1. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB per 15.247(d). 4. Measure and record the results in the test report. 5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.
Test Result:	PASS

6.7.2. Test Instruments

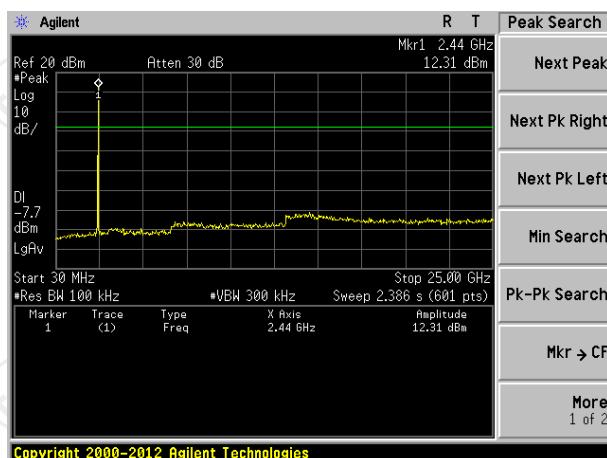
RF Test Room				
Equipment	Manufacturer	Model	Serial Number	Calibration Due
Spectrum Analyzer	Agilent	N9020A	MY49100060	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHWARZ	FSQ	200061	Sep. 27, 2018
RF cable (9kHz-26.5GHz)	TCT	RE-06	N/A	Sep. 27, 2018
Antenna Connector	TCT	RFC-01	N/A	Sep. 27, 2018

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.7.3. Test Data

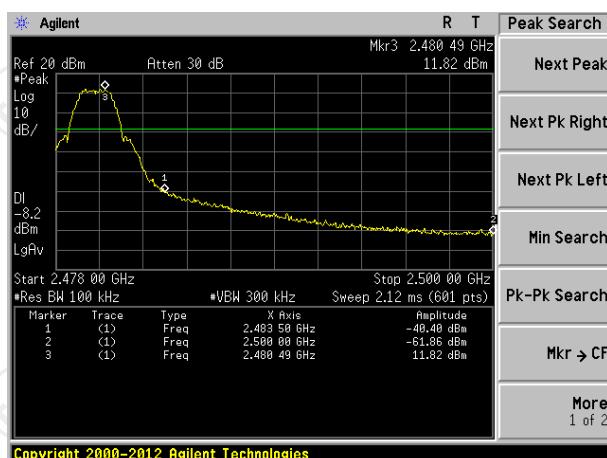


Spurious emission

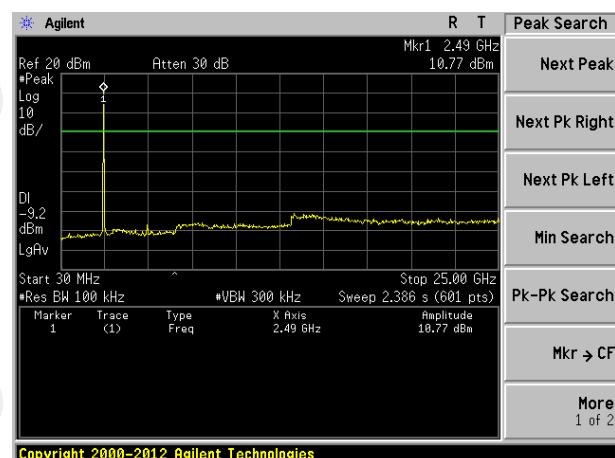


Middle Channel

Band Edge



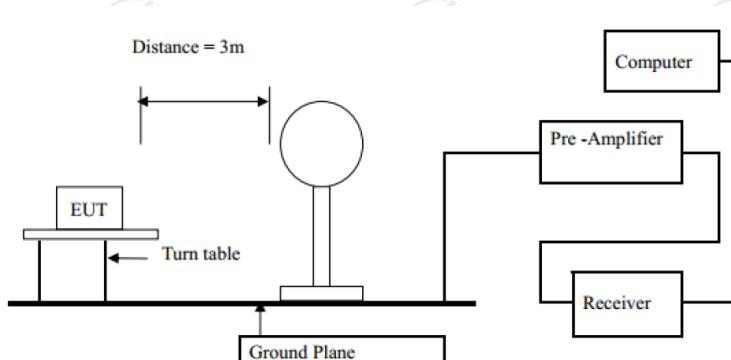
Spurious emission

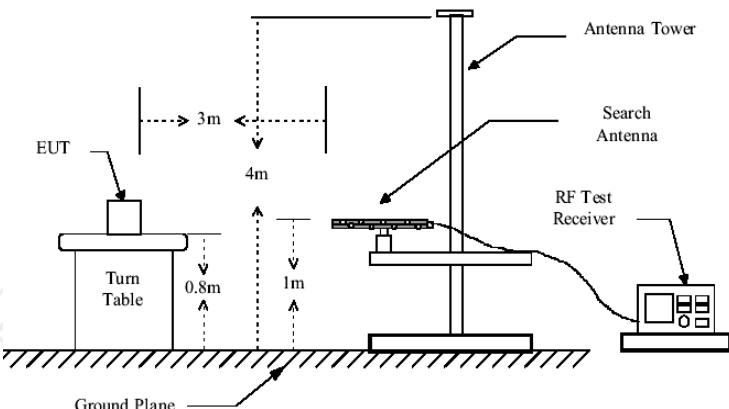


Highest Channel

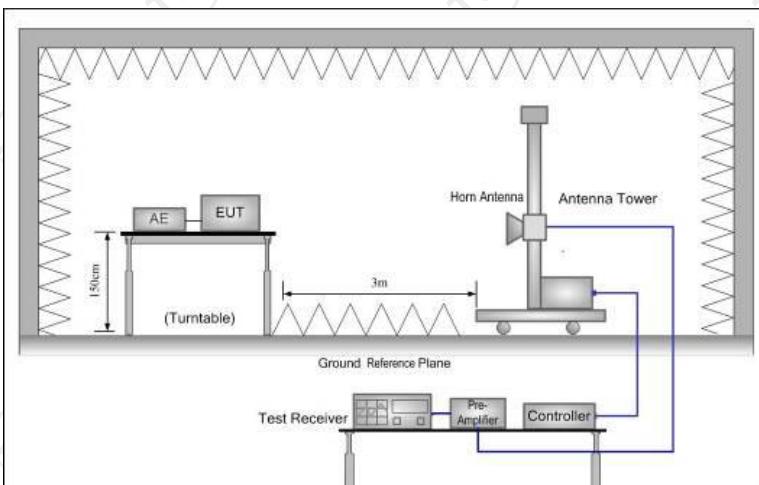
6.8. Radiated Spurious Emission Measurement

6.8.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.209																																															
Test Method:	ANSI C63.10: 2013																																															
Frequency Range:	9 kHz to 25 GHz																																															
Measurement Distance:	3 m																																															
Antenna Polarization:	Horizontal & Vertical																																															
Operation mode:	Refer to item 4.1																																															
Receiver Setup:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>9kHz- 150kHz</td> <td>Quasi-peak</td> <td>200Hz</td> <td>1kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>150kHz- 30MHz</td> <td>Quasi-peak</td> <td>9kHz</td> <td>30kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>120KHz</td> <td>300KHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td><td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table>					Frequency	Detector	RBW	VBW	Remark	9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value	150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value	30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	10Hz	Average Value														
Frequency	Detector	RBW	VBW	Remark																																												
9kHz- 150kHz	Quasi-peak	200Hz	1kHz	Quasi-peak Value																																												
150kHz- 30MHz	Quasi-peak	9kHz	30kHz	Quasi-peak Value																																												
30MHz-1GHz	Quasi-peak	120KHz	300KHz	Quasi-peak Value																																												
Above 1GHz	Peak	1MHz	3MHz	Peak Value																																												
	Peak	1MHz	10Hz	Average Value																																												
Limit:	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Field Strength (microvolts/meter)</th> <th>Measurement Distance (meters)</th> <th></th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(KHz)</td> <td>300</td> <td></td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(KHz)</td> <td>30</td> <td></td> </tr> <tr> <td>1.705-30</td> <td>30</td> <td>30</td> <td></td> </tr> <tr> <td>30-88</td> <td>100</td> <td>3</td> <td></td> </tr> <tr> <td>88-216</td> <td>150</td> <td>3</td> <td></td> </tr> <tr> <td>216-960</td> <td>200</td> <td>3</td> <td></td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> <td></td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Field Strength (microvolts/meter)</th> <th>Measurement Distance (meters)</th> <th>Detector</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Above 1GHz</td><td>500</td> <td>3</td> <td>Average</td> </tr> <tr> <td>5000</td> <td>3</td> <td>Peak</td> </tr> </tbody> </table>					Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)		0.009-0.490	2400/F(KHz)	300		0.490-1.705	24000/F(KHz)	30		1.705-30	30	30		30-88	100	3		88-216	150	3		216-960	200	3		Above 960	500	3		Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector	Above 1GHz	500	3	Average	5000	3	Peak
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)																																														
0.009-0.490	2400/F(KHz)	300																																														
0.490-1.705	24000/F(KHz)	30																																														
1.705-30	30	30																																														
30-88	100	3																																														
88-216	150	3																																														
216-960	200	3																																														
Above 960	500	3																																														
Frequency	Field Strength (microvolts/meter)	Measurement Distance (meters)	Detector																																													
Above 1GHz	500	3	Average																																													
	5000	3	Peak																																													
Test setup:	<p>For radiated emissions below 30MHz</p>  <p>Distance = 3m</p> <p>EUT</p> <p>Turn table</p> <p>Ground Plane</p> <p>Computer</p> <p>Pre -Amplifier</p> <p>Receiver</p> <p>30MHz to 1GHz</p>																																															



Above 1GHz



1. For the radiated emission test below 1GHz:
 The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.

For the radiated emission test above 1GHz:
 Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final

Test Procedure:

	<p>measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <p>2. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level</p> <p>3. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</p> <p>4. Use the following spectrum analyzer settings:</p> <ol style="list-style-type: none"> (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. <p>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p>
Test mode:	Refer to section 4.1 for details
Test results:	PASS

6.8.2. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due
Test Receiver	ROHDE&SCHW ARZ	ESVD	100008	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHW ARZ	FSQ	200061	Sep. 27, 2018
Pre-amplifier	EM Electronics Corporation CO.,LTD	EM30265	07032613	Sep. 27, 2018
Pre-amplifier	HP	8447D	2727A05017	Sep. 27, 2018
Loop antenna	ZHINAN	ZN30900A	12024	Sep. 27, 2018
Broadband Antenna	Schwarzbeck	VULB9163	340	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBHA 9120D	631	Sep. 27, 2018
Horn Antenna	Schwarzbeck	BBH 9170	582	Jun. 07, 2018
Antenna Mast	Keleto	CC-A-4M	N/A	N/A
Coax cable (9KHz-1GHz)	TCT	RE-low-01	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-02	N/A	Sep. 27, 2018
Coax cable (9KHz-1GHz)	TCT	RE-low-03	N/A	Sep. 27, 2018
Coax cable (9KHz-40GHz)	TCT	RE-high-04	N/A	Sep. 27, 2018
EMI Test Software	Shurples Technology	EZ-EMC	N/A	N/A

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.8.3. Test Data

■ Below 1GHz

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
42.60	26.55	12.27	0.69	30.03	9.48	40.00	-30.52	Vertical
60.28	24.98	11.40	0.86	29.92	7.32	40.00	-32.68	Vertical
99.18	27.23	11.73	1.18	29.70	10.44	43.50	-33.06	Vertical
230.91	28.16	11.27	2.02	29.48	11.97	46.00	-34.03	Vertical
377.26	26.09	15.03	2.75	29.61	14.26	46.00	-31.74	Vertical
768.75	25.11	20.85	4.35	29.20	21.11	46.00	-24.89	Vertical
44.12	29.94	12.25	0.71	30.02	12.88	40.00	-27.12	Horizontal
58.20	27.65	11.67	0.84	29.93	10.23	40.00	-29.77	Horizontal
103.08	30.99	11.80	1.22	29.68	14.33	43.50	-29.17	Horizontal
216.02	31.60	10.78	1.93	29.36	14.95	46.00	-31.05	Horizontal
351.71	26.29	14.50	2.63	29.73	13.69	46.00	-32.31	Horizontal
833.32	27.51	21.59	4.58	29.17	24.51	46.00	-21.49	Horizontal

Test channel:	Lowest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	37.47	27.91	5.30	24.64	46.04	74.00	-27.96	Horizontal
2390.00	38.71	27.59	5.38	24.71	46.97	74.00	-27.03	Horizontal
2310.00	37.60	27.91	5.30	24.64	46.17	74.00	-27.83	Vertical
2390.00	38.23	27.59	5.38	24.71	46.49	74.00	-27.51	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2310.00	27.50	27.91	5.30	24.64	36.07	54.00	-17.93	Horizontal
2390.00	28.34	27.59	5.38	24.71	36.60	54.00	-17.40	Horizontal
2310.00	27.32	27.91	5.30	24.64	35.89	54.00	-18.11	Vertical
2390.00	27.41	27.59	5.38	24.71	35.67	54.00	-18.33	Vertical

Test channel:	Highest channel
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	52.01	27.53	5.47	24.80	60.21	74.00	-13.79	Horizontal
2500.00	38.55	27.55	5.49	24.86	46.73	74.00	-27.27	Horizontal
2483.50	46.13	27.53	5.47	24.80	54.33	74.00	-19.67	Vertical
2500.00	39.96	27.55	5.49	24.86	48.14	74.00	-25.86	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	42.11	27.53	5.47	24.80	50.31	54.00	-3.69	Horizontal
2500.00	28.41	27.55	5.49	24.86	36.59	54.00	-17.41	Horizontal
2483.50	35.60	27.53	5.47	24.80	43.80	54.00	-10.20	Vertical
2500.00	28.34	27.55	5.49	24.86	36.52	54.00	-17.48	Vertical

Note:

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (dB μ V/m)- limit (dB μ V/m)

■ Above 1GHz

Test channel:	Lowest
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4810.00	41.35	31.78	8.60	37.66	44.07	74.00	-29.93	Vertical
7215.00	36.95	36.15	11.66	35.69	49.07	74.00	-24.93	Vertical
9620.00	28.04	38.01	14.14	34.91	45.28	74.00	-28.72	Vertical
12025.00	27.46	39.08	15.03	36.13	45.44	74.00	-28.56	Vertical
14430.00	26.76	42.46	17.17	36.01	50.38	74.00	-23.62	Vertical
4810.00	43.32	31.78	8.60	37.66	46.04	74.00	-27.96	Horizontal
7215.00	38.29	36.15	11.66	35.69	50.41	74.00	-23.59	Horizontal
9620.00	27.89	38.01	14.14	34.91	45.13	74.00	-28.87	Horizontal
12025.00	27.76	39.08	15.03	36.13	45.74	74.00	-28.26	Horizontal
14430.00	26.14	42.46	17.17	36.01	49.76	74.00	-24.24	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4810.00	33.07	31.78	8.60	37.66	35.79	54.00	-18.21	Vertical
7215.00	28.07	36.15	11.66	35.69	40.19	54.00	-13.81	Vertical
9620.00	22.28	38.01	14.14	34.91	39.52	54.00	-14.48	Vertical
12025.00	19.45	39.08	15.03	36.13	37.43	54.00	-16.57	Vertical
14430.00	19.39	42.46	17.17	36.01	43.01	54.00	-10.99	Vertical
4810.00	30.04	31.78	8.60	37.66	32.76	54.00	-21.24	Horizontal
7215.00	27.41	36.15	11.66	35.69	39.53	54.00	-14.47	Horizontal
9620.00	21.13	38.01	14.14	34.91	38.37	54.00	-15.63	Horizontal
12025.00	21.74	39.08	15.03	36.13	39.72	54.00	-14.28	Horizontal
14430.00	19.77	42.46	17.17	36.01	43.39	54.00	-10.61	Horizontal

Note:

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (dB μ V/m)- limit (dB μ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “*” in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

Test channel:	Middle
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	39.08	31.85	8.66	37.68	41.91	74.00	-32.09	Vertical
7320.00	36.73	36.37	11.72	35.64	49.18	74.00	-24.82	Vertical
9760.00	28.37	38.35	14.25	34.98	45.99	74.00	-28.01	Vertical
12200.00	27.82	38.92	15.14	36.26	45.62	74.00	-28.38	Vertical
14640.00	26.84	42.21	17.28	35.72	50.61	74.00	-23.39	Vertical
4880.00	42.55	31.85	8.66	37.68	45.38	74.00	-28.62	Horizontal
7320.00	39.30	36.37	11.72	35.64	51.75	74.00	-22.25	Horizontal
9760.00	27.69	38.35	14.25	34.98	45.31	74.00	-28.69	Horizontal
12200.00	26.32	38.92	15.14	36.26	44.12	74.00	-29.88	Horizontal
14640.00	26.06	42.21	17.28	35.72	49.83	74.00	-24.17	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4880.00	29.90	31.85	8.66	37.68	32.73	54.00	-21.27	Vertical
7320.00	26.19	36.37	11.72	35.64	38.64	54.00	-15.36	Vertical
9760.00	21.98	38.35	14.25	34.98	39.60	54.00	-14.40	Vertical
12200.00	19.61	38.92	15.14	36.26	37.41	54.00	-16.59	Vertical
14640.00	18.61	42.21	17.28	35.72	42.38	54.00	-11.62	Vertical
4880.00	31.38	31.85	8.66	37.68	34.21	54.00	-19.79	Horizontal
7320.00	28.75	36.37	11.72	35.64	41.20	54.00	-12.80	Horizontal
9760.00	20.31	38.35	14.25	34.98	37.93	54.00	-16.07	Horizontal
12200.00	21.13	38.92	15.14	36.26	38.93	54.00	-15.07	Horizontal
14640.00	15.83	42.21	17.28	35.72	39.60	54.00	-14.40	Horizontal

Note:

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (dBuV/m)- limit (dBuV/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “*” in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

Test channel:	Highest							
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Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4950.00	37.54	31.93	8.73	37.69	40.51	74.00	-33.49	Vertical
7425.00	30.11	36.59	11.79	35.58	42.91	74.00	-31.09	Vertical
9900.00	30.01	38.98	14.40	35.08	48.31	74.00	-25.69	Vertical
12375.00	27.25	38.76	15.27	36.43	44.85	74.00	-29.15	Vertical
14850.00	26.89	41.52	17.39	35.39	50.41	74.00	-23.59	Vertical
4950.00	43.11	31.93	8.73	37.69	46.08	74.00	-27.92	Horizontal
7425.00	32.92	36.59	11.79	35.58	45.72	74.00	-28.28	Horizontal
9900.00	28.02	38.98	14.40	35.08	46.32	74.00	-27.68	Horizontal
12375.00	27.82	38.76	15.27	36.43	45.42	74.00	-28.58	Horizontal
14850.00	26.83	41.52	17.39	35.39	50.35	74.00	-23.65	Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4950.00	30.50	31.93	8.73	37.69	33.47	54.00	-20.53	Vertical
7425.00	27.91	36.59	11.79	35.58	40.71	54.00	-13.29	Vertical
9900.00	21.30	38.98	14.40	35.08	39.60	54.00	-14.40	Vertical
12375.00	20.86	38.76	15.27	36.43	38.46	54.00	-15.54	Vertical
14850.00	19.41	41.52	17.39	35.39	42.93	54.00	-11.07	Vertical
4950.00	31.07	31.93	8.73	37.69	34.04	54.00	-19.96	Horizontal
7425.00	24.72	36.59	11.79	35.58	37.52	54.00	-16.48	Horizontal
9900.00	22.31	38.98	14.40	35.08	40.61	54.00	-13.39	Horizontal
12375.00	21.42	38.76	15.27	36.43	39.02	54.00	-14.98	Horizontal
14850.00	19.35	41.52	17.39	35.39	42.87	54.00	-11.13	Horizontal

Note:

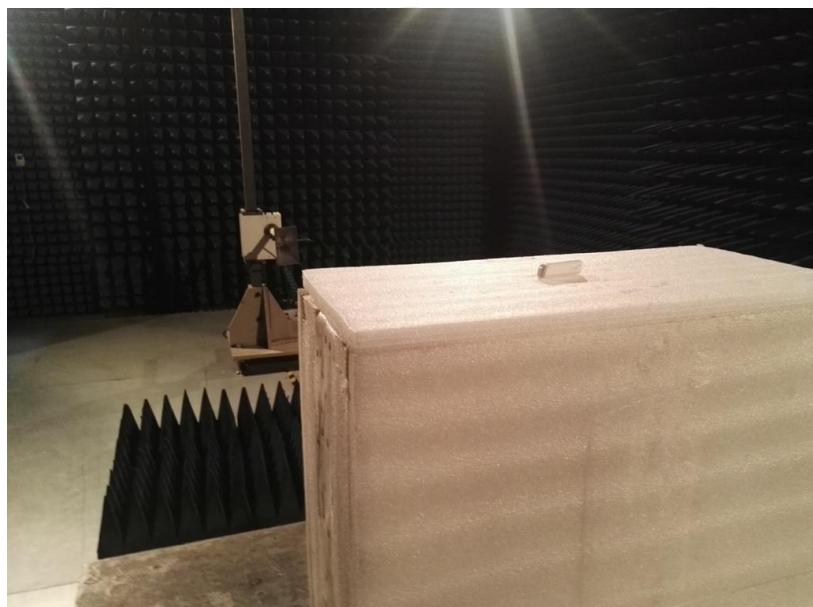
1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (dBuV/m)- limit (dBuV/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency.
5. Data of measurement shown “*” in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

Appendix A: Photographs of Test Setup

Product: Slim Door/window Sensor

Model: SAU2CD1

Radiated Emission



Appendix B: Photographs of EUT

Product: Slim Door/window Sensor

Model: SAU2CD1

External Photos

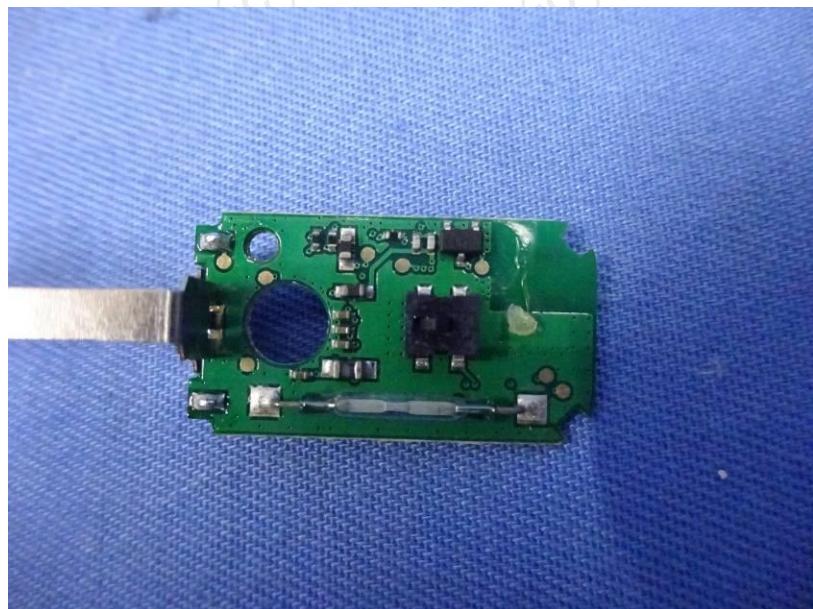
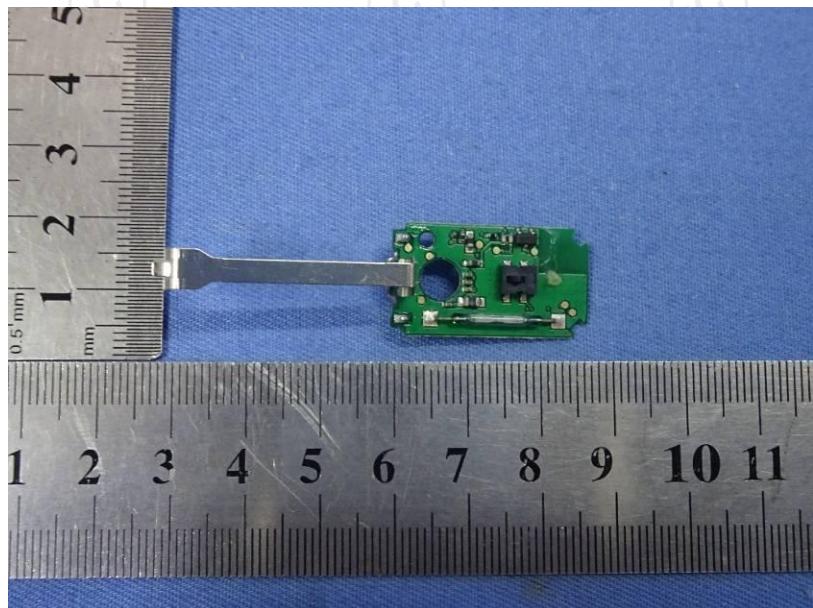


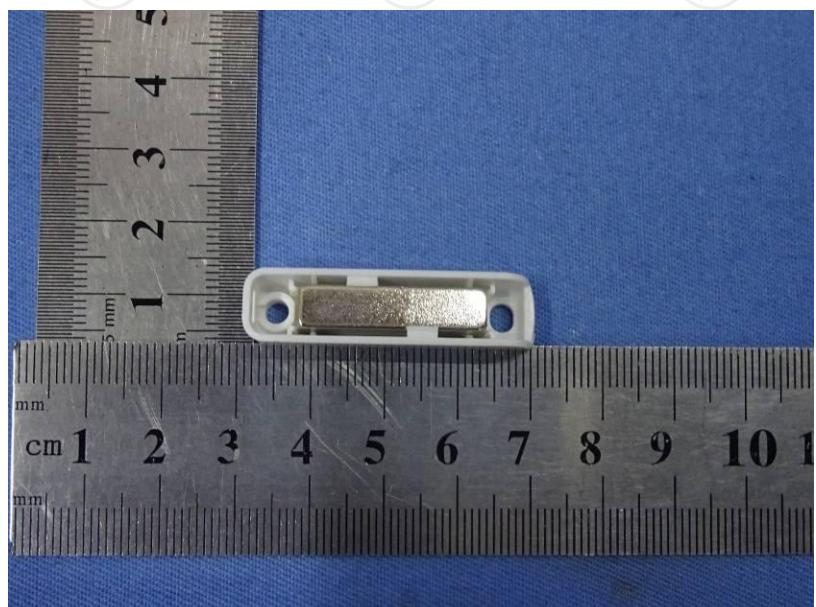
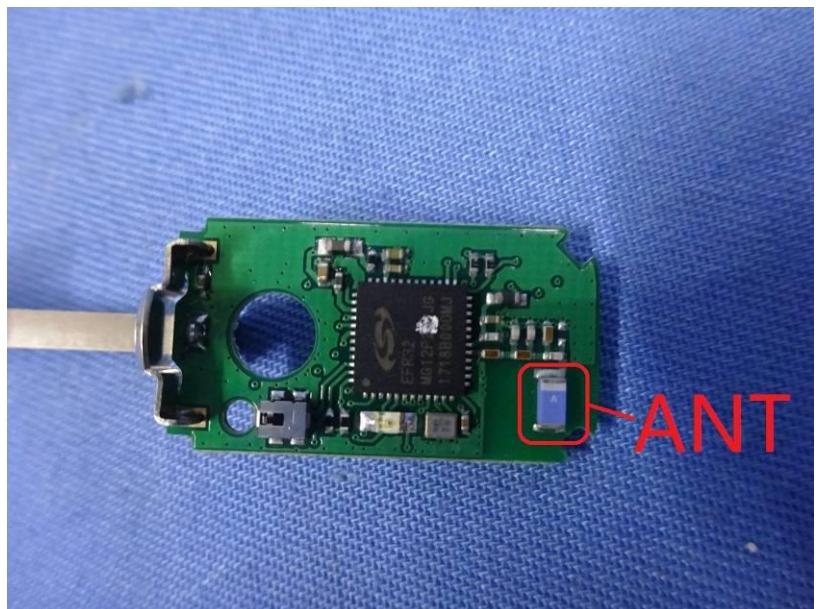


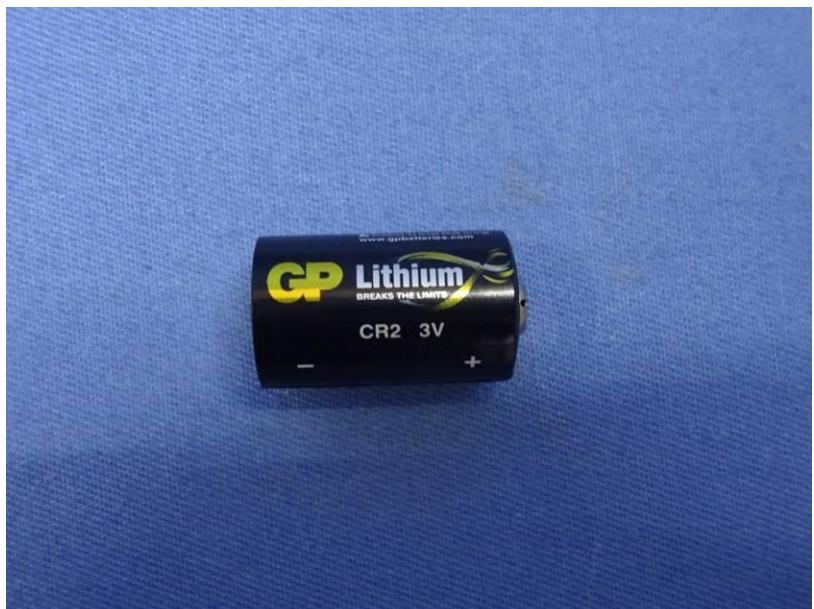




**Product: Slim Door/window Sensor
Model: SAU2CD1
Internal Photos**







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