TCT 通测检测 TESTING CENTRE TECHNOLOGY

TEST REPORT

FCC ID: 2AIT9PG-103

Product: Alarm Host

Model No.: PG-103

Additional Model No.: N/A

Trade Mark: PGST

Report No.: TCT171023E037

Issued Date: Oct. 25, 2017

Issued for:

SZ PGST CO., LTD

No.3, Xinggong 1 Rd, Hongxing Community, Gongming Agency, Guangming New District, Shenzhen City, China

Issued By:

Shenzhen Tongce Testing Lab.

1F, Leinuo Watch Building, Fuyong Town, Baoan Dist, Shenzhen, China

TEL: +86-755-27673339

FAX: +86-755-27673332

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Hotline: 400-6611-140 Tel: 86-755-27673339 Fax: 86-755-27673332 http://www.tct-lab.com

1. Test Certification

Product:	Alarm Host
Model No.:	PG-103
Additional Model:	N/A
Trade Mark:	**PGST**
Applicant:	SZ PGST CO., LTD
Address:	No.3, Xinggong 1 Rd, Hongxing Community, Gongming Agency, Guangming New District, Shenzhen City, China
Manufacturer:	SZ PGST CO., LTD
Address:	No.3, Xinggong 1 Rd, Hongxing Community, Gongming Agency, Guangming New District, Shenzhen City, China
Date of Test:	Jun. 21, 2017 - Jul. 05, 2017
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C

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:	Garen	***Date:***	***Jul. 05, 2017***
Reviewed By:		***Date:***	***Oct. 25, 2017***
Approved By:	Tomsin	***Date:***	***Oct. 25, 2017***

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2. Test Result Summary

Requirement	CFR 47 Section	Result
Conduction Emission, 0.15MHz to 30MHz	§15.207	PASS
Radiation Emission	§15.209, §15.205	PASS
Occupied Bandwidth	§15.215	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.

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3. EUT Description

Product:	Alarm Host
Model No.:	PG-103
Additional Model No.:	N/A
Trade Mark:	**PGST**
Hardware version:	PG-103 V2.3
Software version:	103-3G-H
Operation Frequency:	125kHz
Modulation Technology:	FSK
Antenna Type:	Integral Antenna
Antenna Gain:	3dBi
Power Supply:	Rechargeable Li-ion Battery DC3.7V / 300mAh
Adapter:	Adapter: RD0501000-USBA-18MG Input: AC 100~240V 50/60Hz 0.25A Output: DC 5V⎓1000mA

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4. Genera Information

4.1. Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test Mode:	
Operation mode:	Keep the EUT in continuous transmitting with modulation
The sample was placed (0.8m 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.	

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively

For Conducted Emission	
Final Test Mode	Description
Mode 1	RFID Proximity switch

For Radiated Emission	
Final Test Mode	Description
Mode 1	RFID Proximity switch

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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.

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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

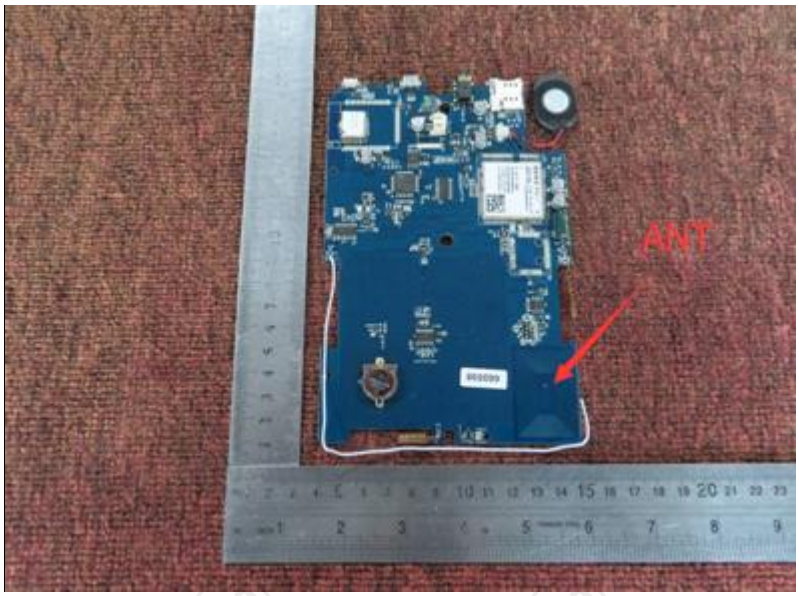
5.3. Measurement Uncertainty

The reported uncertainty of measurement y ± 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	±2.56dB
2	RF power, conducted	±0.12dB
3	Spurious emissions, conducted	±0.11dB
4	All emissions, radiated(<1G)	±3.92dB
5	All emissions, radiated(>1G)	±4.28dB
6	Temperature	±0.1°C
7	Humidity	±1.0%

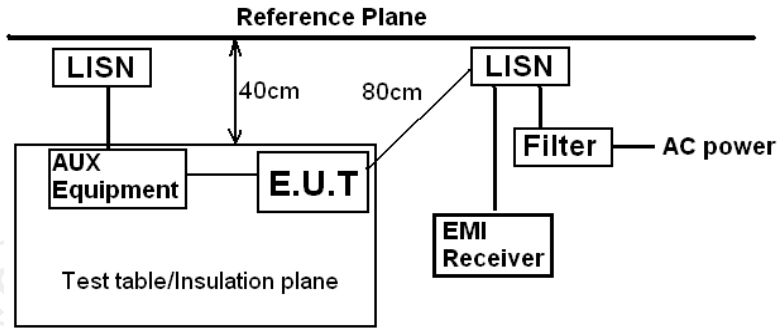
6. Test Results and Measurement Data

6.1. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203
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.	
E.U.T Antenna:	
The antenna is integral antenna which permanently attached, and the best case gain of the antenna is 3dBi.	
	

6.2. Conducted Emission

6.2.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.207</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4:2014</td></tr>
<tr><td>Frequency Range:</td><td>150 kHz to 30 MHz</td></tr>
<tr><td>Receiver setup:</td><td>RBW=9 kHz, VBW=30 kHz, Sweep time=auto</td></tr>
<tr><td>Limits:</td><td>
<table>
<tr><td rowspan="2">Frequency range (MHz)</td><td colspan="2">Limit (dBuV)</td></tr>
<tr><td>Quasi-peak</td><td>Average</td></tr>
<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>
</table>
</td></tr>
<tr><td>Test Setup:</td><td> 

Remark:
E.U.T: Equipment Under Test
LISN: Line Impedence Stabilization Network
Test table height=0.8m</td></tr>
<tr><td>Test Mode:</td><td>Transmitting Mode</td></tr>
<tr><td>Test Procedure:</td><td>1. The E.U.T and simulators are connected to the main power 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 C63.4: 2014 on conducted measurement.</td></tr>
<tr><td>Test Result:</td><td>PASS</td></tr>
</table>

6.2.1. Test Instruments

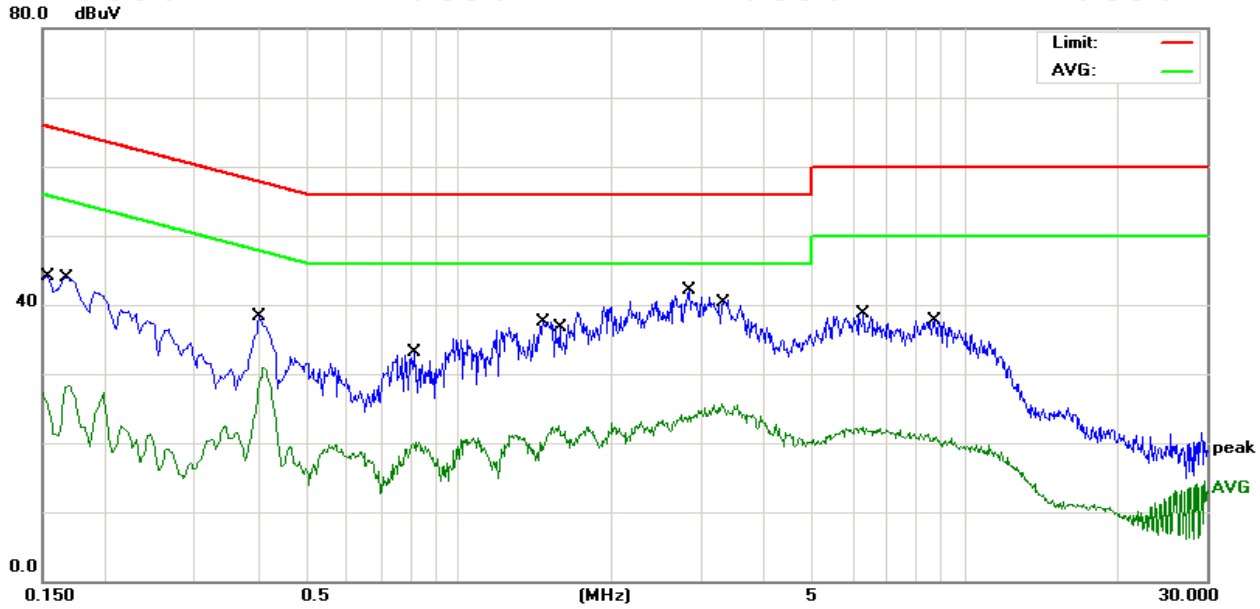
Conducted Emission Shielding Room Test Site (843)				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Test Receiver	R&S	ESPI	101401	Jun. 12, 2018
LISN	Schwarzbeck	NSLK 8126	8126453	Sep. 27, 2018
Coax cable (9KHz-30MHz)	TCT	CE-05	N/A	Sep. 27, 2018
EMI Test Software	Shurple Technology	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).*

6.2.2. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)

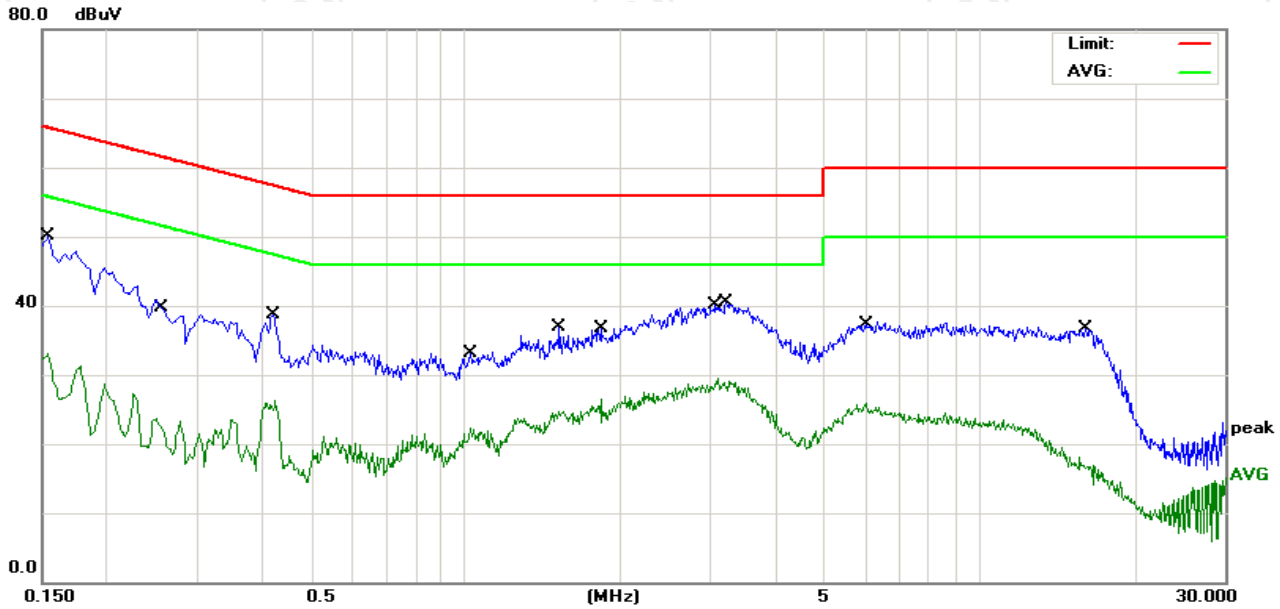


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1539	33.75	10.44	44.19	65.78	-21.59	QP
2		0.1700	17.84	10.44	28.28	54.96	-26.68	AVG
3		0.4020	27.90	10.41	38.31	57.81	-19.50	QP
4		0.4100	20.48	10.41	30.89	47.65	-16.76	AVG
5		0.8260	9.76	10.36	20.12	46.00	-25.88	AVG
6		1.4660	27.19	10.32	37.51	56.00	-18.49	QP
7		1.5700	12.12	10.31	22.43	46.00	-23.57	AVG
8	*	2.8420	31.88	10.27	42.15	56.00	-13.85	QP
9		3.2980	15.49	10.26	25.75	46.00	-20.25	AVG
10		6.2700	12.03	10.22	22.25	50.00	-27.75	AVG
11		6.3180	28.55	10.22	38.77	60.00	-21.23	QP
12		8.6980	27.46	10.20	37.66	60.00	-22.34	QP

Note:

Freq. = Emission frequency in MHz
Reading level (dBμV) = Receiver reading
Corr. Factor (dB) = Antenna factor + Cable loss
Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)
Limit (dBμV) = Limit stated in standard
Margin (dB) = Measurement (dBμV) – Limits (dBμV)
Q.P. =Quasi-Peak; AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1539	39.61	10.44	50.05	65.78	-15.73	QP
2		0.1539	22.67	10.44	33.11	55.78	-22.67	AVG
3		0.2580	29.17	10.43	39.60	61.49	-21.89	QP
4		0.4220	28.28	10.41	38.69	57.41	-18.72	QP
5		0.4260	15.92	10.41	26.33	47.33	-21.00	AVG
6		1.0260	11.98	10.34	22.32	46.00	-23.68	AVG
7		1.5260	26.50	10.31	36.81	56.00	-19.19	QP
8		1.8340	16.23	10.30	26.53	46.00	-19.47	AVG
9		3.1060	19.15	10.27	29.42	46.00	-16.58	AVG
10	*	3.2180	30.29	10.27	40.56	56.00	-15.44	QP
11		6.0460	15.75	10.22	25.97	50.00	-24.03	AVG
12		16.1259	26.55	10.14	36.69	60.00	-23.31	QP

Note:

Freq. = Emission frequency in MHz
Reading level (dBμV) = Receiver reading
Corr. Factor (dB) = Antenna factor + Cable loss
Measurement (dBμV) = Reading level (dBμV) + Corr. Factor (dB)
Limit (dBμV) = Limit stated in standard
Margin (dB) = Measurement (dBμV) – Limits (dBμV)
Q.P. =Quasi-Peak; AVG =average
** is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.*

6.3. Radiated Emission Measurement

6.3.1. Test Specification

<table>
<tr><td>Test Requirement:</td><td>FCC Part15 C Section 15.209</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.4: 2014 and ANSI C63.10:2013</td></tr>
<tr><td>Frequency Range:</td><td>9 kHz to 5 GHz</td></tr>
<tr><td>Measurement Distance:</td><td>3 m</td></tr>
<tr><td>Antenna Polarization:</td><td>Horizontal & Vertical</td></tr>
<tr><td>Receiver Setup:</td><td>
<table>
<tr><th>Frequency</th><th>Detector</th><th>RBW</th><th>VBW</th><th>Remark</th></tr>
<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>100KHz</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>
</table>
</td></tr>
<tr><td></td><td>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber in below 1GHz, 1.5m above the ground in above 1GHz. The table was rotated 360 degrees to determine the position of the highest radiation.
2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</td></tr>
</table>

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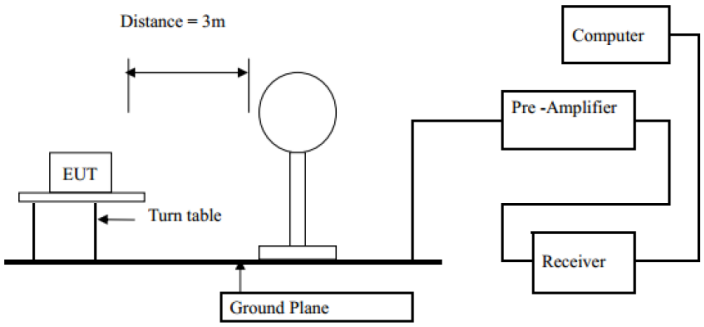
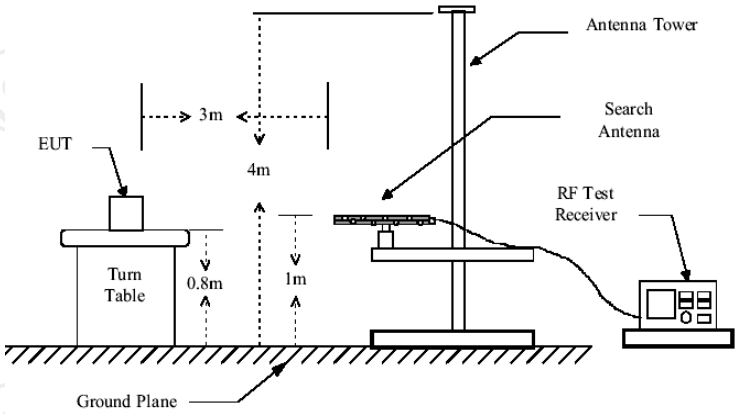
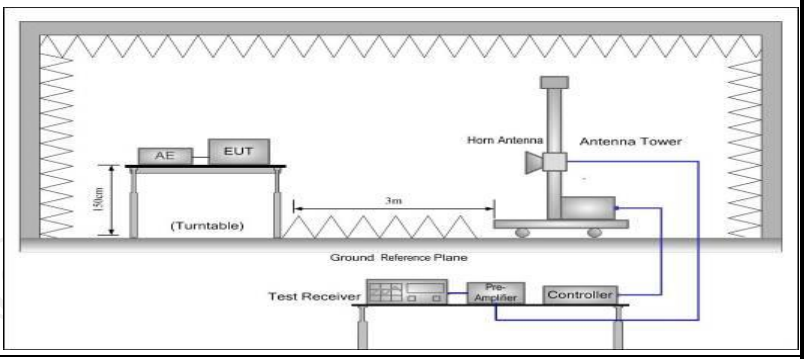
Test setup:	For radiated emissions below 30MHz  30MHz to 1GHz  Above 1GHz 
Test Mode:	Transmitting Mode
Test results:	PASS

6.3.2. Limit

Frequencies in restricted band are complied to limit on Paragraph 15.209

Frequency Range (MHz)	Distance (m)	Field strength (dB μV/m)
0.009-0.490	3	20log 2400/F (kHz) + 80
0.490-1.705	3	20log 24000/F (kHz) + 40
1.705-30	3	20log 30 + 40
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note:

1. *RF Voltage (dBuV) = 20 log RF Voltage (uV)*
2. *In the Above Table, the tighter limit applies at the band edges.*
3. *Distance refers to the distance in meters between the measuring instrument antenna and the EUT*
4. *The radiated emissions should be tested under 3-axes position (Lying, Side, and Stand), After pre-test. It was found that the worse radiated emission was get at the lying position.*
5. *If measurement is made at 3m distance, then F.S Limitation at 3m distance is adjusted by using the formula Ld1 = Ld2 * (d2/d1)*

6.3.3. Test Instruments

Radiated Emission Test Site (966)				
Name of Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
ESPI Test Receiver	ROHDE&SCHWARZ	ESVD	100008	Sep. 27, 2018
Spectrum Analyzer	ROHDE&SCHWARZ	FSEM	848597/001	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
Coax cable	TCT	N/A	N/A	Sep. 27, 2018
Coax cable	TCT	N/A	N/A	Sep. 27, 2018
Coax cable	TCT	N/A	N/A	Sep. 27, 2018
Coax cable	TCT	N/A	N/A	Sep. 27, 2018
EMI Test Software	Shurple 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).*

6.3.4. Test Data

Field Strength of Fundamental

Frequency [MHz]	Reading [dBuV]	Ant Factor [dBuV]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin[dB	Detector
0.1250*	89.4	20.0	6.0	32.2	-	83.2	125.7	38.4	PK

Note: Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter) - Gain(Amprifier)

Harmonics and Spurious Emissions

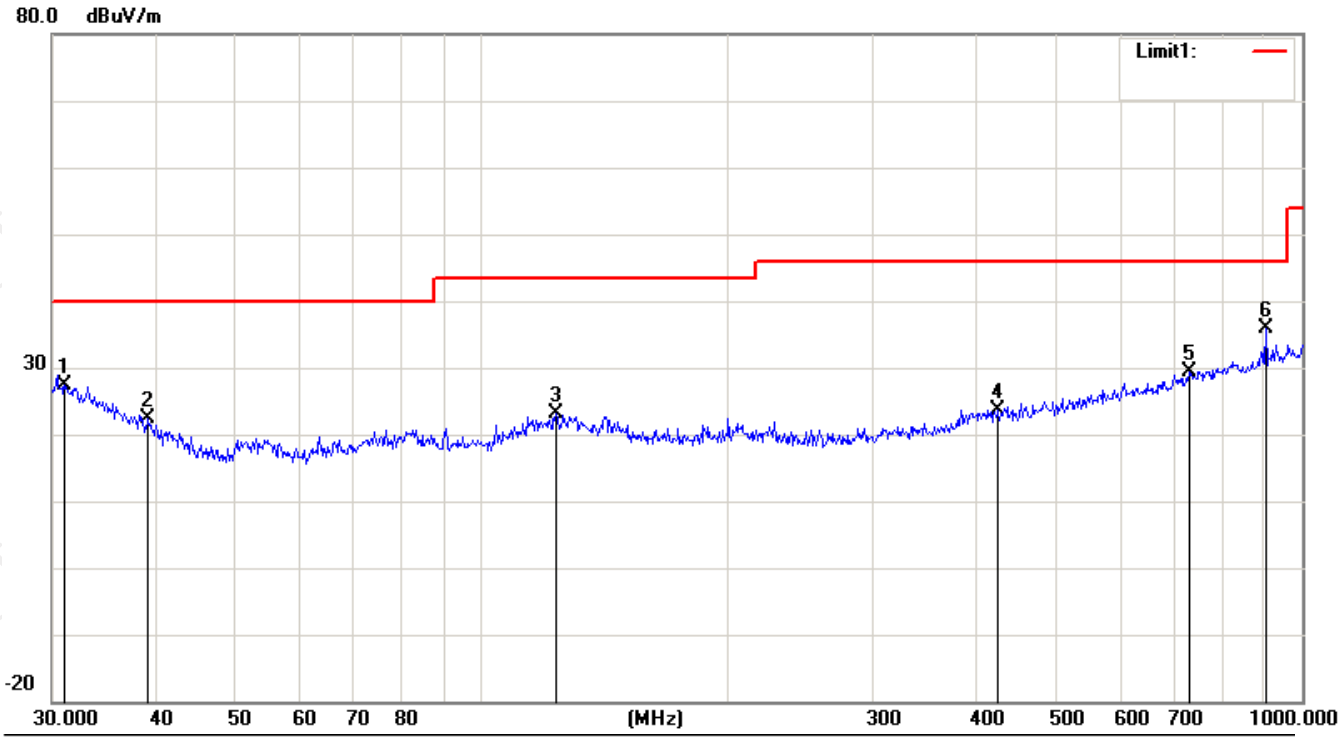
Below 30M

Frequency [MHz]	Reading [dBuV]	Ant Factor [dBuV]	Loss [dB]	Gain [dB]	Duty Factor [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin[dB	Detector
0.1250*	89.4	20.0	6.0	32.2	-	83.2	125.7	38.4	PK
0.2230	49.1	19.9	6.1	32.1	-	43.0	120.6	76.6	PK
0.3540	48.2	19.8	6.1	32.1	-	42.0	116.6	74.1	PK
0.4800	38.1	19.8	6.1	32.1	-	31.9	114.0	81.7	PK
0.5950	37.6	19.8	6.2	32.1	-	31.5	112.1	40.2	PK
0.6750	34.1	19.8	6.2	32.1	-	28.0	111.0	42.1	PK
0.7850	31.9	19.8	6.2	32.1	-	25.8	109.7	42.9	PK
0.9500	33.8	19.8	6.2	32.1	-	27.7	108.0	39.9	PK
1.0350	32.7	19.8	6.2	32.1	-	26.6	107.3	39.9	PK
1.1300	36.4	19.8	6.3	32.1		30.4	106.5	35.2	PK

Note:
1. Result = Reading + Ant Factor + Loss (Cable+Attenuator+Filter+D.Factor) - Gain(Amprifier)
2. The emission levels are 20 dB below the limit value, which are not reported. It is deemed to comply with the requirement

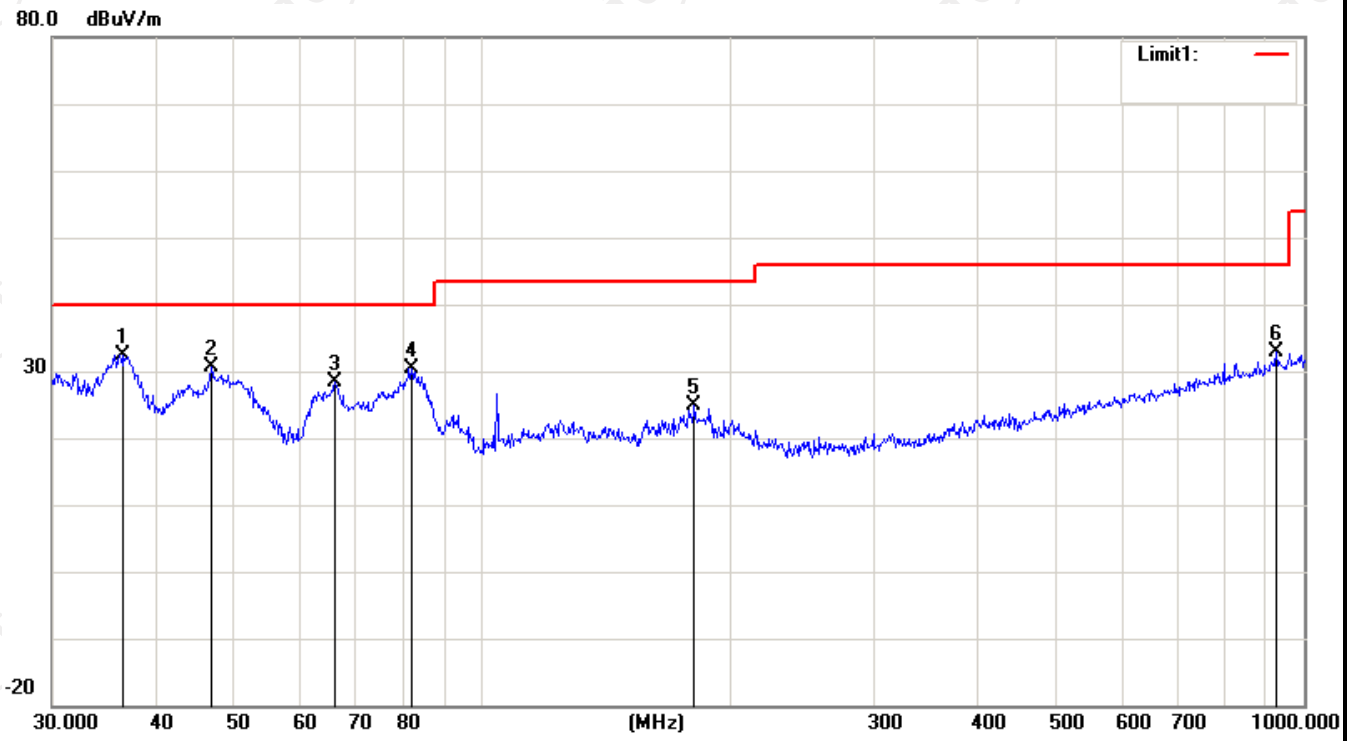
From 30MHz to 1GHz

Horizontal:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		31.0706	24.56	2.77	27.33	40.00	-12.67	QP
2		39.2991	25.28	-2.99	22.29	40.00	-17.71	QP
3		123.2655	25.38	-2.20	23.18	43.50	-20.32	QP
4		426.5210	26.15	-2.43	23.72	46.00	-22.28	QP
5		729.3583	26.15	3.28	29.43	46.00	-16.57	QP
6	*	903.3094	29.91	5.91	35.82	46.00	-10.18	QP

Vertical:



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	36.6375	33.44	-1.06	32.38	40.00	-7.62	QP
2		46.8303	38.19	-7.56	30.63	40.00	-9.37	QP
3		66.2662	36.90	-8.54	28.36	40.00	-11.64	QP
4		82.0706	38.20	-7.83	30.37	40.00	-9.63	QP
5		181.2834	30.00	-5.20	24.80	43.50	-18.70	QP
6		925.7563	26.12	6.79	32.91	46.00	-13.09	QP

Above 1GHz

Freq. (MHz)	Ant. Pol.	Emission Level(dBuV)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
1662.34	V	58.90	41.47	74	54	-15.10	-12.53
2839.20	V	59.53	39.06	74	54	-14.47	-14.94
1678.26	H	59.82	39.62	74	54	-14.18	-14.38
2834.36	H	58.29	39.29	74	54	-15.71	-14.71

Note:

1. *Margin (dB) = Emission Level (dBμV/m)- limit (dBμV/m)*
2. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

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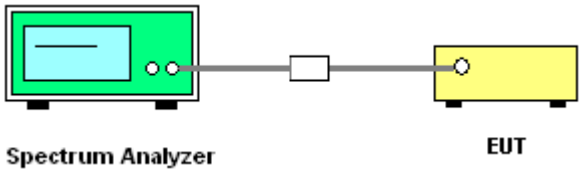
6.4. Occupied Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.215(c)
Test Method:	ANSI C63.10: 2013
Limit:	Intentional radiators operating under the alternative provisions to the general emission limits, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
	1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel; RBW≥ 1% of the 20 dB bandwidth; VBW≥RBW; Sweep = auto; Detector function = peak; Trace = max hold. 4. Measure and record the results in the test report.
Test setup:	
Test Mode:	Transmitting Mode
Test results:	PASS

6.4.2. Test Instruments

RF Test Room				
Equipment	**Manufacturer**	**Model**	**Serial Number**	**Calibration Due**
Spectrum Analyzer	R&S	FSU	200054	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).*

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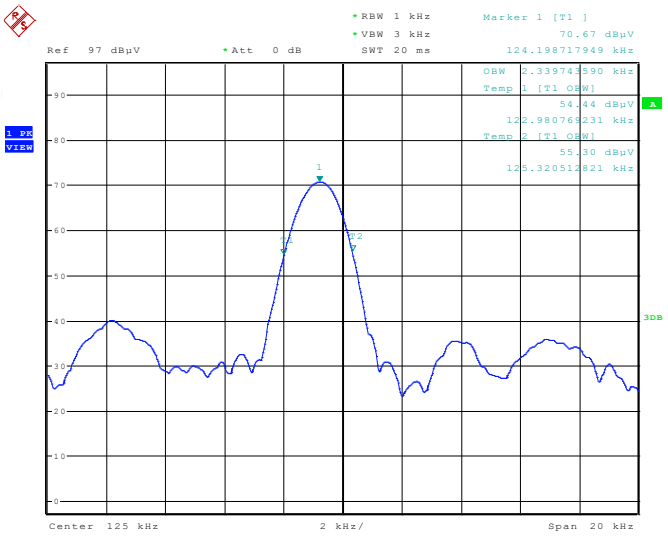
6.4.3. Test data

Test Channel (MHz)	Occupy Bandwidth (kHz)	Conclusion
0.125	2.34	PASS

Test plots as follows:



Appendix A: Photographs of Test Setup

Refer to test report TCT171023E035

Appendix B: Photographs of EUT

Refer to test report TCT171023E035

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