

No. 1 Workshop, M-10, Middle section, Science & Technology Park,

Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

Report No.: SZEM160900770903

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FCC REPORT

Application No: SZEM1609007709RG

Applicant:Huike Electronics(shenzhen)Co.,LtdManufacturer:Huike Electronics(shenzhen)Co.,LtdFactory:Huike Electronics(shenzhen)Co.,Ltd

Product Name: Tablet
Model No.(EUT): R078H
Trade Mark: SCHOCK
FCC ID: ZFN-SM7116

Standards: 47 CFR Part 15, Subpart C (2015)

Date of Receipt: 2016-03-31

Date of Test: 2016-06-23 to 2016-07-15

Date of Issue: 2016-09-08

Test Result: PASS *

Authorized Signature:



Jack Zhang EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

^{*} In the configuration tested, the EUT complied with the standards specified above.



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2 Version

Revision Record							
Version Chapter Date Modifier Remark							
00		2016-09-08		Original			

Authorized for issue by:		
	Hank yan.	2016-07-15
Tested By	(Hank Yan) /Project Engineer	Date
	Iris Zhou	2016-09-08
Prepared By	(Iris Zhou) /Clerk	Date
	Eric Fu	2016-09-08
Checked By	(Eric Fu) /Reviewer	Date



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3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203/15.247 (c)	ANSI C63.10 2013	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 2013	PASS
Conducted Peak Output Power	47 CFR Part 15, Subpart C Section 15.247 (b)(3)	ANSI C63.10 2013	PASS
6dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section 15.247 (a)(2)	ANSI C63.10 2013	PASS
Power Spectral Density	47 CFR Part 15, Subpart C Section 15.247 (e)	ANSI C63.10 2013	PASS
Band-edge for RF Conducted Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
RF Conducted Spurious Emissions	47 CFR Part 15, Subpart C Section 15.247(d)	ANSI C63.10 2013	PASS
Radiated Spurious Emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS
Restricted bands around fundamental frequency (Radiated Emission)	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 2013	PASS



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5 General Information

5.1 Client Information

Applicant:	Huike Electronics(shenzhen)Co.,Ltd					
Address of Applicant:	Huike industrial park, Minying industrial park, Shui tian country, Shiyan, Baoan District, Shenzhen, China					
Manufacturer:	Huike Electronics(shenzhen)Co.,Ltd					
Address of Manufacturer:	Huike industrial park, Minying industrial park, Shui tian country, Shiyan, Baoan District, Shenzhen, China					
Factory:	Huike Electronics(shenzhen)Co.,Ltd					
Address of Factory:	Huike industrial park, Minying industrial park, Shui tian country, Shiyan, Baoan District, Shenzhen, China					

5.2 General Description of EUT

Product Name:	Tablet
Model No.:	R078H
Trade Mark:	SCHOCK
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V4.0 Dual mode
	This report is for BLE mode
Modulation Type:	GFSK
Number of Channel:	40
Sample Type:	Portable production
Antenna Type:	PIFA
Antenna Gain:	2.15dBi
Power Supply:	Adapter: Model No.: SPFXQ-NA Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2.1A Or DC 3.7V Li-ion Battery
Cable:	USB Cable: 122cm shielded.

This test report (Report No.: SZEM160900770903) is base on the original test report (Report No.: SZEM160300194703) issued on 2015-07-25.

Review this report and original report, this report just changing FCC ID from "ZFN-R078H" to "ZFN-SM7116".

Therefore in this report all items do not need to retest and all the test data in this report are base on previous report with report number SZEM160300194703.



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Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency	
The lowest channel (CH0)	2402MHz	
The middle channel (CH19)	2440MHz	
The highest channel (CH39)	2480MHz	



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5.3 Test Environment

Operating Environment:				
Temperature:	25.0 °C			
Humidity:	53 % RH			
Atmospheric Pressure:	1010mbar			

5.4 Description of Support Units

Description Manufacturer		Model No.	Serial No.	
Earphone	PHILIPS	SHE6000	REF. No.SEA1000	

5.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China. 518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.



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5.6 Test Facility

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

CNAS (No. CNAS L2929)

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

A2LA (Certificate No. 3816.01)

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

VCCI

The 10m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

• FCC - Registration No.: 556682

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.

5.7 Deviation from Standards

None.

5.8 Abnormalities from Standard Conditions

None.

5.9 Other Information Requested by the Customer

None.



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5.10 Equipment List

	Conducted Emission							
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)		
1	Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2016-05-13	2017-05-13		
2	LISN	Rohde & Schwarz	ENV216	SEM007-01	2015-10-09	2016-10-09		
3	LISN	ETS- LINDGREN	3816/2	SEM007-02	2016-04-25	2017-04-25		
4	8 Line ISN	Fischer Custom Communications Inc.	FCC- TLISN-T8- 02	EMC0120	2015-08-30	2016-08-30		
5	4 Line ISN	Fischer Custom Communications Inc.	FCC- TLISN-T4- 02	EMC0121	2015-08-30	2016-08-30		
6	2 Line ISN	Fischer Custom Communications Inc.	FCC- TLISN-T2- 02	EMC0122	2015-08-30	2016-08-30		
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2016-04-25	2017-04-25		
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2015-10-09	2016-10-09		

	RF connected test							
Item	Test Equipment	Manufacturer	anufacturer Model No.		Cal. date	Cal.Due date		
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2015-10-09	2016-10-09		
2	Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2015-10-17	2016-10-17		
3	Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2016-04-25	2017-04-25		
4	Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2015-10-09	2016-10-09		



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	RE in Chamber					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)
1	10m Semi-Anechoic Chamber	SAEMC	FSAC1018	SEM001-03	2015-08-01	2016-08-01
2	EMI Test Receiver (9k-3GHz)	Rohde & Schwarz	ESCI	SEM004-01	2016-04-25	2017-04-25
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-17	2016-01-26	2017-01-26
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-04-25	2017-04-25
5	Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2016-08-14

	RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Due date (yyyy-mm-dd)	
1	3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2016-05-13	2017-05-13	
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEM004-04	2016-04-25	2017-04-25	
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2014-11-15	2017-11-15	
4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2015-10-09	2016-10-09	
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14	
6	Low Noise Amplifier	Black Diamond Series	BDLNA- 0118- 352810	SEM005-05	2015-10-09	2016-10-09	
7	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A	



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6 Test results and Measurement Data

6.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(c)

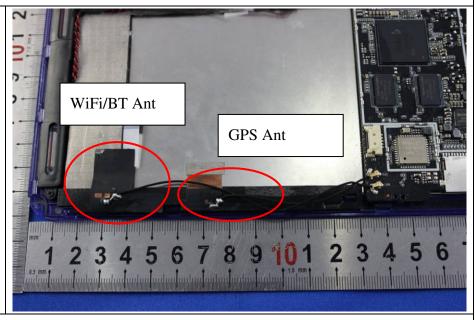
15.203 requirement:

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(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:



The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.15dBi.



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6.2 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207					
Test Method:	ANSI C63.10: 2013					
Test Frequency Range:	150kHz to 30MHz					
Limit:	5 (441.)	Limit (c	Limit (dBuV)			
	Frequency range (MHz)	Quasi-peak	Average			
	0.15-0.5	66 to 56*	56 to 46*			
	0.5-5	56	46			
	5-30	60	50			
	* Decreases with the logarithm	n of the frequency.				
Test Procedure:	 * Decreases with the logarithm of the frequency. 1) The mains terminal disturbance voltage test was conducted in a shielded room. 2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded. 3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane. 4) The test was performed with a vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2. 5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to 					
Test Setup:	Shielding Room EUT AC Mains LISN1	AE LISN2 AC Mai Ground Reference Plane	Test Receiver			



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Test Mode:	Transmitting with GFSK modulation. Charge +Transmitting mode.
Instruments Used:	Refer to section 5.10 for details.
Test Results:	Pass



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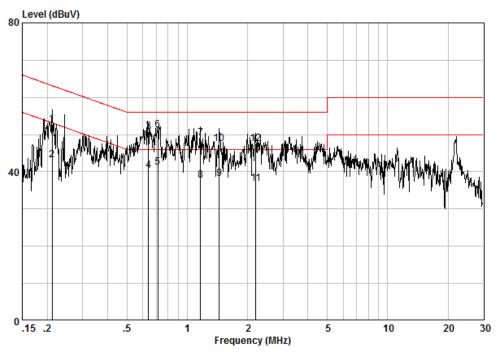
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Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

Live line:



 Site
 : Shielding Room

 Condition
 : CE LINE

 Job No.
 : 1947RG

 Mode
 : Charge + TX

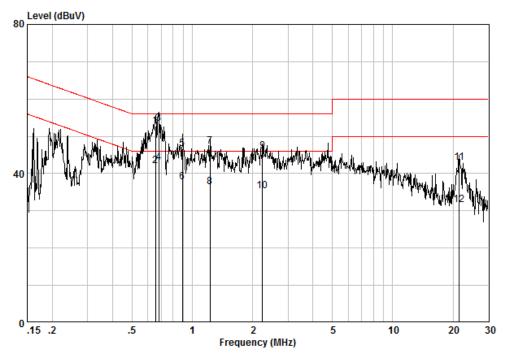
			Cable	LISN	Read		Limit	Over	
		Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	-	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1		0.21167	0.02	9.60	43.09	52.71	63.14	-10.43	QP
2		0.21167	0.02	9.60	33.46	43.08	53.14	-10.06	Average
3	@	0.63908	0.02	9.61	41.10	50.73	56.00	-5.27	QP
4	@	0.63908	0.02	9.61	30.70	40.33	46.00	-5.67	Average
5	@	0.71109	0.03	9.61	31.50	41.13	46.00	-4.87	Average
6	@	0.71109	0.03	9.61	41.60	51.23	56.00	-4.77	QP
7	@	1.166	0.03	9.61	39.47	49.12	56.00	-6.88	QP
8		1.166	0.03	9.61	28.01	37.65	46.00	-8.35	Average
9		1.441	0.03	9.59	28.63	38.25	46.00	-7.75	Average
10		1.441	0.03	9.59	38.00	47.62	56.00	-8.38	QP
11		2.201	0.03	9.63	27.14	36.80	46.00	-9.20	Average
12		2.201	0.03	9.63	37.79	47.45	56.00	-8.55	QP



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Neutral line:



 Site
 : Shielding Room

 Condition
 : CE NEUTRAL

 Job No.
 : 1947RG

 Mode
 : Charge + TX

		Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
		MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	@	0.65430	0.02	9.63	43.00	52.66	56.00	-3.34	QP
2	@	0.65430	0.02	9.63	32.43	42.09	46.00	-3.91	Average
3	@	0.67902	0.02	9.63	43.74	53.40	56.00	-2.60	QP
4	@	0.67902	0.02	9.63	33.31	42.97	46.00	-3.03	Average
5		0.88969	0.03	9.63	36.93	46.59	56.00	-9.41	QP
6		0.88969	0.03	9.63	27.96	37.62	46.00	-8.38	Average
7		1.223	0.03	9.65	37.66	47.34	56.00	-8.66	QP
8		1.223	0.03	9.65	26.71	36.39	46.00	-9.61	Average
9		2.237	0.03	9.67	36.30	45.99	56.00	-10.01	QP
10		2.237	0.03	9.67	25.64	35.33	46.00	-10.67	Average
11		21.486	0.17	10.03	32.80	43.00	60.00	-17.00	QP
12		21 486	0 17	10.03	21 35	31 55	50.00	-18 45	Average

Notes:

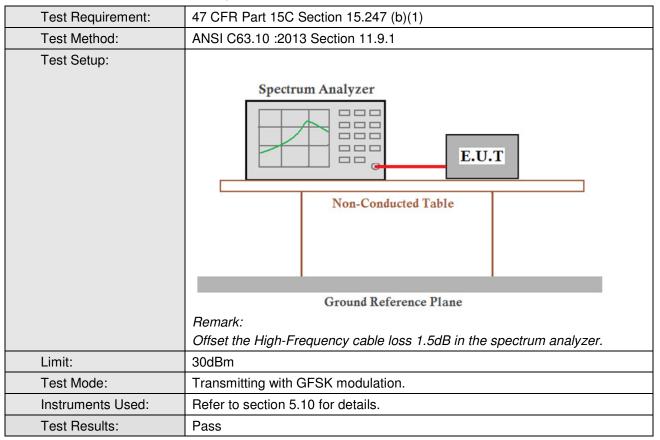
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.



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6.3 Conducted Peak Output Power



Measurement Data

GFSK mode						
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result			
Lowest	8.71	30.00	Pass			
Middle	8.34	30.00	Pass			
Highest	8.36	30.00	Pass			

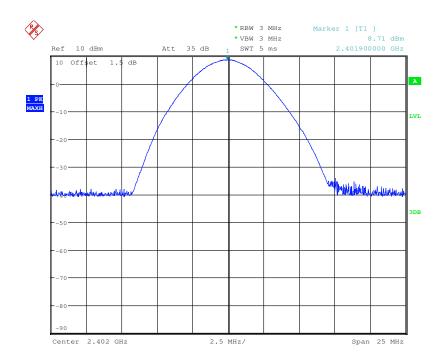


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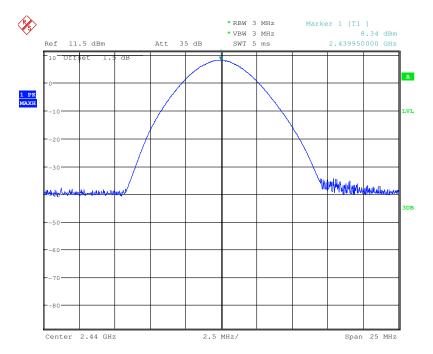
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Test plot as follows:

Test mode: GFSK Test channel: Lowest





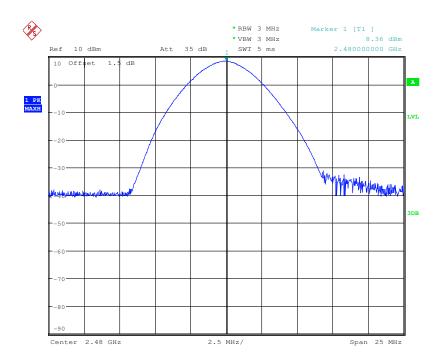




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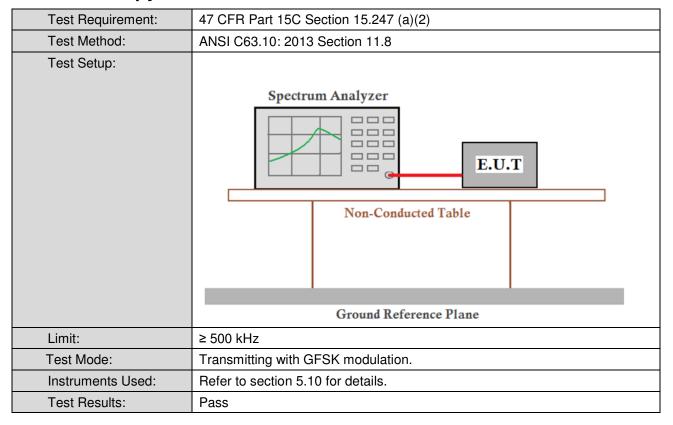




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6.4 6dB Occupy Bandwidth



Measurement Data

GFSK mode						
Test channel	6dB Occupy Bandwidth (MHz)	Limit (kHz)	Result			
Lowest	0.519	≥500	Pass			
Middle	0.525	≥500	Pass			
Highest	0.522	≥500	Pass			

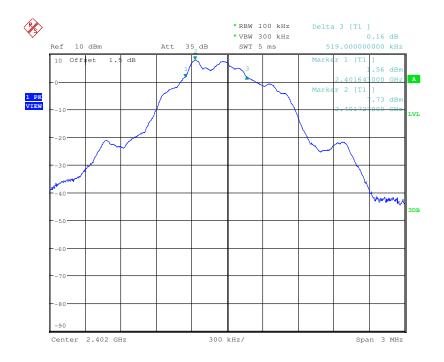


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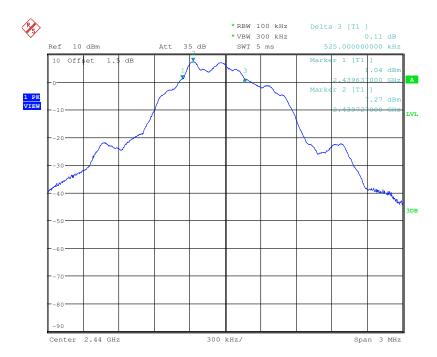
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Test plot as follows:

Test mode: GFSK Test channel: Lowest





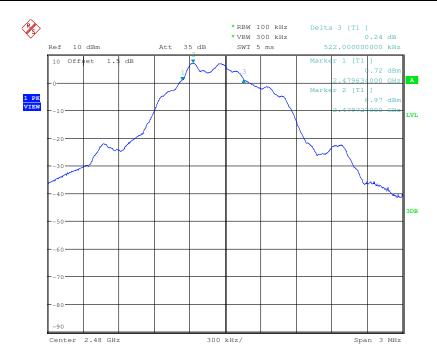




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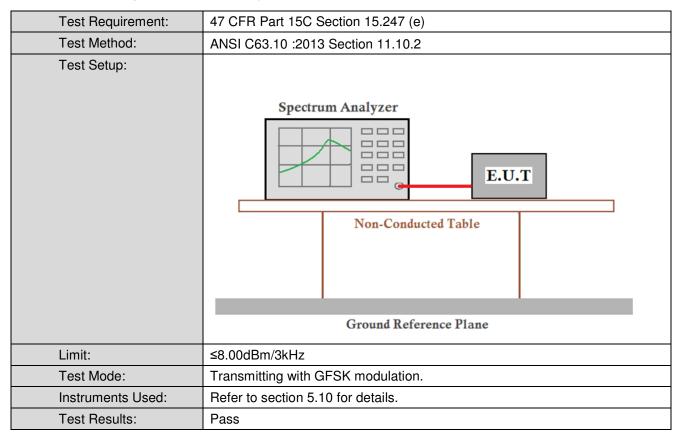




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6.5 Power Spectral Density



Measurement Data

GFSK mode						
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result			
Lowest	-9.25	≤8.00	Pass			
Middle	-9.69	≤8.00	Pass			
Highest	-9.74	≤8.00	Pass			

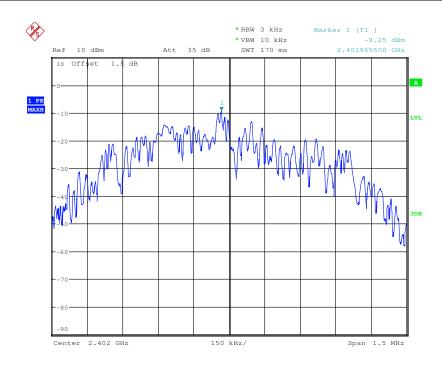


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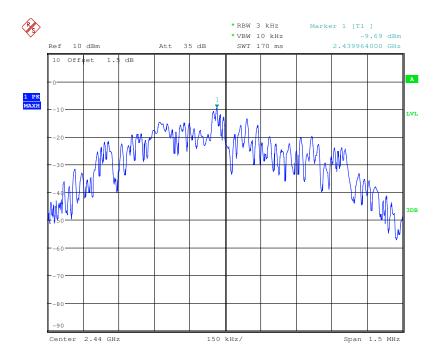
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Test plot as follows:

Test mode: GFSK Test channel: Lowest





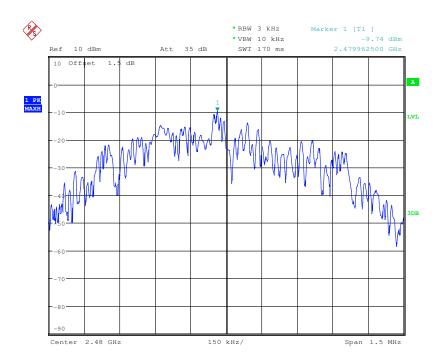




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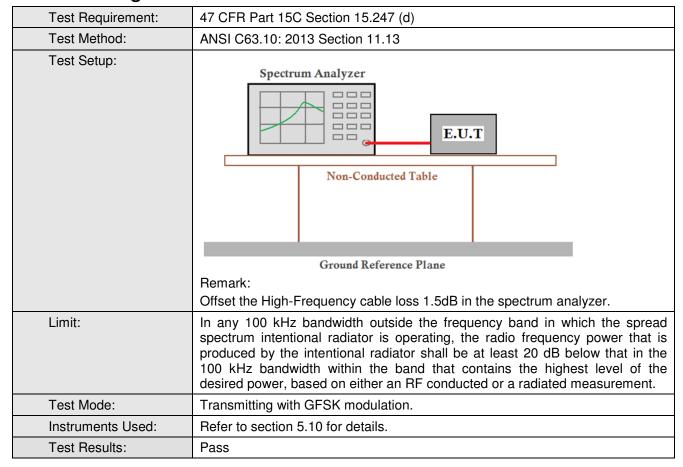




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6.6 Band-edge for RF Conducted Emissions



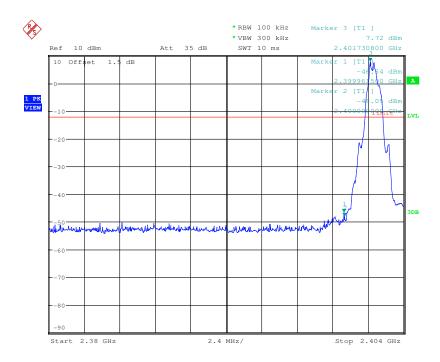


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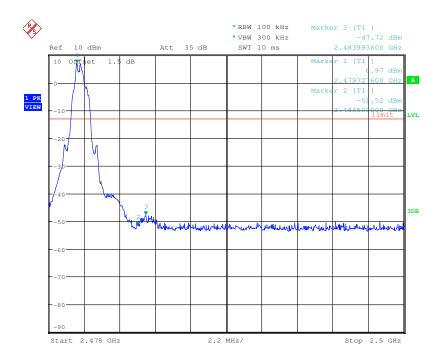
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Test plot as follows:

Test mode: GFSK Test channel: Lowest









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6.7 Spurious RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)			
Test Method:	ANSI C63.10: 2013 Section 11.11			
Test Setup:	Spectrum Analyzer E.U.T Non-Conducted Table			
	Ground Reference Plane			
	Remark: Offset the High-Frequency cable loss 1.5dB in the spectrum analyzer.			
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.			
Test Mode:	Transmitting with GFSK modulation.			
Instruments Used:	Refer to section 5.10 for details.			
Test Results:	Pass			

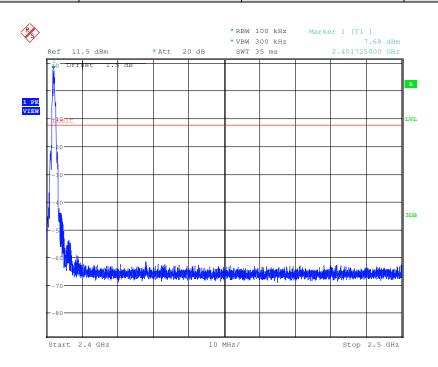


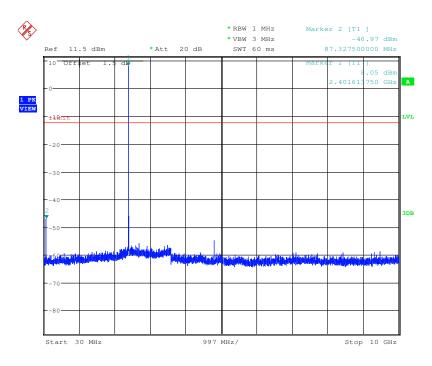
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Test plot as follows:

Test mode: GFSK Test channel: Lowest

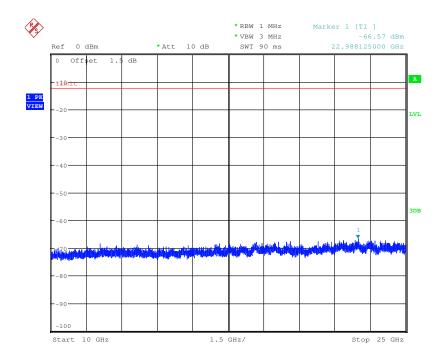




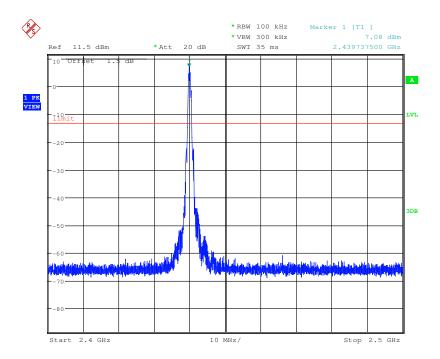


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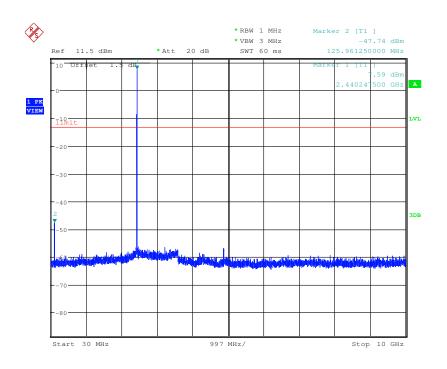


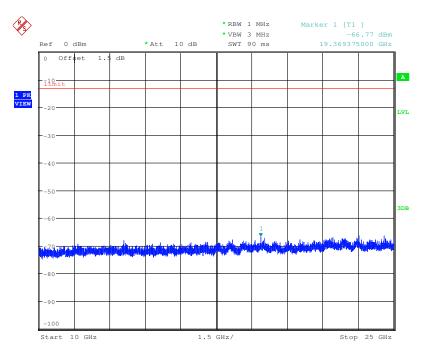




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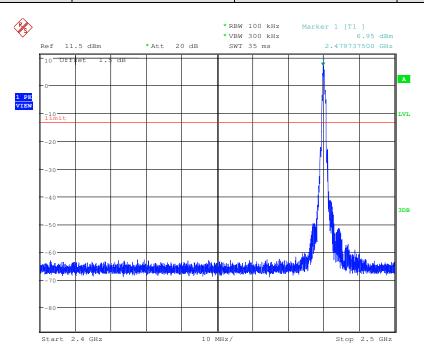


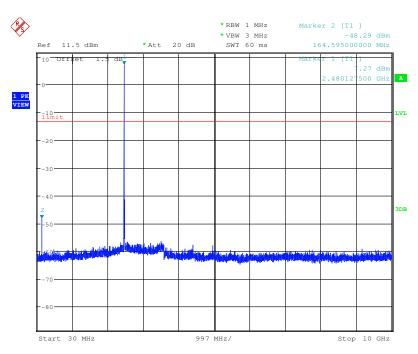


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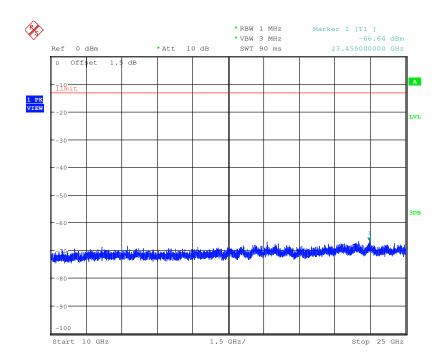






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Remark:

Use 100kHz RBW to determine the relative limit in the band 2.4GHz to 2.5GHz, and Use 1MHz RBW to measure spurious emissions in the band 30MHz to 10GHz and 10GHz to 25GHz. The sweep points set to 30001.



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6.8 Radiated Spurious Emission

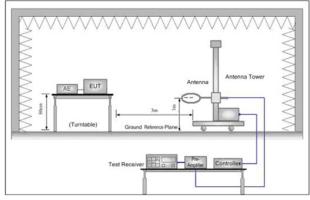
6.8.1 Spurious Emissions								
Test Requirement:	47 CFR Part 15C Secti	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10 :2013 Se	ctior	n 11.12					
Test Site:	Measurement Distance	: 3m	ı (Semi-Anecl	noic Cham	ber	·)		_
Receiver Setup:	Frequency		Detector	RBW		VBW	Remark	Ī
	0.009MHz-0.090MH	Z	Peak	10kHz	Z	30kHz	Peak	
	0.009MHz-0.090MH	z	Average	10kHz	Z	30kHz	Average	
	0.090MHz-0.110MH	z	Quasi-peak	10kHz	Z	30kHz	Quasi-peak	
	0.110MHz-0.490MH	Z	Peak	10kHz	Z	30kHz	Peak	
	0.110MHz-0.490MH	Z	Average	10kHz	Z	30kHz	Average	
	0.490MHz -30MHz		Quasi-peak	10kHz	Z	30kHz	Quasi-peak	
	30MHz-1GHz		Quasi-peak	100 kH	lz	300kHz	Quasi-peak	
	Above 1GHz		Peak	1MHz		3MHz	Peak	
	Above IGH2		Peak	1MHz	1MHz		Average	
Limit:	Frequency		eld strength crovolt/meter)	Limit (dBuV/m)		Remark	Measureme distance (n	
	0.009MHz-0.490MHz	2	400/F(kHz)	-		-	300	
	0.490MHz-1.705MHz	24	1000/F(kHz)	-		-	30	
	1.705MHz-30MHz		30	-			30	
	30MHz-88MHz		100	40.0	40.0 Qua		3	
	88MHz-216MHz		150	43.5	Q	uasi-peak	3	
	216MHz-960MHz 200		46.0	Q	uasi-peak	3		
	960MHz-1GHz 500		54.0	Q	uasi-peak	3		
	Above 1GHz 500		54.0	<u> </u>	Average	3		
	Note: 15.35(b), Unless otherwise specified, the limit on pear frequency emissions is 20dB above the maximum permitted average elimit applicable to the equipment under test. This peak limit applies to peak emission level radiated by the device.					erage emissio	n	



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Test Setup:



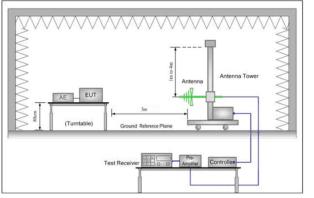


Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

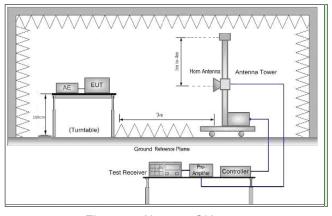


Figure 3. Above 1 GHz

Test Procedure:

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. 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



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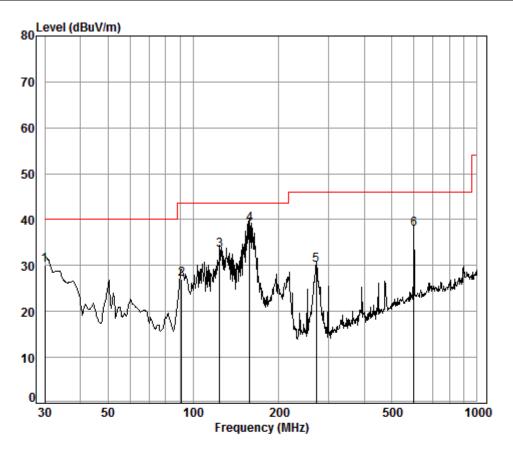
	 EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. h. Test the EUT in the lowest channel (2402MHz),the middle channel (2440MHz),the Highest channel (2480MHz) i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y axis positioning which it is the worst case. j. Repeat above procedures until all frequencies measured was complete. 		
Exploratory Test	Transmitting with GFSK modulation.		
Mode:	Transmitting mode, Charge + Transmitting mode.		
Final Test Mode:	Transmitting with GFSK modulation.		
	Pretest the EUT at Transmitting mode and Charge + Transmitting mode, found the Charge + Transmitting mode which it is worse case.		
	For below 1GHz part, through pre-scan, the worst case is the lowest channel.		
	Only the worst case is recorded in the report.		
Instruments Used:	Refer to section 5.10 for details.		
Test Results:	Pass		



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Radiated Emission below 1GHz								
30MHz~1GHz (QP)								
Test mode:	Charge + Transmitting mode	Vertical						



Condition: 3m VERTICAL

Job No. : 1947RG

Test mode: Charge +TX

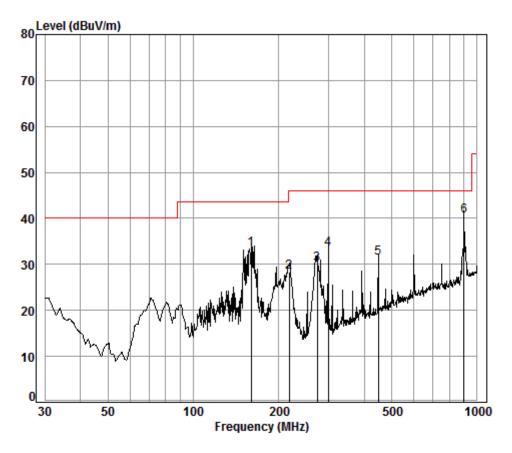
	Freq			Preamp Factor				Over Limit
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.00	0.60	19.00	26.00	36.58	30.18	40.00	-9.82
2	91.17	1.11	8.84	25.91	43.08	27.12	43.50	-16.38
3	124.13	1.26	8.02	25.86	50.03	33.45	43.50	-10.05
4 pp	158.11	1.33	9.63	25.82	53.94	39.08	43.50	-4.42
5	271.32	1.77	12.63	25.72	41.32	30.00	46.00	-16.00
6	599.32	2.70	19.68	25.60	41.11	37.89	46.00	-8.11



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Condition: 3m HORIZONTAL

Job No. : 1947RG Test mode: Charge +TX

		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	159.78	1.34	9.69	25.81	48.22	33.44	43.50	-10.06
2	218.31	1.51	11.09	25.76	41.39	28.23	46.00	-17.77
3	273.23	1.78	12.67	25.72	41.28	30.01	46.00	-15.99
4	299.32	1.90	13.58	25.70	43.59	33.37	46.00	-12.63
5	449.56	2.41	16.89	25.64	37.66	31.32	46.00	-14.68
6 p	p 900.15	3.60	23.20	25.06	38.83	40.57	46.00	-5.43



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Transmitter Emission above 1GHz									
Test mode:		GFSK	Test	channel:	Lowest	Ren	nark:	Peak	
Frequency (MHz)	Antenn factors (dB/m)	Loss	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	l limit	Polarization	
3803.444	32.90	7.74	38.49	45.25	47.40	74.00	-26.60	Vertical	
4804.000	34.10	8.87	38.75	46.51	50.73	74.00	-23.27	Vertical	
5982.226	34.66	10.51	38.96	46.77	52.98	74.00	-21.02	Vertical	
7206.000	35.60	10.68	37.64	43.77	52.41	74.00	-21.59	Vertical	
9608.000	37.10	12.50	36.35	36.70	49.95	74.00	-24.05	Vertical	
12566.850	37.87	14.34	37.72	37.48	51.97	74.00	-22.03	Vertical	
3803.444	32.90	7.74	38.49	44.78	46.93	74.00	-27.07	Horizontal	
4804.000	34.10	8.87	38.75	46.86	51.08	74.00	-22.92	Horizontal	
6051.874	34.73	10.49	38.89	45.99	52.32	74.00	-21.68	Horizontal	
7206.000	35.60	10.68	37.64	43.34	51.98	74.00	-22.02	Horizontal	
9608.000	37.10	12.50	36.35	37.30	50.55	74.00	-23.45	Horizontal	
12530.530	37.83	14.24	37.68	38.79	53.18	74.00	-20.82	Horizontal	

Test mode:		GFSK	Test channel:		Middle	Rem	ark:	Peak
Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3926.464	33.03	7.78	38.53	45.42	47.70	74.00	-26.30	Vertical
4880.000	34.18	8.97	38.76	47.31	51.70	74.00	-22.30	Vertical
5982.226	34.66	10.51	38.96	46.04	52.25	74.00	-21.75	Vertical
7320.000	35.54	10.72	37.59	43.88	52.55	74.00	-21.45	Vertical
9760.000	37.10	12.58	36.14	37.71	51.25	74.00	-22.75	Vertical
12566.850	37.87	14.34	37.72	37.55	52.04	74.00	-21.96	Vertical
3814.467	32.91	7.75	38.49	45.36	47.53	74.00	-26.47	Horizontal
4880.000	34.18	8.97	38.76	47.78	52.17	74.00	-21.83	Horizontal
6087.002	34.74	10.45	38.85	45.50	51.84	74.00	-22.16	Horizontal
7320.000	35.54	10.72	37.59	44.76	53.43	74.00	-20.57	Horizontal
9760.000	37.10	12.58	36.14	37.74	51.28	74.00	-22.72	Horizontal
12530.530	37.83	14.24	37.68	39.10	53.49	74.00	-20.51	Horizontal



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Test mode:	(GFSK	Tes	t channel:	Highest	Ren	nark:	Peak
Frequency (MHz)	Antenna factors (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3631.354	32.23	7.68	38.42	45.98	47.47	74.00	-26.53	Vertical
4960.000	34.26	9.09	38.78	47.31	51.88	74.00	-22.12	Vertical
5999.562	34.70	10.56	38.96	46.38	52.68	74.00	-21.32	Vertical
7440.000	35.60	10.77	37.54	42.46	51.29	74.00	-22.71	Vertical
9920.000	37.22	12.67	35.93	38.16	52.12	74.00	-21.88	Vertical
12603.270	37.90	14.44	37.75	37.62	52.21	74.00	-21.79	Vertical
3870.060	32.97	7.77	38.51	45.37	47.60	74.00	-26.40	Horizontal
4960.000	34.26	9.09	38.78	46.70	51.27	74.00	-22.73	Horizontal
5999.562	34.70	10.56	38.96	46.23	52.53	74.00	-21.47	Horizontal
7440.000	35.60	10.77	37.54	40.09	48.92	74.00	-25.08	Horizontal
9920.000	37.22	12.67	35.93	38.16	52.12	74.00	-21.88	Horizontal
12566.850	37.87	14.34	37.72	37.85	52.34	74.00	-21.66	Horizontal

Remark:

- 1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 - Final Test Level = Receiver Reading + Antenna Factor + Cable Factor Preamplifier Factor
- 2) Scan from 9kHz to 25GHz, the disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 3) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

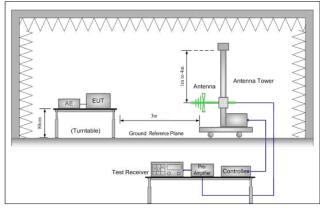


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6.9 Restricted bands around fundamental frequency

	. ,								
Test Requirement:	47 CFR Part 15C Section 1	47 CFR Part 15C Section 15.209 and 15.205							
Test Method:	ANSI C63.10: 2013 Section	NSI C63.10: 2013 Section 11.12							
Test Site:	Measurement Distance: 3n	easurement Distance: 3m (Semi-Anechoic Chamber)							
Limit:	Frequency	Limit (dBuV/m @3m)	Remark						
	30MHz-88MHz	40.0	Quasi-peak Value						
	88MHz-216MHz	43.5	Quasi-peak Value						
	216MHz-960MHz	46.0	Quasi-peak Value						
	960MHz-1GHz	54.0	Quasi-peak Value						
	Ah au a 4 O I I -	54.0	Average Value						
	Above 1GHz	74.0	Peak Value						
Test Setup:									



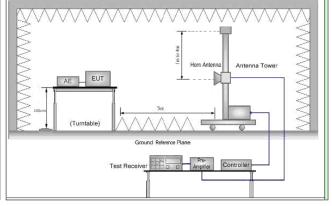


Figure 1. 30MHz to 1GHz

Figure 2. Above 1 GHz

Test Procedure:	a. For below 1GHz, the EUT was placed on the top of a rotating table 0. meters above the ground at a 3 meter semi-anechoic camber. The table
	Ineters above the ground at a 3 meter semi-anechoic camber. The table
	was rotated 360 degrees to determine the position of the highes radiation.
	radiation.

- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. 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.
- e. 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.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the



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Exploratory Test Mode:	restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel h. Test the EUT in the lowest channel, the Highest channel i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the Y axis positioning which it is the worst case. j. Repeat above procedures until all frequencies measured was complete. Transmitting with GFSK modulation.
Exploratory Foot Mode.	Transmitting mode, Charge + Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation. Pretest the EUT at Transmitting mode and Charge + Transmitting mode, found the Charge + Transmitting mode which it is worse case. Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details.
Test Results:	Pass

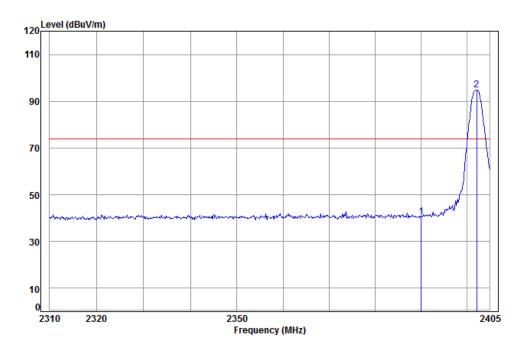


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Test plot as follows:

Worse case mode: GFSK (DH5)	Test channel:	Lowest	Remark:	Peak	Vertical	ĺ
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Condition: 3m Vertical Job No: : 1947RG

Mode: : 2402 Band edge

: BLE

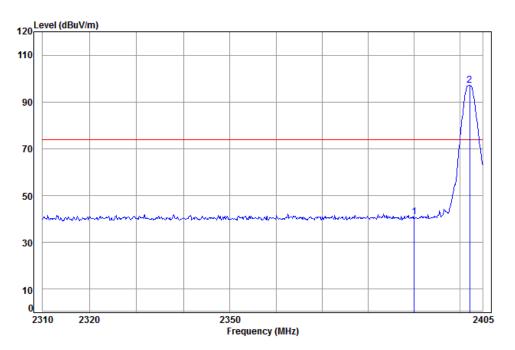
Ant Preamp Cable Read Limit 0ver Freq Loss Factor Factor Level Level Line Limit dBuV dBuV/m dBuV/m MHz dB dB/m dB 2390.00 5.34 28.57 38.11 44.79 40.59 74.00 -33.41 28.61 2402.19 5.35 38.11 99.09 94.94 74.00 20.94



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Worse case mode: GFSK (DH5) Test channel: Lowest Remark: Peak Horizontal



Condition: 3m Horizontal

Job No: : 1947RG

Mode: : 2402 Band edge

: BLE

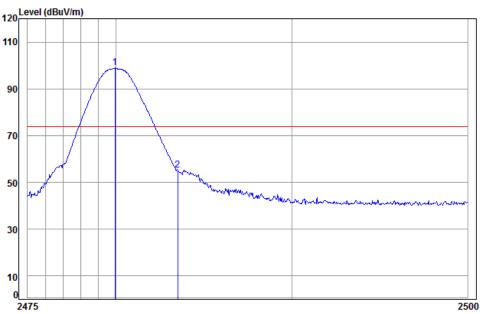
Cable Ant Preamp Read Limit Over Freq Loss Factor Factor Level Level Limit Line dBuV dBuV/m dBuV/m dB/m MHz dB dΒ 5.34 28.57 38.11 44.91 40.71 74.00 -33.29 2402.19 5.35 28.61 38.11 101.42 97.27 74.00 23.27



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Worse case mode: GFS	SK (DH5) Test channel:	Highest Remark:	Peak	Vertical
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Frequency (MHz)

Condition: 3m Vertical Job No: : 1947RG

Mode: : 2480 Band edge

: BLE

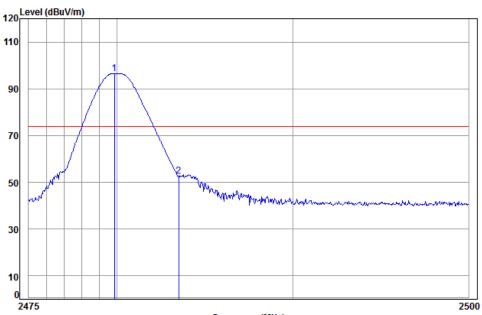
Ant Preamp Cable Limit 0ver Read Freq Loss Factor Factor Level Level Limit dB/m MHz dBuV dBuV/m dBuV/m dB dB 2479.96 5.41 28.97 38.12 102.67 98.93 74.00 24.93 2483.50 5.41 28.98 38.12 58.96 55.23 74.00 -18.77



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Worse case mode:	GFSK(DH5)	Test channel:	Highest	Remark:	Peak	Horizontal
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Frequency (MHz)

Condition: 3m Horizontal

Job No: : 1947RG

Mode: : 2480 Band edge

: BLE

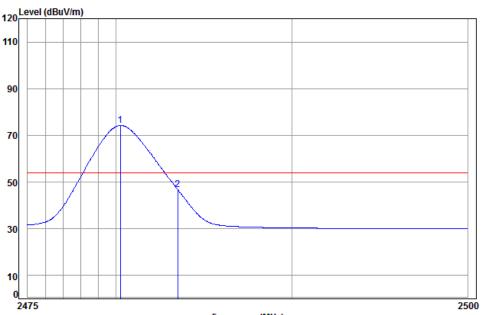
	Freq						Limit Line	
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp 2	2479.86 2483.50							



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Worse case mode:	GFSK (DH5)	Test channel:	Highest	Remark:	Average	Vertical
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Frequency (MHz)

Condition: 3m Vertical Job No: : 1947RG

Mode: : 2480 Band edge

: BLE

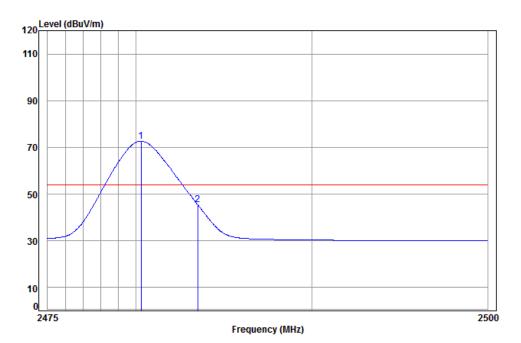
Cable Ant Preamp Read Limit 0ver Freq Loss Factor Factor Level Level Line Limit MHz dB/m dBuV dBuV/m dBuV/m 5.41 28.97 38.12 77.96 74.22 54.00 20.22 2480.25 5.41 28.98 38.12 50.49 46.76 54.00 -7.24 2483.50



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Worse case mode: 0	GFSK(DH5)	Test channel:	Highest	Remark:	Average	Horizontal
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Condition: 3m Horizontal

Job No: : 1947RG

Mode: : 2480 Band edge

: BLE

	Limit Line						Freq	
dB	dBuV/m	dBuV/m	dBuV	dB	dB/m	dB	MHz	-
							2480.30 2483.50	

Note:

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor



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7 Photographs - EUT Test Setup

Test model No.: R078H

7.1 Conducted Emission



7.2 Radiated Emission

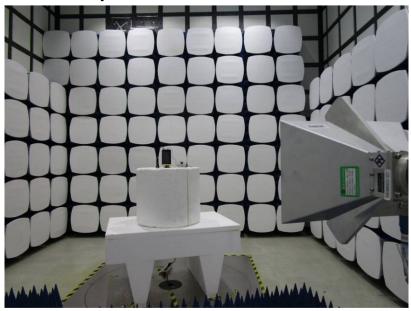




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7.3 Radiated Spurious Emission



8 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1609007709RG.