

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

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### TEST REPORT

Application No.:	SZEM1706006700CR			
Applicant:	Edifier International Limited			
Address of Applicant:	Room 2207-9, Tower Two, Lippo Centre 89 Queensway, HongKong			
Manufacturer:	Beijing Edifier Technology Co., Ltd.			
Address of Manufacturer:	8th floor, ZuoAn Building, NO.68 BeiSiHuanXiLu, Haidian District, Beijing 100080, CHINA			
Factory:	Dongguan Edifier Technology Co., Ltd.			
Address of Factory:	No.2 Gongyedong Road, Songshan Lake Sci&Tech Industry Park, Dongguan, Guangdong 523808, PR. China			
Equipment Under Test (EUT)	:			
EUT Name:	Bluetooth Active Noise Cancelling Stereo Headphones, Headphones			
Model No.:	W360NB			
Trade mark:	EDIFIER			
FCC ID:	Z9G-EDF60			
Standards:	47 CFR Part 15, Subpart C 15.247			
Date of Receipt:	2017-07-03			
Date of Test:	2017-07-07 to 2017-07-20			
Date of Issue:	2017-07-31			
Test Result :	Pass*			

\* In the configuration tested, the EUT complied with the standards specified above.



#### 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.

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Revision Record						
Version	Chapter	Date	Modifier	Remark		
01		2017-07-31		Original		

Authorized for issue by:		
	Bdison Li	
	Edison Li /Project Engineer	
	Eric Fu	
	Eric Fu /Reviewer	



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### 2 Test Summary

Radio Spectrum Technical Requirement					
Item	Standard	Method	Requirement	Result	
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(c)	Pass	
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass	

Radio Spectrum Matter Part					
Item	Standard	Method	Requirement	Result	
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass	
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass	
20dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass	
Carrier Frequencies Separation	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass	
Hopping Channel Number	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass	
Dwell Time	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass	
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.6	47 CFR Part 15, Subpart C 15.247(d)	Pass	
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 7.8.8	47 CFR Part 15, Subpart C 15.247(d)	Pass	
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass	



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### 4 General Information

### 4.1 Details of E.U.T.

Power supply:	DC 3.7V, 300mAh rechargeable battery which charged by USB port
Cable:	USB cable: 100cm unshielded
Rating:	DC 5V, 500mA
Internal Highest Frequency:	Less than 108MHz
Frequency Range:	2402MHz to 2480MHz
Bluetooth Version:	Bluetooth V4.1 signal mode
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channels:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Antenna Type:	Chip Antenna
Antenna Gain:	2.5dBi

#### 4.2 Description of Support Units

The EUT has been tested independent unit.

#### 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.25 x 10 <sup>-8</sup>
2	Duty cycle	0.37%
3	Occupied Bandwidth	3%
4	RF conducted power	0.75dB
5	RF power density	2.84dB
6	Conducted Spurious emissions	0.75dB
7	PE Padiated power	4.5dB (below 1GHz)
/	nr naulateu power	4.8dB (above 1GHz)
0	Dedicted Sourious omission test	4.5dB (30MHz-1GHz)
0	Radiated Spundus emission test	4.8dB (1GHz-18GHz)
9	Temperature test	1 °C
10	Humidity test	3%
11	Supply voltages	1.5%



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#### 4.4 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.

#### 4.5 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 – Designation Number: CN1178

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

#### 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.

### 4.6 Deviation from Standards

None

#### 4.7 Abnormalities from Standard Conditions

None



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### 5 Equipment List

Conducted Emissions at AC Power Line (150kHz-30MHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2017-05-10	2018-05-10	
Measurement Software	AUDIX	e3 V5.4.1221d	N/A	N/A	N/A	
LISN	Rohde & Schwarz	ENV216	SEM007-01	2016-10-09	2017-10-09	
LISN	ETS-LINDGREN	3816/2	SEM007-02	2017-04-14	2018-04-13	
8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T8-02	EMC0120	2016-09-28	2017-09-28	
4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T4-02	EMC0121	2016-09-28	2017-09-28	
2 Line ISN	Fischer Custom	FCC-TLISN- T2-02	EMC0122	2016-09-28	2017-09-28	

RF Conducted Test						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2016-10-09	2017-10-09	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2016-10-09	2017-10-09	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Signal Generator	Rohde & Schwarz	SML03	SEM006-02	2017-04-14	2018-04-13	
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2016-10-09	2017-10-09	

Radiated Emissions which fall in the restricted bands									
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date				
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-10	2018-05-10				
Measurement Software	AUDIX	e3 V8.2014- 6-27	N/A	N/A	N/A				
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13				
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05				
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14				

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Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15	
(15GHz-40GHz)						
Pre-amplifier	НР	8447D	SEM005-02	2016-10-09	2017-10-09	
(0.1-1300MHz)		04470	OEMOOD 02	2010 10 00	2017 10 00	
Low Noise Amplifier	Black Diamond	BDLNA-	SEM005.05	2016 10 00	2017-10-09	
(100MHz-18GHz)	Series	0118-352810	3EI0003-05	2010-10-09		
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17	
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13	
DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09	
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14	
Band filter	N/A	N/A	SEM023-01	N/A	N/A	

Radiated Spurious Emissions								
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date			
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2017-05-10	2018-05-10			
Measurement Software	AUDIX	e3 V8.2014- 6-27	N/A	N/A	N/A			
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2017-04-14	2018-04-13			
BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017-03-05	2020-03-05			
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2015-06-14	2018-06-14			
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-14	2017-06-16	2020-06-15			
Pre-amplifier (0.1-1300MHz)	HP	8447D	8447D SEM005-02		2017-10-09			
Low Noise Amplifier (100MHz-18GHz)	Black Diamond Series	BDLNA- 0118-352810	SEM005-05	2016-10-09	2017-10-09			
Pre-amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-10	2016-10-17	2017-10-17			
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2017-04-14	2018-04-13			

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DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2016-10-09	2017-10-09
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14
Band filter	N/A	N/A	SEM023-01	N/A	N/A

General used equipment									
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date				
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2016-10-12	2017-10-12				
Humidity/ Temperature Indicator	dity/ Temperature Indicator Shanghai Meteorological Industry Factory		SEM002-04	2016-10-12	2017-10-12				
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2016-10-12	2017-10-12				
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2017-04-18	2018-04-18				



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### 6 Radio Spectrum Technical Requirement

#### 6.1 Antenna Requirement

#### 6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(c)

#### 6.1.2 Conclusion

#### Standard 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 2.5dBi.





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#### 6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

#### 6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

#### 6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

#### Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

- > Number of shift register stages: 9
- > Length of pseudo-random sequence: 29 -1 = 511 bits
- > Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

┎╺╘┚╌╘┚╌╘┚┑╘┚╌╘┚╌╘┚╶╸	
↓ 	

An example of Pseudorandom Frequency Hopping Sequence as follow:

20 62 46 77	7	64	8	73	)	16	75	1
				Γ				



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Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Bluetooth Core specification, the Bluetooth system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

According to the Bluetooth Core specification, the Bluetooth system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.



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#### **Radio Spectrum Matter Test Results** 7

#### 7.1 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement	47 CFR Part 15, Subpart C 15.207
Test Method:	ANSI C63.10 (2013) Section 6.2
Limit:	

	Conducted limit(dBµV)					
Frequency of emission(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 of the frequency.						

nequency

#### 7.1.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25	°C	Humidity:	55 % RH	Atmospheric Pressure:	1005	mbar	
Pretest these mode to find the worst case:	e: C with bee	harge +TX GFSK mod n tested an	_Hop mode_ dulation, π/4l d only the da	Keep the EUT in DQPSK modulation ta of worst case is	charging and frequency ho n, 8DPSK modulation. All i s recorded in the report.	pping m modes l	iode nave	
	f: Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.							
The worst case for final test:	e: C with bee	harge +TX GFSK mod n tested an	_Hop mode_ dulation, π/4l d only the da	Keep the EUT in DQPSK modulation ta of worst case is	charging and frequency ho n, 8DPSK modulation. All i s recorded in the report.	pping m modes ł	iode nave	

#### 7.1.2 Test Setup Diagram





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#### 7.1.3 Measurement Procedure and Data

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  $500hm/50\mu$ H + 50hm 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 rear of the EUT shall be 0.4 m from the 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 ANSI C63.10 on conducted measurement.

Remark: LISN=Read Level+ Cable Loss+ LISN Factor



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Mode:e; Line:Live Line



Site	: Shielding Room
Condition	: CE LINE
Job No.	: 06700CR
Test Mode	: e

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1 2	0.15000	0.02	9.64 9.64	34.54 32.02	44.20 41.68	56.00 54.77	-11.80 -13.09	Peak Peak
3 4 5	0.20614 0.24293 0.41266	0.02 0.02 0.02	9.64 9.64 9.64	31.35 30.20 28.24	41.01 39.86 37.90	53.36 52.00 47.59	-12.35 -12.13 -9.69	Peak Peak Peak
60	0.63048	0.02	9.65	30.12	39.79	46.00	-6.21	Peak



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Site	: Shielding Room
Condition	: CE NEUTRAL
Job No.	: 06700CR

Test Mode	: e									
			Cable	LISN	Read		Limit	Over		
		Freq	Loss	Factor	Level	Level	Line	Limit	Remark	
		MHz	dB	dB	dBuV	dBuV	dBuV	dB		_
1		0.17866	0.02	9.63	32.96	42.61	54.55	-11.93	Peak	
2		0.21279	0.02	9.63	30.90	40.55	53.10	-12.54	Peak	
3		0.23533	0.02	9.63	30.88	40.53	52.26	-11.73	Peak	
4		0.38929	0.02	9.63	28.07	37.72	48.08	-10.36	Peak	
50		0.63383	0.02	9.63	30.36	40.02	46.00	-5.98	Peak	
6		7,100	0.08	9.77	21.99	31.84	50.00	-18.16	Peak	



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#### 7.2 Conducted Peak Output Power

Test Requirement	47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.5
Limit:	

Frequency range(MHz)	Output power of the intentional radiator(watt)
	1 for ≥50 hopping channels
902-928	0.25 for 25≤ hopping channels <50
	1 for digital modulation
	1 for ≥75 non-overlapping hopping channels
2400-2483.5	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

#### 7.2.1 E.U.T. Operation

Operating Environment:

Temperature:	25	°C	Humidity:	55 % RH	Atmospheric Pressure:	1005	mbar
Pretest these mode to find the worst case:	d: T moo and	<sup>•</sup> X_non-I dulation, l only the	Hop mode_Kee π/4DQPSK mo e data of worst o	p the EUT ir odulation, 8D case is recor	continuously transmitting mode PSK modulation. All modes have ded in the report.	with GF been t	SK ested
	f: Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is record in the report.						
The worst case for final test:	d: T moo	<sup>.</sup> X_non-I dulation.	Hop mode_Kee π/4DQPSK mc	p the EUT ir odulation. 8D	continuously transmitting mode PSK modulation. All modes have	with GF e been t	<sup>-</sup> SK ested

and only the data of worst case is recorded in the report.



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#### 7.2.2 Test Setup Diagram



### **Ground Reference Plane**

#### 7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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#### 7.3 20dB Bandwidth

Test Requirement	47 CFR Part 15, Subpart C 15.247(a)(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.7

#### 7.3.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25 °C	Humidity:	55 % RH	Atmospheric Pressure:	1005	mbar					
Pretest these mode to find the worst case:	d: TX_nor modulatio and only t	d: TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.									
	f: Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, $\pi$ /4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is rec in the report.										
The worst case for final test:	d: TX_nor modulatio and only t	1-Hop mode_Kee n, π/4DQPSK mc he data of worst (	p the EUT in c odulation, 8DP case is recorde	ontinuously transmitting mode SK modulation. All modes have ad in the report.	with GF e been t	<sup>-</sup> SK tested					

#### 7.3.2 Test Setup Diagram



### **Ground Reference Plane**

#### 7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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#### 7.4 Carrier Frequencies Separation

Test Requirement	47 CFR Part 15, Subpart C 15.247a(1)
Test Method:	ANSI C63.10 (2013) Section 7.8.2
Limit:	2/3 of the 20dB bandwidth base on the transmission power is less than 0.125W

#### 7.4.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25	°C	Humidity:	55	% RH	Atmospheric Pressu	re: 100	5 mbar
Pretest these mode to find the worst case:	d: T mo anc	<sup>-</sup> X_non- dulation I only th	Hop mode_Kee , π/4DQPSK mc e data of worst c	o the dula ase	EUT in a ation, 8DF is record	continuously transmitting r PSK modulation. All modes ed in the report.	have beer	GFSK 1 tested
f: Charge + TX_non-Hop mode_Keep the EUT in charging and conti transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8 modulation. All modes have been tested and only the data of worst of in the report.							tinuously 8DPSK case is rea	corded
The worst case for final test:	d: T mo	<sup>-</sup> X_non- dulation	Hop mode_Kee , π/4DQPSK mc	o the dula	e EUT in a ation, 8DF	continuously transmitting r PSK modulation. All modes	node with C have beer	GFSK

and only the data of worst case is recorded in the report.

#### 7.4.2 Test Setup Diagram



### **Ground Reference Plane**

#### 7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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#### 7.5 Hopping Channel Number

Test Requirement	47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method:	ANSI C63.10 (2013) Section 7.8.3
Limit:	

Frequency range(MHz)	Number of hopping channels (minimum)
000.000	50 for 20dB bandwidth <250kHz
902-928	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

#### 7.5.1 E.U.T. Operation

Operating Environment:

Temperature:	25	°C	Humidity:	55 % RH	Atmospheric Pressure:	1005	mbar
Pretest these mode to find the worst case:	c: T π/4 the	X_Hop DQPSI data of	o mode_Keep the K modulation, 8D f worst case is re	EUT in freque PSK modulat	ency hopping mode with GFSK ion. All modes have been tester report.	modula d and or	ation, nly
	e: C with bee	Charge n GFSk en teste	+TX_Hop mode_ C modulation, $\pi/4$ and only the dates of	_Keep the EU DQPSK mod ata of worst ca	T in charging and frequency ho ulation, 8DPSK modulation. All ase is recorded in the report.	pping m modes l	10de have
The worst case for final test:	c: T π/4 the	X_Hop DQPSI data of	o mode_Keep the K modulation, 8D f worst case is ree	EUT in freque PSK modulat	ency hopping mode with GFSK ion. All modes have been tested report.	modula d and or	ation, nly

#### 7.5.2 Test Setup Diagram



### **Ground Reference Plane**



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#### 7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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#### 7.6 Dwell Time

Test Requirement Test Method: Limit: 47 CFR Part 15, Subpart C 15.247a(1)(iii) ANSI C63.10 (2013) Section 7.8.4

Frequency(MHz)	Limit
000.008	0.4S within a 20S period(20dB bandwidth<250kHz)
902-928	0.4S within a 10S period(20dB bandwidth≥250kHz)
0400 0400 5	0.4S within a period of 0.4S multiplied by the number
2400-2483.5	of hopping channels
5725-5850	0.4S within a 30S period

#### 7.6.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25	°C	Humidity:	55 % RH	Atmospheric Pressure:	1005	mbar	
Pretest these mode to find the worst case:	c: Τ) π/4[ the c	X_Hop mod DQPSK mod data of wors	e_Keep the dulation, 8DI at case is rec	EUT in frequency PSK modulation. A corded in the repor	hopping mode with GFSK Il modes have been tested t.	modula and or	ıtion, าly	
	e: Charge +TX_Hop mode_Keep the EUT in charging and frequency hopping mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.							
The worst case for final test:	c: Τλ π/4[ the o	X_Hop mod DQPSK moo data of wors	e_Keep the dulation, 8DI t case is rec	EUT in frequency PSK modulation. A corded in the repor	hopping mode with GFSK Il modes have been tested t.	modula and or	ıtion, າly	



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#### 7.6.2 Test Setup Diagram



### **Ground Reference Plane**

#### 7.6.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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#### 7.7 Conducted Band Edges Measurement

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 7.8.6

#### 7.7.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25	°C	Humidity:	55 % F	RH	Atmospheric Press	ure: 1005	mbar		
Pretest these mode to find the worst case:	c: Τ) π/4[ the o	X_Hop mo DQPSK m data of wo	ode_Keep the odulation, 8D orst case is re	EUT in PSK mo corded ir	frequency dulation. / n the repo	hopping mode with All modes have been rt.	GFSK modul tested and c	ation, only		
	d: T moc and	d: TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, $\pi$ /4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.								
	e: C with beer	e: Charge +TX_Hop mode_Keep the EUT in charging and frequency hopping mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.								
	f: Ch tran: moc in th	narge + TX smitting m lulation. A e report.	K_non-Hop m node with GFS Il modes have	iode_Kee SK modu e been te	ep the EU lation, π/4 sted and	T in charging and con IDQPSK modulation, only the data of wors	ntinuously 8DPSK t case is rec	orded		
The worst case for final test:	c: TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulatio $\pi$ /4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.									
	d: T mod	d: TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, $\pi$ /4DQPSK modulation, 8DPSK modulation. All modes have been tested								

#### 7.7.2 Test Setup Diagram



and only the data of worst case is recorded in the report.

### **Ground Reference Plane**



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#### 7.7.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247

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#### 7.8 Conducted Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.247(d)
Test Method:	ANSI C63.10 (2013) Section 7.8.8
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.

#### 7.8.1 E.U.T. Operation

**Operating Environment:** 

Temperature:	25	°C	Humidity:	55 % RH	Atmospheric Pressure:	1005	mbar		
Pretest these mode to find the worst case:	d: T moo and	<sup>-</sup> X_non dulatior l only th	-Hop mode_Keep n, π/4DQPSK mo ne data of worst c	o the EUT in dulation, 8DF ase is record	continuously transmitting mode PSK modulation. All modes hav led in the report.	with GF e been t	<sup>-</sup> SK tested		
	f: C tran moo in th	f: Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.							
The worst case for final test:	d: T moo and	X_non dulatior	-Hop mode_Keep n, π/4DQPSK mo ne data of worst c	o the EUT in dulation, 8DF ase is record	continuously transmitting mode PSK modulation. All modes hav led in the report.	with GF e been t	<sup>-</sup> SK tested		

#### 7.8.2 Test Setup Diagram



### Spectrum Analyzer

### Ground Reference Plane

#### 7.8.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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#### 7.9 Radiated Emissions which fall in the restricted bands

-			-								
	Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209									
	Test Method:		ANSI C63.10 (2013) Section 6.10.5								
	Measurement Dist	ance:	3m	3m							
7.9.1	E.U.T. Operation										
	Operating Environ	ment:									
	Temperature:	23 °C	2	Humidity:	54 % RH	Atmospheric Pressure:	1005	mbar			
Pretest these d: TX_ mode to find the modul worst case: and or f: Cha transm modul			non-Hop ation, $\pi/4$ ly the da ge + TX litting mo ation. All	o mode_Keep 4DQPSK mo ata of worst o _non-Hop m ode with GFS modes have	the EUT in co dulation, 8DPS ase is recorde ode_Keep the K modulation, been tested a	ontinuously transmitting mode SK modulation. All modes have d in the report. EUT in charging and continu π/4DQPSK modulation, 8DF and only the data of worst cas	with GF /e been t ously 'SK ie is reco	<sup>-</sup> SK ested			
	The worst case for final test:	f: Char transm modula	rge + TX nitting mo ation. All report.	_non-Hop m ode with GFS modes have	ode_Keep the SK modulation, been tested a	EUT in charging and continu π/4DQPSK modulation, 8DF and only the data of worst cas	ously 'SK e is reco	orded			

#### 7.9.2 Test Setup Diagram





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#### 7.9.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. 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 fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 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 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, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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Mode:f; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low





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Mode:f; Polarization:Vertical; Modulation Type:GFSK; Channel:Low





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Mode:f; Polarization:Horizontal; Modulation Type:GFSK; Channel:High





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Mode:f; Polarization:Vertical; Modulation Type:GFSK; Channel:High



	Freq	Loss	Factor	Preamp Factor	Level	Level	Limit	Limit	Remark	
-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		_
1 pp 2 3	2480.000 2483.500 2497.790	5.41 5.41 5.42	29.34 29.35 29.39	37.95 37.95 37.95	101.64 56.04 56.22	98.44 52.85 53.08	74.00 74.00 74.00	24.44 -21.15 -20.92	peak peak peak	



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#### 7.10 Radiated Spurious Emissions

Test Requirement	47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method:	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Measurement Distance:	3m
Limit:	

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, 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.



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#### 7.10.1 E.U.T. Operation

Operating Environm	ment:							
Temperature:	23 °C	Humidity:	54 % RH	Atmospheric Pressure:	1005 m	ıbar		
Pretest these mode to find the worst case:	d: TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, $\pi/4DQPSK$ modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.							
	f: Charge + TX_non-Hop mode_Keep the EUT in charging and continuously transmitting mode with GFSK modulation, $\pi$ /4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.							
The worst case for final test:	f: Charge transmitt modulati in the rep	e + TX_non-Hop m ing mode with GFS on. All modes have port.	ode_Keep th SK modulatio e been tested	e EUT in charging and continuo n, $\pi/4DQPSK$ modulation, 8DPS and only the data of worst case	usly }K is recorde	əd		

#### 7.10.2Test Setup Diagram





Above 1GHz


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#### 7.10.3 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. 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 fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 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 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, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

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#### 30MHz~1GHz

Mode: f; Polarization: Horizontal;



#### Condition: 3m HORIZONTAL Job No. : 06700CR Test mode: f

	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
155.91	1.33	9.35	26.88	35.26	19.06	43.50	-24.44
255.62	1.70	12.41	26.52	31.76	19.35	46.00	-26.65
299.32	1.89	13.87	26.41	37.90	27.25	46.00	-18.75
372.00	2.12	15.75	26.95	36.96	27.88	46.00	-18.12
554.83	2.66	18.94	27.61	29.73	23.72	46.00	-22.28
785.09	3.16	22.04	27.31	27.36	25.25	46.00	-20.75
	Freq MHz 155.91 255.62 299.32 372.00 554.83 785.09	Cable Freq Loss MHz dB 155.91 1.33 255.62 1.70 299.32 1.89 372.00 2.12 554.83 2.66 785.09 3.16	Cable Ant   Freq Loss Factor   MHz dB dB/m   155.91 1.33 9.35   255.62 1.70 12.41   299.32 1.89 13.87   372.00 2.12 15.75   554.83 2.66 18.94   785.09 3.16 22.04	CableAntPreampFreqLossFactorFactorMHzdBdB/mdB155.911.339.3526.88255.621.7012.4126.52299.321.8913.8726.41372.002.1215.7526.95554.832.6618.9427.61785.093.1622.0427.31	Cable Ant Preamp Read   Freq Loss Factor Factor Level   MHz dB dB/m dB dBUV   155.91 1.33 9.35 26.88 35.26   255.62 1.70 12.41 26.52 31.76   299.32 1.89 13.87 26.41 37.90   372.00 2.12 15.75 26.95 36.96   554.83 2.66 18.94 27.61 29.73   785.09 3.16 22.04 27.31 27.36	Cable Ant Preamp Read   Freq Loss Factor Factor Level Level   MHz dB dB/m dB dBuV dBuV/m   155.91 1.33 9.35 26.88 35.26 19.06   255.62 1.70 12.41 26.52 31.76 19.35   299.32 1.89 13.87 26.41 37.90 27.25   372.00 2.12 15.75 26.95 36.96 27.88   554.83 2.66 18.94 27.61 29.73 23.72   785.09 3.16 22.04 27.31 27.36 25.25	Cable Ant Preamp Read Limit   Freq Loss Factor Factor Level Level Line   MHz dB dB/m dB dBuV dBuV/m dBuV/m   155.91 1.33 9.35 26.88 35.26 19.06 43.50   255.62 1.70 12.41 26.52 31.76 19.35 46.00   299.32 1.89 13.87 26.41 37.90 27.25 46.00   372.00 2.12 15.75 26.95 36.96 27.88 46.00   554.83 2.66 18.94 27.61 29.73 23.72 46.00   785.09 3.16 22.04 27.31 27.36 25.25 46.00



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Mode :f; Polarization: Vertical



Condition: 3m VERTICAL Job No. : 06700CR

Test mode: f

	(	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
pp 4	43.51	0.68	11.56	27.31	38.28	23.21	40.00	-16.79
19	91.75	1.39	10.12	26.73	27.29	12.07	43.50	-31.43
26	53.82	1.74	12.58	26.50	27.66	15.48	46.00	-30.52
31	12.18	1.94	14.34	26.50	30.01	19.79	46.00	-26.21
53	39.48	2.64	18.73	27.63	27.25	20.99	46.00	-25.01
93	32.27	3.63	23.30	26.61	26.23	26.55	46.00	-19.45
19 26 31 53 93	91.75 53.82 12.18 89.48 32.27	1.39 1.74 1.94 2.64 3.63	10.12 12.58 14.34 18.73 23.30	26.73 26.50 26.50 27.63 26.61	27.29 27.66 30.01 27.25 26.23	12.07 15.48 19.79 20.99 26.55	43.50 46.00 46.00 46.00 46.00	-3 -2 -2 -2 -1



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#### Above 1GHz

Mode:f; Polarization:Horizontal; Modulation Type:GFSK; Channel:Low



Condition: 3m HORIZONTAL

Job No	:	06699CR/06700CR
Mode	:	2402 TX RSE

Mode	: 2402
Note	: BT

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1199.726	4.08	24.48	38.08	47.34	37.82	74.00	-36.18	peak
2	1808.551	4.82	27.10	38.02	45.01	38.91	74.00	-35.09	Peak
3	4316.859	7.08	33.60	38.16	44.46	46.98	74.00	-27.02	peak
4	4804.000	7.73	34.16	38.40	42.90	46.39	74.00	-27.61	peak
5	7206.000	9.65	36.42	37.11	43.51	52.47	74.00	-21.53	peak
6 p	p 9608.000	11.06	37.52	35.10	39.65	53.13	74.00	-20.87	peak



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Mode:f; Polarization:Vertical; Modulation Type:GFSK; Channel:Low



Condition: 3m VERTICAL

Job No	:	06699CR/06700CR
Mode	:	2402 TX RSE

T

			Cable	Ant	Preamp	Read		Limit	0ver	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1611.091	4.60	26.30	38.04	51.29	44.15	74.00	-29.85	peak
2		3168.500	6.06	31.62	37.92	44.27	44.03	74.00	-29.97	Peak
3		4392.376	7.16	33.60	38.20	44.48	47.04	74.00	-26.96	peak
4		4804.000	7.73	34.16	38.40	43.50	46.99	74.00	-27.01	peak
5		7206.000	9.65	36.42	37.11	42.29	51.25	74.00	-22.75	peak
6 p	р	9608.000	11.06	37.52	35.10	39.09	52.57	74.00	-21.43	peak



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Mode:f; Polarization:Horizontal; Modulation Type:GFSK; Channel:middle



#### Condition: 3m HORIZONTAL

Job No	:	06699CR/06700CR				
Mode	:	2441 TX RSE				

Note	- :	ВΤ

	Freq	Cable Loss	Ant Factor	Preamp Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1282.193	4.20	24.87	38.07	46.52	37.52	74.00	-36.48	peak
2	3703.723	6.47	32.79	37.97	43.62	44.91	74.00	-29.09	Peak
3	4405.090	7.18	33.60	38.20	44.90	47.48	74.00	-26.52	peak
4	4882.000	7.84	34.30	38.44	43.01	46.71	74.00	-27.29	peak
5	7323.000	9.73	36.37	37.01	41.45	50.54	74.00	-23.46	peak
6 p	p 9764.000	11.21	37.55	35.02	40.08	53.82	74.00	-20.18	peak



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Mode:f; Polarization:Vertical; Modulation Type:GFSK ; Channel:middle



Condition: 3m VERTICAL

Job No	:	06699CR/06700CR
Mode	:	2441 TX RSE

BT

Note	:

			Cable	Ant	Preamp	Read		Limit	0ver	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	_									
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1644.019	4.64	26.44	38.04	43.55	36.59	74.00	-37.41	peak
2		4392.376	7.16	33.60	38.20	44.19	46.75	74.00	-27.25	peak
3		4882.000	7.84	34.30	38.44	43.15	46.85	74.00	-27.15	peak
4		6855.063	9.38	36.10	37.44	43.65	51.69	74.00	-22.31	peak
5		7323.000	9.73	36.37	37.01	40.45	49.54	74.00	-24.46	peak
6	рр	9764.000	11.21	37.55	35.02	39.18	52.92	74.00	-21.08	peak
										-



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Mode:f; Polarization:Horizontal; Modulation Type:GFSK; ; Channel:High



#### Condition: 3m HORIZONTAL

Mode	:	2480	ТΧ	RSE		
Note	:	BT				
		(	Cabl	e	Ant	Preamp

			Cable	Ant	Preamp	Read		Limit	0ver	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	_									
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1297.103	4.22	24.94	38.07	45.40	36.49	74.00	-37.51	peak
2		4341.886	7.10	33.60	38.17	44.24	46.77	74.00	-27.23	peak
3		4960.000	7.95	34.43	38.48	43.59	47.49	74.00	-26.51	peak
4		6835.278	9.37	36.05	37.46	43.00	50.96	74.00	-23.04	peak
5		7440.000	9.81	36.32	36.90	41.16	50.39	74.00	-23.61	peak
6	рр	9920.000	11.36	37.58	34.94	39.02	53.02	74.00	-20.98	peak
										-



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Mode:f; Polarization:Vertical; Modulation Type:GFSK; ; Channel:High



Condition: 3m VERTICAL

Job No	:	06699CR/06700CR
Mode	:	2480 TX RSE

Note	:	вт
------	---	----

		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1597.181	4.59	26.24	38.04	45.01	37.80	74.00	-36.20	peak
2	1955.344	4.97	27.64	38.00	47.00	41.61	74.00	-32.39	Peak
3	4145.664	6.88	33.60	38.07	44.48	46.89	74.00	-27.11	peak
4	4960.000	7.95	34.43	38.48	42.73	46.63	74.00	-27.37	peak
5	7440.000	9.81	36.32	36.90	41.46	50.69	74.00	-23.31	peak
6 p	p 9920.000	11.36	37.58	34.94	38.48	52.48	74.00	-21.52	peak



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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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#### 8 Photographs

8.1 Conducted Emissions at AC Power Line (150kHz-30MHz) Test Setup



8.2 Radiated Emissions which fall in the restricted bands Test Setup





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#### 8.3 Radiated Spurious Emissions Test Setup







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#### 8.4 EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1706006700CR



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#### 9 Appendix

#### 9.1 Appendix 15.247

#### 1.20 dB Bandwidth

Test Mode	Test Channel	EBW[MHz]	Limit[MHz]	Verdict
DH5	2402	0.958		PASS
DH5	2441	0.950		PASS
DH5	2480	0.950		PASS
2DH5	2402	1.254		PASS
2DH5	2441	1.222		PASS
2DH5	2480	1.234		PASS
3DH5	2402	1.232		PASS
3DH5	2441	1.254		PASS
3DH5	2480	1.256		PASS



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#### 2.Occupied Bandwidth

Test Mode	Test Channel	OBW[MHz]	Limit[MHz]	Verdict
DH5	2402	0.876		PASS
DH5	2441	0.866		PASS
DH5	2480	0.866		PASS
2DH5	2402	1.172		PASS
2DH5	2441	1.168		PASS
2DH5	2480	1.168		PASS
3DH5	2402	1.156		PASS
3DH5	2441	1.152		PASS
3DH5	2480	1.154		PASS

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#### **3.Conducted Peak Output Power**

Test Mode	Test Channel	Power[dBm]	Limit[dBm]	Verdict
DH5	2402	1.2	<30	PASS
DH5	2441	2.93	<30	PASS
DH5	2480	2.64	<30	PASS
2DH5	2402	-1.93	<30	PASS
2DH5	2441	1.45	<30	PASS
2DH5	2480	1.03	<30	PASS
3DH5	2402	-1.44	<30	PASS
3DH5	2441	1.97	<30	PASS
3DH5	2480	1.61	<30	PASS



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#### 4. Carrier Frequency Separation

Test Mode	Test Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	2441	0.999	>=0.639	PASS
2DH5	2441	1.008	>=0.836	PASS
3DH5	2441	1.005	>=0.837	PASS



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#### **5.Dwell Time**

Test Mode	Test Channel	Burst Width[ms/hop/ch]	Total Hops[hop*ch]	Dwell Time[s]	Limit[s]	Verdict
DH1	2402	0.39	320	0.125	<0.4	PASS
DH3	2402	1.66	160	0.266	<0.4	PASS
DH5	2402	2.9	100	0.29	<0.4	PASS
2DH1	2402	0.41	320	0.131	<0.4	PASS
2DH3	2402	1.67	160	0.267	<0.4	PASS
2DH5	2402	2.9	110	0.319	<0.4	PASS
3DH1	2402	0.41	320	0.131	<0.4	PASS
3DH3	2402	1.66	160	0.266	<0.4	PASS
3DH5	2402	2.91	100	0.291	<0.4	PASS



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#### **6.Hopping Channel Number**

Test Mode	Test Channel	Number of Hopping Channel[N]	Limit[N]	Verdict
DH5	2402	79	>=15	PASS
2DH5	2402	79	>=15	PASS
3DH5	2402	79	>=15	PASS

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#### 7.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Hopping	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit[dBm]	Verdict
DH5	2402	On	2.340	-52.897	<-17.66	PASS
DH5	2402	Off	0.690	-62.714	<-19.31	PASS
DH5	2480	On	2.840	-56.157	<-17.16	PASS
DH5	2480	Off	3.180	-60.685	<-16.82	PASS
2DH5	2402	On	-2.460	-57.701	<-22.46	PASS
2DH5	2402	Off	-4.470	-65.696	<-24.47	PASS
2DH5	2480	On	-2.030	-61.132	<-22.03	PASS
2DH5	2480	Off	-1.570	-60.704	<-21.57	PASS
3DH5	2402	On	-2.600	-56.646	<-22.6	PASS
3DH5	2402	Off	-4.360	-66.252	<-24.36	PASS
3DH5	2480	On	-2.680	-60.704	<-22.68	PASS
3DH5	2480	Off	-1.370	-61.151	<-21.37	PASS



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Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
DH5	2402	30	10000	1000	3000	0.67	-44.150	<-19.33	PASS
DH5	2402	10000	25000	1000	3000	0.67	-65.230	<-19.33	PASS
DH5	2441	30	10000	1000	3000	3.66	-40.610	<-16.34	PASS
DH5	2441	10000	25000	1000	3000	3.66	-62.420	<-16.34	PASS
DH5	2480	30	10000	1000	3000	3.33	-43.350	<-16.67	PASS
DH5	2480	10000	25000	1000	3000	3.33	-60.730	<-16.67	PASS
2DH5	2402	30	10000	1000	3000	-4.42	-47.890	<-24.42	PASS
2DH5	2402	10000	25000	1000	3000	-4.42	-64.840	<-24.42	PASS
2DH5	2441	30	10000	1000	3000	-0.99	-47.020	<-20.99	PASS
2DH5	2441	10000	25000	1000	3000	-0.99	-64.740	<-20.99	PASS
2DH5	2480	30	10000	1000	3000	-1.64	-46.730	<-21.64	PASS
2DH5	2480	10000	25000	1000	3000	-1.64	-65.300	<-21.64	PASS
3DH5	2402	30	10000	1000	3000	-4.4	-48.030	<-24.4	PASS
3DH5	2402	10000	25000	1000	3000	-4.4	-64.880	<-24.4	PASS
3DH5	2441	30	10000	1000	3000	-0.98	-46.210	<-20.98	PASS
3DH5	2441	10000	25000	1000	3000	-0.98	-65.200	<-20.98	PASS
3DH5	2480	30	10000	1000	3000	-1.46	-46.040	<-21.46	PASS
3DH5	2480	10000	25000	1000	3000	-1.46	-65.190	<-21.46	PASS

#### 8.RF Conducted Spurious Emissions

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