

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

Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053 Report No.: SZEM161100971904 Fax: +86 (0) 755 2671 0594 Page : 1 of 21

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FCC REPORT

Application No.: SZEM1611009719CR

Applicant:BRAGI GMBHManufacturer:BRAGI GMBH

Factory: VTech (Dongguan) Communications Ltd.

Product Name: The Headphone

Model No.(EUT): H1001-01
Trade Mark: Bragi

FCC ID: 2AF5TH1001L

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

 Date of Receipt:
 2016-11-17

 Date of Test:
 2016-11-21

 Date of Issue:
 2016-12-08

Test Result: PASS *

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



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.

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1 Version

Revision Record								
Version Chapter Date Modifier Remark								
00		2016-12-08		Original				

Authorized for issue by:		
Tested By	Peter Gene	2016-11-21
	(Peter Geng) /Project Engineer	Date
Checked By	Eric Fu	2016-12-08
	(Eric Fu) /Reviewer	Date



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2 Test Summary

Test Item	Test Requirement	Test method	Result
Radiated Spurious emissions	47 CFR Part 15, Subpart C Section 15.205/15.209	ANSI C63.10 (2013)	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 (2013)	PASS
20dB Occupied Bandwidth	47 CFR Part 15, Subpart C Section	ANSI C63.10 (2013)	PASS



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4 General Information

4.1 Client Information

Applicant:	BRAGI GMBH				
Address of Applicant:	Sendlinger Strasse 7 / Angerblock 2. OG, 80331 München, Germany				
Manufacturer:	BRAGI GMBH				
Address of Manufacturer:	Sendlinger Strasse 7 / Angerblock 2. OG, 80331 München, Germany				
Factory:	VTech (Dongguan) Communications Ltd.				
Address of Factory:	Xia Ling Bei Management Zone, Liaobu Town, Dongguan City, Guangdong Province, China				

4.2 General Description of EUT

Name:	The Headphone
Model No.:	H1001-01
Trade Mark:	Bragi
Operation Frequency:	10.579MHz
Antenna Type:	Loop Antenna
Power Supply:	Left headphone: DC 3.7V, 50mAh rechargeable battery; Right headphone: DC 3.7V, 100mAh rechargeable battery Which both charged by the docking(Charged from Adapter via USB cable)
Test Voltage:	AC 120V/50Hz
Cable:	USB charging line: 18.5cm, shielded
Product details:	H1001-01 consists of a left earplug, a right earplug, a USB charging line and a charging case.



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4.3 Test Environment and Mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	55 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
TX mode	Keep the EUT in transmitting mode

4.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Adapter	Apple	A1357 W010A051

4.5 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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4.6 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)

The 3m Semi-anechoic chambers and the 10m Semi-anechoic chambers 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-2, 4620C-3.

4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.



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4.10 Equipment List

	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	2016-05-13	2017-05-13
2	EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2016-04-25	2017-04-25
3	Trilog-Broadband Antenna(30M-1GHz)	Schwarzbeck	VULB9168	SEM003-18	2016-06-29	2019-06-29
4	Pre-amplifier	Sonoma Instrument Co	310N	SEM005-03	2016-07-06	2017-07-06
5	Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015-08-14	2018-08-14

	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	2016-10-09	2017-10-09		
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	2016-09-28	2017-09-28		
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4- 02	EMC0121	2016-09-28	2017-09-28		
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2- 02	EMC0122	2016-09-28	2017-09-28		
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	2016-10-09	2017-10-09		



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5 Test results and Measurement Data

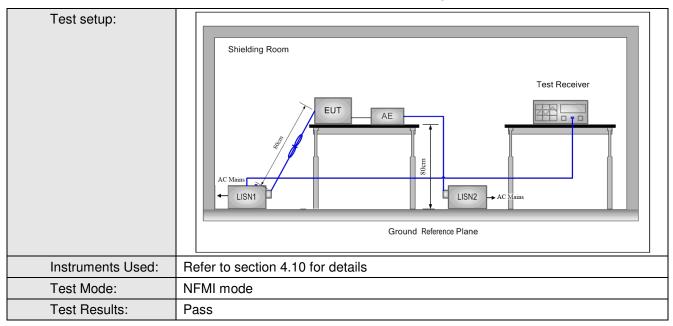
5.1 Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	150kHz to 30MHz				
Limit:	Francisco (MILE)	Limit (dBuV)			
	Frequency range (MHz)	Quasi-peak	Average		
	0.15-0.5	0.15-0.5 66 to 56* 56 to 4			
	0.5-5	56	46		
	5-30	60	50		
	* Decreases with the logarithm	of the frequency.			
Test Procedure:	 The mains terminal disturb shielded room. The EUT was connected to 	-			
	 shielded room. 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. 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, 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. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to 				



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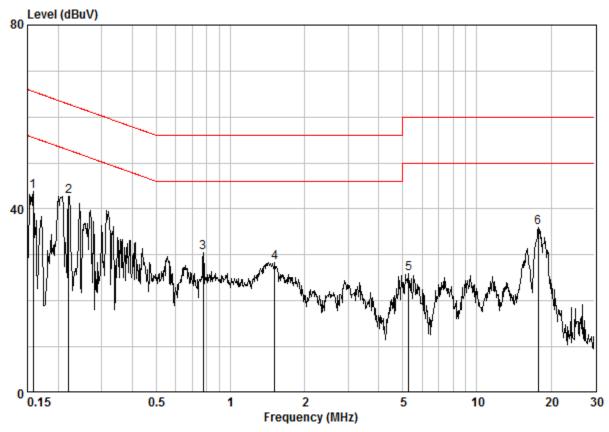
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Measurement Data

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. : 9719CR Mode : TX(NFMI)

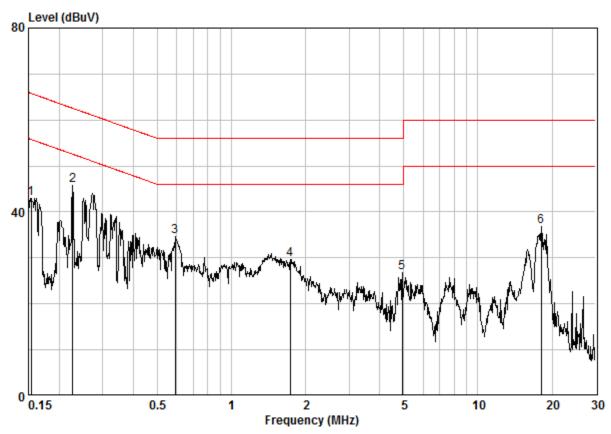
	Freq		LISN Factor					Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15816	0.02	9.59	34.19	43.80	55.56	-11.76	Peak
2	0.22083	0.02	9.60	33.03	42.65	52.79	-10.14	Peak
3	0.77519	0.03	9.60	20.87	30.50	46.00	-15.50	Peak
4	1.511	0.03	9.58	18.65	28.26	46.00	-17.74	Peak
5	5.277	0.03	9.66	16.32	26.00	50.00	-24.00	Peak
6	17.755	0.16	9.77	26.06	36.00	50.00	-14.00	Peak



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Neutral Line:



Site : Shielding Room Condition : CE NEUTRAL Job No. : 9719CR Mode : TX(NFMI)

	Freq		LISN Factor					Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15403	0.02	9.62	33.37	43.00	55.78	-12.78	Peak
2 @	0.22676	0.02	9.61	36.09	45.72	52.57	-6.84	Peak
3	0.59164	0.02	9.63	25.05	34.70	46.00	-11.30	Peak
4	1.734	0.03	9.65	20.07	29.75	46.00	-16.25	Peak
5	4.926	0.02	9.72	17.00	26.74	46.00	-19.26	Peak
6	18.039	0.17	9.96	26.82	36.94	50.00	-13.06	Peak

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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5.2 Radiated Emission

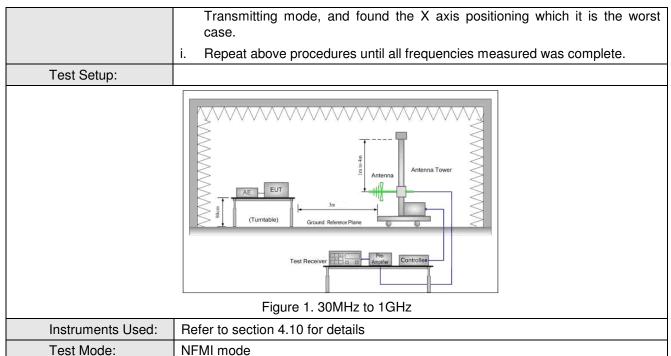
Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205									
Test Method:	ANSI C63.10: 201	3								
Test Site:	Measurement Distance: 10m (Semi-Anechoic Chamber)									
Receiver Setup:	Frequency	[Detector	RB	RBW \		sw		Remark	
	30MHz-1GHz	Qı	uasi-peak	100	кНz	300kHz Q		Quas	asi-peak Value	
	Above 1GHz		Peak	1M	Hz	ЗМІ	Hz	Pe	eak Value	
Limit:	Frequency		Field strer (microvolt/n	•		mit ıV/m)	Rer	mark	Measurement distance (m)	
	0.009MHz-0.490	ИHz	2400/F(k	Hz)		-		-	300	
	0.490MHz-1.705	ИHz	24000/F(k	(Hz)	-	-		-	30	
	1.705MHz-30M	Hz	30		-	-		-	30	
	30MHz-88MH	Z	100		40.	.0	Quas	si-peak	3	
	88MHz-216MH	lz	150		43.	.5	Quas	si-peak	3	
	216MHz-960MI	Ηz	200		46	.0	Quas	si-peak	3	
	960MHz-1GH	Z	500		54	.0	Quasi-peak		3	
	Above 1GHz	Above 1GHz 500 54.0		.0	Average		3			
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 and 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 full-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 									
	 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. The radiation measurements are performed in X, Y, Z axis positioning for 									

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Field Strength Of The Fundamental Signal

Pass

Test Results:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level @10m (dBuV/m)	Level @ 30m (dBuV/m)	Limit Line @ 30m (dBuV/m)	Over Limit (dB)	Polariz ation
10.579	0.50	10.66	32.90	60.05	38.31	19.23	29.5	10.27	Н
10.579	0.50	10.66	32.90	58.84	37.10	18.02	29.5	11.48	V

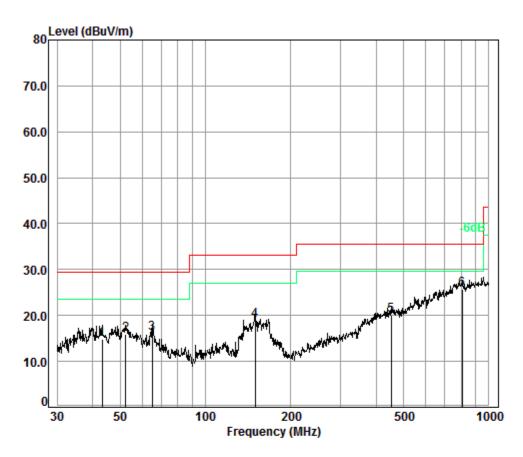


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QP value: 30MHz~1GHz

Horizontal



Condition: 10m HORIZONTAL

Job No. : 9719CR Test Mode: NFMI Mode

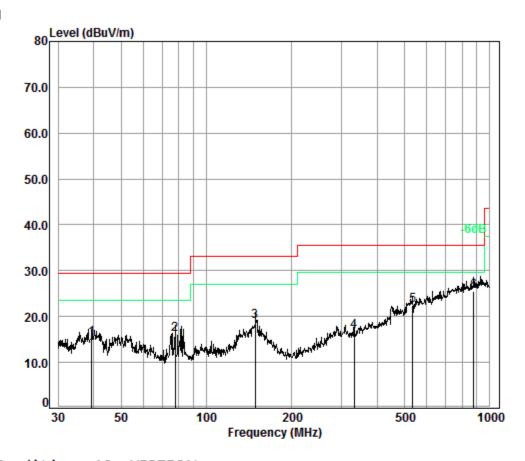
			•					
		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	43.20	6.80	13.05	32.99	27.98	14.84	29.50	-14.66
2	52.39	6.95	12.58	32.99	29.34	15.88	29.50	-13.62
3	64.89	7.00	11.02	32.92	31.03	16.13	29.50	-13.37
4	150.01	7.45	13.41	32.74	30.90	19.02	33.10	-14.08
5	452.72	8.43	16.21	32.60	28.07	20.11	35.60	-15.49
6 pp	804.60	9.30	21.26	32.60	27.79	25.75	35.60	-9.85



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Vertical



Condition: 10m VERTICAL

Job No. : 9719CR Test Mode: NFMI Mode

		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	39.44	6.79	13.25	32.99	28.24	15.29	29.50	-14.21
2	77.59	7.05	8.89	32.87	33.10	16.17	29.50	-13.33
3	148.96	7.45	13.34	32.74	30.86	18.91	33.10	-14.19
4	332.52	8.17	13.52	32.60	27.60	16.69	35.60	-18.91
5	533.83	8.74	17.43	32.60	28.89	22.46	35.60	-13.14
6 pp	878.32	9.49	21.93	32.52	26.61	25.51	35.60	-10.09



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Below 1GHz

The test was performed at a 10m test site. According to below formulate and the test data at 10m test distance,

 $L_3 / L_{10} = D_{10} / D_3$

Note:

L₃: Level @ 3m distance. Unit: uV/m; L₁₀: Level @ 10m distance. Unit: uV/m;

D₃: 3m distance. Unit: m D₁₀: 10m distance. Unit: m

The level at 3m test distance is below:

Frequency (MHz)	Level @ 10m (dBuV/m)	Level @ 10m (uV/m)	Level @ 3m (uV/m)	Level @ 3m (dBuV/m)	Limit @ 3m (dBuV/m)	Margin (dB)	Ant. Polarization
39.44	15.29	5.81	19.38	25.75	40.00	-14.25	V
77.59	16.17	6.43	21.45	26.63	40.00	-13.37	V
148.96	18.91	8.82	29.40	29.37	43.50	-14.13	V
332.52	16.69	6.83	22.77	27.15	46.00	-18.85	V
533.83	22.46	13.27	44.25	32.92	46.00	-13.08	V
878.32	25.51	18.86	62.86	35.97	46.00	-10.03	V
43.20	14.84	5.52	18.40	25.30	40.00	-14.70	Н
52.39	15.88	6.22	20.74	26.34	40.00	-13.66	Н
64.89	16.13	6.40	21.35	26.59	40.00	-13.41	Н
150.01	19.02	8.93	29.78	29.48	43.50	-14.02	Н
452.72	20.11	10.13	33.76	30.57	46.00	-15.43	Н
804.60	25.75	19.39	64.62	36.21	46.00	-9.79	Н

Remark:

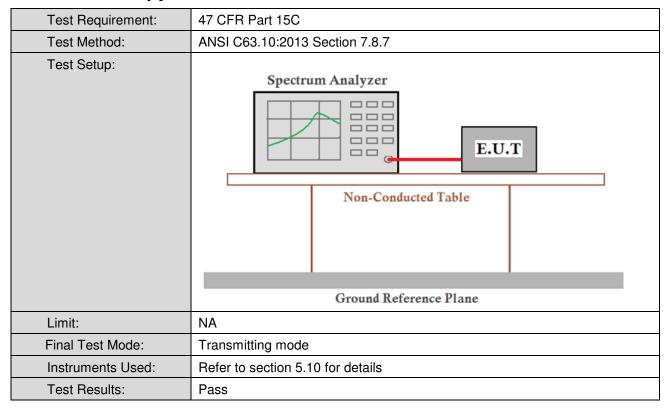
- 1)The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
- 2) Final Test Level = Receiver Reading + Antenna Factor + Cable Factor Preamplifier Factor
- 3) Emissions from 9kHz to 30 MHz is too low to be find, so it is not reported.



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5.3 20dB Occupy Bandwidth



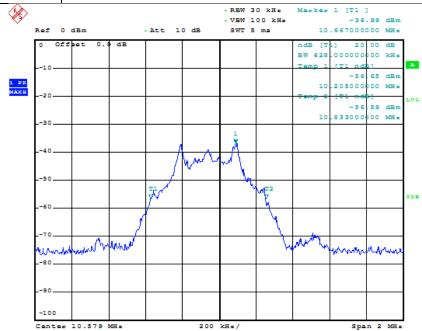


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Measurement Data

Test channel	20dB Occupy Bandwidth (kHz)
10.579MHz	628





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6 Photographs - EUT Test Setup

6.1 Conducted Emission



6.2 Radiatd Emission (30MHz-1000MHz)





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6.3 Radiated Spurious Emission (Below 30MHz)



7 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1611009719CR.