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Report No.: SZEM180700624403

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## **FCC TEST REPORT**

Application No: SZEM1807006244RG

Applicant: Huawei Technologies Co.,Ltd.

Address of Applicant Administration Building, Headquarters of Huawei Technologies Co., Ltd.,

Bantian,

Longgang District, Shenzhen, 518129, P.R.C

Manufacturer: Huawei Technologies Co.,Ltd.

Address of Manufacturer Administration Building, Headquarters of Huawei Technologies Co., Ltd.,

Bantian,

Longgang District, Shenzhen, 518129, P.R.C

Product Name: Tablet

Model No.(EUT): AGS2-W19

Trade Mark: HUAWEI

FCC ID: QISAGS2-W19

**Standards:** 47 CFR Part 15, Subpart C

Test Method KDB 558074 D01 DTS Meas Guidance v04

ANSI C63.10 (2013)

**Date of Receipt:** 2018-07-10

**Date of Test:** 2018-07-11 to 2018-07-23

**Date of Issue:** 2018-07-24

Test Result: PASS \*

Authorized Signature:

Derek Yang Wireless Laboratory Manager

Derele yang

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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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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## 1 Version

Revision Record						
Version Chapter Date Modifier Remark						
01		2018-07-24		Original		

Authorized for issue by:		
Tested By	(Mike Hu) /Project Engineer	2018-07-24  Date
Checked By	Dand Chen (Jim Huang) / Reviewer	2018-07-24  Date



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## 2 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	Antenna Requirement 47 CFR Part 15, Subpart C Section 15.203/15.247 (c)		PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15,207		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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## 4 General Information

### 4.1 Client Information

Applicant:	Huawei Technologies Co.,Ltd.		
Address of Applicant:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C		
Manufacturer:	Huawei Technologies Co.,Ltd.		
Address of Manufacturer:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C		

### 4.2 General Description of EUT

	555p.151. 51. E			
Product Name:	Tablet			
Model No.:	AGS2-W19			
Trade Mark:	HUAWEI			
Hardware Version:	A6t6e			
Software Version:	AGS2-W19 8.0.0.11 (C605)			
Operation Frequency:	2402MHz~2480MHz			
Bluetooth Version:	Bluetooth V4.2			
Modulation Type:	GFSK			
Number of Channel:	40			
Sample Type:	Portable Device			
Antenna Type:	PIFA			
Antenna Gain:	0.1dBi			
Power Supply	Battery Model: HB2899C0ECW-C Rated capacity: 4980mAh			
Fower Supply	Nominal Voltage: +3.82V			
	Charging Voltage: +4.40V			
AC adaptor:	Model: HW-050100U01 Input: 100-240V ~50/60Hz 0.2A			
AC adaptor:	Output: 5V === 1A			



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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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#### 4.3 Test Environment

Operating Environment				
Temperature:	25.0 °C			
Humidity:	50 % RH			
Atmospheric Pressure:	101.32 KPa			

### 4.4 Description of Support Units

The EUT has been tested independent unit.

#### 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.

### 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 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 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.



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4.7 Deviation from Standards

None.

4.8 Abnormalities from Standard Conditions

None.

4.9 Other Information Requested by the Customer

None.

### 4.10 Measurement Uncertainty (95% confidence levels, k=2)

No.	ltem	Measurement Uncertainty	
1	Total RF power, conducted	$\pm$ 0.75dB	
2	RF power density, conducted	±2.84dB	
3	Spurious emissions, conducted	±0.75dB	
		±4.5dB (30MHz-1GHz)	
4	Radiated Spurious emission test	±4.8dB (1GHz-25GHz)	
5	Conduct emission test	$\pm$ 3.12 dB(9KHz- 30MHz)	
6	Temperature test	±1°C	
7	Humidity test	±3%	
8	DC and low frequency voltages	±0.5%	



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## 4.11 Equipment List

	Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Duedate (yyyy-mm-dd)	
1	Shielding Room	ZhongYu Electron	GB-88	SEM001-06	2018/3/10	2019/3/9	
2	LISN	Rohde & Schwarz	ENV216	SEM007-01	2017/10/09	2018/10/09	
3	LISN	ETS-LINDGREN	3816/2	SEM007-02	2018/2/14	2019/2/13	
4	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T8-02	EMC0120	2017/09/28	2018/09/28	
5	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T4-02	EMC0121	2017/09/28	2018/09/28	
6	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN- T2-02	EMC0122	2017/09/28	2018/09/28	
7	EMI Test Receiver	Rohde & Schwarz	ESCI	SEM004-02	2018/2/14	2019/2/13	
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017/10/09	2018/10/09	

	RF connected test						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. date (yyyy-mm-dd)	Cal.Duedate (yyyy-mm-dd)	
1	DC Power Supply	ZhaoXin	RXN-305D	SEM011-02	2017/10/09	2018/10/09	
2	Signal Analyzer	Rohde &Schwarz	FSV	W005-02	2018/3/13	2019/3/12	
3	Signal Generator	Rohde &Schwarz	SML03	SEM006-02	2018/2/14	2019/2/13	
4	Power Meter	Rohde &Schwarz	NRVS	SEM014-02	2017/10/09	2018/10/09	
5	Power Sensor	Agilent Technologies	U2021XA	SEM009-01	2017/10/09	2018/10/09	



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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	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2018/3/10	2019/3/9
2	EMI Test Receiver	Agilent Technologies	N9038A	SEM004-05	2017/10/09	2018/10/09
3	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017/11/01	2020/11/01
4	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEM003-11	2015/10/17	2018/10/17
5	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEM003-12	2017/11/24	2020/11/24
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2018/2/14	2019/2/13
7	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A
8	DC Power Supply	Zhao Xin	RXN-305D	SEM011-02	2017/10/09	2018/10/09
9	Loop Antenna	Beijing Daze	ZN30401	SEM003-09	2018/3/10	2019/3/9

	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	2018/3/10	2019/3/9	
2	EMI Test Receiver (9k-7GHz)	Rohde & Schwarz	ESR	SEM004-03	2018/2/14	2019/2/13	
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	2018/6/18	2019/6/17	
5	.Loop Antenna	ETS-Lindgren	6502	SEM003-08	2015/08/14	2018/08/14	

	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	2018/3/10	2019/3/9	
2	EXA Spectrum Analyzer	Agilent Technologies Inc	N9010A	SEM004-09	2018/6/18	2019/6/17	
3	BiConiLog Antenna (26-3000MHz)	ETS-Lindgren	3142C	SEM003-02	2017/11/15	2020/11/15	



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4	Amplifier (0.1-1300MHz)	HP	8447D	SEM005-02	2017/10/09	2018/10/09
5	Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018/5/14	2020/5/13
6	Horn Antenna (18-26GHz)	ETS-Lindgren	3160	SEM003-12	2017/11/24	2020/11/24
7	HornAntenna (26GHz-40GHz)	A.H.Systems, inc.	SAS-573	SEM003-13	2017/10/17	2020/10/16
8	Low Noise Amplifier	Black Diamond Series	BDLNA- 0118- 352810	SEM005-05	2017/10/09	2018/10/09
9	Band filter	Amindeon	Asi 3314	SEM023-01	N/A	N/A



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### 5 Test results and Measurement Data

### 5.1 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.

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

of the antenna is 0.1dBi.





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#### **Conducted Emissions** 5.2

5.2	muucteu Eiiiissioiis			
Test Requirement:	47 CFR Part 15C Section 15.207			
Test Method:	ANSI C63.10: 2013			
Test Frequency Range:	150kHz to 30MHz			
	[	Limit (dBuV)		
	Frequency range (MHz)	Quasi-peak	Average	
1 ::	0.15-0.5	66 to 56*	56 to 46*	
Limit:	0.5-5	56	46	
	5-30	60	50	
	* Decreases with the logarit	hm of the frequency.		
Test Procedure:	<ol> <li>The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to</li> </ol>			
Test Setup:	Shielding Room  EUT  AC Mains  LISN1		est 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

Note1: c:Telecom Idle+BT+WLAN 2.4G+GPS Rx+earphone+playing MP4+battery+adapter1

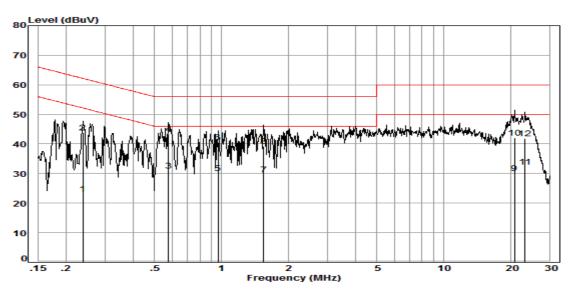
Note2: Only the worse test data had been display

#### **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: Neutral Job No. : 06244RG

Test mode: c

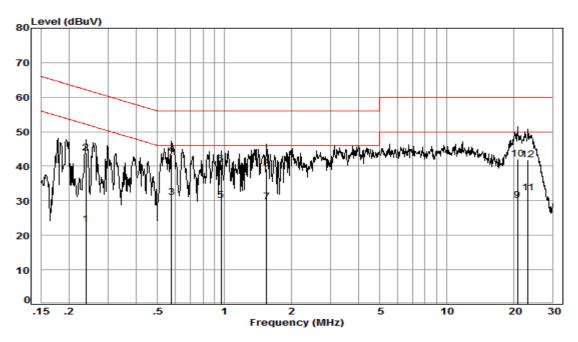
	mouc. c							
		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.24	0.03	9.58	13.58	23.19	52.17	-28.98	Average
2	0.24	0.03	9.58	34.10	43.71	62.17	-18.46	QP
3	0.58	0.05	9.62	21.20	30.87	46.00	-15.13	Average
4	0.58	0.05	9.62	33.74	43.41	56.00	-12.59	QP
5	0.97	0.09	9.62	20.46	30.17	46.00	-15.83	Average
6	0.97	0.09	9.62	30.77	40.48	56.00	-15.52	QP
7	1.55	0.13	9.63	19.92	29.68	46.00	-16.32	Average
8	1.55	0.13	9.63	29.54	39.30	56.00	-16.70	QP
9	20.81	0.27	10.07	19.73	30.07	50.00	-19.93	Average
10	20.81	0.27	10.07	31.81	42.15	60.00	-17.85	QP
11	23.26	0.27	10.16	21.72	32.15	50.00	-17.85	Average
12	23.26	0.27	10.16	31.32	41.75	60.00	-18.25	QP



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#### Neutral line:



Site : Shielding Room

Condition: Neutral Job No. : 06244RG

Test mode: c

		Cable	LISN	Read		Limit	0ver	
	Freq	Loss	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.24	0.03	9.58	13.58	23.19	52.17	-28.98	Average
2	0.24	0.03	9.58	34.10	43.71	62.17	-18.46	QP
3	0.58	0.05	9.62	21.20	30.87	46.00	-15.13	Average
4	0.58	0.05	9.62	33.74	43.41	56.00	-12.59	QP
5	0.97	0.09	9.62	20.46	30.17	46.00	-15.83	Average
6	0.97	0.09	9.62	30.77	40.48	56.00	-15.52	QP
7	1.55	0.13	9.63	19.92	29.68	46.00	-16.32	Average
8	1.55	0.13	9.63	29.54	39.30	56.00	-16.70	QP
9	20.81	0.27	10.07	19.73	30.07	50.00	-19.93	Average
10	20.81	0.27	10.07	31.81	42.15	60.00	-17.85	QP
11	23.26	0.27	10.16	21.72	32.15	50.00	-17.85	Average
12	23.26	0.27	10.16	31.32	41.75	60.00	-18.25	QP

### Notes:

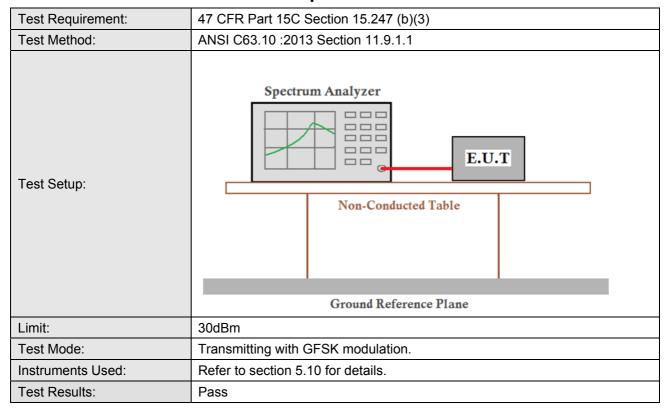
- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.



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### 5.3 Conducted Peak Output Power



#### **Measurement Data**

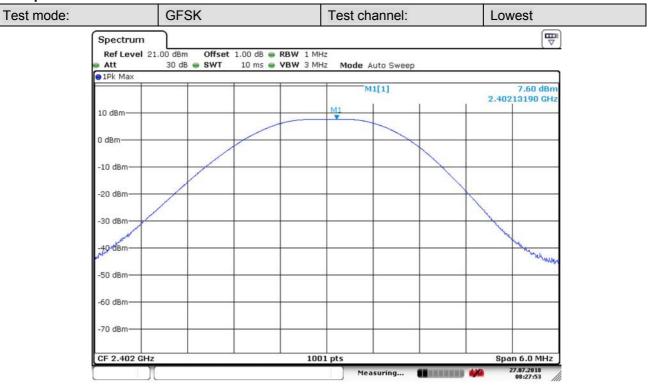
GFSK mode					
Test channel	Peak Output Power (dBm)	Limit (dBm)	Result		
Lowest	7.60	30.00	Pass		
Middle	9.28	30.00	Pass		
Highest	6.37	30.00	Pass		



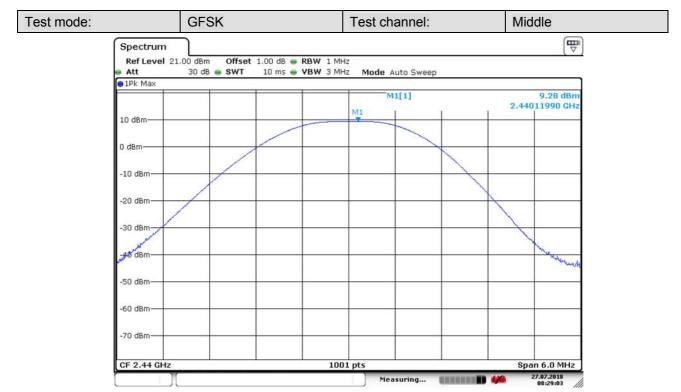
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#### Test plot as follows:



Date: 27.JUL.2018 08:27:53

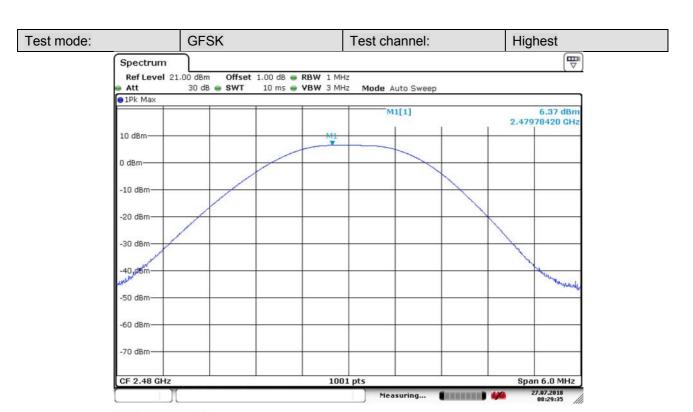


Date: 27.JUL.2018 08:29:04



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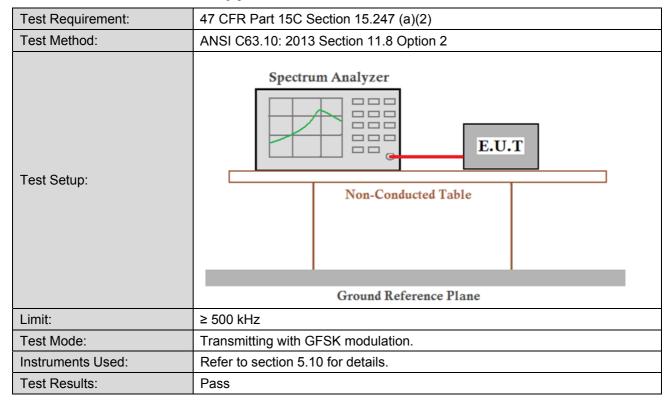
Date: 27.JUL.2018 08:29:36



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### 5.4 6dB Occupy Bandwidth



#### **Measurement Data**

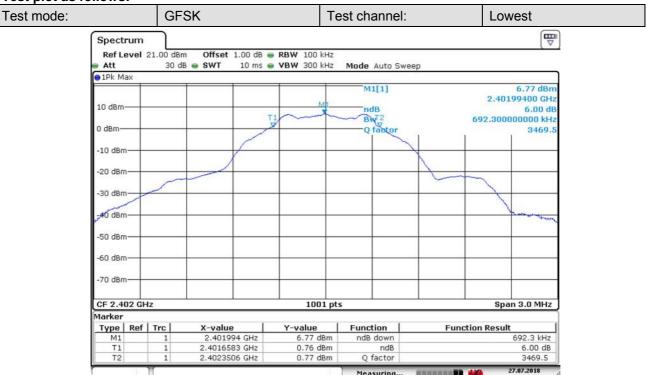
	GFSK mode					
Test channel	6dB Occupy Bandwidth (kHz)	Limit (kHz)	Result			
Lowest	692.3	≥500	Pass			
Middle	695.3	≥500	Pass			
Highest	707.3	≥500	Pass			



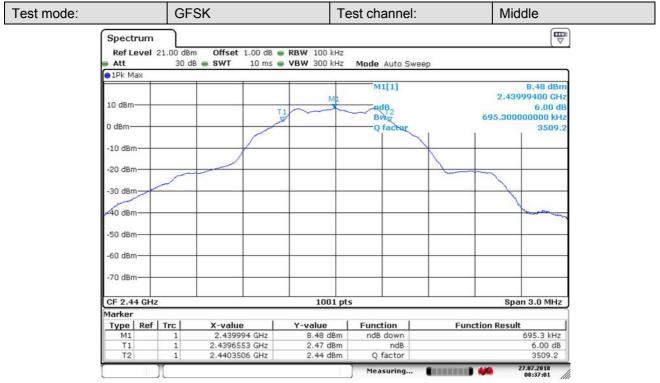
Report No.: SZEM180700624403

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### Test plot as follows:



Date: 27.JUL.2018 08:36:10

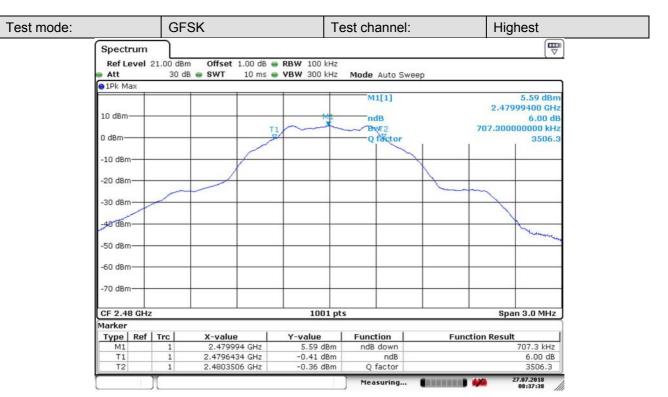


Date: 27.JUL.2018 08:37:02



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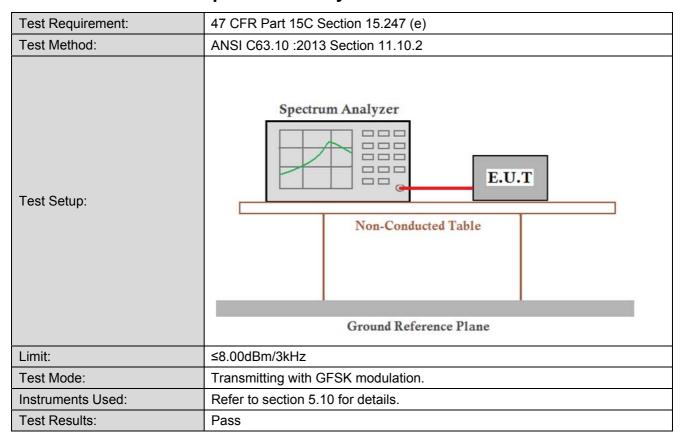
Date: 27.JUL.2018 08:37:38



Report No.: SZEM180700624403

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### 5.5 Power Spectral Density



#### **Measurement Data**

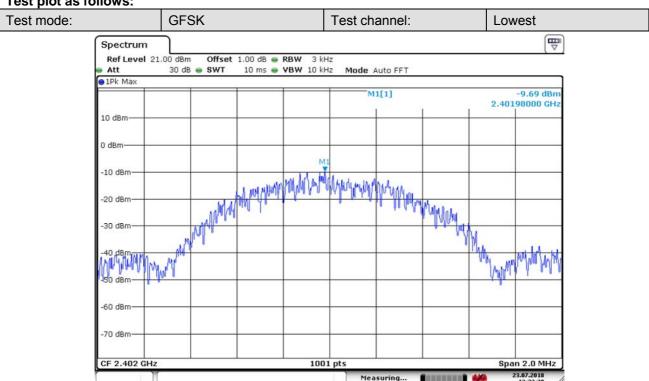
	GFSK mode					
Test channel	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)	Result			
Lowest	-9.69	≤8.00	Pass			
Middle	-9.03	≤8.00	Pass			
Highest	-9.30	≤8.00	Pass			



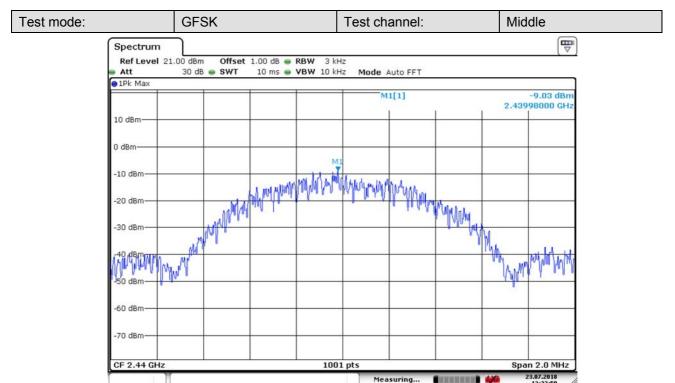
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Test plot as follows:



Date: 23.JUL.2018 12:22:20

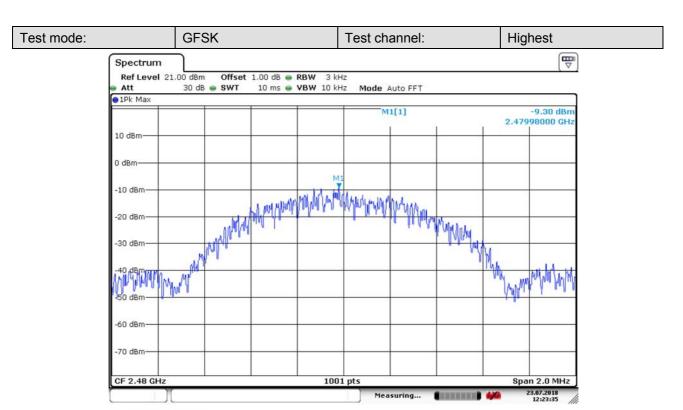


Date: 23.JUL.2018 12:23:00



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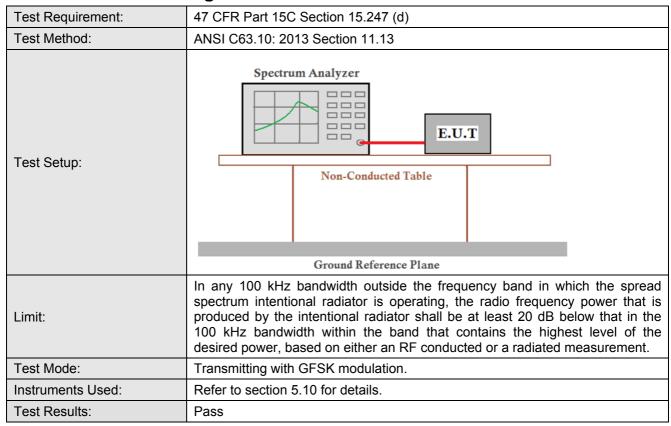
Date: 23.JUL.2018 12:23:35



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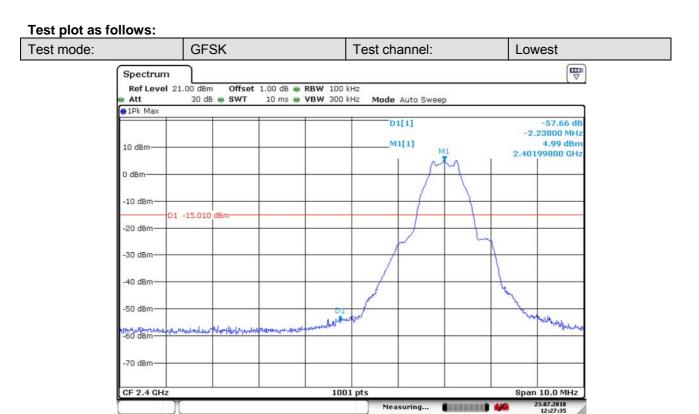
### 5.6 Band-edge for RF Conducted Emissions



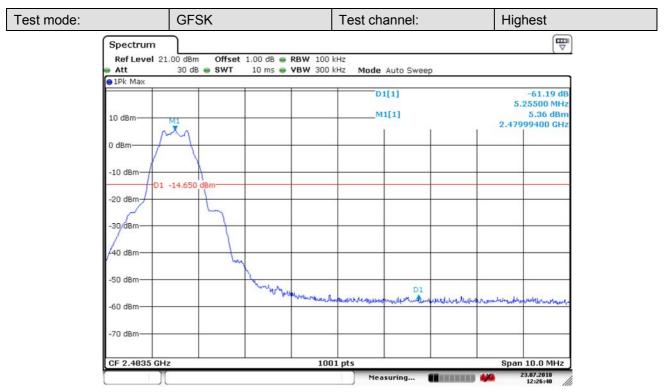


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Date: 23.JUL.2018 12:27:35



Date: 23.JUL.2018 12:26:41



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### 5.7 Spurious RF Conducted Emissions

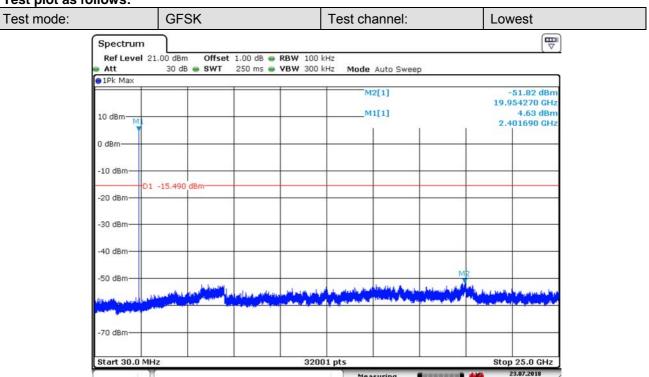
Test Requirement:	47 CFR Part 15C Section 15.247 (d)		
Test Method:	ANSI C63.10: 2013 Section 11.11		
Test Setup:	Spectrum Analyzer  E.U.T  Non-Conducted Table  Ground Reference Plane		
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, 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		



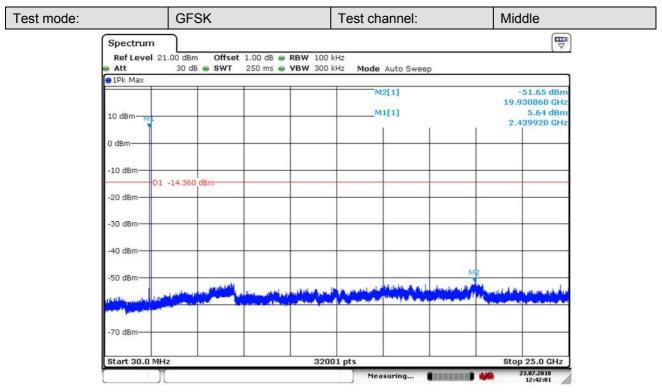
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### Test plot as follows:



Date: 23.JUL.2018 12:43:01



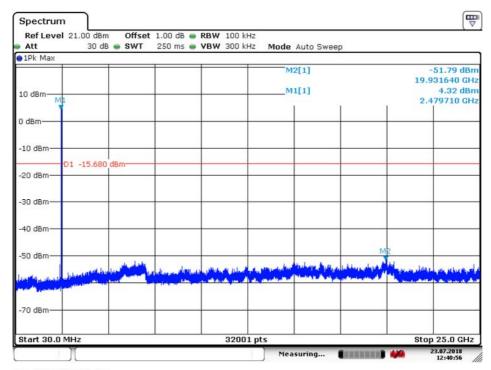
Date: 23.JUL.2018 12:42:01

Test mode: GFSK Test channel: Highest



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#### Date: 23.JUL.2018 12:40:57

#### Remark:

Scan from 9kHz to 25GHz, the disturbance between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.



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### 5.8 Radiated Spurious Emission

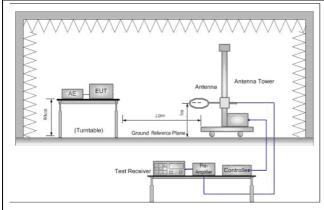
Test Requirement:	47 CFR Part 15C Section	on 1	5.209 and 15.2	205					
Test Method:	ANSI C63.10 :2013 Section 11.12								
Test Site:	Measurement Distance: 3m or 10m (Semi-Anechoic Chamber)								
	Frequency		Detector	RBW	VBW		Remark		
	0.009MHz-0.090MH	z	Peak	10kHz	30kHz		Peak		
	0.009MHz-0.090MH	z	Average	10kHz	30kHz		Average		
	0.090MHz-0.110MH	z	Quasi-peak	10kHz	30kHz		Quasi-peak		
Receiver Setup:	0.110MHz-0.490MH	z	Peak	10kHz	30kHz		Peak		
	0.110MHz-0.490MH	Z	Average	10kHz	30kHz		Average		
	0.490MHz -30MHz		Quasi-peak	10kHz	30kHz		Quasi-peak		
	30MHz-1GHz		Quasi-peak	100 kHz	300kHz		Quasi-peak		
	Above 1GHz		Peak	1MHz	3MHz		Peak		
			Peak	1MHz	10Hz		Average		
	Frequency		eld strength crovolt/meter)	Limit (dBuV/m)	Remark		Measurement distance (m)		
	0.009MHz-0.490MHz	2	400/F(kHz)	-	-		300		
	0.490MHz-1.705MHz	24	4000/F(kHz)	-	-		30		
	1.705MHz-30MHz		30	-	-		30		
	30MHz-88MHz		100	40.0	Quasi-pe	ak	3		
Limit:	88MHz-216MHz		150	43.5	Quasi-pe	ak	3		
	216MHz-960MHz		200	46.0	Quasi-pe	ak	3		
	960MHz-1GHz		500	54.0	Quasi-pe	ak	3		
	Above 1GHz		500	54.0	Average	9	3		
	Note: 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.								



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#### Test Setup:



Antenna Tower

Antenna Tower

Ground Reference Plane

Test Receiver

Test Receiver

Controlles

Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

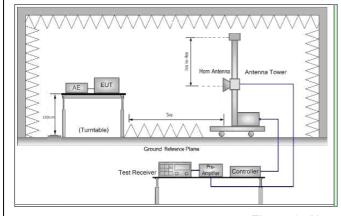


Figure 3. Above 1 GHz

- 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 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 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

#### Test Procedure:

- 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

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	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 (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 X axis positioning which it is the worst case.			
	j. Repeat above procedures until all frequencies measured was complete.			
Exploratory Test Mode:	Transmitting with GFSK modulation. Charge + Transmitting mode.			
Final Test Mode:	Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode,  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			

### 5.9 Radiated Emission below 1GHz

Note1: Mode k: BLE RSE from 30MHz-1GHz

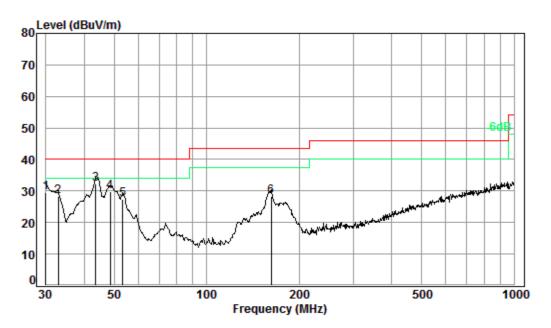
Note2: The disturbance above 13GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, So only the worse test data had been displayed.



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



Condition: 3m VERTICAL Job No. : 06244RG

Test mode: k

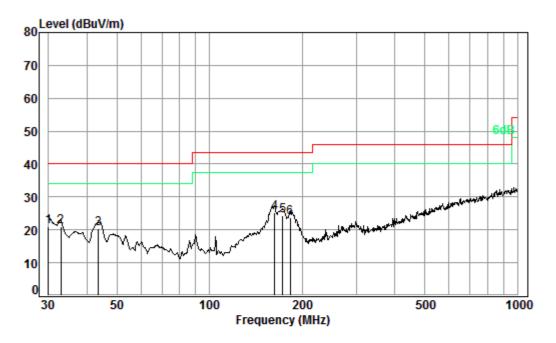
		Cable	Ant	Preamp	Read		Limit	0ver
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.00	0.60	22.50	27.67	33.94	29.37	40.00	-10.63
2	32.86	0.60	20.92	27.66	34.34	28.20	40.00	-11.80
3 рр	43.51	0.68	16.26	27.62	42.99	32.31	40.00	-7.69
4	48.50	0.77	14.65	27.60	41.90	29.72	40.00	-10.28
5	53.32	0.80	13.85	27.59	40.31	27.37	40.00	-12.63
6	162.04	1.34	15.54	27.52	38.99	28.35	43.50	-15.15

Test mode:	Charge + Transmitting	Horizontal



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Condition: 3m HORIZONTAL

Job No. : 06244RG

Test mode: k

		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	30.00	0.60	22.50	27.67	25.69	21.12	40.00	-18.88
2	32.86	0.60	20.92	27.66	27.27	21.13	40.00	-18.87
3	43.51	0.68	16.26	27.62	31.07	20.39	40.00	-19.61
4 pp	162.61	1.34	15.55	27.52	35.99	25.36	43.50	-18.14
5	172.60	1.36	15.76	27.52	34.81	24.41	43.50	-19.09
6	182.56	1.37	15.98	27.53	33.94	23.76	43.50	-19.74

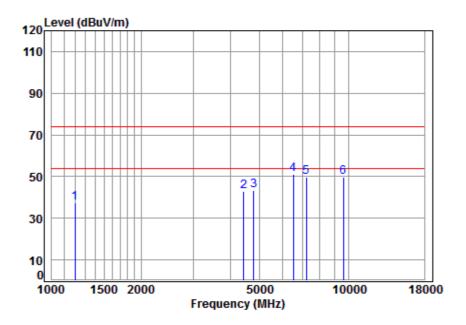
### 5.10 Transmitter Emission above 1GHz

Test mode: GFSK	Test channel:	Lowest	Remark:	Peak	Vertical	
-----------------	---------------	--------	---------	------	----------	--



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Condition: 3m VERTICAL

Job No : 6244RG Mode : 2402 RSE

Note : BLE

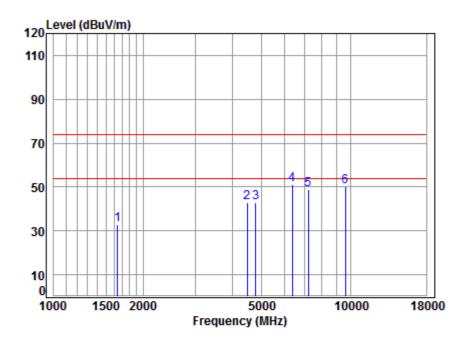
			Cable	Ant	Preamp	Read		Limit	0ver	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1199.726	4.42	24.59	41.18	49.60	37.43	74.00	-36.57	peak
2		4430.628	7.48	33.48	42.41	44.51	43.06	74.00	-30.94	peak
3		4804.000	7.89	33.97	42.47	43.81	43.20	74.00	-30.80	peak
4	pp	6507.536	11.52	35.60	41.21	45.32	51.23	74.00	-22.77	peak
5		7206.000	10.08	36.07	40.71	44.17	49.61	74.00	-24.39	peak
6		9608.000	10.75	37.67	37.74	38.90	49.58	74.00	-24.42	peak

Test mode:	GFSK	Test channel:	Lowest	Remark:	Peak	Horizontal



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Condition: 3m HORIZONTAL

Job No : 6244RG Mode : 2402 RSE

Note : BLE

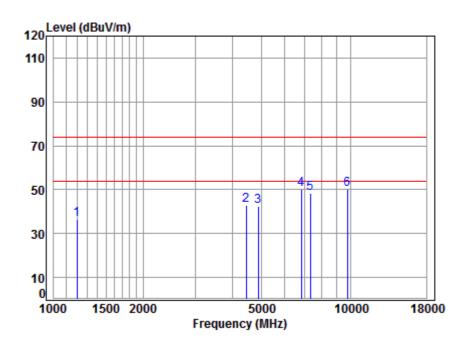
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1639.274	5.30	26.42	41.49	42.41	32.64	74.00	-41.36	peak
2	4482.150	7.54	33.57	42.41	44.20	42.90	74.00	-31.10	peak
3	4804.000	7.89	33.97	42.47	43.60	42.99	74.00	-31.01	peak
4 p	p 6358.789								•
	7206.000								-
	9608.000								•



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Test mode: GFSK Test channel: Middle Remark: Peak Vertical
--



Condition: 3m VERTICAL

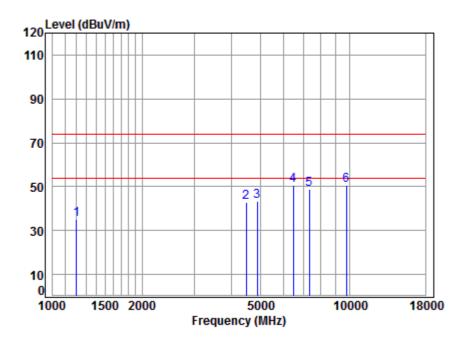
Job No : 6244RG Mode : 2440 RSE

		Freq			Preamp Factor					Remark	
	-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB		-
1		1199.726	4.42	24.59	41.18	48.51	36.34	74.00	-37.66	peak	
2		4456.315	7.51	33.53	42.41	44.05	42.68	74.00	-31.32	peak	
3		4880.000	7.97	34.06	42.48	42.84	42.39	74.00	-31.61	peak	
4	pp	6815.551	10.64	35.79	40.98	44.87	50.32	74.00	-23.68	peak	
5		7320.000	10.05	36.16	40.63	42.82	48.40	74.00	-25.60	peak	
6		9760.000	10.82	37.76	37.53	39.16	50.21	74.00	-23.79	peak	



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Condition: 3m HORIZONTAL

Job No : 6244RG Mode : 2440 RSE

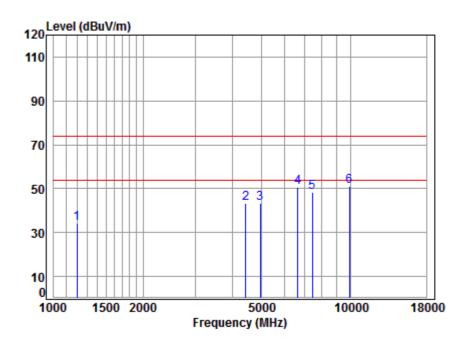
		Freq			Preamp Factor					Remark
	-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1203.199	4.43	24.60	41.19	47.16	35.00	74.00	-39.00	peak
2		4495.125	7.55	33.59	42.42	44.15	42.87	74.00	-31.13	peak
3		4880.000	7.97	34.06	42.48	43.94	43.49	74.00	-30.51	peak
4	pp	6470.026	11.48	35.57	41.24	45.06	50.87	74.00	-23.13	peak
5		7320.000	10.05	36.16	40.63	43.14	48.72	74.00	-25.28	peak
6		9760.000	10.82	37.76	37.53	39.60	50.65	74.00	-23.35	peak



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Test mode:	GFSK	Test channel:	Highest	Remark:	Peak	Vertical
			5			



Condition: 3m VERTICAL

Job No : 6244RG Mode : 2480 RSE

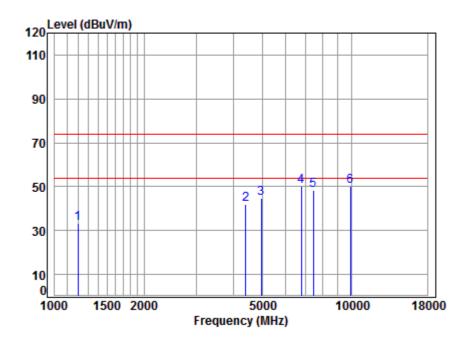
		Freq			Preamp Factor					Remark
	-	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		1199.726	4.42	24.59	41.18	46.38	34.21	74.00	-39.79	peak
2		4430.628	7.48	33.48	42.41	44.60	43.15	74.00	-30.85	peak
3		4960.000	8.05	34.15	42.49	43.55	43.26	74.00	-30.74	peak
4		6640.542	11.13	35.69	41.11	45.12	50.83	74.00	-23.17	peak
5		7440.000	10.02	36.25	40.56	42.51	48.22	74.00	-25.78	peak
6	pp	9920.000	10.90	37.85	37.31	39,47	50.91	74.00	-23.09	peak



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Test mode:   GFSK   Test channel:   Highest   Remark:   Peak   Horizon
--



Condition: 3m HORIZONTAL

Job No : 6244RG Mode : 2480 RSE

	Freq			Preamp Factor					Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	1199.726	4.42	24.59	41.18	45.64	33.47	74.00	-40.53	peak
2	4405.090	7.46	33.44	42.40	43.60	42.10	74.00	-31.90	peak
3	4960.000	8.05	34.15	42.49	45.04	44.75	74.00	-29.25	peak
4 p	p 6776.265	10.75	35.77	41.01	44.88	50.39	74.00	-23.61	peak
5	7440.000	10.02	36.25	40.56	42.65	48.36	74.00	-25.64	peak
6	9920.000	10.90	37.85	37.31	38.78	50.22	74.00	-23.78	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 between 9KHz to 30MHz and 18GHz to 25GHz was very low, and the above harmonics were the highest point could be found when testing, 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.

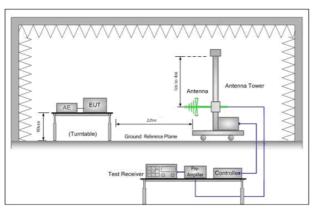


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### 5.11 Restricted bands around fundamental frequency

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



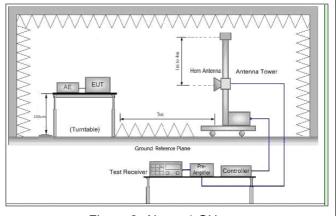


Figure 1. 30MHz to 1GHz

Test Procedure:

Figure 2. Above 1 GHz

- 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 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 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

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	<ul> <li>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.</li> <li>j. Repeat above procedures until all frequencies measured was complete.</li> </ul>
Exploratory Test Mode:	Transmitting with GFSK modulation. Charge + Transmitting mode.
Final Test Mode:	Transmitting with GFSK modulation.  Pretest the EUT at Charge + Transmitting mode.  Only the worst case is recorded in the report.
Instruments Used:	Refer to section 5.10 for details.
Test Results:	Pass

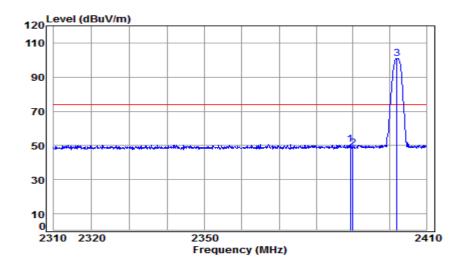


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#### Test plot as follows:

Worse case mode: G	SFSK	Test channel:	Lowest	Remark:	Peak	Vertical	
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Condition: 3m VERTICAL

Job No : 6244RG

Mode : 2402 Band edge Note : BLE

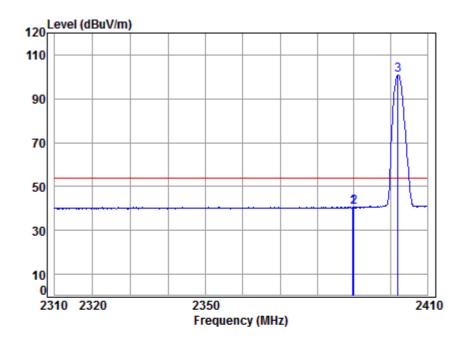
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2389.254	5.47	28.52	41.87	58.55	50.67	74.00	-23.33	Peak
2	2390.000	5.47	28.52	41.87	56.43	48.55	74.00	-25.45	Peak
3 рр	2402.000	5.49	28.54	41.88	108.85	101.00	74.00	27.00	Peak



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Worse case mode: GFSK	Test channel:	Lowest	Remark:	Average	Vertical	
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Condition: 3m VERTICAL

Job No : 6244RG

Mode : 2402 Band edge

Note : BLE

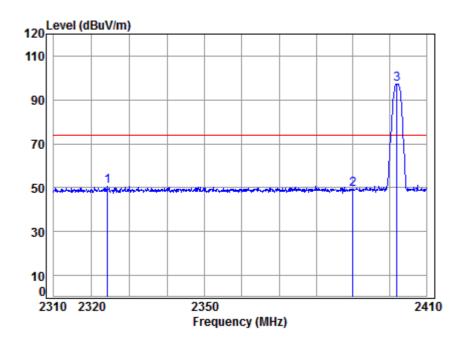
Enga	Cable Loss F					Limit		Romank
		actor						
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 2389.659	5.47	28.52	41.87	48.52	40.64	54.00	-13.36	Average
2 2390.000 3 pp 2402.000								Average Average



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Worse case mode:	GFSK	Test channel:	Lowest	Remark:	Peak	Horizontal
	U. U.					



Condition: 3m HORIZONTAL

Job No : 6244RG

Mode : 2402 Band edge

Note : BLE

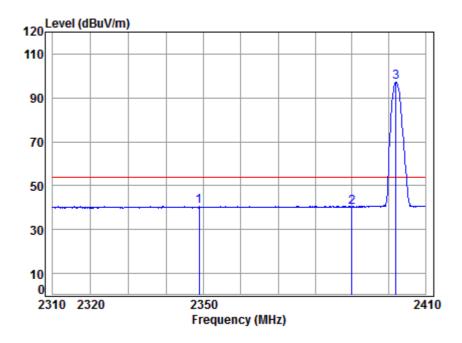
		Cable	Ant	Preamp	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	2324.140	5.38	28.41	41.84	58.80	50.75	74.00	-23.25	peak
2	2390.000	5.47	28.52	41.87	56.96	49.08	74.00	-24.92	peak
3 рр	2402.000	5.49	28.54	41.88	105.13	97.28	74.00	23.28	peak



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W	Vorse case mode:	GFSK	Test channel:	Lowest	Remark:	Average	Horizontal
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Condition: 3m HORIZONTAL

Job No : 6244RG

Mode : 2402 Band edge

Note : BLE

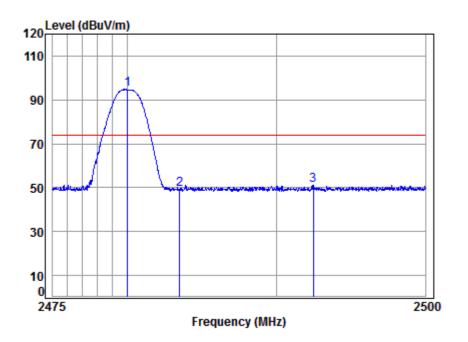
			Cable	Ant	Preamp	Read		Limit	0ver	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	_									
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		2348.795	5.42	28.45	41.85	48.70	40.72	54.00	-13.28	Average
2		2390.000	5.47	28.52	41.87	48.21	40.33	54.00	-13.67	Average
3	pp	2402.000	5.49	28.54	41.88	105.21	97.36	54.00	43.36	Average



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Worse case mode: GFSK	Test channel:	Highest	Remark:	Peak	Vertical
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Condition: 3m VERTICAL

Job No : 6244RG

Mode : 2480 Band edge

Note : BLE

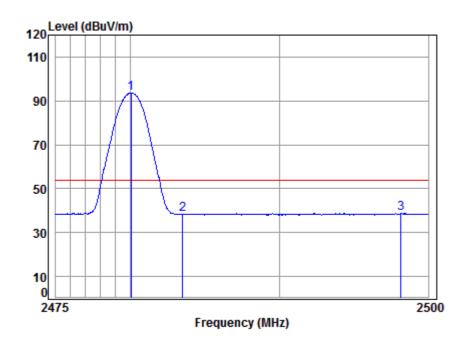
			Cable	Ant	Preamp	Read		Limit	0ver	
		Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	_									
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1	pp	2480.000	5.59	28.67	41.91	102.34	94.69	74.00	20.69	Peak
2		2483.500	5.60	28.67	41.91	56.99	49.35	74.00	-24.65	Peak
3		2492.448	5.61	28.69	41.91	58.76	51.15	74.00	-22.85	Peak



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Worse case mode:   GFSK
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Condition: 3m VERTICAL

Job No : 6244RG

Mode : 2480 Band edge

Note : BLE

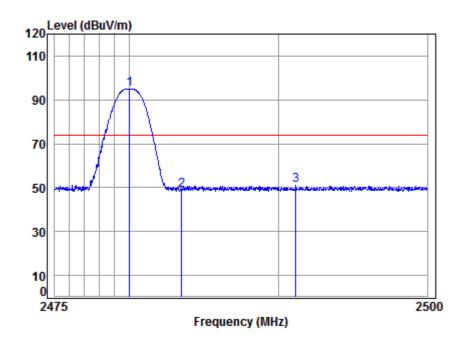
		Cable	Ant	${\bf Preamp}$	Read		Limit	0ver	
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
_									
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2480.030	5.59	28.67	41.91	101.29	93.64	54.00	39.64	Average
2	2483.500	5.60	28.67	41.91	45.99	38.35	54.00	-15.65	Average
3	2498.167	5.62	28.70	41.92	46.37	38.77	54.00	-15.23	Average



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Worse case mode:	GFSK	Test channel:	Highest	Remark:	Peak	Horizontal
			5			



Condition: 3m HORIZONTAL

Job No : 6244RG

Mode : 2480 Band edge

Note : BLE

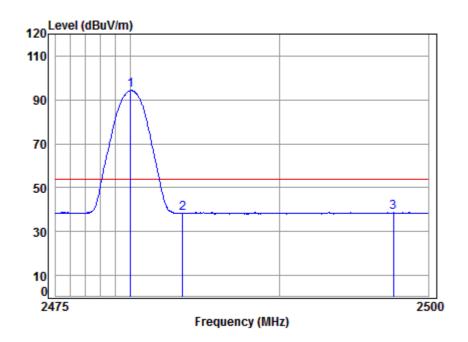
	Freq					Level			Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1 pp	2480.000	5.59	28.67	41.91	102.59	94.94	74.00	20.94	peak
2	2483.500	5.60	28.67	41.91	56.64	49.00	74.00	-25.00	peak
3	2491.146	5.61	28.69	41.91	58.56	50.95	74.00	-23.05	peak



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Worse case mode: GFSK Test channel: Highest Remark: Average Horizontal



Condition: 3m HORIZONTAL

Job No : 6244RG

Mode : 2480 Band edge

Note : BLE

			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	pp	2480.000	5.59	28.67	41.91	101.92	94.27	54.00	40.27	Average
2		2483.500	5.60	28.67	41.91	45.87	38.23	54.00	-15.77	Average
3		2497.639	5.62	28.70	41.92	46.30	38.70	54.00	-15.30	Average



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#### 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

### 6 Photographs - EUT Constructional Details

Refer to Appendix A - Photographs of EUT Constructional Details for SZEM1807006244RG.

The End