



Report No.: SZEM210300237702

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TEST REPORT

Application No.: SZEM2103002377CR

Applicant: Million Concept Electronic (Shenzhen) Co., Ltd

Address of Applicant: No.98, Xiashanmen Road, Songgang town, Bao'an District, Shenzhen,

518105, China

Manufacturer: Million Concept Electronic (Shenzhen) Co., Ltd

Address of Manufacturer: No.98, Xiashanmen Road, Songgang town, Bao'an District, Shenzhen,

518105, China

Factory: Million Concept Electronic (Shenzhen) Co., Ltd

Address of Factory: No.98, Xiashanmen Road, Songgang town, Bao'an District, Shenzhen,

518105, China

Equipment Under Test (EUT):

EUT Name: Physical activity belt

Model No.:MZ-SwitchTrade Mark:MyzoneFCC ID:OVJMZSW

Standard(s): 47 CFR Part 15, Subpart C 15.249

Date of Receipt: 2021-03-05

Date of Test: 2021-03-08 to 2021-03-22

Date of Issue: 2021-03-23

Test Result: Pass*

Keny Xu EMC Laboratory Manager



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



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	Revision Record					
Version	Chapter	Date	Modifier	Remark		
01		2021-03-23		Original		

Authorized for issue by:		
	(eo-li	
	Leo Li/Project Engineer	
	Exic Fu	
	Eric Fu/Reviewer	



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Test Summary

Radio Spectrum Technical Requirement							
Item	Item Standard Method Requirement Result						
Antenna Requirement	47 CFR Part 15, Subpart C 15.249	N/A	47 CFR Part 15, Subpart C 15.203	Pass			

Radio Spectrum Matter Part						
Item	Standard	Method	Requirement	Result		
20dB Bandwidth		ANSI C63.10 (2013) Section 6.9	47 CFR Part 15, Subpart C 15.215	Pass		
Field Strength of the Fundamental Signal (15.249(a))	47 CFR Part 15,	ANSI C63.10 (2013) Section 6.5&6.6	47 CFR Part 15, Subpart C 15.249(a)	Pass		
Restricted Band Around Fundamental Frequency	Subpart C 15.249	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209	Pass		
Radiated Emissions		ANSI C63.10 (2013) Section 6.4&6.5&6.6	47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)	Pass		



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General Information

Details of E.U.T.

Power supply:	Lithium Ion Battery: 3.8V 80mAh rechargeable battery which charged by USB port
USB cable:	20cm unshielded
Operation Frequency:	2410MHz;2457MHz; 2473MHz;2479MHz
Modulation Type:	GFSK
Number of Channels:	4
Antenna Type:	PIFA Antenna
Antenna Gain:	0dBi

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.			
The EUT has been tested as an independent unit.						

4.3 Measurement Uncertainty

Test Item	Measurement Uncertainty
20dB Bandwidth	± 3%
Field Strength of the Fundamental Signal (15.249(a))	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)
Restricted Band Around Fundamental Frequency	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)
Radiated Emissions	± 4.5dB (Below 1GHz);± 4.8dB (Above 1GHz)

Remark:

The Ulab (lab Uncertainty) is less than Ucispr (CISPR Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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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:

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.

Innovation, Science and Economic Development Canada

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

CAB identifier: CN0006.

IC#: 4620C.

4.6 Deviation from Standards

4.7 Abnormalities from Standard Conditions

None



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5 **Equipment List**

20dB Bandwidth					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12
DC Power Supply	Rohde & Schwarz	NGSM 32/10	SEM011-04	2020-03-24	2021-03-23
Spectrum Analyzer	Rohde & Schwarz	FSU43	SEM004-08	2020-04-01	2021-03-31
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2020-09-23	2021-09-22
Measurement Software	TST	TST PASS V1.0.5	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2020-07-10	2021-07-09
Attenuator	Huber+Suhner	6620_SMA-50- 1	SEM021-09	2020-05-21	2021-05-20

Field Strength of the Fundamental Signal (15.249(a))						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
3m Semi-Anechoic	AUDIX	N/A	SEM001 02	2018-03-13	2021-03-12	
Chamber	AUDIX	IN/A	SEM001-02	2021-03-11	2024-03-10	
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08	
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09	



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Restricted Band Around Fundamental Frequency						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
3m Semi-Anechoic	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12	
Chamber	AUDIX	IN/A	3EIVI001-02			
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08	
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09	
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020-04-01	2021-03-31	

Radiated Spurious Emissions (Above 1GHz)						
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date	
3m Semi-Anechoic	ALIDIV	NI/A	SEM001 00	2018-03-13	2021-03-12	
Chamber	AUDIX	N/A SEM001-02	2021-03-11	2024-03-10		
EXA Signal Analyzer	Agilent Technologies Inc	N9010A	SEM004-12	2020-04-09	2021-04-08	
Horn Antenna	Rohde&Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2020-09-23	2021-09-22	
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM026-01	2020-07-10	2021-07-09	
Horn Antenna	Schwarzbeck	BBHA 9170	SEM003-15	2020-11-14	2023-11-13	
Pre-Amplifier	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2020-04-01	2021-03-31	

Radiated Spurious Emissions (Below 1GHz)									
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date				
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2020-07-19	2023-07-18				
MXE EMI Receiver	Agilent Technologies	N9038A	SEM004-15	2020-11-02	2021-11-01				
BiConiLog Antenna	ETS-LINDGREN	3142C	SEM003-02	2019-05-24	2022-05-23				



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Pre-Amplifier	Agilent Technologies	8447D	SEM005-01	2020-04-01	2021-03-31
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2020-07-10	2021-07-09

General used equipment							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2020-09-15	2021-09-14		
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2020-09-15	2021-09-14		
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2020-04-07	2021-04-06		



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Radio Spectrum Technical Requirement 6

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203

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 use an unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

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.

This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site.

However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

Antenna location: Refer to Internal photos.





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Radio Spectrum Matter Test Results 7

7.1 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.215 Test Method: ANSI C63.10 (2013) Section 6.9

Limit: N/A

7.1.1 E.U.T. Operation

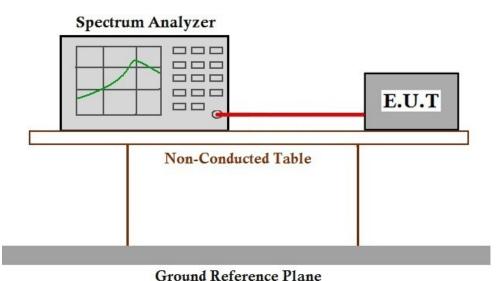
Operating Environment:

Temperature: 20.0 °C Humidity: 58.1 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(ANT+)_Keep the EUT in continuously transmitting mode with GFSK modulation.

7.1.3 Test Setup Diagram





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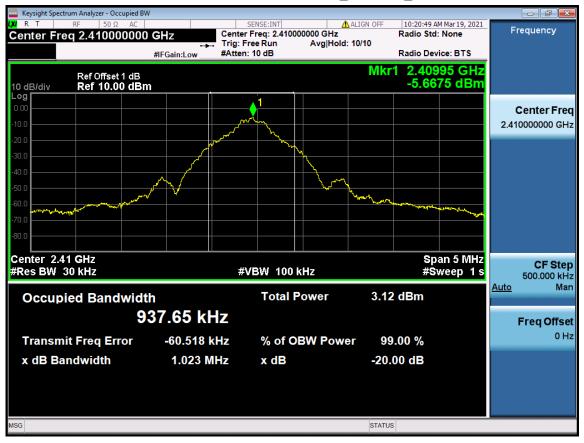


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7.1.4 Measurement Procedure and Data

Test Mode: OBW 2410MHz





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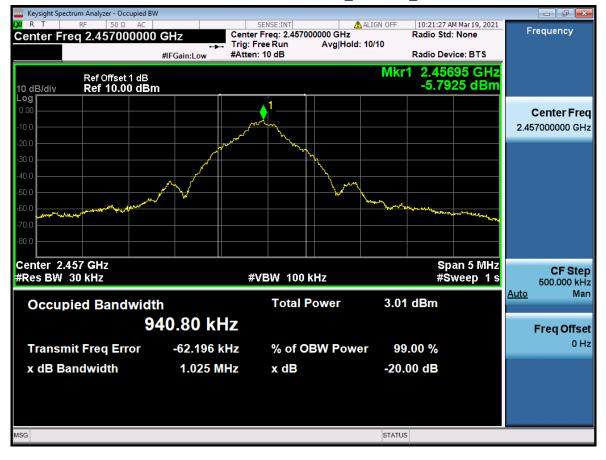
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Test Mode: OBW 2457MHz





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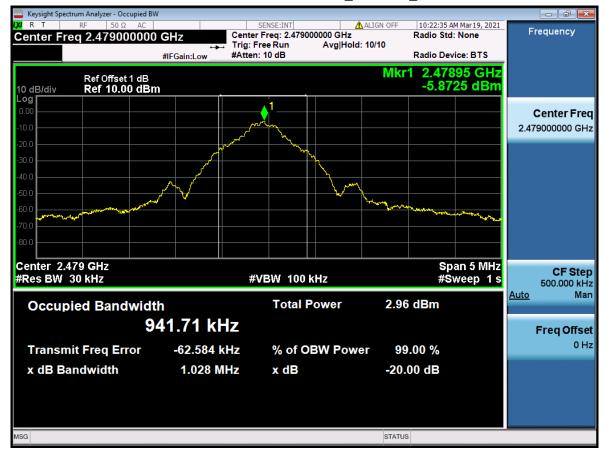
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Test Mode: OBW 2479MHz





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7.2 Field Strength of the Fundamental Signal (15.249(a))

Test Requirement 47 CFR Part 15, Subpart C 15.249(a) Test Method: ANSI C63.10 (2013) Section 6.5&6.6

Measurement Distance: 3m

Limit:

Fundamental frequency(MHz)	Field strength of fundamental(millivolts/meter)	Field strength of harmonics(microvolts/meter)
902-928	50	500
2400-2483.5	50	500
5725-5875	50	500
24000-24250	250	2500

Remark: The frequencies above 1000MHz 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.

For fundamental frequency in "902-928MHz", the field strength of fundamental is based on Quasi-

7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 53.5 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description						
Final test	01	TX mode(ANT+)_Keep the EUT in continuously transmitting mode with GFSK modulation.						



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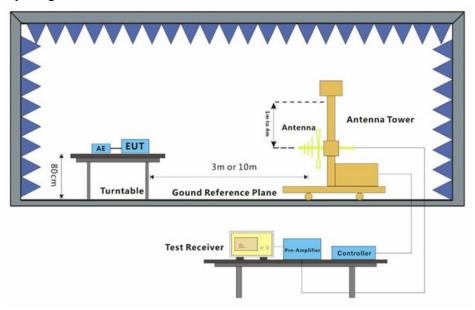
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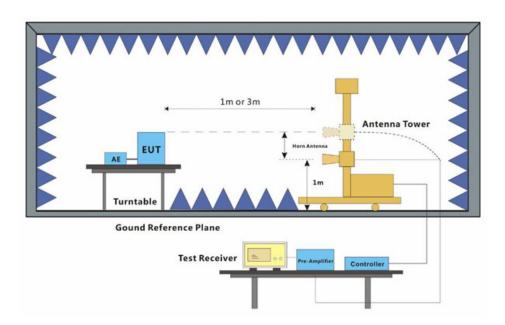


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7.2.3 Test Setup Diagram







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7.2.4 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.
- a. 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

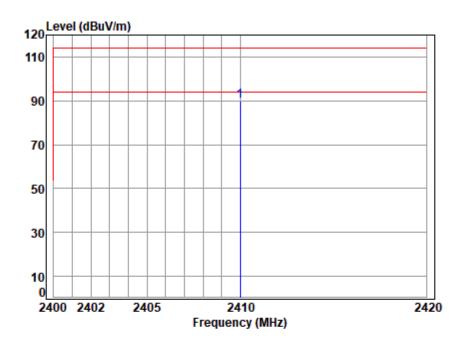




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Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02377CR

: 2410 Field strength Mode

Ant Preamp Cable Read Limit 0ver

Freq Loss Factor Factor Level Level Line Limit Remark

dBuV dBuV/m dBuV/m MHz dB dB/m dΒ dB

4.38 28.55 40.43 97.17 89.67 114.00 -24.33 peak 2410.000



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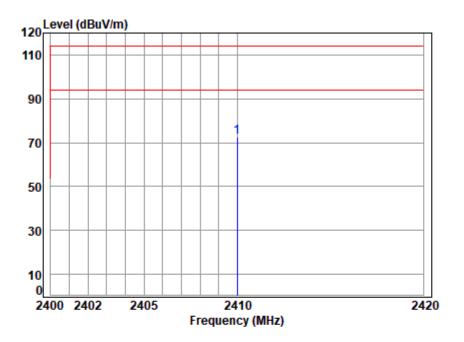
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

Job No : 02377CR

: 2410 Field strength Mode

> Ant Preamp Cable Read Limit 0ver

Loss Factor Factor Level Level Line Limit Remark Freq

dBuV dBuV/m dBuV/m MHz dB dB/m dΒ dB

4.38 28.55 40.43 80.03 72.53 114.00 -41.47 peak 2410.000



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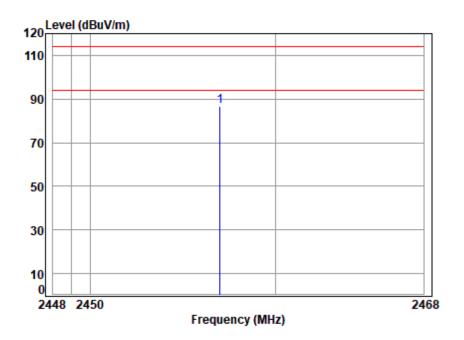
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02377CR

Mode : 2457 Field strength

> Limit Cable Ant Preamp Read 0ver Freq Loss Factor Factor Level Level Line Limit Remark dBuV dBuV/m dBuV/m MHz dB dB/m dB dB

2457.000 4.45 28.63 40.45 94.24 86.87 114.00 -27.13 peak



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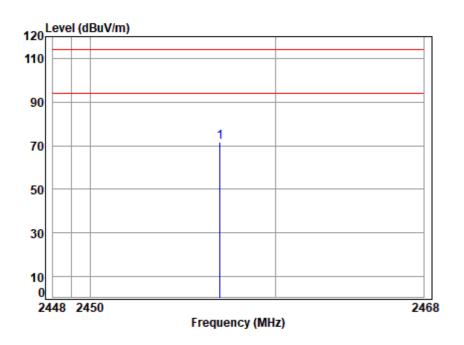
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m VERTICAL Job No : 02377CR

Mode : 2457 Field strength

> Limit Cable Ant Preamp Read 0ver

Freq Loss Factor Factor Level Level Line Limit Remark

dBuV dBuV/m dBuV/m MHz dB dB/m dB dB

2457.000 4.45 28.63 40.45 79.13 71.76 114.00 -42.24 peak



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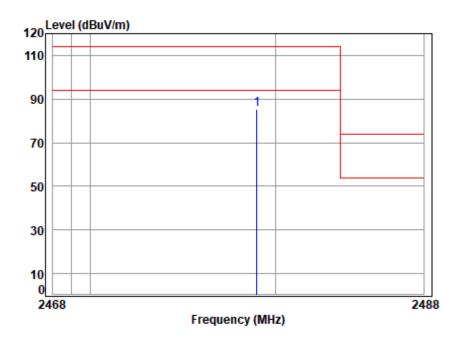
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02377CR

Mode : 2479 Field strength

> Limit Cable Ant Preamp Read 0ver Freq Loss Factor Factor Level Level Line Limit Remark dBuV dBuV/m dBuV/m MHz dB dB/m dB dB

2479.000 4.49 28.67 40.46 92.57 85.27 114.00 -28.73 peak



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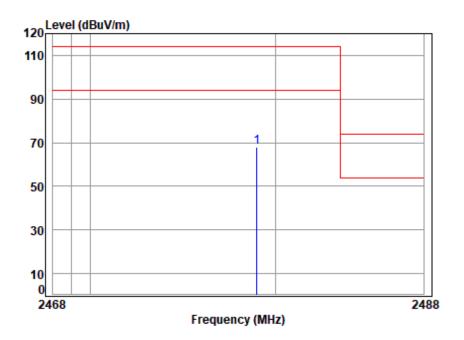
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 02377CR

Mode : 2479 Field strength

> Limit Cable Ant Preamp Read 0ver

Freq Loss Factor Factor Level Level Line Limit Remark

dBuV dBuV/m dBuV/m MHz dB dB/m dB dB

2479.000 4.49 28.67 40.46 75.48 68.18 114.00 -45.82 peak



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7.3 Restricted Band Around Fundamental Frequency

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.249(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.10.5

Measurement Distance: 3m

Limit:

Frequency	Limit (dBuV/m @3m)	Remark
30MHz-88MHz	40.0	Quasi-peak Value
88MHz-216MHz	43.5	Quasi-peak Value
216MHz-960MHz	46.0	Quasi-peak Value
960MHz-1GHz	54.0	Quasi-peak Value
Above 1GHz	54.0	Average Value
Above 1GHz	74.0	Peak Value

Emission radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 22.6 °C Humidity: 53.5 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(ANT+)_Keep the EUT in continuously transmitting mode with GFSK modulation.



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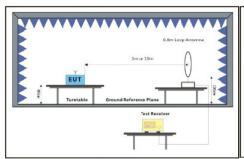
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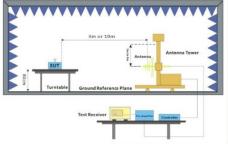


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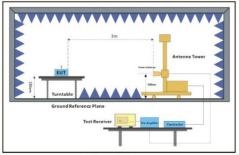
7.3.3 Test Setup Diagram





Below 30MHz

30MHz-1GHz



Above 1GHz



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7.3.4 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.
- a. 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

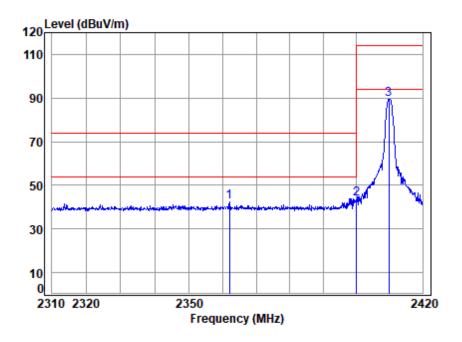




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Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

: 02377CR Job No

2

Mode : 2410 Band edge

		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		
	2362.052	4.30	28.47	40.41	49.88	42.24	74.00	-31.76	Peak	
2	2400.000	4.36	28.53	40.42	51.45	43.92	74.00	-30.08	peak	
3	2409.777	4.38	28.55	40.43	96.84	89.34	114.00	-24.66	peak	



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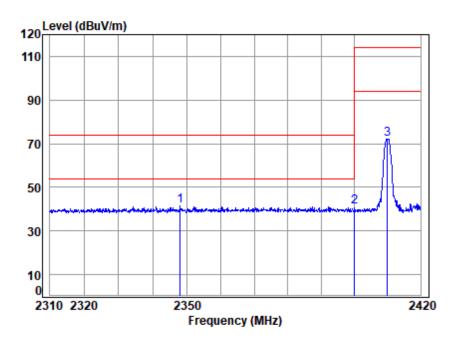
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 02377CR Job No

1 2

Mode : 2410 Band edge

-	. 2-	TO Dun	u cubc						
		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	
							-		
	2348.029	4.28	28.45	40.40	49.28	41.61	74.00	-32.39	Peak
2	2400.000	4.35	28.52	40.42	48.39	40.84	74.00	-33.16	peak
;	2410.001	4.38	28.55	40.43	79.72	72.22	114.00	-41.78	peak



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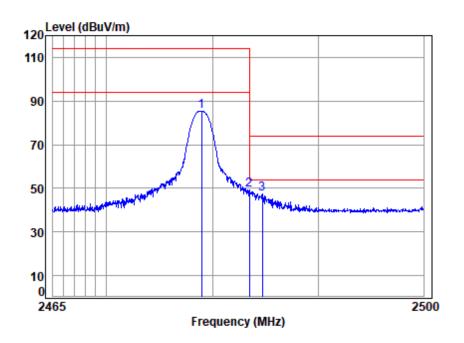
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

: 02377CR Job No

Mode : 2479 Band edge

		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	2479.000	4.49	28.67	40.46	92.56	85.26	114.00	-28.74	peak
2	2483.500	4.49	28.67	40.47	56.36	49.05	74.00	-24.95	peak
3	2484.714	4.50	28.68	40.47	54.79	47.50	74.00	-26.50	Peak



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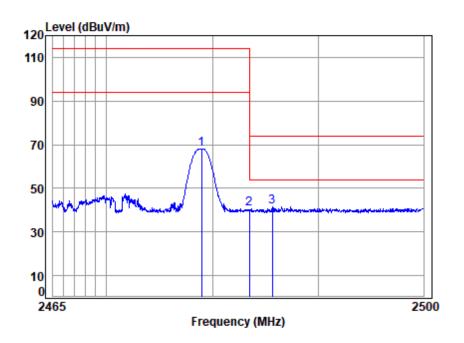
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m VERTICAL

: 02377CR Job No

Mode : 2479 Band edge

		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	2479.000	4.49	28.67	40.46	75.49	68.19	114.00	-45.81	peak	
2	2483.500	4.49	28.67	40.47	47.78	40.47	74.00	-33.53	peak	
3	2485.660	4.50	28.68	40.47	49.02	41.73	74.00	-32.27	Peak	



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7.4 Radiated Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.209 & 15.249 (a),(d)

Test Method: ANSI C63.10 (2013) Section 6.4&6.5&6.6

Measurement Distance: 3m

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit (dBuV/m)	Detector	Measurement Distance (meters)
0.009-0.490	2400/F(kHz)	-	-	300
0.490-1.705	24000/F(kHz)	-	-	30
1.705-30	30	-	-	30
30-88	100	40.0	QP	3
88-216	150	43.5	QP	3
216-960	200	46.0	QP	3
960-1000	500	54.0	QP	3
Above 1000	500	54.0	AV	3

7.4.1 E.U.T. Operation

Operating Environment:

25.5 °C Temperature: Atmospheric Pressure: 1010 mbar Humidity: 51.2 % RH

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX mode(ANT+)_Keep the EUT in continuously transmitting mode with GFSK modulation.



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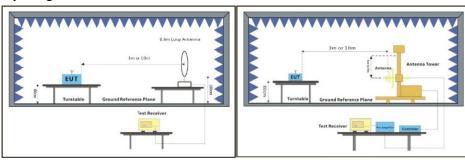
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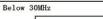


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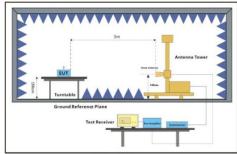
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7.4.3 Test Setup Diagram





30MHz-1GHz



Above 1GHz



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7.4.4 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.
- a. 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:
- 1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.
- 2) 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

- 3) Scan from 9kHz to 25GHz, the disturbance above 18GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.
- 4) 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. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.



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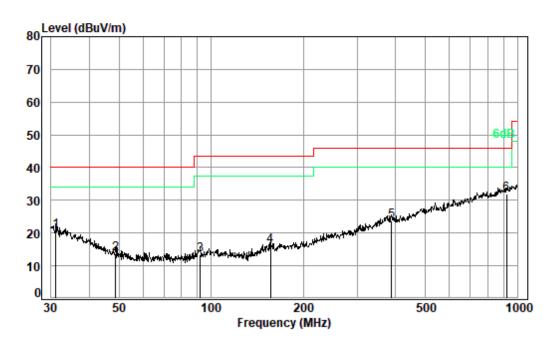
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Test Mode: 01; Polarity: Horizontal



Condition: 3m HORIZONTAL

Job No. : 02377CR

Test Mode: 01

		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	31.07	0.61	22.19	27.73	25.62	20.69	40.00	-19.31	QP
2	48.84	0.70	14.39	27.68	26.38	13.79	40.00	-26.21	QP
3	92.14	1.26	13.50	27.62	26.35	13.49	43.50	-30.01	QP
4	156.46	1.16	15.16	27.31	27.23	16.24	43.50	-27.26	QP
5	387.99	2.27	22.28	27.34	26.37	23.58	46.00	-22.42	QP
6 pp	922.52	3.52	29.20	27.05	26.16	31.83	46.00	-14.17	OP



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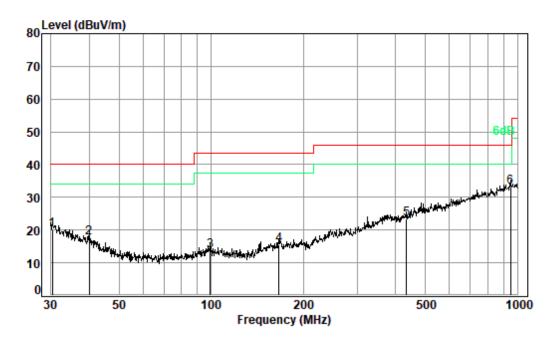
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Test Mode: 01; Polarity: Vertical



Condition: 3m VERTICAL Job No. : 02377CR

Test Mode: 01

				Preamp					
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
4	20.22	0.60	22.76	27 72	24 52	20.45	40.00	40.05	OD
1	30.32	0.60	22./6	27.73	24.52	20.15	40.00	-19.85	Ų٢
2	39.99	0.70	18.00	27.71	26.75	17.74	40.00	-22.26	QP
3	99.18	1.12	13.92	27.61	26.30	13.73	43.50	-29.77	QP
4	166.65	1.17	15.53	27.27	25.95	15.38	43.50	-28.12	QP
5	434.07	2.37	22.24	27.54	26.47	23.54	46.00	-22.46	QP
6 pp	948.76	3.55	29.33	26.91	27.23	33.20	46.00	-12.80	OP



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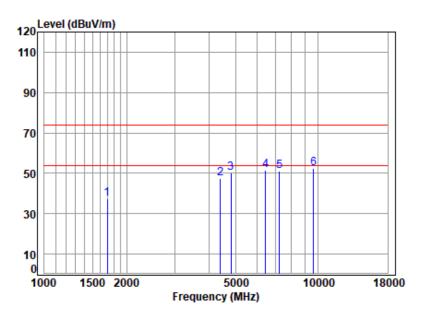
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Test Mode: 01; Polarity: Horizontal; Modulation: GFSK; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02377CR Mode : 2410 TX RSE

		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	1697.129	3.43	26.66	40.06	47.47	37.50	74.00	-36.50	peak
2	4405.090								•
3	4820.000	7.11	33.99	42.15	51.13	50.08	74.00	-23.92	peak
4	6451.353	8.28	35.55	42.07	50.01	51.77	74.00	-22.23	Peak
5	7230.000	8.76	36.09	41.48	47.85	51.22	74.00	-22.78	peak
6	9640.000	10.80	37.69	37.71	41.84	52.62	74.00	-21.38	peak



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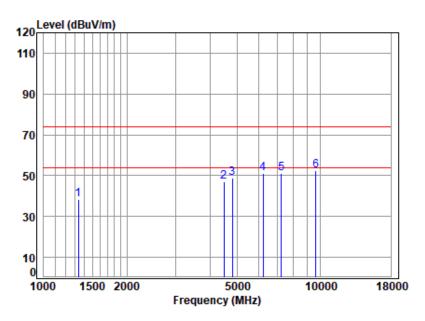
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low



Site : chamber Condition: 3m VERTICAL Job No : 02377CR

: 2410 TX RSE Mode

		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	1335.141	3.00	25.17	39.85	49.84	38.16	74.00	-35.84	peak
2	4482.150	6.74	33.57	41.86	48.75	47.20	74.00	-26.80	peak
3	4820.000	7.11	33.99	42.15	49.97	48.92	74.00	-25.08	peak
4	6231.427	8.27	35.34	42.23	49.94	51.32	74.00	-22.68	Peak
5	7230.000	8.76	36.09	41.48	47.87	51.24	74.00	-22.76	peak
6	9640.000	10.80	37.69	37.71	41.77	52.55	74.00	-21.45	peak



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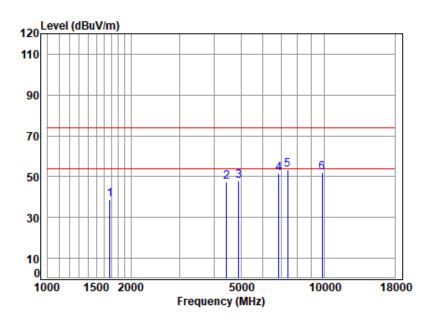
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02377CR

: 2457 TX RSE Mode

		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	1677.621	3.41	26.58	40.05	48.77	38.71	74.00	-35.29	peak
2	4430.628	6.70	33.48	41.81	49.14	47.51	74.00	-26.49	peak
3	4914.000	7.21	34.10	42.23	48.69	47.77	74.00	-26.23	peak
4	6855.063	8.47	35.82	41.80	49.29	51.78	74.00	-22.22	peak
5	7371.000	8.89	36.20	41.35	49.58	53.32	74.00	-20.68	peak
6	9828.000	10.74	37.80	37.39	40.99	52.14	74.00	-21.86	peak



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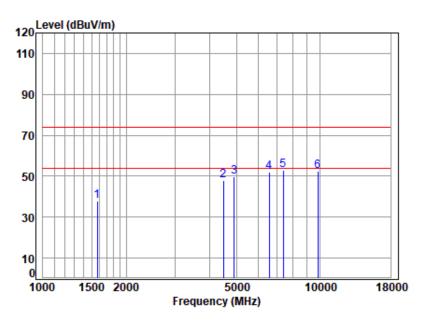
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle



Site : chamber Condition: 3m VERTICAL Job No : 02377CR

: 2457 TX RSE Mode

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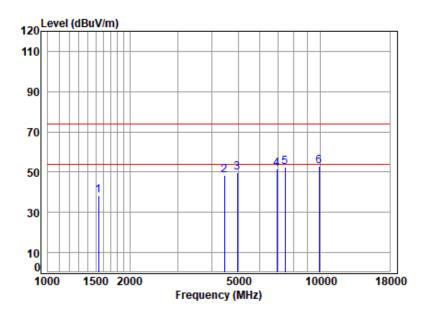
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Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High



Site : chamber

Condition: 3m HORIZONTAL

Job No : 02377CR Mode : 2479 TX RSE

		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	1538.281	3.29	25.98	39.97	48.82	38.12	74.00	-35.88	peak
2	4456.315	6.72	33.53	41.84	50.14	48.55	74.00	-25.45	peak
3	4958.000	7.26	34.15	42.27	50.38	49.52	74.00	-24.48	peak
4	6934.778	8.51	35.86	41.74	49.10	51.73	74.00	-22.27	peak
5	7437.000	8.95	36.25	41.29	48.61	52.52	74.00	-21.48	peak
6	9916.000	10.71	37.85	37.24	41.45	52.77	74.00	-21.23	peak



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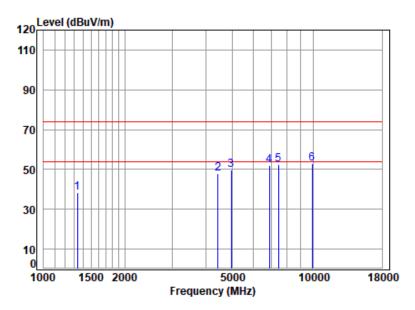
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Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High



Site : chamber Condition: 3m VERTICAL Job No : 02377CR · 2479 TX RSF Mode

: 24	/9 IX	KSE						
	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	
1335.141	3.00	25.17	39.85	50.01	38.33	74.00	-35.67	peak
4430.628	6.70	33.48	41.81	49.34	47.71	74.00	-26.29	peak
4958.000	7.26	34.15	42.27	50.46	49.60	74.00	-24.40	peak
6874.906	8.48	35.83	41.78	49.38	51.91	74.00	-22.09	peak
7437.000	8.95	36.25	41.29	48.70	52.61	74.00	-21.39	peak
9916.000	10.71	37.85	37.24	41.40	52.72	74.00	-21.28	peak
	Freq MHz 1335.141 4430.628 4958.000 6874.906 7437.000	Treq Cable Loss MHz dB 1335.141 3.00 4430.628 6.70 4958.000 7.26 6874.906 8.48 7437.000 8.95	Freq Loss Factor MHz dB dB/m 1335.141 3.00 25.17 4430.628 6.70 33.48 4958.000 7.26 34.15 6874.906 8.48 35.83 7437.000 8.95 36.25	Kreq Cable Loss Factor Factor Ant Preamp Factor MHz dB dB/m dB 1335.141 3.00 25.17 39.85 4430.628 6.70 33.48 41.81 4958.000 7.26 34.15 42.27 6874.906 8.48 35.83 41.78 7437.000 8.95 36.25 41.29	Kreq Cable Loss Factor Factor Factor Read Level MHz dB dB/m dB dBuV 1335.141 3.00 25.17 39.85 50.01 4430.628 6.70 33.48 41.81 49.34 4958.000 7.26 34.15 42.27 50.46 6874.906 8.48 35.83 41.78 49.38 7437.000 8.95 36.25 41.29 48.70	Cable Loss Factor Factor Read Level Level MHz dB dB/m dB dBuV dBuV/m 1335.141 3.00 25.17 39.85 50.01 38.33 4430.628 6.70 33.48 41.81 49.34 47.71 4958.000 7.26 34.15 42.27 50.46 49.60 6874.906 8.48 35.83 41.78 49.38 51.91 7437.000 8.95 36.25 41.29 48.70 52.61	Freq Cable Loss Factor Factor Ant Preamp Level Level Level Line Limit Level Level Level Line MHz dB dB/m dB dBuV dBuV/m dBuV/m 1335.141 3.00 25.17 39.85 50.01 38.33 74.00 4430.628 6.70 33.48 41.81 49.34 47.71 74.00 4958.000 7.26 34.15 42.27 50.46 49.60 74.00 6874.906 8.48 35.83 41.78 49.38 51.91 74.00 7437.000 8.95 36.25 41.29 48.70 52.61 74.00	Cable Ant Preamp Read Limit Over Freq Loss Factor Factor Level Level Line Limit



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Test Setup Photo 8

Refer to test setup photos.

EUT Constructional Details (EUT Photos) 9

Refer to external and internal photos for SZEM2103002377CR

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