



Report No.: SZEM191001907402

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TEST REPORT

Application No.: SZEM1910019074CR

Applicant: Kingstate Electronics (DongGuan) Co., Ltd.

Address of Applicant: Shi Chong Industrial Park, Shi Chong Avenue, Xiang Xi Village, Shi Pai

Town, Dongguan, China

Manufacturer: Kingstate Electronics (Dongguan) Co., Ltd

Address of Manufacturer: Shi Chong Industrial Park, Shi Chong Avenue, Xiang Xi Village, Shi Pai

Town, Dong Guan City, Guang Dong Province, China.

Factory: Kingstate Electronics (Dongguan) Co., Ltd

Address of Factory: Shi Chong Industrial Park, Shi Chong Avenue, Xiang Xi Village, Shi Pai

Town, Dong Guan City, Guang Dong Province, China.

Equipment Under Test (EUT):

EUT Name: Earphones
Model No.: EP-E30A
Trade Mark: YAMAHA

FCC ID: 2AKMBEP-E30A

Standard(s): 47 CFR Part 15, Subpart C 15.247

Date of Receipt: 2019-10-08

Date of Test: 2019-10-09 to 2019-10-24

Date of Issue: 2019-10-28

Test Result: Pass*

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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	Version Chapter Date Modifier						
01		2019-10-28		Original			

Authorized for issue by:		
	Heavy Ul	
	Harry Wu /Project Engineer	
	EvicFu	
	Eric Fu /Reviewer	



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Test Summary

Radio Spectrum Technical Requirement							
Item	Standard	Method	Requirement	Result			
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass			

Radio Spectrum Matter Part						
Item	Standard	Method	Requirement	Result		
Minimum 6dB Bandwidth	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.8.1	47 CFR Part 15, Subpart C 15.247a(2)	Pass		
Conducted Peak Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.9.1	47 CFR Part 15, Subpart C 15.247(b)(3)	Pass		
Power Spectrum Density	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.10.2	47 CFR Part 15, Subpart C 15.247(e)	Pass		
Conducted Band Edges Measurement	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.13.3.2	47 CFR Part 15, Subpart C 15.247(d)	Pass		
Conducted Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 11.11	47 CFR Part 15, Subpart C 15.247(d)	Pass		
Radiated Emissions which fall in the restricted bands	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass		
Radiated Spurious Emissions	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2013) Section 6.4,6.5,6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass		



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General Information

Details of E.U.T.

Power Supply:	Rating: DC5V, 0.5A Lithium Battery: DC3.7V, 90mAh, 0.33Wh
Cable:	Type C cable: 30cm, Unshielded
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.0
Modulation Type:	GFSK
Number of Channels:	40
Channel Spacing:	2MHz
Antenna Type:	Integral Antenna
Antenna Gain:	2.59dBi
Data Rate:	1Mb/s, 2Mb/s
Serial No.:	Z010229UW

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10 ⁻⁸
2	Duty cycle	± 0.37%
3	Occupied Bandwidth	± 3%
4	RF conducted power	± 0.75dB
5	RF power density	± 2.84dB
6	Conducted Spurious emissions	± 0.75dB
7	DE Dadiated news	± 4.5dB (Below 1GHz)
	RF Radiated power	± 4.8dB (Above 1GHz)
8	Dedicted Churique emission test	± 4.5dB (Below 1GHz)
	Radiated Spurious emission test	± 4.8dB (Above 1GHz)
9	Temperature test	± 1 ℃
10	Humidity test	± 3%
11	Supply voltages	± 1.5%
12	Time	± 3%



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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.

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

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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Equipment List

Minimum 6dB 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	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2019-09-24	2020-09-23	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10	
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A	
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23	
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23	
Electric and Magnetic Field Analyzer	Narda	NBM- 550/EHP-50F	EMC2143	2018-02-07	2020-02-06	
Electric Field Probe (100KHz-3GHz)	WANDEL & GOLTERMANN	EMR-20	EMC0907	2019-05-21	2020-05-20	
EMF Tester	Narda	ELT-400	SZE039-4	2019-07-08	2020-07-07	

Conducted Peak Output Power						
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	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2019-09-24	2020-09-23	
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A	
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10	
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A	
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23	
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23	
Electric and Magnetic Field Analyzer	Narda	NBM- 550/EHP-50F	EMC2143	2018-02-07	2020-02-06	
Electric Field Probe	WANDEL &	EMR-20	EMC0907	2019-05-21	2020-05-20	
(100KHz-3GHz)	GOLTERMANN	EIVIM-20	EIVICU907	2019-05-21	2020-05-20	
EMF Tester	Narda	ELT-400	SZE039-4	2019-07-08	2020-07-07	

Power Spectrum Density						
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	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23	
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2019-09-24	2020-09-23	



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Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23
Electric and Magnetic Field Analyzer	Narda	NBM- 550/EHP-50F	EMC2143	2018-02-07	2020-02-06
Electric Field Probe (100KHz-3GHz)	WANDEL & GOLTERMANN	EMR-20	EMC0907	2019-05-21	2020-05-20
EMF Tester	Narda	ELT-400	SZE039-4	2019-07-08	2020-07-07

Conducted Band Edges Measurement									
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	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23				
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2019-09-24	2020-09-23				
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A				
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10				
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A				
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23				
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23				
Electric and Magnetic Field Analyzer	Narda	NBM- 550/EHP-50F	EMC2143	2018-02-07	2020-02-06				
Electric Field Probe	WANDEL &	EMR-20	EMC0907	2019-05-21	2020-05-20				
(100KHz-3GHz)	GOLTERMANN	EIVIR-20	EIVICU907	2019-05-21	2020-05-20				
EMF Tester	Narda	ELT-400	SZE039-4	2019-07-08	2020-07-07				

Conducted Spurious Emissions									
Equipment	Manufacturer	Model No	Model No Inventory No		Cal Due Date				
Shielding Room	SAEMC	MSR733	SEM001-09	2019-06-13	2022-06-12				
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23				
Spectrum Analyzer	Rohde & Schwarz	FSP	SEM004-06	2019-09-24	2020-09-23				
Measurement Software	JS Tonscend	JS1120-2 BT/WIFI V2.	N/A	N/A	N/A				
Coaxial Cable	SGS	N/A	SEM031-02	2019-07-11	2020-07-10				
Attenuator	Weinschel Associates	WA41	SEM021-09	N/A	N/A				
Signal Generator	KEYSIGHT	N5173B	SEM006-05	2019-09-24	2020-09-23				
Power Meter	Rohde & Schwarz	NRVS	SEM014-02	2019-09-24	2020-09-23				
Electric and Magnetic Field Analyzer	Narda	NBM- 550/EHP-50F	EMC2143	2018-02-07	2020-02-06				



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Electric Field Probe (100KHz-3GHz)	WANDEL & GOLTERMANN	EMR-20	EMC0907	2019-05-21	2020-05-20
EMF Tester	Narda	ELT-400	SZE039-4	2019-07-08	2020-07-07

Radiated Emissions which fall in the restricted bands								
Equipment	Manufacturer	Manufacturer Model No Inventory No		Cal Date	Cal Due Date			
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12			
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A			
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10			
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11			
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907 SEM003-07		2018-04-13	2021-04-12			
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16			
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23			
Pre-amplifier (18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31			
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31			
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23			
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21			

Radiated Spurious Emissions							
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date		
3m Semi-Anechoic Chamber	AUDIX	N/A	SEM001-02	2018-03-13	2021-03-12		
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A		
Coaxial Cable	SGS	N/A	SEM026-01	2019-07-11	2020-07-10		
EXA Spectrum Analyzer	AgilentTechnologies Inc	N9010A	SEM004-12	2019-04-12	2020-04-11		
Horn Antenna (1-18GHz)	Rohde & Schwarz	HF907	SEM003-07	2018-04-13	2021-04-12		
Horn Antenna (15GHz-40GHz)	Schwarzbeck	BBHA 9170	SEM003-15	2017-10-17	2020-10-16		
Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEM004-11	2019-09-24	2020-09-23		



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Pre-amplifier (18-26GHz)	Rohde & Schwarz	CH14-H052	SEM005-17	2019-04-01	2020-03-31
Pre-amplifier (26GHz-40GHz)	Compliance Directions Systems Inc.	PAP-2640-50	SEM005-08	2019-04-01	2020-03-31
DC Power Supply	Zhao Xin	KXN-6020D	SEM011-08	2019-09-24	2020-09-23
Active Loop Antenna	ETS-Lindgren	6502	SEM003-08	2017-08-22	2020-08-21

RE in Chamber					
Test Equipment	Manufacturer	Model No.	Inventory No.	Cal. Date	Cal. Due date
3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEM001-01	2017-08-05	2020-08-04
MXE EMI Receiver (20Hz-8.4GHz)	Agilent Technologies			2019-09-24	2020-09-23
BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEM003-01	2017-06-27	2020-06-26
Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEM005-01	2019-04-01	2020-03-31
Measurement Software	AUDIX	e3 V8.2014-6- 27	N/A	N/A	N/A
Coaxial Cable	SGS	N/A	SEM025-01	2019-07-11	2020-07-10

General used equipment								
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date			
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-03	2019-09-26	2020-09-25			
Humidity/ Temperature Indicator	Shanghai Meteorological Industry Factory	ZJ1-2B	SEM002-04	2019-09-26	2020-09-25			
Humidity/ Temperature Indicator	Mingle	N/A	SEM002-08	2019-09-26	2020-09-25			
Barometer	Changchun Meteorological Industry Factory	DYM3	SEM002-01	2019-04-04	2020-04-03			



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Radio Spectrum Technical Requirement 6

Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

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

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.59dBi.

Antenna location: Refer to Internal photos



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7 Radio Spectrum Matter Test Results

7.1 Minimum 6dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247a(2)
Test Method: ANSI C63.10 (2013) Section 11.8.1

Limit: ≥500 kHz

7.1.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C Humidity: 47.4 % RH Atmospheric Pressure: 1015 mbar

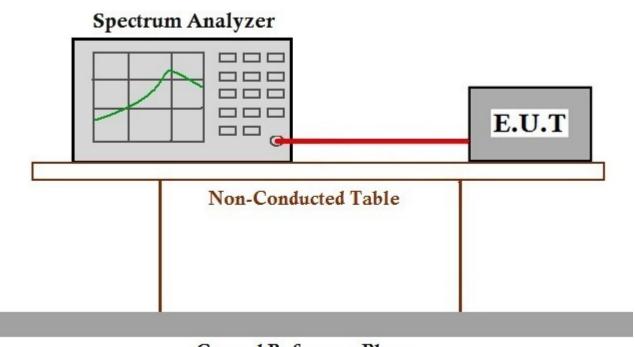
Test mode d:TX mode_Keep the EUT in continuously transmitting mode with GFSK

modulation and 1Mb/s data rate

e: TX mode_Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

7.1.2 Test Setup Diagram



Ground Reference Plane

7.1.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.2 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(3) Test Method: ANSI C63.10 (2013) Section 11.9.1

Limit:

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



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7.2.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C Humidity: 47.4 % RH Atmospheric Pressure: 1015 mbar

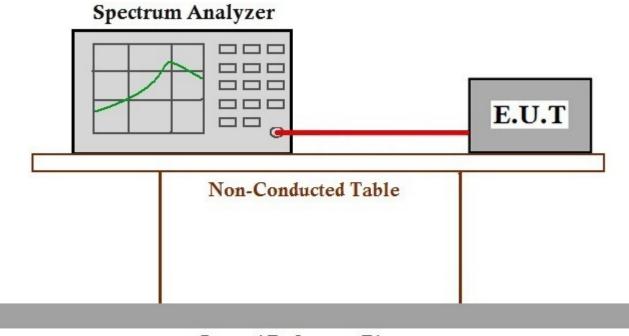
Test mode d:TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 1Mb/s data rate

e: TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

7.2.2 Test Setup Diagram



Ground Reference Plane

7.2.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.3 Power Spectrum Density

Test Requirement 47 CFR Part 15, Subpart C 15.247(e)
Test Method: ANSI C63.10 (2013) Section 11.10.2

Limit: ≤8dBm in any 3 kHz band during any time interval of continuous

transmission

7.3.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C Humidity: 47.4 % RH Atmospheric Pressure: 1015 mbar

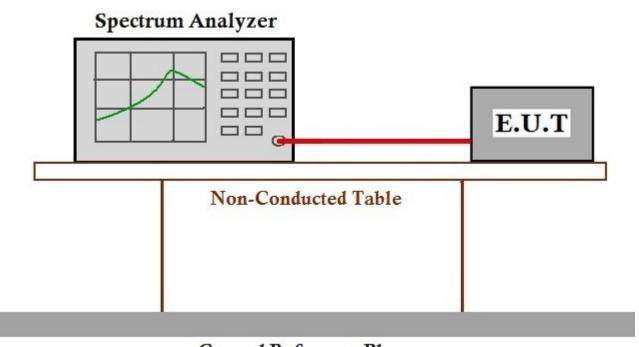
Test mode d:TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 1Mb/s data rate

e: TX mode_Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

7.3.2 Test Setup Diagram



Ground Reference Plane

7.3.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.4 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d) Test Method: ANSI C63.10 (2013) Section 11.13.3.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)



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7.4.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C Humidity: 47.4 % RH Atmospheric Pressure: 1015 mbar

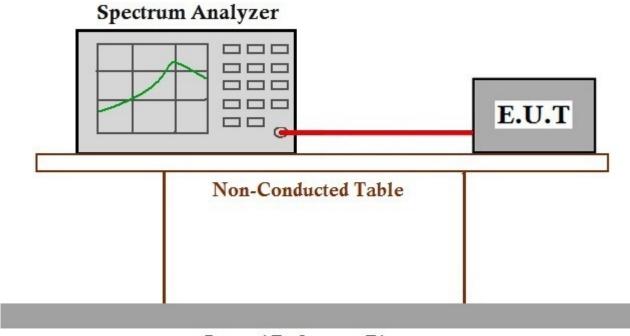
Test mode d:TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 1Mb/s data rate

e: TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

7.4.2 Test Setup Diagram



Ground Reference Plane

7.4.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.5 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d) Test Method: ANSI C63.10 (2013) Section 11.11

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in

§15.209(a) (see §15.205(c)



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7.5.1 E.U.T. Operation

Operating Environment:

Temperature: 25.5 °C Humidity: 47.4 % RH Atmospheric Pressure: 1015 mbar

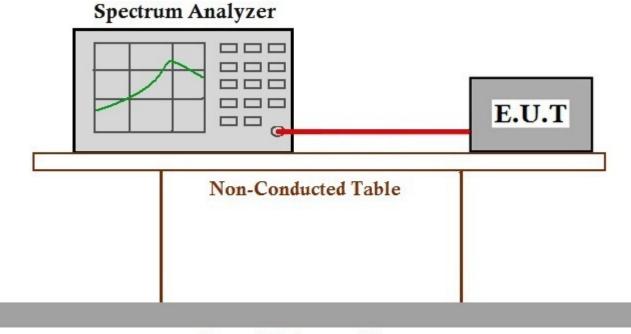
Test mode d:TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 1Mb/s data rate

e: TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

7.5.2 Test Setup Diagram



Ground Reference Plane

7.5.3 Measurement Procedure and Data

The detailed test data see: Appendix 15.247



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7.6 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209

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

Measurement Distance: 3m

Limit:

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 23.4 °C Humidity: 58 % RH Atmospheric Pressure: 1015 mbar

d:TX mode_Keep the EUT in continuously transmitting mode with GFSK Pretest these

modes to find modulation and 1Mb/s data rate

the worst case: e: TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

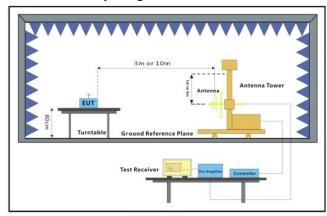
The worst case d:TX mode_Keep the EUT in continuously transmitting mode with GFSK

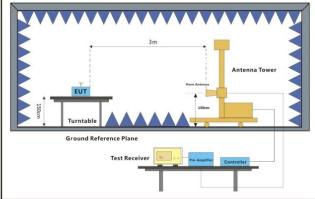
for final test: modulation and 1Mb/s data rate

e: TX mode_Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

7.6.2 Test Setup Diagram





Above 1GHz 30MHz-1GHz



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7.6.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: 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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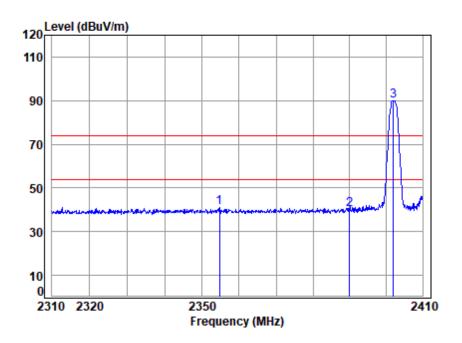


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1Mb/s

Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Mode : 2402 Band edge

Note : BLE

> 1 2 3

Freq			Preamp Factor					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	——dB	
2354.676	5.43	28.46	40.96	48.24	41.17	74.00	-32.83	peak
2390.000 * 2402.000								•



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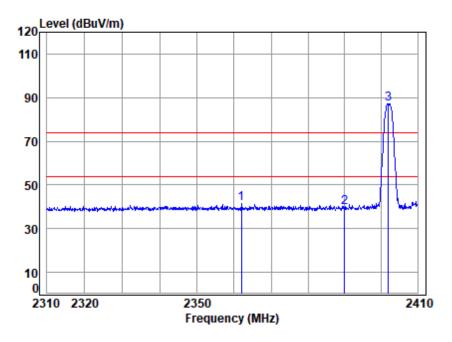
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Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Site : chamber Condition: 3m VERTICAL

Job No : 19074CR/19075CR Mode : 2402 Band edge

Note : BLE

> 1 2 3

			Preamp					
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
2361.971	5.44	28.47	40.96	48.36	41.31	74.00	-32.69	peak
2390.000	5.47	28.52	40.97	46.67	39.69	74.00	-34.31	peak
* 2402 000	5 49	28 54	40 98	93 93	86 98	74 00	12 98	neak



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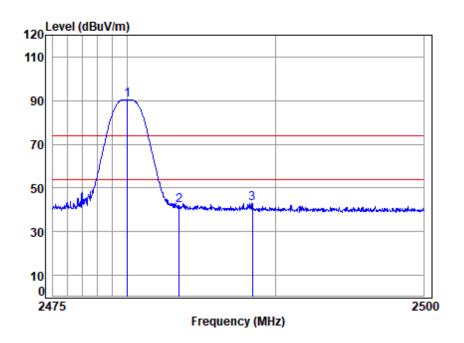
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Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Job No Mode : 2480 Band edge

Note : BLE

> 1 2 3

_			Preamp					
Freq	Loss	Factor	Factor	revel	Level	Line	Limit	Kemark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2480.000	5.59	28.67	41.01	97.24	90.49	74.00	16.49	peak
2483.500	5.60	28.67	41.01	48.56	41.82	74.00	-32.18	peak
2488 419	5 61	28 68	41 01	49 73	43 01	74 00	-30 99	neak



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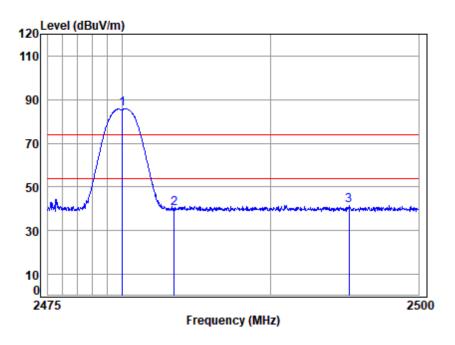
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Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber Condition: 3m VERTICAL

: 19074CR/19075CR Job No Mode : 2480 Band edge

Note : BLE

> 1 2 3

Freq			Preamp Factor					
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
* 2480.000 2483.500 2495.306	5.60	28.67	41.01	47.04	40.30	74.00	-33.70	peak



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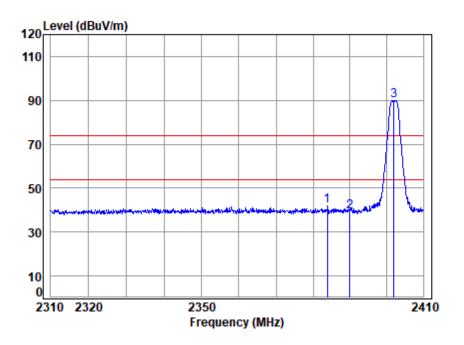


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2Mb/s

Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR : 2402 Band edge Mode

Note : BLE

		Freq			Preamp Factor					Remark
		MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1		2383.894	5.47	28.51	40.97	48.89	41.90	74.00	-32.10	peak
2		2390.000	5.47	28.52	40.97	46.27	39.29	74.00	-34.71	peak
3	*	2402.000	5.49	28.54	40.98	96.96	90.01	74.00	16.01	peak



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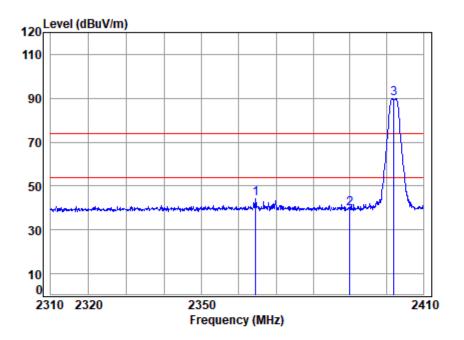
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Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 19074CR/19075CR 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	2364.575	5.44	28.48	40.96	51.16	44.12	74.00	-29.88	peak	
2	2390.000	5.47	28.52	40.97	46.70	39.72	74.00	-34.28	peak	
3	* 2402.000	5.49	28.54	40.98	96.73	89.78	74.00	15.78	peak	



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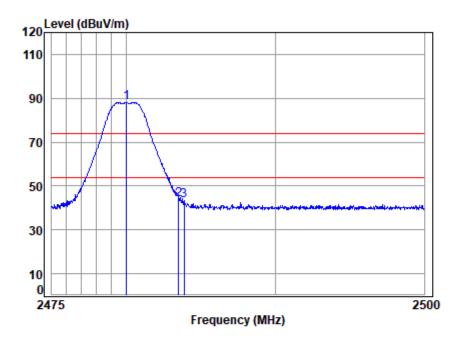
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Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



Site : chamber

Condition: 3m HORIZONTAL Job No : 19074CR/19075CR 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 *	2480.000	5.59	28.67	41.01	94.94	88.19	74.00	14.19	peak	
2	2483.500	5.60	28.67	41.01	50.50	43.76	74.00	-30.24	peak	
3	2483.871	5.60	28.67	41.01	49.99	43.25	74.00	-30.75	peak	



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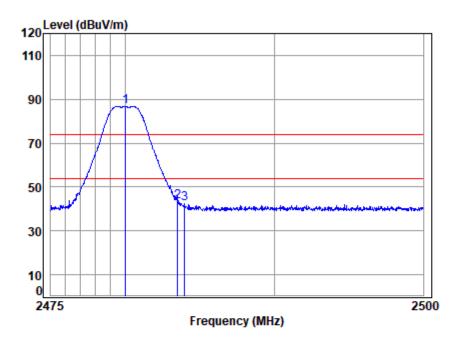
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Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber

Condition: 3m VERTICAL

Job No : 19074CR/19075CR 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 *	2480.000	5.59	28.67	41.01	93.57	86.82	74.00	12.82	peak	
2	2483.500	5.60	28.67	41.01	50.25	43.51	74.00	-30.49	peak	
3	2483.971	5.60	28.67	41.01	48.99	42.25	74.00	-31.75	peak	



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7.7 Radiated Spurious Emissions

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

Measurement Distance: 3m

Limit:

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

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.



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7.7.1 E.U.T. Operation

Operating Environment:

Humidity: 55 % RH Temperature: Atmospheric Pressure: 1015 mbar

d:TX mode Keep the EUT in continuously transmitting mode with GFSK Pretest these

modulation and 1Mb/s data rate modes to find

the worst case: e: TX mode Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

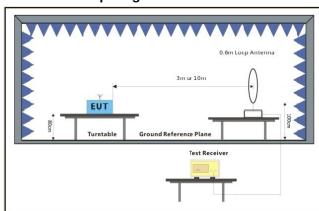
The worst case d:TX mode_Keep the EUT in continuously transmitting mode with GFSK

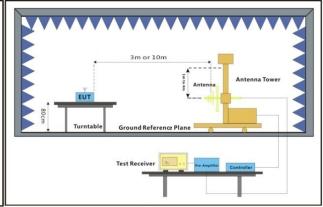
for final test: modulation and 1Mb/s data rate

e: TX mode_Keep the EUT in continuously transmitting mode with GFSK

modulation and 2Mb/s data rate.

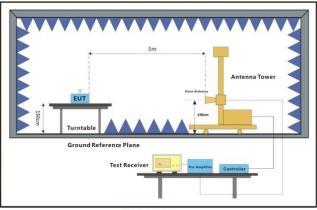
7.7.2 Test Setup Diagram





Below 30MHz

30MHz-1GHz



Above 1GHz



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7.7.3 Measurement Procedure and Data

- a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
- i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- j. Repeat above procedures until all frequencies measured was complete.

Remark:

- 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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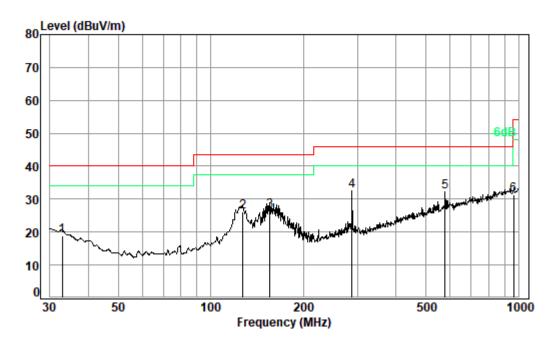
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1Mb/s

30MHz~1GHz

QP value:

Mode: d; Polarization: Horizontal



Condition: 3m HORIZONTAL

Job No. : 19074CR

Test mode: d

	Freq			Preamp Factor				
_	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	32.86	0.60	20.92	27.72	25.13	18.93	40.00	-21.07
2	127.22	1.27	13.33	27.48	38.99	26.11	43.50	-17.39
3	155.91	1.33	15.15	27.34	37.47	26.61	43.50	-16.89
4 pp	287.99	1.85	19.13	26.92	38.62	32.68	46.00	-13.32
5	576.64	2.68	26.16	28.10	31.40	32.14	46.00	-13.86
6	965.54	3.67	30.13	27.04	24.65	31.41	54.00	-22.59



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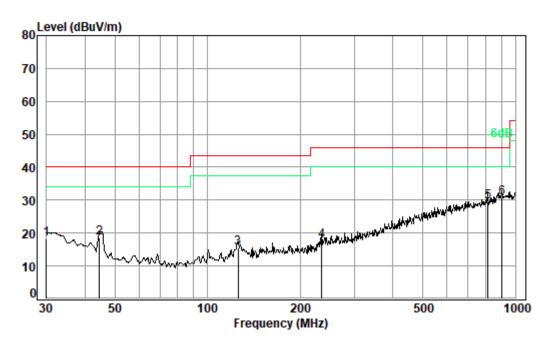
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Mode: d; Polarization: Vertical



Condition: 3m VERTICAL Job No. : 19074CR

Test mode: d

	Freq			Preamp Factor				
	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1	30.00	0.60	22.50	27.73	22.82	18.19	40.00	-21.81
2	44.59	0.70	15.89	27.70	29.62	18.51	40.00	-21.49
3	125.89	1.27	13.29	27.48	28.37	15.45	43.50	-28.05
4	234.99	1.60	18.41	27.06	24.79	17.74	46.00	-28.26
5	813.11	3.26	28.68	27.66	25.27	29.55	46.00	-16.45
6 pp	903.31	3.60	29.82	27.28	24.58	30.72	46.00	-15.28



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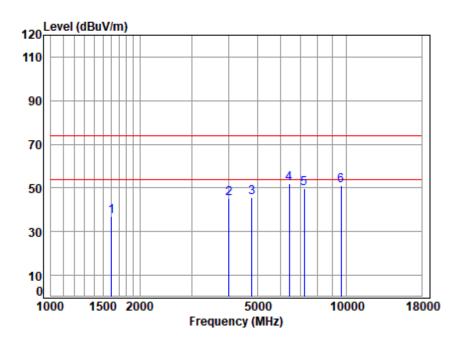


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Above 1GHz

Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Job No Mode : 2402 TX RSE

Note : BLE

			Preamp					
Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1606.441	5.34	26.28	40.57	45.87	36.92	74.00	-37.08	peak
4004.339	6.99	33.60	42.16	46.53	44.96	74.00	-29.04	peak
4804.000	7.89	34.16	42.77	46.53	45.81	74.00	-28.19	peak
6414.167	11.38	35.03	42.00	47.81	52.22	74.00	-21.78	peak
7206.000	10.08	36.42	41.58	44.87	49.79	74.00	-24.21	peak
9608.000	10.75	37.52	38.57	41.47	51.17	74.00	-22.83	neak



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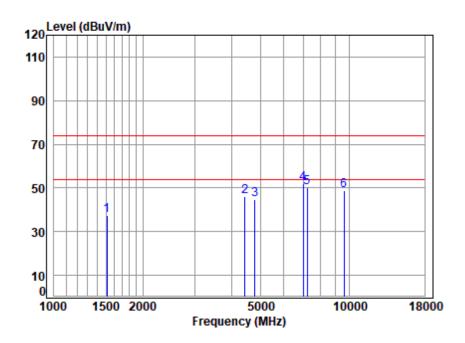
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Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m VERTICAL

: 19074CR/19075CR Job No

: 2402 TX RSE Mode

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	
1511.833	5.46	25.85	40.51	46.52	3/.32	/4.00	-36.68	peak
4430.628	7.48	33.60	42.50	47.34	45.92	74.00	-28.08	peak
4804.000	7.89	34.16	42.77	45.49	44.77	74.00	-29.23	peak
6995.172	10.14	36.49	41.69	47.21	52.15	74.00	-21.85	peak
7206.000	10.08	36.42	41.58	45.35	50.27	74.00	-23.73	peak
9608 000	10 75	37 52	38 57	39 06	48 76	74 00	-25 24	neak



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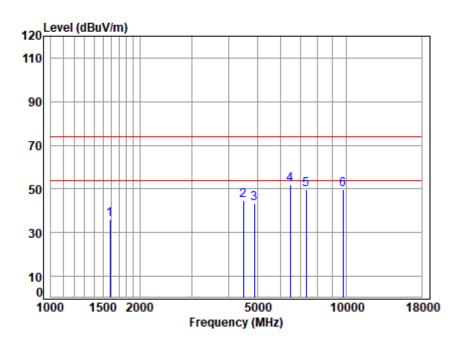
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Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Job No Mode : 2440 TX RSE

Note : BLE

				Preamp					
	Freq	Loss	Factor	Factor	Level	Level	Line	Limit	Remark
	MHz	——dB		——dB	-dRuV	dBul//m	dBul//m	dB	
	MINZ	ub	ub/m	ub	abuv	ubuv/m	ubuv/m	ub	
1	1583.392	5.37	26.18	40.56	44.86	35.85	74.00	-38.15	peak
2	4482.150	7.54	33.60	42.54	46.19	44.79	74.00	-29.21	peak
3	4882.000	7.97	34.30	42.82	43.75	43.20	74.00	-30.80	peak
4	6470.026	11.48	35.08	41.97	47.22	51.81	74.00	-22.19	peak
5	7323.000	10.05	36.37	41.52	45.03	49.93	74.00	-24.07	peak
6	9764,000	10.82	37.55	38.34	39.68	49.71	74.00	-24.29	neak



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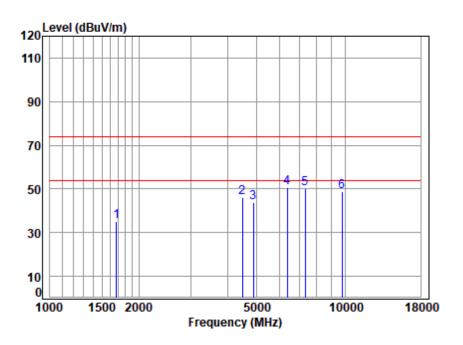
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Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



Site : chamber

Condition: 3m VERTICAL

: 19074CR/19075CR Job No

Mode : 2440 TX RSE

Note : BLE

Enoa			Preamp Factor					Pomonic
		-actor	-actor		revei	Line		nemark
MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB	
1677.621	5.25	26.58	40.62	44.03	35.24	74.00	-38.76	peak
4482.150	7.54	33.60	42.54	47.62	46.22	74.00	-27.78	peak
4882.000	7.97	34.30	42.82	44.44	43.89	74.00	-30.11	peak
6377.195	11.31	35.00	42.02	46.29	50.58	74.00	-23.42	peak
7323.000	10.05	36.37	41.52	45.20	50.10	74.00	-23.90	peak
9764.000	10.82	37.55	38.34	38.82	48.85	74.00	-25.15	neak



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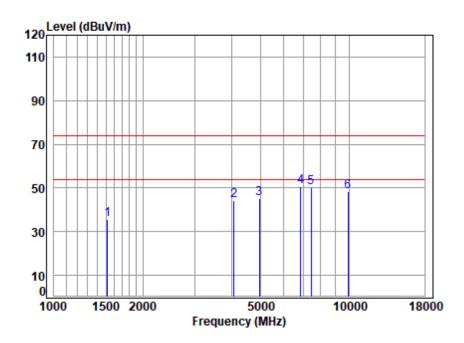
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Mode:d; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



: chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Job No Mode : 2480 TX 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	
1520.598	5.45	25.89	40.52	44.86	35.68	/4.00	-38.32	peak
4074.388	7.07	33.60	42.22	45.94	44.39	74.00	-29.61	peak
4960.000	8.05	34.43	42.87	45.49	45.10	74.00	-28.90	peak
6855.063	10.53	36.10	41.76	45.69	50.56	74.00	-23.44	peak
7440.000	10.02	36.32	41.46	45.34	50.22	74.00	-23.78	peak
9920 000	10 90	37 58	38 12	37 78	48 14	74 99	-25 86	neak



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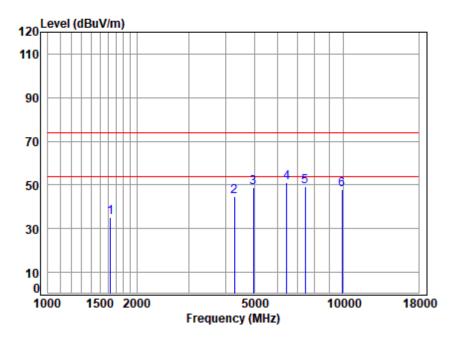
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Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber Condition: 3m VERTICAL

Job No : 19074CR/19075CR Mode : 2480 TX RSE

Note : BLE

1

3 4 5

		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	
	1629.825	5.31	26.38	40.59	43.92	35.02	74.00	-38.98	peak
2	4279.589	7.31	33.60	42.38	46.39	44.92	74.00	-29.08	peak
}	4960.000	8.05	34.43	42.87	49.12	48.73	74.00	-25.27	peak
ļ	6432.732	11.41	35.05	41.99	46.52	50.99	74.00	-23.01	peak
,	7440.000	10.02	36.32	41.46	44.29	49.17	74.00	-24.83	peak
,	9920.000	10.90	37.58	38.12	37.34	47.70	74.00	-26.30	peak



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SGS-CSTC Standards Technical Services Co., Ltd.

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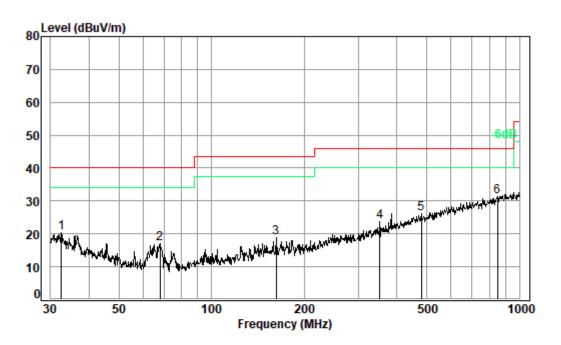
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2Mb/s

30MHz~1GHz

QP value:

Mode: e; Polarization: Horizontal



Condition: 3m HORIZONTAL

Job No. : 19074CR

Test mode: e

		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	32.52	0.60	21.10	27.72	26.32	20.30	40.00	-19.70
2	68.15	0.80	12.87	27.67	31.10	17.10	40.00	-22.90
3	162.04	1.34	15.54	27.31	29.20	18.77	43.50	-24.73
4	351.71	2.06	21.15	27.18	27.71	23.74	46.00	-22.26
5	480.53	2.53	24.21	27.76	27.24	26.22	46.00	-19.78
6 pp	848.06	3.40	29.14	27.51	26.23	31.26	46.00	-14.74



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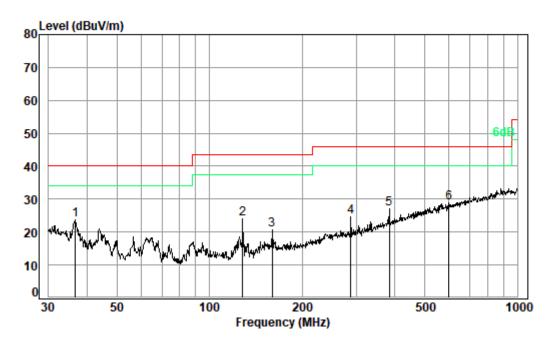
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Mode: e; Polarization: Vertical



Condition: 3m VERTICAL Job No. : 19074CR

Test mode: e

	Freq			Preamp Factor				
_	MHz	dB	dB/m	dB	dBuV	dBuV/m	dBuV/m	dB
1 pp	36.64	0.60	19.03	27.71	31.90	23.82	40.00	-16.18
2	128.11	1.27	13.35	27.47	36.80	23.95	43.50	-19.55
3	159.78	1.34	15.48	27.32	31.32	20.82	43.50	-22.68
4	287.99	1.85	19.13	26.92	30.68	24.74	46.00	-21.26
5	383.93	2.16	22.00	27.35	30.40	27.21	46.00	-18.79
6	599.32	2.70	26.59	28.17	27.76	28.88	46.00	-17.12



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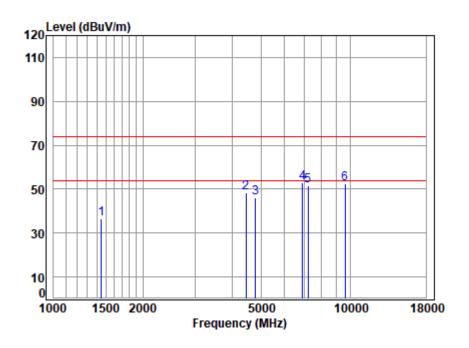


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Above 1GHz

Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR

Mode : 2402 TX RSE

Note : BLF

uce	. DLI	-								
		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	1447.688	5.31	25.59	40.47	45.94	36.37	74.00	-37.63	peak	
2	4456.315	7.51	33.60	42.52	49.85	48.44	74.00	-25.56	peak	
3	4804.000	7.89	34.16	42.77	46.76	46.04	74.00	-27.96	peak	
4	6894.806	10.42	36.21	41.74	47.83	52.72	74.00	-21.28	peak	
5	7206.000	10.08	36.42	41.58	46.48	51.40	74.00	-22.60	peak	
6	9608 000	10 75	37 52	38 57	42 72	52 42	74 00	-21 58	neak	



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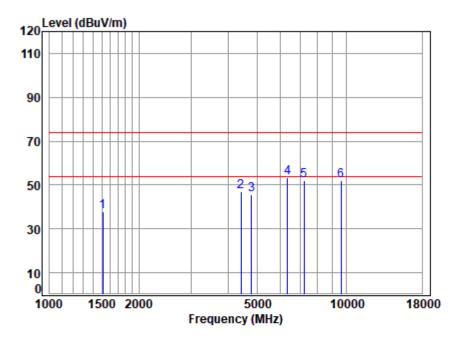
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Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:Low



Site : chamber

Condition: 3m VERTICAL

Job No : 19074CR/19075CR

Mode : 2402 TX RSE

Note : BLE

OCC		_							
		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	1511.833	5.46	25.85	40.51	47.27	38.07	74.00	-35.93	peak
2	4417.841	7.47	33.60	42.49	48.62	47.20	74.00	-26.80	peak
3	4804.000	7.89	34.16	42.77	46.28	45.56	74.00	-28.44	peak
4	6340.436	11.24	34.98	42.04	49.06	53.24	74.00	-20.76	peak
5	7206.000	10.08	36.42	41.58	47.11	52.03	74.00	-21.97	peak
6	9608.000	10.75	37.52	38.57	42.14	51.84	74.00	-22.16	peak



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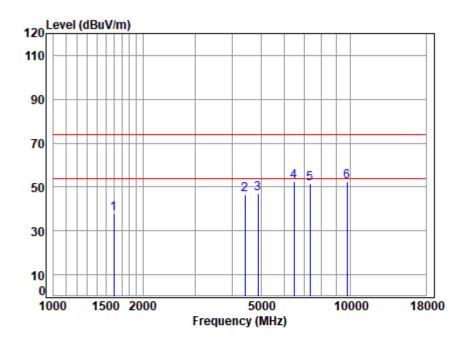
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Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:middle



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Mode : 2440 TX 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	
_	4507 404						74.00	26.25	
1	1597.181	5.35	26.24	40.5/	46.63	37.65	/4.00	-36.35	peak
2	4417.841	7.47	33.60	42.49	48.00	46.58	74.00	-27.42	peak
3	4880.000	7.97	34.29	42.82	47.53	46.97	74.00	-27.03	peak
4	6470.026	11.48	35.08	41.97	47.72	52.31	74.00	-21.69	peak
5	7320.000	10.05	36.37	41.52	46.81	51.71	74.00	-22.29	peak
6	9760 000	10 82	37 55	38 35	42 32	52 34	74 99	-21 66	neak



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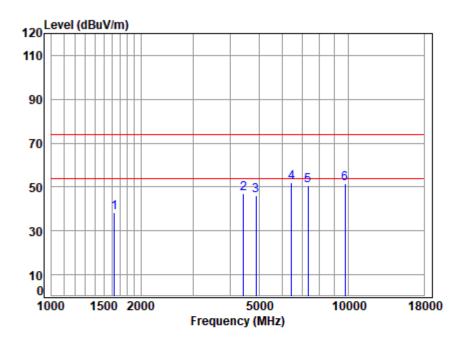
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Mode:e; Polarization:Vertical; Modulation:GFSK; ; Channel:middle



Site : chamber

Condition: 3m VERTICAL

Job No : 19074CR/19075CR

Mode : 2440 TX RSE

Note : BLE

0.00		_							
		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	1629.825	5.31	26.38	40.59	47.37	38.47	74.00	-35.53	peak
2	4430.628	7.48	33.60	42.50	48.27	46.85	74.00	-27.15	peak
3	4880.000	7.97	34.29	42.82	46.72	46.16	74.00	-27.84	peak
4	6432.732	11.41	35.05	41.99	47.59	52.06	74.00	-21.94	peak
5	7320.000	10.05	36.37	41.52	45.90	50.80	74.00	-23.20	peak
6	9760,000	10.82	37.55	38.35	41.57	51.59	74.00	-22.41	peak



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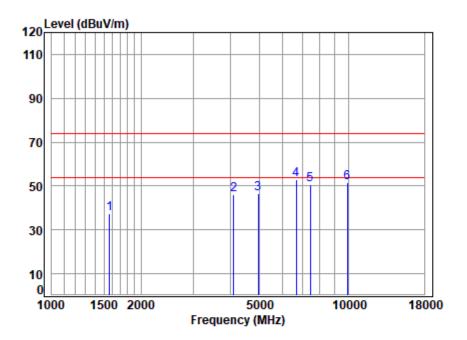
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Mode:e; Polarization:Horizontal; Modulation:GFSK; ; Channel:High



Site : chamber

Condition: 3m HORIZONTAL : 19074CR/19075CR Mode : 2480 TX 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	
	4565 404	F 30	25.40	40 55	46.00	27.00	74.00	26.70	
1	1565.191	5.39	26.10	40.55	46.28	3/.22	74.00	-36./8	peak
2	4109.872	7.11	33.60	42.25	47.76	46.22	74.00	-27.78	peak
3	4960.000	8.05	34.43	42.87	46.88	46.49	74.00	-27.51	peak
4	6679.040	11.02	35.61	41.85	47.93	52.71	74.00	-21.29	peak
5	7440.000	10.02	36.32	41.46	45.89	50.77	74.00	-23.23	peak
6	9920.000	10.90	37.58	38.12	41.35	51.71	74.00	-22.29	peak



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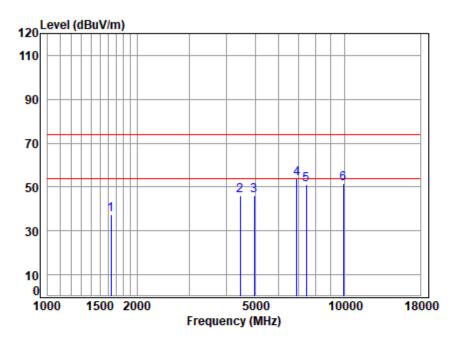
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Mode:d; Polarization:Vertical; Modulation:GFSK; ; Channel:High



Site : chamber

Condition: 3m VERTICAL Job No : 19074CR/19075CR

Mode : 2480 TX 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	1634.543	5.31	26.40	40.59	46.46	37.58	74.00	-36.42	peak	
2	4456.315	7.51	33.60	42.52	47.55	46.14	74.00	-27.86	peak	
3	4960.000	8.05	34.43	42.87	46.64	46.25	74.00	-27.75	peak	
4	6914.763	10.36	36.27	41.73	48.81	53.71	74.00	-20.29	peak	
5	7440.000	10.02	36.32	41.46	46.12	51.00	74.00	-23.00	peak	
6	9920.000	10.90	37.58	38.12	41.20	51.56	74.00	-22.44	peak	



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8 **Photographs**

8.1 Test Setup

Refer to Setup Photos

8.2 EUT Constructional Details (EUT Photos)

Refer to EUT external and internal photos



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Appendix 9

Appendix 15.247

1Mb/s

1.6dB Bandwidth

Test Mode	Test	Ant	EBW[MHz]	Limit[MHz]	Verdict
BLE	2402	Ant1	0.726	>=0.5	PASS
BLE	2440	Ant1	0.723	>=0.5	PASS
BLE	2480	Ant1	0.723	>=0.5	PASS



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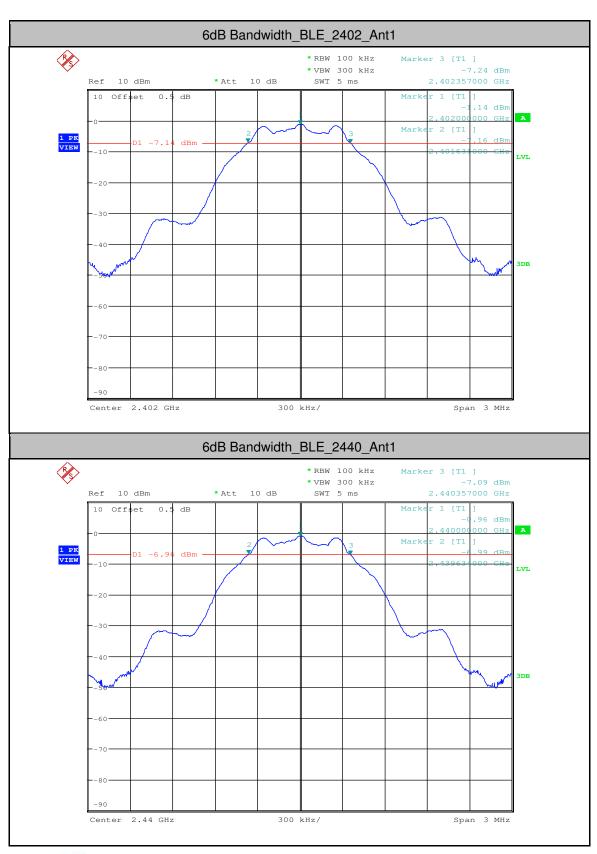
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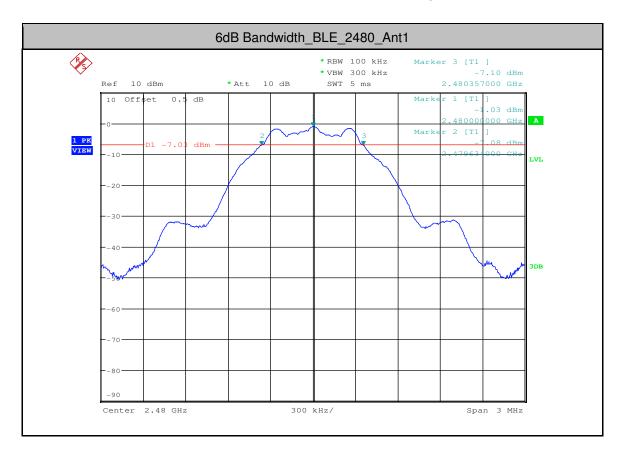
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2.Maximum peak conducted output power

Test Mode	Test Channel	Test Channel Ant Power[dBm]		Limit[dBm]	Verdict
BLE	2402	Ant1	-0.55	<30	PASS
BLE	2440	Ant1	-0.42	<30	PASS
BLE	2480	Ant1	-0.01	<30	PASS



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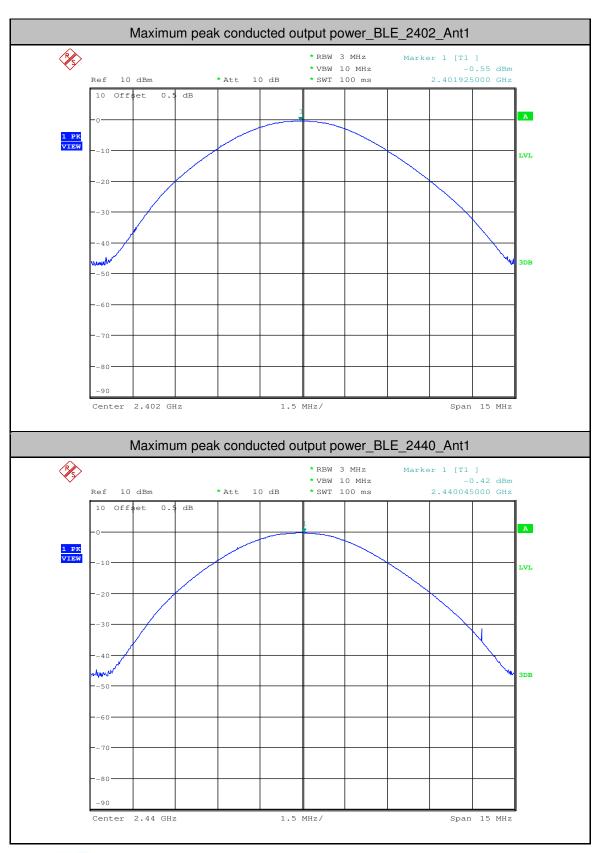
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3. Maximum Peak power spectral density

Test Mode	Test Channel	Ant	PSD[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE	2402	Ant1	-16.32	<8.00	PASS
BLE	2440	Ant1	-16.13	<8.00	PASS
BLE	2480	Ant1	-16.19	<8.00	PASS



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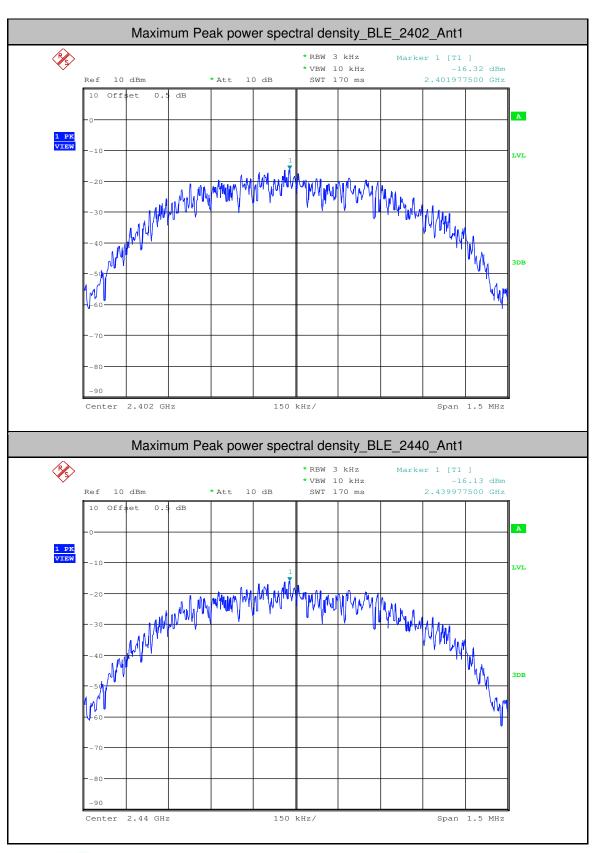
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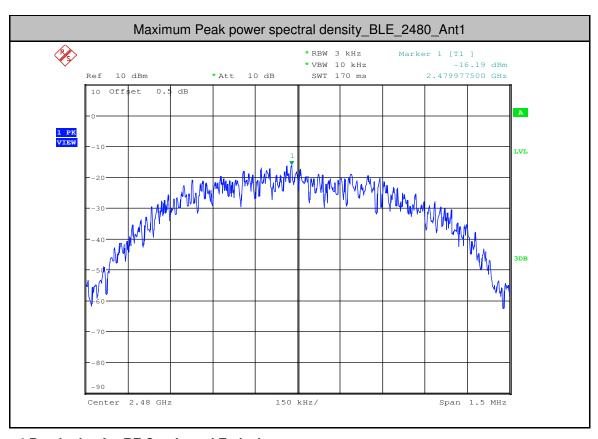
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4.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Ant	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
BLE	2402	Ant1	-1.010	-64.601	<-21.01	PASS
BLE	2480	Ant1	-1.050	-59.687	<-21.05	PASS



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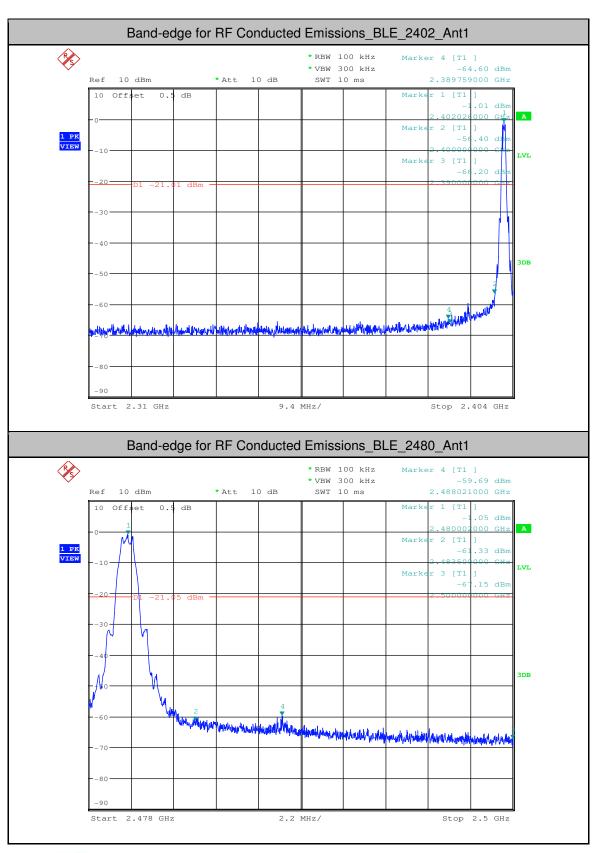
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5.RF Conducted Spurious Emissions

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BLE	2402	30	10000	1000	3000	-0.9	-47.480	<-20.9	PASS
BLE	2402	10000	25000	1000	3000	-0.9	-54.850	<-20.9	PASS
BLE	2440	30	10000	1000	3000	-0.76	-46.180	<-20.76	PASS
BLE	2440	10000	25000	1000	3000	-0.76	-55.180	<-20.76	PASS
BLE	2480	30	10000	1000	3000	-0.88	-44.960	<-20.88	PASS
BLE	2480	10000	25000	1000	3000	-0.88	-55.310	<-20.88	PASS



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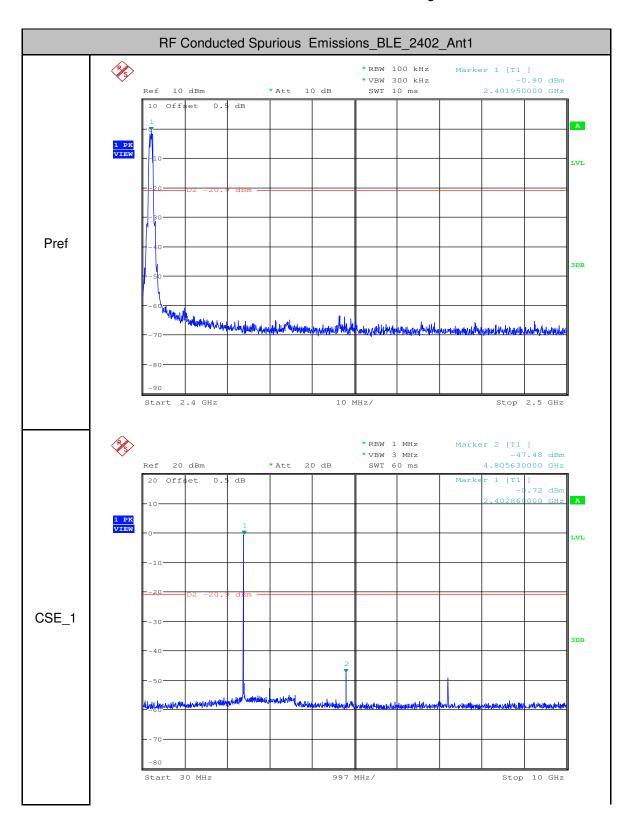
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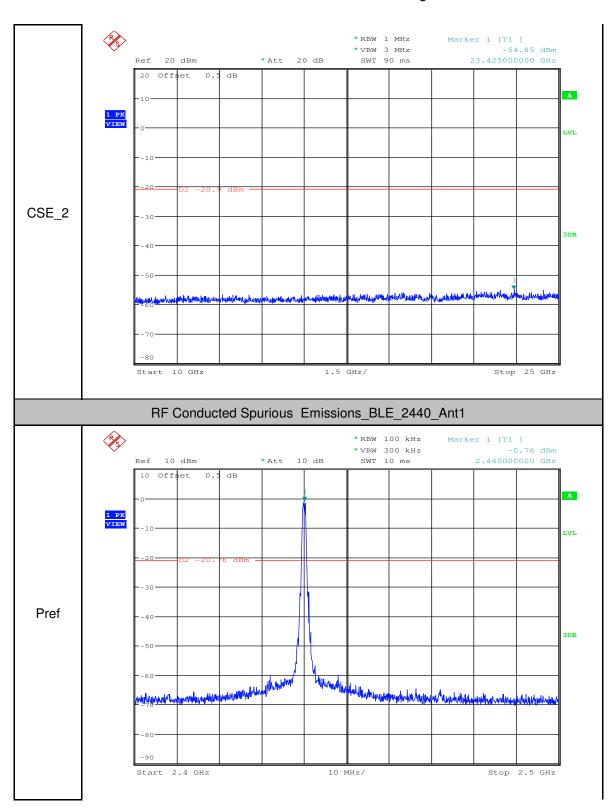
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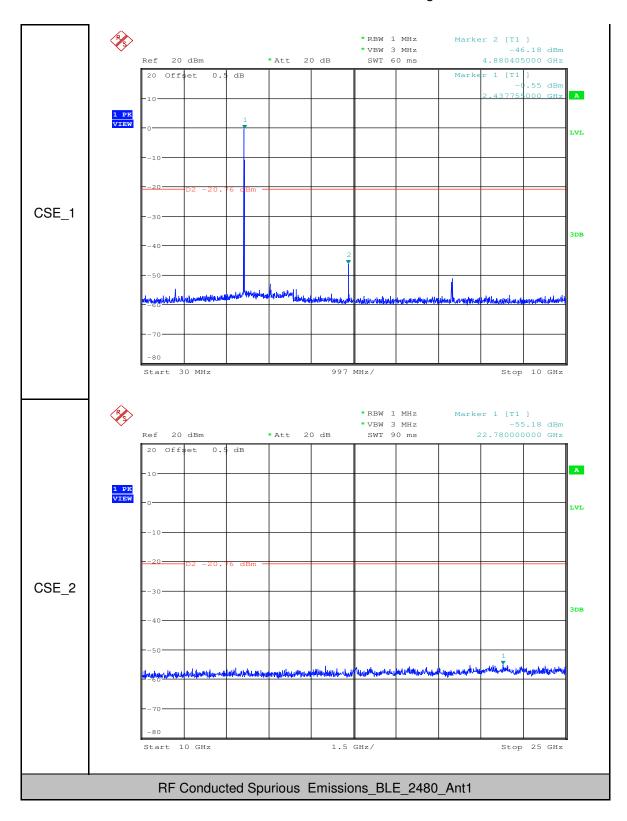
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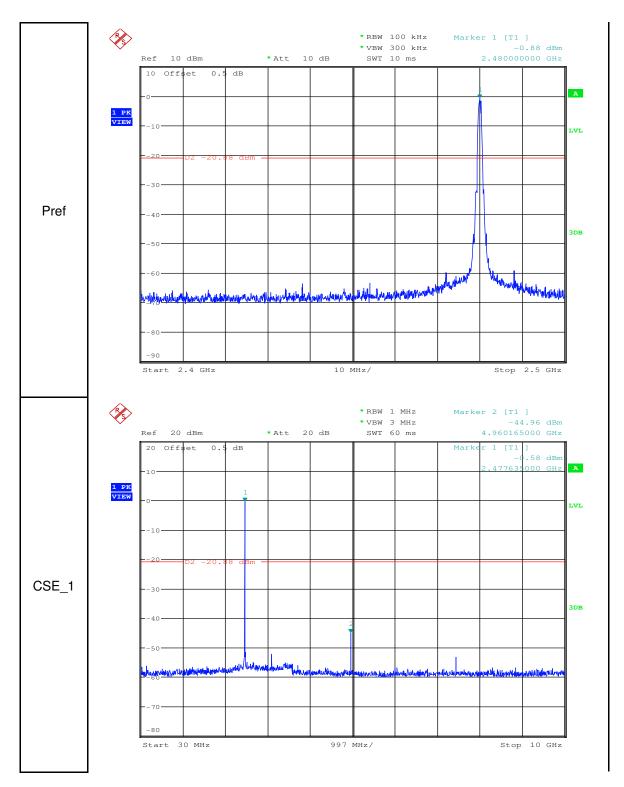
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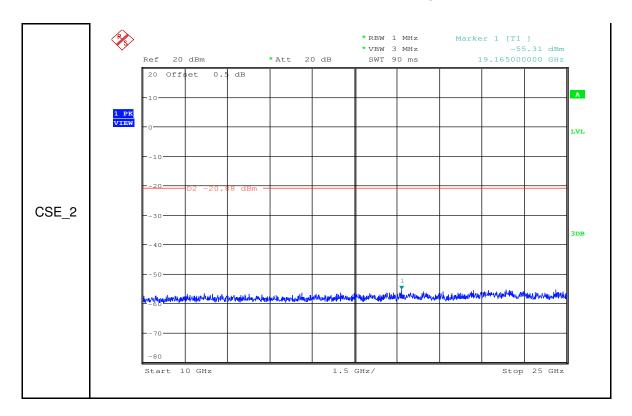
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2Mb/s

1.6dB Bandwidth

Test Mode	Test Channel	Ant	Ant EBW[MHz]		Verdict
BLE	2402	Ant1	1.265	>=0.5	PASS
BLE	2440	Ant1	1.275	>=0.5	PASS
BLE	2480	Ant1	1.265	>=0.5	PASS



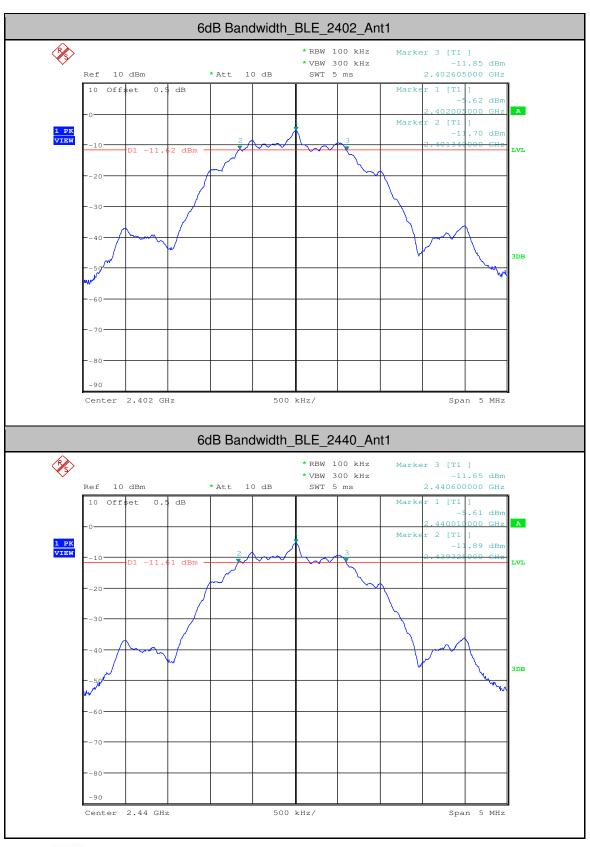
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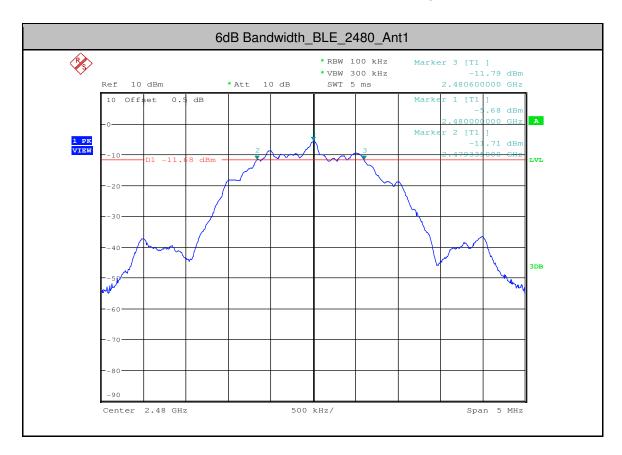
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2.Maximum peak conducted output power

Test Mode	Test Channel	est Channel Ant Power[o		Limit[dBm]	Verdict
BLE	2402	Ant1	-4.61	<30	PASS
BLE	2440	Ant1	-4.64	<30	PASS
BLE	2480	Ant1	-4.7	<30	PASS



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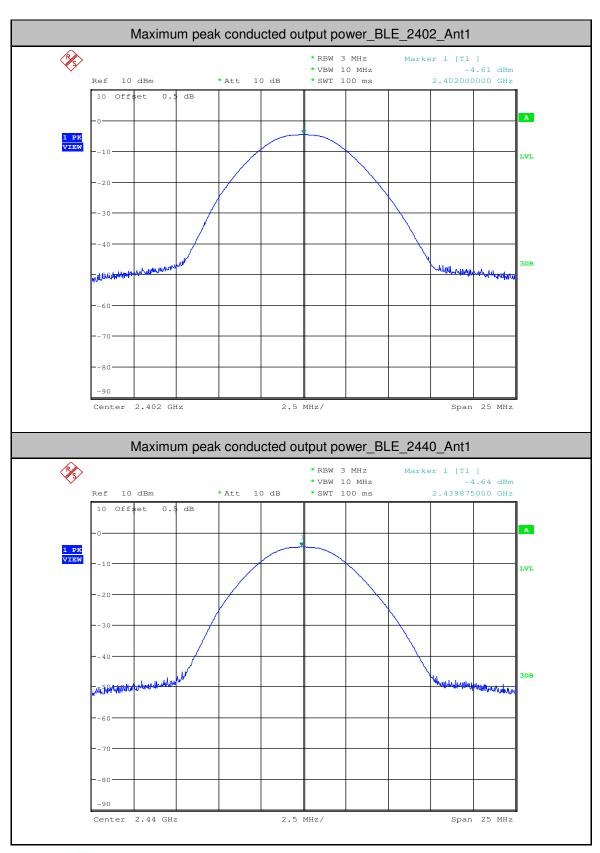
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3.Maximum Peak power spectral density

Test Mode	Test Channel	Ant	PSD[dBm/3kHz]	Limit[dBm/3kHz]	Verdict
BLE	2402	Ant1	-23.56	<8.00	PASS
BLE	2440	Ant1	-23.49	<8.00	PASS
BLE	2480	Ant1	-23.51	<8.00	PASS



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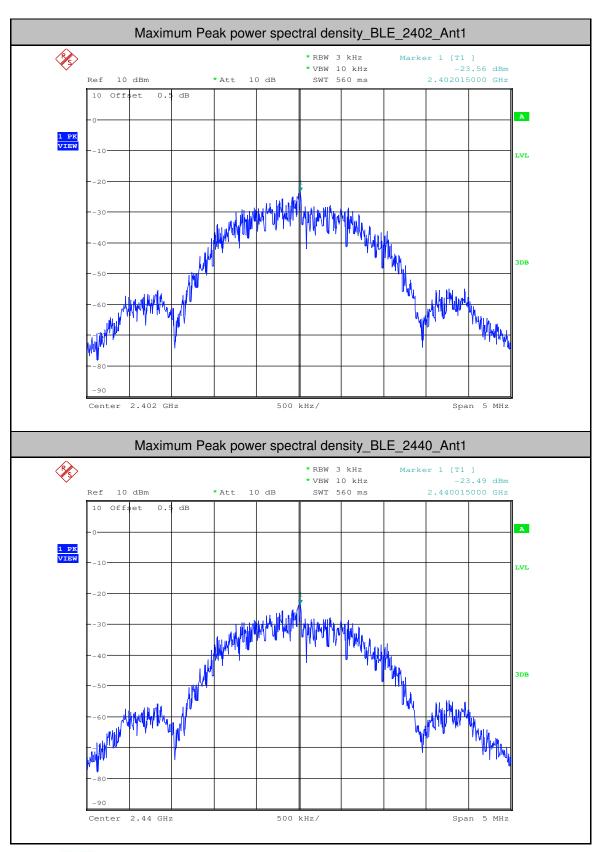
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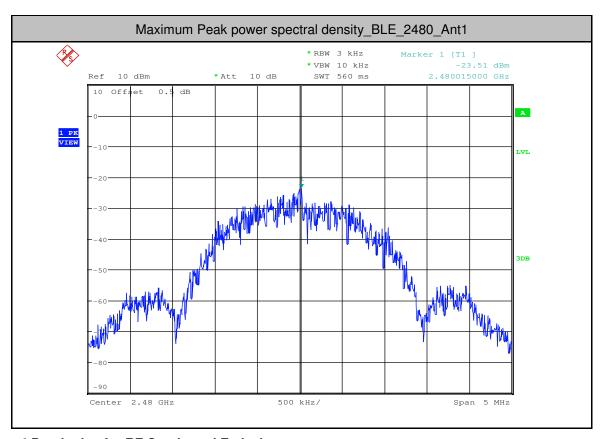
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4.Band-edge for RF Conducted Emissions

Test Mode	Test Channel	Ant	Carrier Power[dBm]	Max. Spurious Level [dBm]	Limit [dBm]	Verdict
BLE	2402	Ant1	-5.530	-64.985	<-25.53	PASS
BLE	2480	Ant1	-5.720	-60.443	<-25.72	PASS



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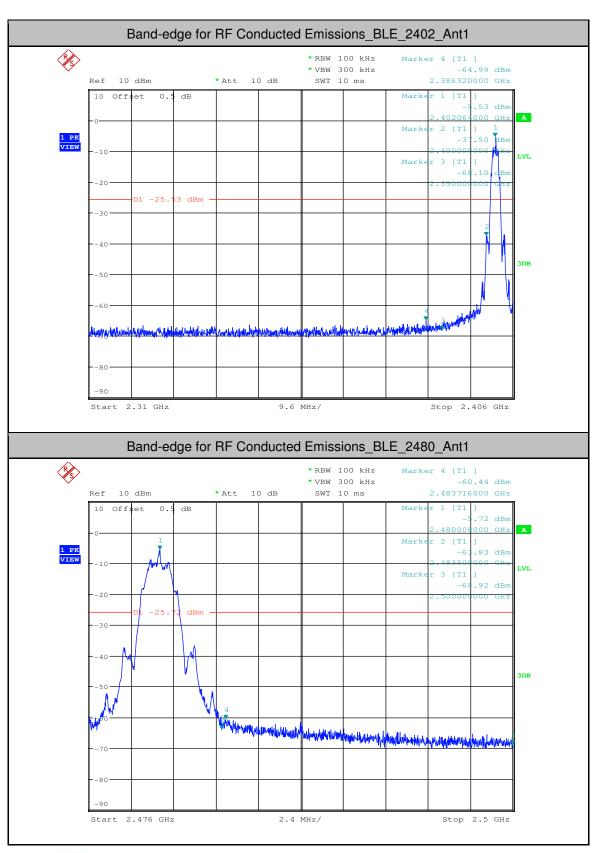
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5.RF Conducted Spurious Emissions

Test Mode	Test Channel	StartFre [MHz]	StopFre [MHz]	RBW [kHz]	VBW [kHz]	Pref[dBm]	Max. Level [dBm]	Limit [dBm]	Verdict
BLE	2402	30	10000	1000	3000	-5.4	-51.720	<-25.4	PASS
BLE	2402	10000	25000	1000	3000	-5.4	-65.090	<-25.4	PASS
BLE	2440	30	10000	1000	3000	-5.41	-50.910	<-25.41	PASS
BLE	2440	10000	25000	1000	3000	-5.41	-65.220	<-25.41	PASS
BLE	2480	30	10000	1000	3000	-5.45	-49.900	<-25.45	PASS
BLE	2480	10000	25000	1000	3000	-5.45	-65.230	<-25.45	PASS



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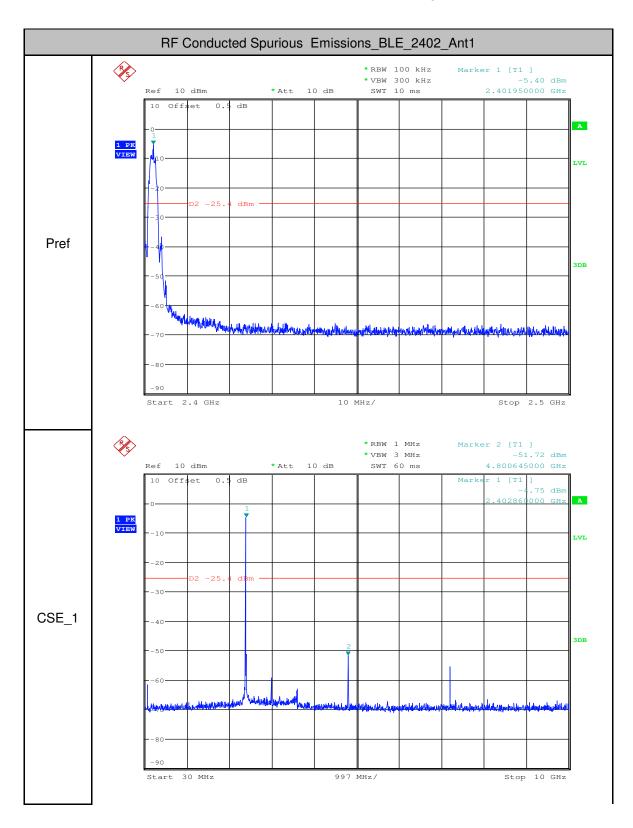
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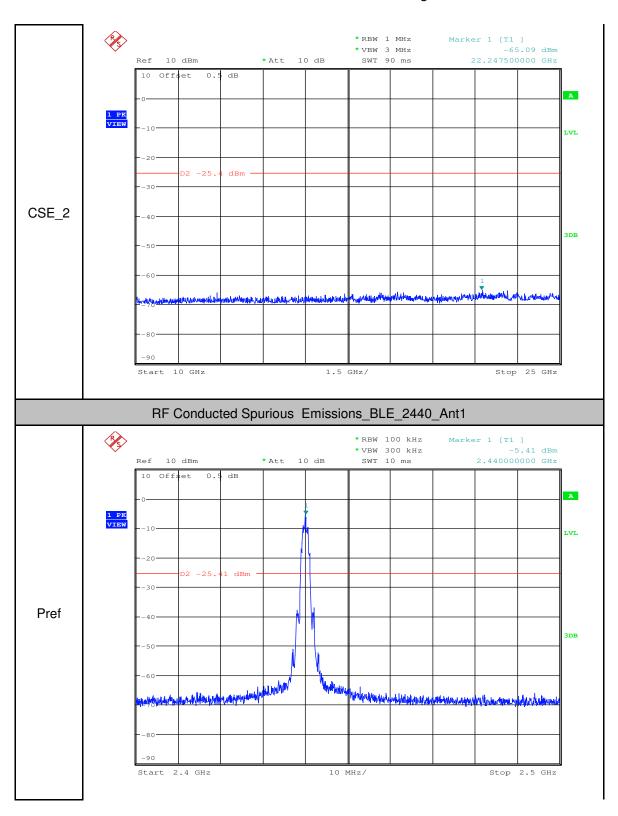
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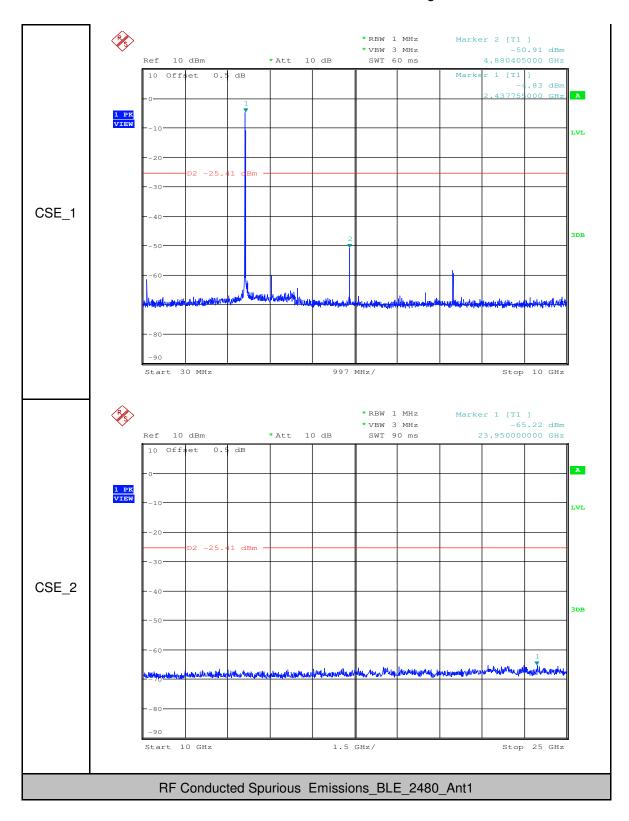
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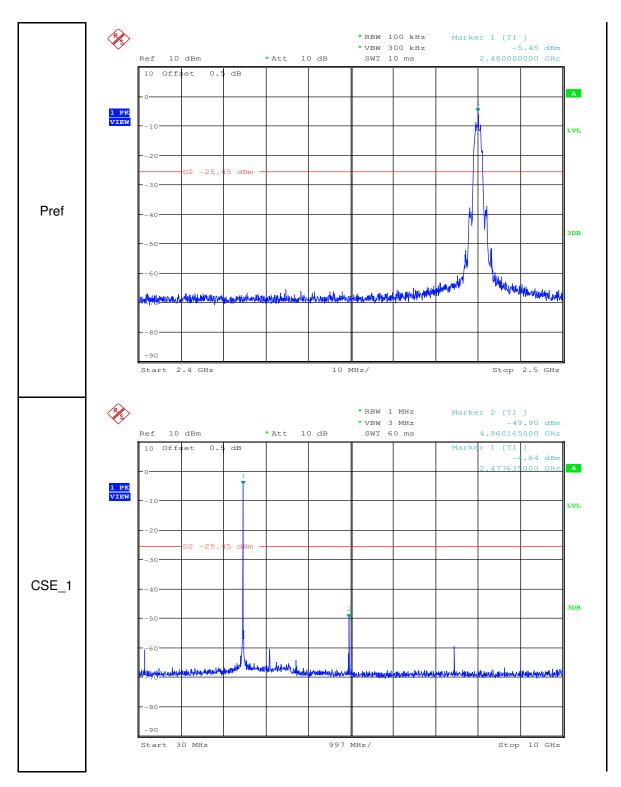
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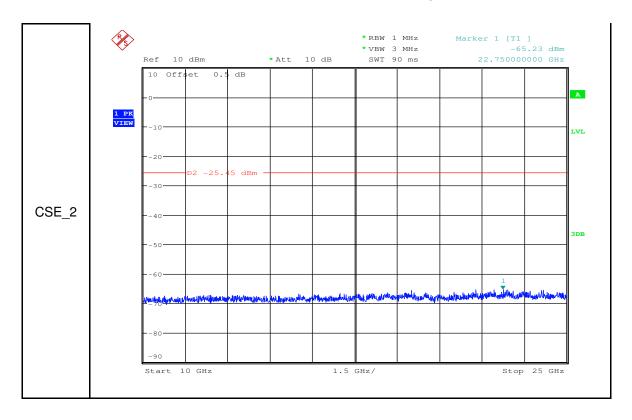
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