

Report No: CCISE200901903V01

FCC REPORT

Applicant:	Shenzhen Huafurui Technology Co., Ltd.
Address of Applicant:	Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street, Xili, Nan shan district Shenzhen China
Equipment Under Test (E	EUT)
Product Name:	Smartphone
Model No.:	KINGKONG MINI 2
Trade mark:	CUBOT
FCC ID:	2AHZ5KKMN2
Applicable standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247
Date of sample receipt:	09 Sep., 2020
Date of Test:	10 Sep., to 09 Oct., 2020
Date of report issued:	02 Nov., 2020
Test Result:	PASS*

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

Authorized Signature:



Bruce Zhang Laboratory Manager

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product and does not permit the use of the CCIS product certification mark. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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2 Version

Version No.	Date	Description
00	10 Oct., 2020	Original
01	02 Nov., 2020	Update Applicant, Address, Manufacturer Address, Factory Address.

Tested by:

Mike.OU Test Engineer

Date: 02 Nov., 2020

Winner thang

Reviewed by:

Project Engineer

Date:

02 Nov., 2020

CCIS

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4 Test Summary

Test Items	Section in CFR 47	Result
Antenna requirement	15.203 & 15.247 (b)	Pass
AC Power Line Conducted Emission	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
6dB Emission Bandwidth 99% Occupied Bandwidth	15.247 (a)(2)	Pass
Power Spectral Density	15.247 (e)	Pass
Band Edge	15.247 (d)	Pass
Spurious Emission	15.205 & 15.209	Pass
Remark: 1. Pass: The EUT complies with the esser 2. N/A: Not Applicable.	ntial requirements in the standard.	

3. The cable insertion loss used by "RF Output Power" and other conduction measurement items is 0.5dB (provided by the customer).

Test Method:

ANSI C63.10-2013 KDB 558074 D01 15.247 Meas Guidance v05r02



5 General Information

5.1 Client Information

Applicant:	Shenzhen Huafurui Technology Co., Ltd.
Address:	Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street, Xili, Nan shan district Shenzhen China
Manufacturer/ Factory:	Shenzhen Huafurui Technology Co., Ltd.
Address:	Unit 1401 14/F, Jin qi zhi gu mansion Liu xian street, Xili, Nan shan district Shenzhen China

5.2 General Description of E.U.T.

Product Name:	Smartphone
Model No.:	KINGKONG MINI 2
Operation Frequency:	2402-2480 MHz
Channel numbers:	40
Channel separation:	2 MHz
Modulation technology:	GFSK
Data speed :	1Mbps
Antenna Type:	Internal Antenna
Antenna gain:	1.65 dBi
Power supply:	Rechargeable Li-ion Battery DC3.85V-3000mAh
AC adapter:	Model: HJ-0501000E1-US Input: AC100-240V, 50/60Hz, 0.2A Output: DC 5.0V, 1.0A
Test Sample Condition:	The test samples were provided in good working order with no visible defects.

Operation	Frequency eac	h of channe	el				
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
2	2406MHz	12	2426MHz	22	2446MHz	32	2466MHz
3	2408MHz	13	2428MHz	23	2448MHz	33	2468MHz
4	2410MHz	14	2430MHz	24	2450MHz	34	2470MHz
5	2412MHz	15	2432MHz	25	2452MHz	35	2472MHz
6	2414MHz	16	2434MHz	26	2454MHz	36	2474MHz
7	2416MHz	17	2436MHz	27	2456MHz	37	2476MHz
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz
Noto:		•		-			

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test. Channel No. 0, 20 & 39 were selected as Lowest, Middle and Highest channel.



5.3 Test environment and mode

Operating Environment:

Temperature:	24.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode	Keep the EUT in continuous transmitting with modulation

Radiated Emission: The sample was placed 0.8m (below 1GHz)/1.5m (above 1GHz) above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. Duty cycle setting during the transmission is 100% with maximum power setting for all modulations.

5.4 Description of Support Units

The EUT has been tested as an independent unit.

5.5 Measurement Uncertainty

Parameters	Expanded Uncertainty
Conducted Emission (9kHz ~ 30MHz)	±1.60 dB (k=2)
Radiated Emission (9kHz ~ 30MHz)	±3.12 dB (k=2)
Radiated Emission (30MHz ~ 1000MHz)	±4.32 dB (k=2)
Radiated Emission (1GHz ~ 18GHz)	±5.16 dB (k=2)
Radiated Emission (18GHz ~ 40GHz)	±3.20 dB (k=2)

5.6 Additions to, deviations, or exclusions from the method

No

5.7 Laboratory Facility

The test facility is recognized, certified, or accredited by the following organizations:

• FCC - Designation No.: CN1211

Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been accredited as a testing laboratory by FCC(Federal Communications Commission). The test firm Registration No. is 727551.

• ISED – CAB identifier.: CN0021

The 3m Semi-anechoic chamber of Shenzhen Zhongjian Nanfang Testing Co., Ltd. has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 10106A-1.

• A2LA - Registration No.: 4346.01

This laboratory is accredited in accordance with the recognized International Standard ISO/IE C 17025:2005 General requirements for the competence of testing and calibration laboratories. The test scope can be found as below link: https://portal.a2la.org/scopedf/4346-01.pdf

5.8 Laboratory Location

Shenzhen Zhongjian Nanfang Testing Co., Ltd. Address: No.110~116, Building B, Jinyuan Business Building, Xixiang Road, Bao'an District, Shenzhen, Guangdong, China Tel: +86-755-23118282, Fax: +86-755-23116366 Email: info@ccis-cb.com, Website: http://www.ccis-cb.com

5.9 Test Instruments list

Radiated Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
				(mm-dd-yy)	(mm-dd-yy)
3m SAC	SAEMC	9m*6m*6m	966	07-21-2020	07-20-2021
Loop Antenna	SCHWARZBECK	FMZB1519B	044	03-07-2020	03-06-2021
BiConiLog Antenna	SCHWARZBECK	VULB9163	497	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	916	03-07-2020	03-06-2021
Horn Antenna	SCHWARZBECK	BBHA9120D	1805	06-20-2020	06-19-2021
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170582	11-18-2019	11-17-2020
EMI Test Software	AUDIX	E3	V	ersion: 6.110919)
Pre-amplifier	HP	8447D	2944A09358	03-07-2020	03-06-2021
Pre-amplifier	CD	PAP-1G18	11804	03-07-2020	03-06-2021
Spectrum analyzer	Rohde & Schwarz	FSP30	101454	03-05-2020	03-04-2021
Spectrum analyzer	Rohde & Schwarz	FSP40	100363	11-18-2019	11-17-2020
EMI Test Receiver	Rohde & Schwarz	ESRP7	101070	03-05-2020	03-04-2021
Cable	ZDECL	Z108-NJ-NJ-81	1608458	03-07-2020	03-06-2021
Cable	MICRO-COAX	MFR64639	K10742-5	03-07-2020	03-06-2021
Cable	SUHNER	SUCOFLEX100	58193/4PE	03-07-2020	03-06-2021
RF Switch Unit	MWRFTEST	MW200	N/A	N/A	N/A
Test Software	MWRFTEST	MTS8200		Version: 2.0.0.0	

Conducted Emission:					
Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Due date
				(mm-dd-yy)	(mm-dd-yy)
EMI Test Receiver	Rohde & Schwarz	ESCI	101189	03-05-2020	03-04-2021
Pulse Limiter	SCHWARZBECK	OSRAM 2306	9731	03-05-2020	03-04-2021
LISN	CHASE	MN2050D	1447	03-05-2020	03-04-2021
LISN	Rohde & Schwarz	ESH3-Z5	8438621/010	06-18-2020	07-17-2021
Cable	HP	10503A	N/A	03-05-2020	03-04-2021
EMI Test Software	AUDIX	E3	V	ersion: 6.110919	D



6 Test results and Measurement Data

6.1 Antenna requirement:

|--|

15.203 requirement:

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

15.247(b) (4) requirement:

(4) 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.

E.U.T Antenna:

The BLE antenna is an Internal antenna which cannot replace by end-user, the best-case gain of the antenna is 1.65 dBi.

6.2 Conducted Emission

Test Requirement:	FCC Part 15 C Section 15.207							
Test Frequency Range:	150 kHz to 30 MHz							
Class / Severity:	Class B							
Receiver setup:	RBW=9kHz, VBW=30kHz							
Limit:	Frequency range (MHz)	Limit (dBuV)						
		Quasi-peak	Average					
	0.15-0.5	66 to 56*	56 to 46*					
	0.5-5	56	46					
	5-30	60	50					
Test procedure:	 * Decreases with the logarithm of the frequency. 1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.), which provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10(latest version) on conducted measurement. 							
Test setup:	Reference	80cm Filter EMI Receiver	– AC power					
Test Instruments:	Refer to section 5.9 for details	i						
Test mode:	Refer to section 5.3 for details	i						
Test results:	Passed							

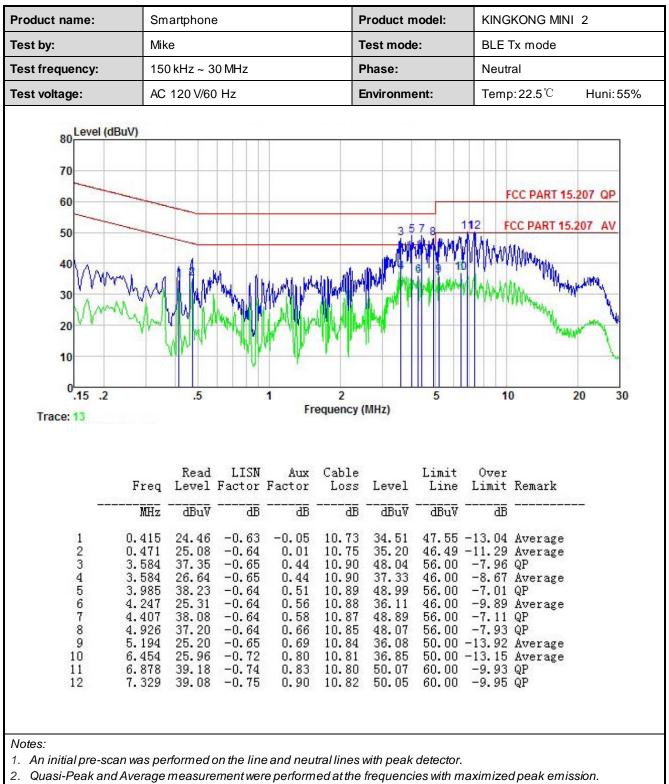


Measurement Data:

Product name: Smartphone			Product model:			odel:	KINGKONG MINI 2				
Test by:	Mike				Те	Test mode: B			BLE Tx mode		
Test frequency:	150	kHz ~ 30	MHz	Phase:				Line			
Test voltage:	AC 1	20 V/60	Hz		En	vironme	nt:	Temp:	: 22.5 ℃	Huni: 55%	
80 Level (dBu 70 60 50 40 30 20 40 10 0.15 .2 Trace: 15	V)	.5	1	Freq	2 uency (M	245789 3 6 10 3 6 10 Hz)	5		C PART 15.2	OT AV	
		Read Level		Factor	Loss	Level	Limit Line	Over Limit	Remark		
	Freq MHz	 dBuV	dB	dB	dB	dBu∛	dBuV	dB			

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3. Final Level = Receiver Read level + LISN Factor + Aux Factor + Cable Loss.



6.3 Conducted Output Power

Test Requirement:	FCC Part 15 C Section 15.247 (b)(3)
Limit:	30dBm
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed



6.4 Occupy Bandwidth

Test Requirement:	FCC Part 15 C Section 15.247 (a)(2)
Limit:	>500kHz
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed



6.5 Power Spectral Density

Test Requirement:	FCC Part 15 C Section 15.247 (e)
Limit:	8 dBm/3kHz
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed



6.6 Band Edge

6.6.1 Conducted Emission Method

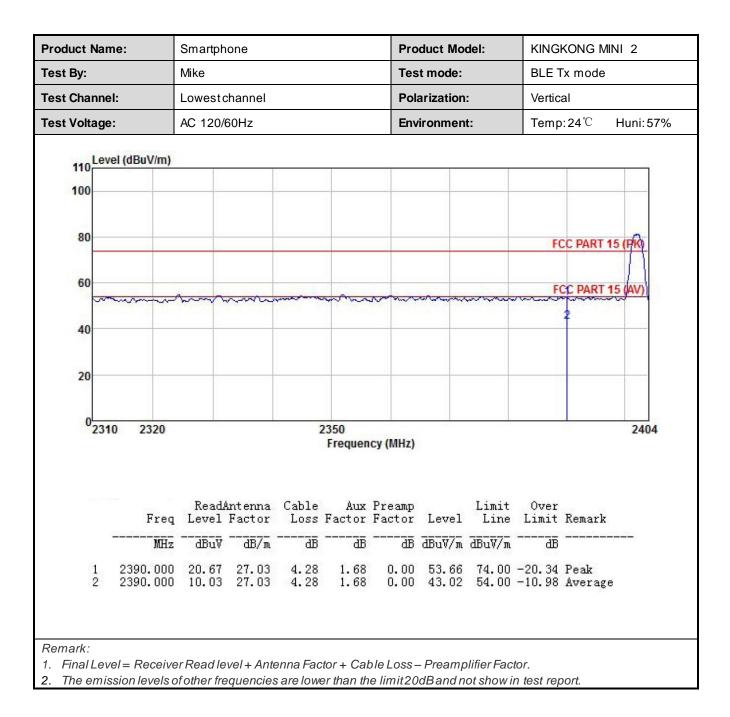
Test Requirement:	FCC Part 15 C Section 15.247 (d)						
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.						
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane						
Test Instruments:	Refer to section 5.9 for details						
Test mode:	Refer to section 5.3 for details						
Test results:	Passed						

6.6.2 Radiated Emission Method

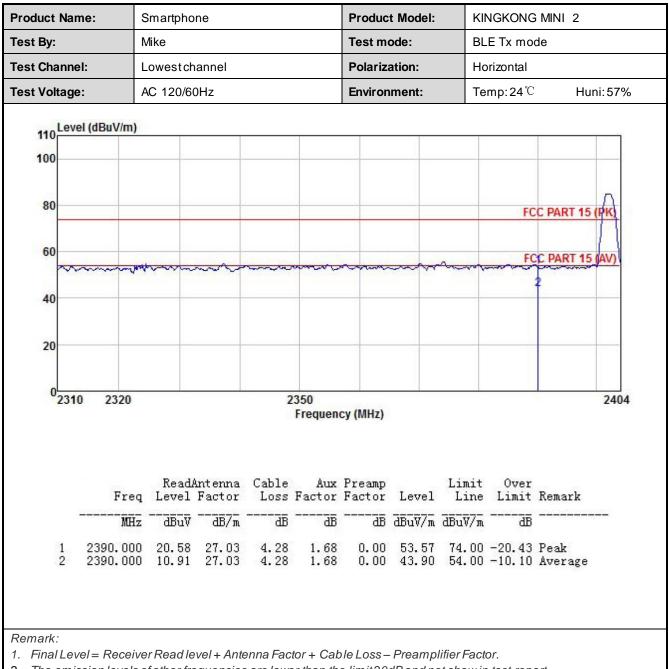
Test Requirement:	FCC Part 15 C Section 15.205 and 15.209							
Test Frequency Range:	2310 MHz to 2	2390 MHz and	2483.5MHz to 2	2500 MHz				
Test Distance:	3m							
Receiver setup:	Frequency	Detector	RBW	VBW	Remark			
	Above 1GHz	Peak	1MHz	3MHz	Peak Value			
1 : :	Frequen	RMS	1MHz .imit (dBuV/m @:	3MHz	Average Value Remark			
Limit:	•		54.00		verage Value			
	Above 10	GHz	74.00		Peak Value			
Test Procedure:	 the ground to determ The EUT antenna, tower. The antern the ground Both horiz make the For each case and meters and to find the The test-rest Specified If the emist the limits of the EU have 10 compared to compare the compared to compared to compare the compared to compare the compare to	d at a 3 meter ine the position was set 3 meter which was meter and height is d to determinate ontal and very measurement suspected ent then the anter and the rota talk emaximum re- receiver system Bandwidth we ssion level of specified, ther T would be re- dB margin wo	varied from one r e the maximum v tical polarization t. nission, the EUT onna was tuned to ble was turned fro ading. em was set to Pe ith Maximum Ho the EUT in peak testing could be eported. Otherwis	able was rotat radiation. the interference of a variable meter to four value of the f is of the ante was arrange o heights from om 0 degrees ak Detect Fu Id Mode. mode was 1 e stopped and se the emissione by one u	ted 360 degrees ce-receiving e-height antenna meters above field strength. Inna are set to d to its worst m 1 meter to 4 s to 360 degrees nction and 0 dB lower than d the peak values ions that did not using peak, quasi-			
Test setup:		urntable)	Horn Antenna Horn Antenna 3m Areliference Plane	Antenna Tower				
Test Instruments:	Refer to section	on 5.9 for deta	ails					
Test mode:	Refer to section	on 5.3 for deta	ils					
Test results:	Passed							





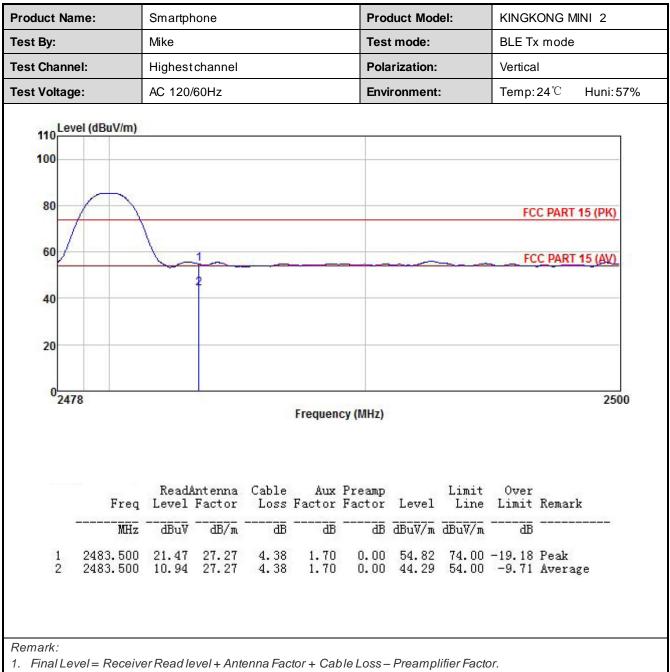






2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.

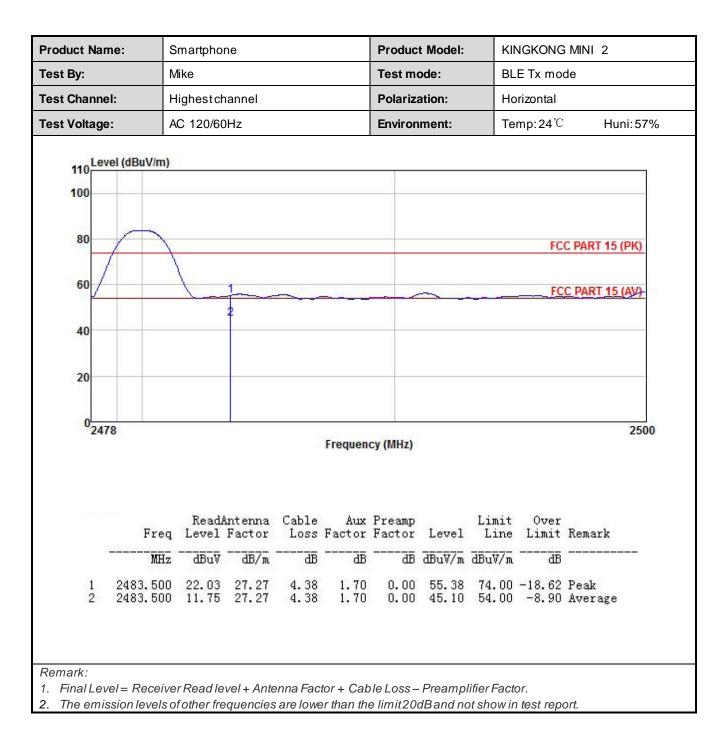




2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.









6.7 Spurious Emission

6.7.1 Conducted Emission Method

Test Requirement:	FCC Part 15 C Section 15.247 (d)
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.
Test setup:	Spectrum Analyzer E.U.T Non-Conducted Table Ground Reference Plane
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed



6.7.2 Radiated Emission Method

Test Requirement:	FCC Part 15 C Section 15.205 and 15.209						
Test Frequency Range:	9kHz to 25GHz						
Test Distance:	3m						
Receiver setup:	Frequency	Detector	r	RBW	VB	W	Remark
	30MHz-1GHz	Quasi-pea	ak	120KHz	300KHz		Quasi-peak Value
	Above 1GHz	Peak		1MHz	3MHz		Peak Value
	ADOVE IGHZ	RMS		1MHz	3MHz		Average Value
Limit:	Frequenc	y	Lim	nit (dBuV/m @	3m)		Remark
	30MHz-88M	Hz		40.0		Q	uasi-peak Value
	88MHz-216N	/Hz		43.5		Q	uasi-peak Value
	216MHz-960I	MHz		46.0		Q	uasi-peak Value
	960MHz-1G	Hz		54.0		Q	uasi-peak Value
		-		54.0			Average Value
	Above 1GH	12		74.0			Peak Value
	 The EUT was placed on the top of a rotating table 0.8m(below 1GHz)/1.5m(above 1GHz) above the ground at a 3 meter camber The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. 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. For each suspected emission, the EUT was arranged to its wors case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10 dB lower thar 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 10 dB margin would be re-tested one by one using peak, quasi peak or average method as specified and then reported in a data 						the position of the rference-receiving ole-height antenna our meters above the field strength. Intenna are set to anged to its worst from 1 meter to 4 es to 360 degrees ect Function and 10 dB lower than and the peak values ssions that did not using peak, quasi-
Test setup:		3m 4m 4m 0.8m 1m 4m				Antenna Search Antenna Test eiver —	

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	Horn Antenna Tower Horn Antenna Tower Ground Reference Plane Test Receiver
Test Instruments:	Refer to section 5.9 for details
Test mode:	Refer to section 5.3 for details
Test results:	Passed
Remark:	 Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the Y-axis is the worst case. 9 kHz to 30MHz is lower than the limit 20dB, so only shows the data of above 30MHz in this report.



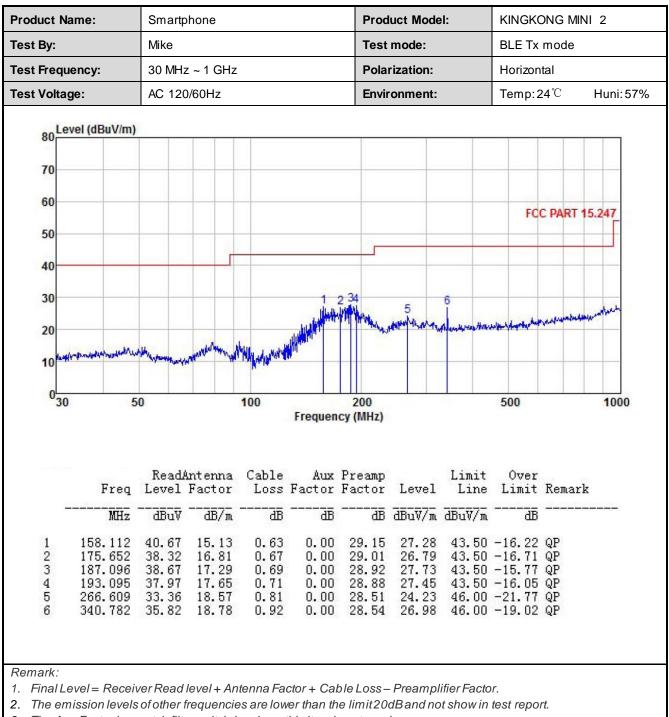
Measurement Data (worst case):

Below 1GHz:

duct Name: Smartphone				Produ	Product Model:			KINGKONG MINI 2			
	Mike				Test	mode:		BLE Tx mode			
ncy:	30 MHz	~ 1 GHz			Polar	ization:		Vertical			
e:	AC 120/	60Hz			Envir	onment:		Temp:2	4 ℃	Huni: 57%	
el (dBuV/m)											
	_										
								FCC	PART 15	.247	
							_				
5.000		- 1		5 6							
Manuful	h h	MAN		Lawrence	MY Marchele	more a fi	d Immediately	wowner	and white and	malline	
	we weld	- MI	When when the	lo and		Warn					
50			100		200			500		1000	
Freq			Cable	Aux	Preamp	Level	Limit Line				
MHz	dBuV		dB	āē	ā	dBuV/m	dBuV/m	<u>a</u> B			
32.864 46.503 81.783 93.440 135.982 165.487	45.22 40.58 41.43 45.51 45.53 42.84	12.27 12.99 12.38 9.43 13.56 15.70	0.36 0.38 0.47 0.50 0.59 0.64	0.00 0.00 0.00	29.85 29.63 29.56 29.29	24.10 24.65 25.88	40.00 40.00 43.50 43.50	-15.90 -15.35 -17.62	QP QP QP QP		
	ncy: 2: 1 (dBuV/m) 4 (dBuV/m) 50 50 Freq 50 50 50 50 50 50 50 50 50 50	Mike ncy: 30 MHz 30 MHz AC 120/ (dBuV/m) (dBuV/m) (dBuV/m) 50 50 50 Freq ReadA Freq Level MHz dBuV 32.864 45.22 46.503 40.58 81.783 41.43 93.440 45.51 135.982 45.53	Mike ncy: 30 MHz ~ 1 GHz AC 120/60Hz (dBuV/m) (dBuV/	Mike ncy: $30 \text{ MHz} \sim 1 \text{ GHz}$ AC 120/60Hz I (dBuV/m) I (dBuV/m)	Mike ncy: 30 MHz ~ 1 GHz a: AC 120/60Hz I(dBuV/m) Identified to the second seco	Mike Test ncy: 30 MHz ~ 1 GHz Polar a: AC 120/60Hz Envir 1(dBuV/m) IdBuV/m) IdBuV/m) 1 IdBuV/m) IdBuV/m) 50 100 200 50 100 200 Frequency (MHz) IdBuV IdBuV Freq Level Factor Loss Factor Factor MHz IdBuV IdB/m IdB IdB 32.864 45.22 12.27 0.36 0.00 29.96 46.503 40.58 12.99 0.38 0.00 29.85 81.783 41.43 12.38 0.47 0.00 29.63 393.440 45.51 9.43 0.50 0.00 29.29	Mike Test mode: ncy: 30 MHz ~ 1 GHz Polarization: a: AC 120/60Hz Environment: 1(dBuV/m)	Mike Test mode: ncy: 30 MHz ~ 1 GHz Polarization: a: AC 120/60Hz Environment:	Mike Test mode: BLE Tx ncy: 30 MHz ~ 1 GHz Polarization: Vertical e: AC 120/60Hz Environment: Temp: 2 1(dBuV/m)	Mike Test mode: BLE Tx mode ncy: 30 MHz ~ 1 GHz Polarization: Vertical a: AC 120/60Hz Environment: Temp:24°C 1(dBuV/m) FCC PART 15 FCC PART 15 4(dBuV/m) FCC PART 15 FCC PART 15 50 100 200 50 100 200 Frequency (MHz) 500 Frequency (MHz) 500 MHz dB/m dB 32.864 45.22 12.27 0.36 0.00 29.96 27.89 40.00 -12.11 QP 33.40 45.51 9.43 0.50 0.00 29.85 24.10 40.00 -15.90 QP 31.783 41.43 12.38 0.47 0.00 29.65 25.88 43.50 -15.90 QP 31.56 0.59 0.00 29.26 25.88 43.50 -15.90 QP	

3. The Aux Factor is a notch filter switch box loss, this item is not used.





3. The Aux Factor is a notch filter switch box loss, this item is not used.

Above 1GHz

			Te		el: Lowest c				
	[r	or: Peak Val	ue		[Γ
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarizatior
4804.00	47.64	30.78	6.80	2.44	41.81	45.85	74.00	-28.15	Vertical
4804.00	46.67	30.78	6.80	2.44	41.81	44.88	74.00	-29.12	Horizontal
				Detector:	: Average Va	alue			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarizatior
4804.00	38.97	30.78	6.80	2.44	41.81	37.18	54.00	-16.82	Vertical
4804.00	38.42	30.78	6.80	2.44	41.81	36.63	54.00	-17.37	Horizontal
					-1				
					el: Middle cl				
	Read	Antonno	Cabla	1	or: Peak Val	ue	Limit	Over	
Frequency (MHz)	Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	47.90	30.96	6.86	2.47	41.84	46.35	74.00	-27.65	Vertical
4884.00	46.83	30.96	6.86	2.47	41.84	45.28	74.00	-28.72	Horizontal
				Detector	Average Va	alue			
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4884.00	38.60	30.96	6.86	2.47	41.84	37.05	54.00	-16.95	Vertical
4884.00	37.92	30.96	6.86	2.47	41.84	36.37	54.00	-17.63	Horizontal
			Te		el: Highest c				
	1			1	or: Peak Val	ue		[
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
4960.00	47.76	31.11	6.91	2.49	41.87	46.40	74.00	-27.60	Vertical
4960.00	46.57	31.11	6.91	2.49	41.87	45.21	74.00	-28.79	Horizontal
				Detector:	: Average Va	alue			
-	Read Level	Antenna Factor	Cable Loss (dB)	Aux Factor (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarizatior
Frequency (MHz)	(dBuV)	(dB/m)	(uD)	(22)					
• •		(dB/m) 31.11	(dB) 6.91	2.49	41.87	37.95	54.00	-16.05	Vertical

2. The emission levels of other frequencies are lower than the limit 20dB and not show in test report.



Appendix A - BLE Test Data

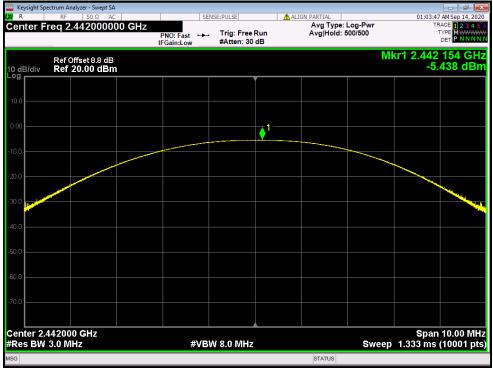
Maximum Conducted Output Power

Condi	ition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Duty Factor (dB)	Total Power (dBm)	Limit (dBm)	Verdict
NVI	NT	BLE	2402	Ant1	-4.877	(dB) 0	-4.877	30	Pass
NVI	NT	BLE	2442	Ant1	-5.438	0	-5.438	30	Pass
NVI	NT	BLE	2480	Ant1	-5.92	0	-5.92	30	Pass

Power NVNT BLE 2402MHz Ant1

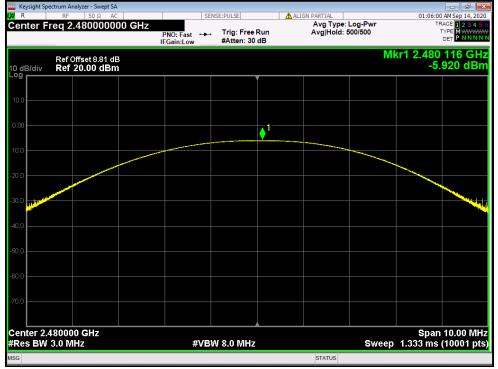
Penter Freq 2.402000000 GHz PNO: Fast Image: Free Run Higgs of the state o	Keysight Spectrum Analyzer - Swept SA			- ē 💌
PRO: Fast Trig: Free Run #Atten: 30 dB Avg Hold: 500/500 Trig: Free Run #Atten: 30 dB 0 dB/div Ref Offset 8.77 dB Mkr1 2.402 081 GHz 4.877 dBm 0 dB/div Ref 20.00 dBm 4.877 dBm 0 d 1 1	IXI R RF 50 Ω AC	SENSE:PULSE	ALIGN PARTIAL	01:01:52 AM Sep 14, 2020
-09 100 000 100 100 100 100 100 1	Center Freq 2.402000000 GHz		Avg Type: Log-Pwr Avg Hold: 500/500	TYPE M WAARAAAAA
100 000 100 100 100 100 100 100	10 dB/div Ref 20.00 dBm		Mk	r1 2.402 081 GHz -4.877 dBm
100 200 300 400 400 400 400 400 400 4	10.0			
200 200 300 400 500 500 500 500 500 500 5	0.00	1-		
300 300 <td>-10.0</td> <td></td> <td></td> <td></td>	-10.0			
40.0 50.0 60.0 70.0 Center 2.402000 GHz FRes BW 3.0 MHz * VBW 8.0 MHz	-20.0			
50 0 60 0 70 0 Center 2.402000 GHz FRes BW 3.0 MHz Sweep 1.333 ms (10001 pts)	-30.0			
60.0	-40.0			
Center 2.402000 GHz Span 10.00 MHz Res BW 3.0 MHz #VBW 8.0 MHz Sweep 1.333 ms (10001 pts)	-60.0			
	-70.0			
	Center 2.402000 GHz #Res BW 3.0 MHz	#VBW 8.0 MHz	Sweep	Span 10.00 MHz 1.333 ms (1000 <u>1 pts</u>)
	MSG			





Power NVNT BLE 2442MHz Ant1

Power NVNT BLE 2480MHz Ant1



-6dB Bandwidth

Cal Ball						
Condition	Mode	Frequency	Antenna	-6 dB Bandwidth	Limit -6 dB Bandwidth	Verdict
		(MHz)		(MHz)	(MHz)	
NVNT	BLE	2402	Ant1	0.682	0.5	Pass
NVNT	BLE	2442	Ant1	0.672	0.5	Pass
NVNT	BLE	2480	Ant1	0.678	0.5	Pass

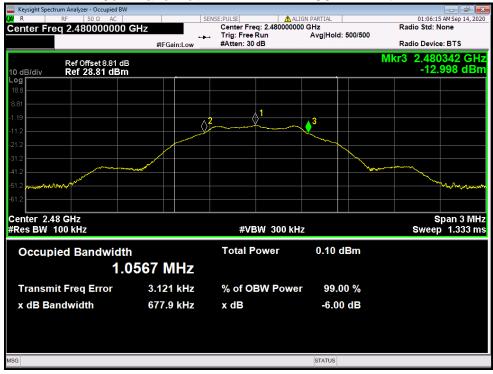




-6dB Bandwidth NVNT BLE 2402MHz Ant1

-6dB Bandwidth NVNT BLE 2442MHz Ant1



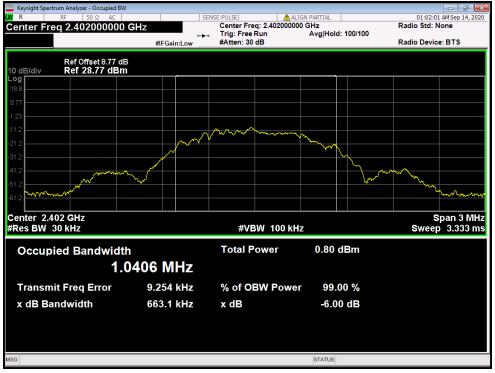


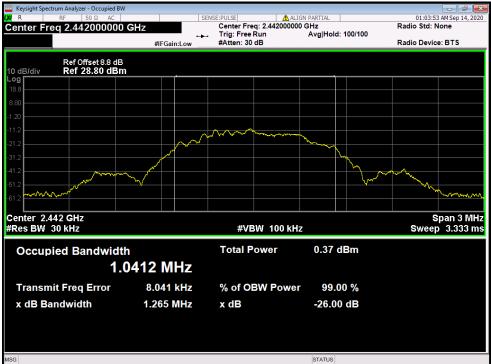
-6dB Bandwidth NVNT BLE 2480MHz Ant1

Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE	2402	Ant1	1.040619345
NVNT	BLE	2442	Ant1	1.041240158
NVNT	BLE	2480	Ant1	1.042787187

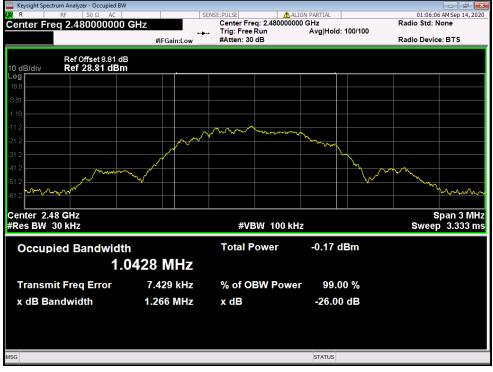
OBW NVNT BLE 2402MHz Ant1





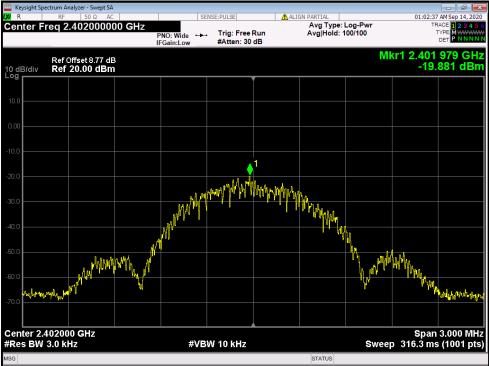
OBW NVNT BLE 2442MHz Ant1

OBW NVNT BLE 2480MHz Ant1



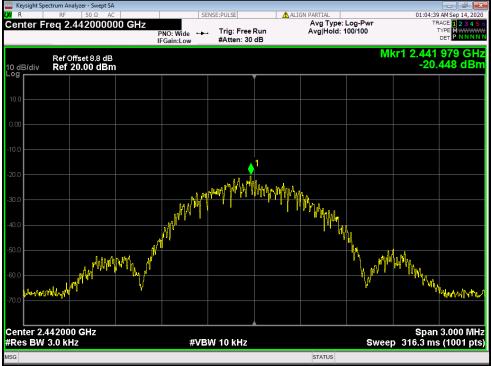
Maximum Power Spectral Density Level

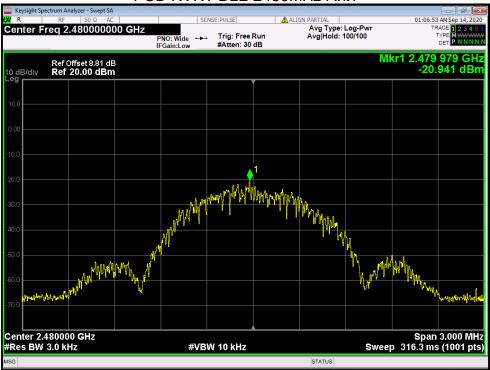
Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant1	-19.881	8	Pass
NVNT	BLE	2442	Ant1	-20.448	8	Pass
NVNT	BLE	2480	Ant1	-20.941	8	Pass



PSD NVNT BLE 2402MHz Ant1

PSD NVNT BLE 2442MHz Ant1

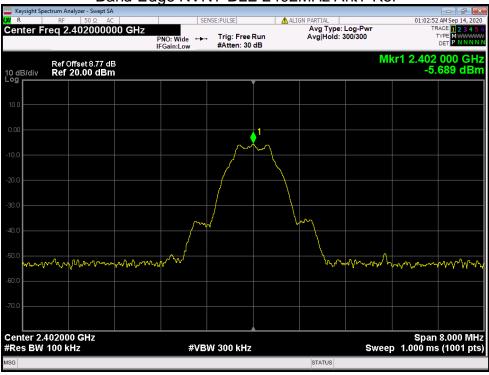




PSD NVNT BLE 2480MHz Ant1

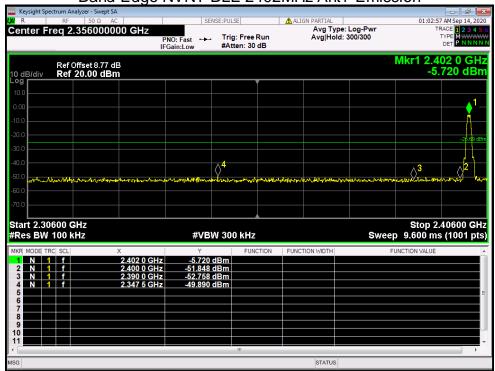
Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE	2402	Ant1	-44.19	-20	Pass
NVNT	BLE	2480	Ant1	-42.58	-20	Pass



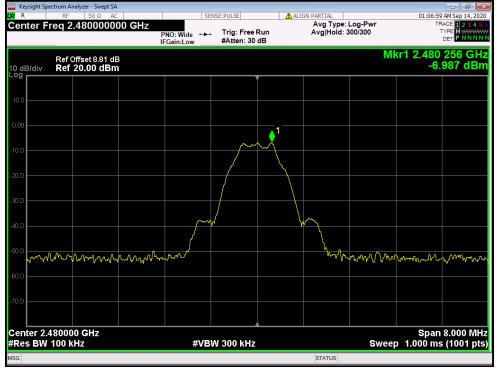
Band Edge NVNT BLE 2402MHz Ant1 Ref





Band Edge NVNT BLE 2402MHz Ant1 Emission

Band Edge NVNT BLE 2480MHz Ant1 Ref





Keysight Spectrum Analyzer - Swept SA					- 6 - ×
LXI R RF 50 Ω AC	SENSE:PUL	.SE 🚺	ALIGN PARTIAL	01:07:04 AM 5	
Center Freq 2.526000000 GHz		g: Free Run tten: 30 dB	Avg Type: Log Avg Hold: 300/	300 TYPE	123456 MWWWWW PNNNNN
Ref Offset 8.81 dB 10 dB/div Ref 20.00 dBm				Mkr1 2.480 -6.83	0 GHz 9 dBm
-10.0					
-30.0					-26.99 dBm
-50.0 -50.0	handerstature and Westman	๛ฃ๛๛๚๛๛๚๚๚๚๛๚๛๚๚	and the second and the second s	www.www.whence.com	New Joseph Contractions
-60.0					
Start 2.47600 GHz #Res BW 100 kHz	#VBW 30	0 kHz		Stop 2.576 Sweep 9.600 ms (1	00 GHz 001 pts)
MKR MODE TRC SCL X	Y	FUNCTION FI	UNCTION WIDTH	FUNCTION VALUE	*
1 N 1 f 2.480 0 GH 2 N 1 f 2.483 5 GH 3 N 1 f 2.500 0 GH 4 N 1 f 2.496 0 GH	z -53.671 dBm z -52.460 dBm				
5 6 7 7 8					
9 10 11					-
MSG			STATUS		•

Band Edge NVNT BLE 2480MHz Ant1 Emission

Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE	2402	Ant1	-31.57	-20	Pass
NVNT	BLE	2442	Ant1	-30.83	-20	Pass
NVNT	BLE	2480	Ant1	-30.88	-20	Pass



Tx. Spurious NVNT BLE 2402MHz Ant1 Ref



	RF 50 Ω	AC	SENSE:P	ULSE	ALIGN PARTIAL		01:03:30 AM Sep 14.
nter Freq		00000 GHz	NO: East +++ T	rig: Free Run Atten: 30 dB		be: Log-Pwr d: 10/10	TRACE 1 2 3 TYPE MWW DET P N N
dB/div R	ef Offset 8.77 ef 20.00 dE						Mkr1 2.402 G -6.568 di
	11						
o							
o							-25.6
o							-23.0
.0		34	<mark>5</mark>				what and a standard
	and all a tork of the second	June marken	manus and	- Martin Martin	والمحط المراجعة والمستحد والمصاحب	hand you and and all the second	
0							
o							
	47						Stop 25.00.0
			#VBW 3	00 kHz		Swe	Stop 25.00 C ep 2.386 s (1001)
art 0.03 GH es BW 100	0 kHz	X	Y	FUNCTION	FUNCTION WIDTH		Stop 25.00 C ep 2.386 s (1001) INCTION VALUE
MODE TRC S	0 kHz	2.402 GHz	۲ -6.568 dBn	FUNCTION	FUNCTION WIDTH		ep 2.386 s (1001
MODE TRC S	0 kHz	2.402 GHz 24.850 GHz 4.999 GHz	Y -6.568 dBn -37.261 dBn -50.070 dBn	FUNCTION	FUNCTION WIDTH		ep 2.386 s (1001
es BW 100 N 1 1 N 1 1 N 1 1 N 1 1	0 kHz	2.402 GHz 24.850 GHz	Ƴ -6.568 dBn -37.261 dBn	FUNCTION 1 1	FUNCTION WIDTH		ep 2.386 s (1001
es BW 100 N 1 1 N 1 1 N 1 1 N 1 1	0 kHz	2.402 GHz 24.850 GHz 4.999 GHz 7.121 GHz	Y -6.568 dBn -37.261 dBn -50.070 dBn -48.625 dBn	FUNCTION 1 1	FUNCTION WIDTH		ep 2.386 s (1001
es BW 100 N 00E TRC SU N 1 1 N 1 1 N 1 1 N 1 1 N 1 1	0 kHz	2.402 GHz 24.850 GHz 4.999 GHz 7.121 GHz	Y -6.568 dBn -37.261 dBn -50.070 dBn -48.625 dBn	FUNCTION 1 1	FUNCTION WIDTH		ep 2.386 s (1001
es BW 10/ MODE TRC S/ N 1 1 N 1 1 N 1 1 N 1 1 N 1 1	0 kHz	2.402 GHz 24.850 GHz 4.999 GHz 7.121 GHz	Y -6.568 dBn -37.261 dBn -50.070 dBn -48.625 dBn	FUNCTION 1 1	FUNCTION WIDTH		ep 2.386 s (1001
es BW 100 NODE TRC SU N 1 1 N 1 1 N 1 1 N 1 1 N 1 1	0 kHz	2.402 GHz 24.850 GHz 4.999 GHz 7.121 GHz	Y -6.568 dBn -37.261 dBn -50.070 dBn -48.625 dBn	FUNCTION 1 1	FUNCTION WIDTH		ep 2.386 s (1001

Tx. Spurious NVNT BLE 2402MHz Ant1 Emission

Tx. Spurious NVNT BLE 2442MHz Ant1 Ref





R	RF	nalyzer - Swept SA 50 Ω AC 2.515000		SENSE:	PULSE		be: Log-Pwr		MSep 14, 20
		2.3130000	P		Trig: Free Run #Atten: 30 dB	Avg Hol		TY	
0 dB/div		Offset 8.8 dB 20.00 dBm						Mkr1 2.4 -7.0	52 GH 19 dBi
0.0									
.00		1							
0.0									
1.0									-26.28 (
0.0 0.0									ماديني ام
10		and the second s				and the second second	moutherstall	and a second and a second	φ. ⁷
	1- 1- 1-			The second s					
0.0									
Lart 0.03	GHz				^			Stop 2	5.00 GI
tart 0.03 Res BW				#VBW:	300 kHz		Swe	Stop 2 ep 2.386 s(5.00 GH 1001 pt
Res BW	100 k	KHz	X	Y	FUNCTION	FUNCTION WIDTH		Stop 2 ep 2.386 s (5.00 GI 1001 pt
Res BW	100 k	KHz	2.452 GHz 24.775 GHz	۲ -7.019 dB -37.111 dB	FUNCTION m	FUNCTION WIDTH		ep 2.386 s(5.00 GI 1001 pt
Res BW	100 k	KHz	2.452 GHz	Y -7.019 dB -37.111 dB -50.027 dB -49.425 dB	FUNCTION m m m	FUNCTION WIDTH		ep 2.386 s(5.00 Gł 1001 pi
Res BW R MODE TF 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1	100 k	KHz	2.452 GHz 24.775 GHz 4.999 GHz	-7.019 dBi -37.111 dBi -50.027 dBi	FUNCTION m m m	FUNCTION WIDTH		ep 2.386 s(5.00 Gł 1001 pi
Res BW R MODE TF 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6 7 1	100 k	KHz	2.452 GHz 24.775 GHz 4.999 GHz 7.221 GHz	Y -7.019 dB -37.111 dB -50.027 dB -49.425 dB	FUNCTION m m m	FUNCTION WIDTH		ep 2.386 s(5.00 GH
Res BW R MODE TF 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6 7 7 8 9 9	100 k	KHz	2.452 GHz 24.775 GHz 4.999 GHz 7.221 GHz	Y -7.019 dB -37.111 dB -50.027 dB -49.425 dB	FUNCTION m m m	FUNCTION WIDTH		ep 2.386 s(5.00 GI
Res BW IR MODE TF 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6 7 7 8 1 1	100 k	KHz	2.452 GHz 24.775 GHz 4.999 GHz 7.221 GHz	Y -7.019 dB -37.111 dB -50.027 dB -49.425 dB	FUNCTION m m m	FUNCTION WIDTH		ep 2.386 s(5.00 GI
Res BW R MODE TR 1 N 1 2 N 1 3 N 1 4 N 1 5 N 1 6 7 8 9 9 9 0	100 k	KHz	2.452 GHz 24.775 GHz 4.999 GHz 7.221 GHz	Y -7.019 dB -37.111 dB -50.027 dB -49.425 dB	FUNCTION m m m	FUNCTION WIDTH		ep 2.386 s(5.00 GH

Tx. Spurious NVNT BLE 2442MHz Ant1 Emission

Tx. Spurious NVNT BLE 2480MHz Ant1 Ref





Keysight Spe R	ectrum A	nalyzer - Swept SA 50 Ω AC		SE	NSE:PUL	SE	ALI	GN PARTIAL		01:07:3	T AM Sep 14, 202
Center Fi	req 1	2.5150000	F	PNO: Fast ↔ Gain:Low		: Free Run ten: 30 dB		Avg Type Avg Hold:			RACE 12345 TYPE M DET PNNNN
10 dB/div		Offset 8.81 dE 20.00 dBm								Mkr1 2 -7.	.477 GH: 030 dBn
10.0 0.00		1									
20.0											
30.0											-26.83 dBr
40.0	nf-and ph.m.m.t.	- and a second second	3 meretan	4 Marylangersyndyste	\$ 4	w	awayoo ya ahaa	and a stand a st	White and any of the second	and the second	and the second second
-60.0											
tart 0.03 Res BW				#VB	W 30) kHz			Sw	Stop eep 2.386 s	25.00 GH (1001 pts
	RC SCL)	2.477 GHz	۲ -7.030	dBm	FUNCTIO	I FUNC	TION WIDTH		FUNCTION VALUE	
2 N 1 3 N 1 4 N 1	f f f		23.826 GHz 5.149 GHz 7.571 GHz	-37.718 -49.047 -49.487	dBm dBm dBm						
5 N 1 6 7	f		10.118 GHz	-49.357	dBm						
8 9 10											
						III					•
G								STATUS			

Tx. Spurious NVNT BLE 2480MHz Ant1 Emission

-----End of report-----