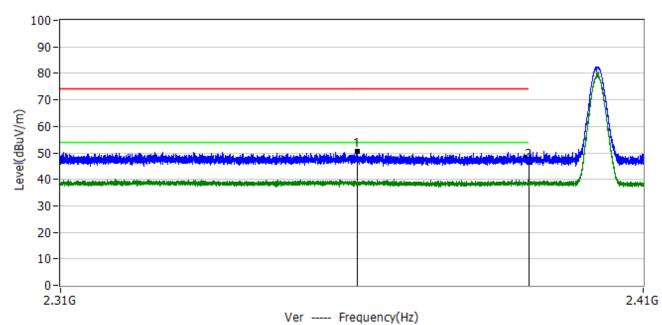


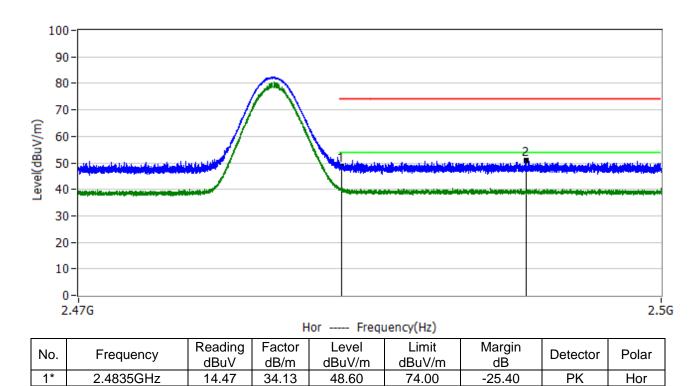
Project: LGT23A013	Test Engineer: Dylan.shi
EUT: Smart phone	Temperature: 20.3°C
M/N: A151	Humidity: 47%RH
Test Voltage: AC 230V/50Hz	Test Data: 2023-02-16
Test Mode: 3DH5 2402	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.3604GHz	16.42	34.02	50.44	74.00	-23.56	PK	Ver
2*	2.3900GHz	12.65	33.95	46.60	74.00	-27.40	PK	Ver



Project: LGT23A013	Test Engineer: Dylan.shi
EUT: Smart phone	Temperature: 20.3°C
M/N: A151	Humidity: 47%RH
Test Voltage: AC 230V/50Hz	Test Data: 2023-02-16
Test Mode: 3DH5 2480	
Note:	



50.79

74.00

-23.21

ΡK

Hor

2*

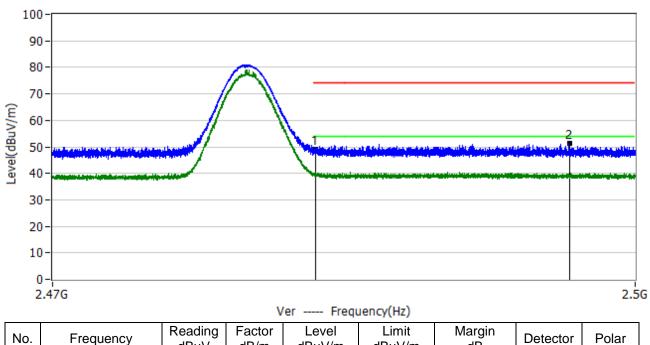
2.4930GHz

16.64

34.15



Project: LGT23A013	Test Engineer: Dylan.shi
EUT: Smart phone	Temperature: 20.3°C
M/N: A151	Humidity: 47%RH
Test Voltage: AC 230V/50Hz	Test Data: 2023-02-16
Test Mode: 3DH5 2480	
Note:	



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Margin dB	Detector	Polar
1*	2.4835GHz	14.97	34.13	49.10	74.00	-24.90	PK	Ver
2*	2.4966GHz	17.21	34.16	51.37	74.00	-22.63	PK	Ver



4. CONDUCTED SPURIOUS & BAND EDGE EMISSION

4.1 LIMIT

According to FCC section 15.247(d), in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

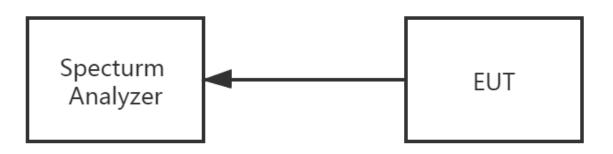
For Band edge

Spectrum Parameter	Setting
Detector	Peak
Stort/Stop Fraguenov	Lower Band Edge: 2300 – 2407 MHz
Start/Stop Frequency	Upper Band Edge: 2475 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

For Hopping Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stap Eraguanay	Lower Band Edge: 2300– 2403 MHz
Start/Stop Frequency	Upper Band Edge: 2479 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold





The EUT is connected to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Tune the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, the span is set to be greater than RBW.

4.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

4.5 TEST RESULTS

For the measurement records, refer to the appendix I.



5. NUMBER OF HOPPING CHANNEL

5.1 LIMIT

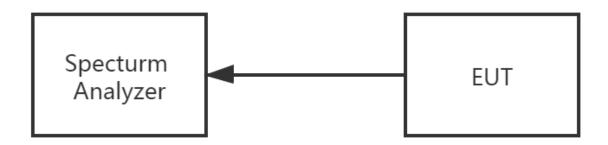
FCC Part 15.247, Subpart C					
Section	Test Item	Limit	FrequencyRange (MHz)	Result	
15.247 (a)(1)(iii)	Number of Hopping Channel	≥15	2400-2483.5	PASS	

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	> Operating FrequencyRange
RB	300KHz
VB	300KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 300KHz, VBW=300KHz, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

5.5 TEST RESULTS

For the measurement records · refer to the appendix I.



6. AVERAGE TIME OF OCCUPANCY

6.1 LIMIT

FCC Part 15.247,Subpart C				
Section	Test Item	Limit	FrequencyRange (MHz)	Result
15.247 (a)(1)(iii)	Average Time of Occupancy	0.4sec	2400-2483.5	PASS

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer.
- b. Set RBW =1MHz/VBW =3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to e. zero span.
- $\ensuremath{\mathsf{f}}$. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- \check{h} . Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum 1600/ 79 / 6 = 3.37 hops per second in each channel (5 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is $3.37 \times 31.6 = 106.6$.
- j. DH3 Packet permit maximum 1600 / 79 / 4 = 5.06 hops per second in each channel (3 time slots RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is $5.06 \times 31.6 = 160$.
- k. DH1 Packet permit maximum 1600 / 79 / 2 = 10.12 hops per second in each channel (1 time slot RX, 1 time slot TX). So the number of pulses in the observation period of 31.6 seconds is $10.12 \times 31.6 = 320$.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

6.5 TEST RESULTS

For the measurement records \cdot refer to the appendix I.



7. HOPPING CHANNEL SEPARATION MEASUREMEN

7.1 LIMIT

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> 20 dB Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- b. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for 20 dB bandwidth measurement.
- c. The resolution bandwidth of 30 kHz and the video bandwidth of 100 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

7.5 TEST RESULTS

For the measurement records \cdot refer to the appendix I.



8. BANDWIDTH TEST

8.1 LIMIT

FCC Part15 15.247, Subpart C					
Section Test Item Limit FrequencyRange (MHz) Result					
15.247 (a)(1) Bandwidth N/A 2400-2483.5 PASS					

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	> Measurement Bandwidth or Channel Separation
RB	30 kHz (20dB Bandwidth) / 30 kHz (Channel Separation)
VB	100 kHz (20dB Bandwidth) / 100 kHz (Channel Separation)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

8.2 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- b. Spectrum Setting: RBW= 30KHz, VBW=100KHz, Sweep time = Auto.

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.

8.5 TEST RESULTS

For the measurement records, refer to the appendix I.



9. OUTPUT POWER TEST

9.1 LIMIT

	FCC Part 15.247,Subpart C						
Section	on Test Item Limit		Frequency Range (MHz)	Result			
		1 W or 0.125W					
15.247 (a)(1)&(b)(1)	Output Power	if channel separation > 2/3 bandwidthprovided thesystems operatewith an output power no greater than125 mW(20.97dBm)	2400-2483.5	PASS			

9.2 TEST PROCEDURE

This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test:

a) Use the following spectrum analyzer settings:

1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel.

2) RBW > 20 dB bandwidth of the emission being measured.

3) VBW \geq RBW.

4) Sweep: Auto.

5) Detector function: Peak.

6) Trace: Max hold.

b) Allow trace to stabilize.

c) Use the marker-to-peak function to set the marker to the peak of the emission.

d) The indicated level is the peak output power, after any corrections for external attenuators and cables.

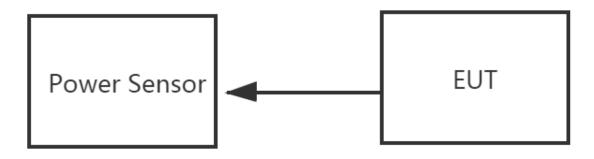
e) A plot of the test results and setup description shall be included in the test report.

NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

PKPM1 Peak power meter method:

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DSS bandwidth and shall use a fast-responding diode detector.

9.3 TEST SETUP



9.4 EUT OPERATION CONDITIONS

Please refer to section 3.1.4 of this report.



9.5 TEST RESULTS

For the measurement records \cdot refer to the appendix I.



10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

10.2 EUT ANTENNA

The EUT antenna is FPC antenna. It PIFA with the standard requirement.



APPENDIX I:TEST RESULTS

Dwell Time

Condition	Mode	Frequency (MHz)	Antenna	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH1	2441	Ant1	0.392	124.264	317	31600	400	Pass
NVNT	1-DH3	2441	Ant1	1.648	271.92	165	31600	400	Pass
NVNT	1-DH5	2441	Ant1	2.896	292.496	101	31600	400	Pass
NVNT	2-DH1	2441	Ant1	0.384	122.112	318	31600	400	Pass
NVNT	2-DH3	2441	Ant1	1.636	256.852	157	31600	400	Pass
NVNT	2-DH5	2441	Ant1	2.884	311.472	108	31600	400	Pass
NVNT	3-DH1	2441	Ant1	0.382	122.24	320	31600	400	Pass
NVNT	3-DH3	2441	Ant1	1.632	262.752	161	31600	400	Pass
NVNT	3-DH5	2441	Ant1	2.883	320.013	111	31600	400	Pass



























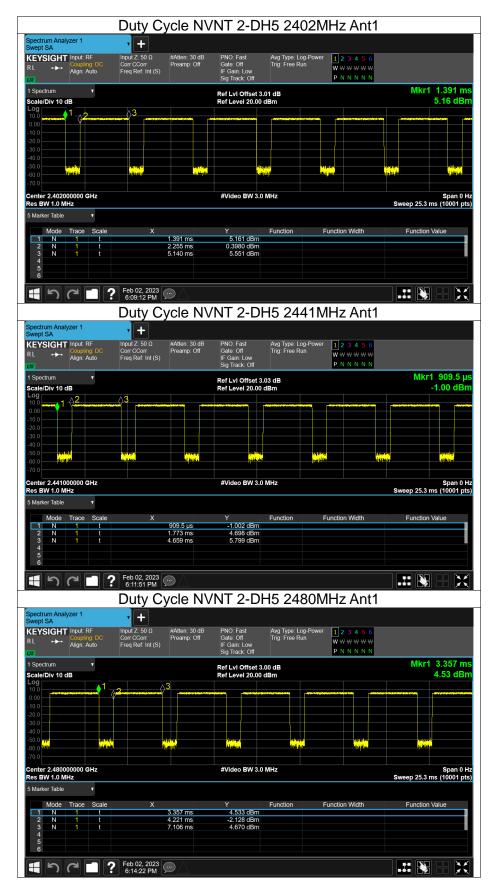
Duty Cycle

Condition	Mode	Frequency (MHz)	Antenna	Duty Cycle (%)	Correction Factor (dB)	1/T (kHz)
NVNT	1-DH5	2402	Ant1	77.25	1.12	0.35
NVNT	1-DH5	2441	Ant1	77.31	1.12	0.34
NVNT	1-DH5	2480	Ant1	77.23	1.12	0.35
NVNT	2-DH5	2402	Ant1	76.96	1.14	0.35
NVNT	2-DH5	2441	Ant1	76.96	1.14	0.35
NVNT	2-DH5	2480	Ant1	76.96	1.14	0.35
NVNT	3-DH5	2402	Ant1	76.93	1.14	0.35
NVNT	3-DH5	2441	Ant1	76.96	1.14	0.35
NVNT	3-DH5	2480	Ant1	76.91	1.14	0.35















Maximum Peak Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	Ant1	7.06	21	Pass
NVNT	1-DH5	2441	Ant1	7.39	21	Pass
NVNT	1-DH5	2480	Ant1	6.3	21	Pass
NVNT	2-DH5	2402	Ant1	8.2	21	Pass
NVNT	2-DH5	2441	Ant1	8.42	21	Pass
NVNT	2-DH5	2480	Ant1	7.36	21	Pass
NVNT	3-DH5	2402	Ant1	8.49	21	Pass
NVNT	3-DH5	2441	Ant1	8.66	21	Pass
NVNT	3-DH5	2480	Ant1	7.62	21	Pass



-20dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-20 dB Bandwidth (MHz)	Verdict
NVNT	1-DH5	2402	Ant1	0.949	Pass
NVNT	1-DH5	2441	Ant1	0.944	Pass
NVNT	1-DH5	2480	Ant1	0.951	Pass
NVNT	2-DH5	2402	Ant1	1.288	Pass
NVNT	2-DH5	2441	Ant1	1.287	Pass
NVNT	2-DH5	2480	Ant1	1.319	Pass
NVNT	3-DH5	2402	Ant1	1.298	Pass
NVNT	3-DH5	2441	Ant1	1.305	Pass
NVNT	3-DH5	2480	Ant1	1.289	Pass







-20dB Bandwidth	NVNT 2-DH	5 2402MH	z Ant1
Spectrum Analyzer 1 The Spectr			
KEYSIGHT Input: RF Input: Z: 50 Ω Atten: 30 dB RL ++ Coupling: DC Corr CCorr Preamp: Off Align: Auto Freq Ref: Int (S) Preamp: Off Preamp: Off	Trig: Free Run Center F Gate: Off Avg Hok #IF Gain: Low Radio St	req: 2.402000000 GHz i: 100/100 d: None	
1 Graph v Scale/Div 10.0 dB	Ref Lvi Offset 3.01 dB Ref Value 23.01 dBm		Mkr3 2.402636000 GHz -15.10 dBm
Log 13.0 3.01	1 		
-6.99		~~~~~	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-27.0 -37.0 -47.0			- Marine - M
-57.0			
Center 2.402000 GHz #Res BW 30.000 kHz	#Video BW 100.00 kHz		Span 2 MHz Sweep 2.67 ms (10001 pts)
2 Metrics V		Measure Trace	Trace 1
Occupied Bandwidth 1.1969 MHz		Total Power	12.4 dBm
Transmit Freq Error -8.067 kHz x dB Bandwidth 1.288 MHz		% of OBW Power x dB	99.00 % -20.00 dB
-20dB Bandwidth	INVNI 2-DH	5 2441MH	iz Antí
KEYSIGHT Input: RF Input Z: 50 Q Atten: 30 dB		ireq: 2.441000000 GHz 1: 100/100	
RL Align: Auto Freq Ref. Int (S)	#IF Gain: Low Radio St	d: None	
1 Graph ▼ Scale/Div 10.0 dB	Ref LvI Offset 3.03 dB Ref Value 23.03 dBm		Mkr3 2.441633000 GHz -14.56 dBm
Log 13.0 3.03	1		
-6.97		h	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
-27.0 -37.0 -47.0			m
-57.0			
Center 2.441000 GHz #Res BW 30.000 kHz	#Video BW 100.00 kHz		Span 2 MHz Sweep 2.67 ms (10001 pts)
2 Metrics v		Measure Trace	Troop 4
Occupied Bandwidth 1.1850 MHz		Total Power	Trace 1 12.9 dBm
Transmit Freq Error -10.336 kHz x dB Bandwidth 1.287 MHz		% of OBW Power x dB	99.00 % -20.00 dB
-20dB Bandwidth		5 0400MU	
Spectrum Analyzer 1		5 2480101	iz Ant i
KEYSIGHT Input: RF Input Z: 50 Q Atten: 30 dB	Trig: Free Run Center F Gate: Off Avg Hold	req: 2.480000000 GHz j: 100/100	
RL +++ Align: Auto Freq Ref: Int (S)	#IF Gain: Low Radio St	d: None	
1 Graph v Scale/Div 10.0 dB	Ref LvI Offset 3.00 dB Ref Value 23.00 dBm		Mkr3 2.480650000 GHz -19.61 dBm
Log 13.0 3.00		2	
-7.00 .17.0 .27.0			3
-37.0 -47.0			- man man
-57.0 -67.0			Cran 2 Mile
Center 2.480000 GHz #Res BW 30.000 kHz 2 Metrics	#Video BW 100.00 kHz		Span 2 MHz Sweep 2.67 ms (10001 pts)
		Measure Trace	Trace 1
Occupied Bandwidth 1.1936 MHz		Total Power	11.5 dBm
Transmit Freq Error-9.620 kHzx dB Bandwidth1.319 MHz		% of OBW Power x dB	99.00 % -20.00 dB
E D C D ? Feb 02, 2023			



-20dB Bandwidth	NVNT 3-DH	5 2402MF	Iz Ant1
Spectrum Analyzer 1 Imput 2 Occupied BW Imput RF KEYSIGHT Imput 2: 50 Ω R L Imput 2: 50 Ω Atten: 30 dB Preamp: Off Input 2: 50 Ω Atten: 30 dB Preamp: Off Freq Ref: Int (S)	Trig: Free Run Center Fr Gate: Off Avg Hold #IF Gain: Low Radio Sto	eq: 2.402000000 GHz : 100/100 I: None	
1 Graph ▼ Secile/Dis 40.0 4D	Ref Lvi Offset 3.01 dB		Mkr3 2.402638000 GHz -16.26 dBm
Scale/Div 10.0 dB	Ref Value 23.01 dBm	1	- 16.20 UBIII
3.01 .6.99 .17.0		`	
-27.0			- man
-47.0 -57.0 -67.0			
Center 2.402000 GHz #Res BW 30.000 kHz	#Video BW 100.00 kHz		Span 2 MHz Sweep 2.67 ms (10001 pts)
2 Metrics T			
Occupied Bandwidth		Measure Trace	Trace 1
1.1919 MHz Transmit Freq Error -11.084 kHz		Total Power % of OBW Power	12.8 dBm 99.00 %
x dB Bandwidth 1.298 MHz		x dB	-20.00 dB
手 り ペ ■ ? Feb 02, 2023 💬 _			
-20dB Bandwidth	NVNT 3-DH	5 2441MF	Iz Ant1
Spectrum Analyzer 1 v +			
KEYSIGHT Input RF Input Z: 50 Ω Atten: 30 dB RL → Align: Auto Freq Ref: Int (S)	Trig: Free Run Center Fr Gate: Off Avg Hold #IF Gain: Low Radio Sto		
1 Graph v	Ref LvI Offset 3.03 dB		Mkr3 2.441641000 GHz
Scale/Div 10.0 dB	Ref Value 23.03 dBm		-16.66 dBm
13.0 3.03 -6.97	n	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	~3
-17.0			
-37.0 proceeding of the second			
-67.0 Center 2.441000 GHz	#Video BW 100.00 kHz		Span 2 MHz
#Res BW 30.000 kHz 2 Metrics			Sweep 2.67 ms (10001 pts)
		Measure Trace	Trace 1
Occupied Bandwidth 1.1928 MHz		Total Power	13.0 dBm
Transmit Freq Error-11.951 kHzx dB Bandwidth1.305 MHz		% of OBW Power x dB	99.00 % -20.00 dB
Feb 02, 2023			
-20dB Bandwidth	NVNT 3-DH	5 2480MF	
Spectrum Analyzer 1		2 100111	
KEYSIGHT Input: RF Input Z: 50 Ω Atten: 30 dB Coupling: DC Corr CCorr Preamp: Off	Gate: Off Avg Hold	req: 2.480000000 GHz : 100/100	
Align. Auto Freq Rel. Int (5)	#IF Gain: Low Radio Sto	I: None	Mkr3 2.480633000 GHz
1 Graph v Scale/Div 10.0 dB Log	Ref LvI Offset 3.00 dB Ref Value 23.00 dBm		-19.70 dBm
13.0	manna	1	
-7.00 -17.0 -27.0			3
-37.0 -47.0			
-57.0 -67.0			
Center 2.480000 GHz #Res BW 30.000 kHz	#Video BW 100.00 kHz		Span 2 MHz Sweep 2.67 ms (10001 pts)
2 Metrics V		Measure Trace	Trace 1
Occupied Bandwidth 1.1864 MHz		Total Power	11.9 dBm
Transmit Freq Error -11.253 kHz x dB Bandwidth 1.289 MHz		% of OBW Power x dB	99.00 % -20.00 dB



Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH5	2402	Ant1	0.871
NVNT	1-DH5	2441	Ant1	0.856
NVNT	1-DH5	2480	Ant1	0.847
NVNT	2-DH5	2402	Ant1	1.188
NVNT	2-DH5	2441	Ant1	1.189
NVNT	2-DH5	2480	Ant1	1.192
NVNT	3-DH5	2402	Ant1	1.201
NVNT	3-DH5	2441	Ant1	1.206
NVNT	3-DH5	2480	Ant1	1.186