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18 ANTENNA REQUIREMENT

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

18.1 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 antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna:

The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 1.89dBi.







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19 CONDUCTED SPURIOUS EMISSIONS

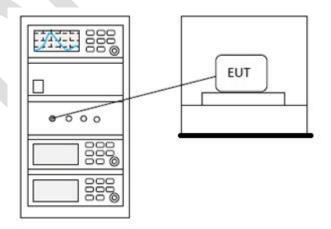
Test Standard	47 CFR Part 15, Subpart C 15.247				
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11				
Test Mode (Pre-Scan)	TX				
Test Mode (Final Test)	TX				
Tester	Charlie				
Temperature	25℃				
Humidity	60%				

19.1 LIMITS

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)).

19.2 BLOCK DIAGRAM OF TEST SETUP





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19.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details





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20 CONDUCTED BAND EDGES MEASUREMENT

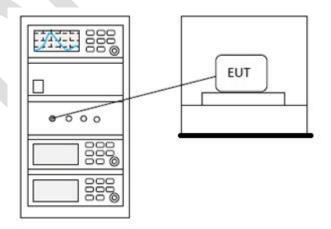
Test Standard	47 CFR Part 15, Subpart C 15.247				
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2				
Test Mode (Pre-Scan)	TX				
Test Mode (Final Test)	TX				
Tester	Charlie				
Temperature	25℃				
Humidity	60%				

20.1 LIMITS

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)).

20.2 BLOCK DIAGRAM OF TEST SETUP





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20.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details





21 APPENDIX

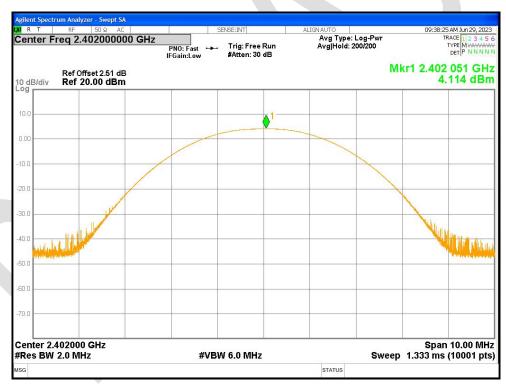
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Appendix1

21.1 MAXIMUM CONDUCTED OUTPUT POWER

Condition	Mode	Frequency	Antenna	Conducted Power	Limit	Verdict
		(MHz)		(dBm)	(dBm)	
NVNT	1-DH1	2402	Ant1	4.114	21	Pass
NVNT	1-DH1	2441	Ant1	-1.755	21	Pass
NVNT	1-DH1	2480	Ant1	3.33	21	Pass
NVNT	2-DH1	2402	Ant1	3.141	21	Pass
NVNT	2-DH1	2441	Ant1	-2.781	21	Pass
NVNT	2-DH1	2480	Ant1	2.313	21	Pass
NVNT	3-DH1	2402	Ant1	3.683	21	Pass
NVNT	3-DH1	2441	Ant1	-2.238	21	Pass
NVNT	3-DH1	2480	Ant1	2.898	21	Pass

Power NVNT 1-DH1 2402MHz Ant1



Power NVNT 1-DH1 2441MHz Ant1





Power NVNT 1-DH1 2480MHz Ant1



Power NVNT 2-DH1 2402MHz Ant1





Power NVNT 2-DH1 2441MHz Ant1



Power NVNT 2-DH1 2480MHz Ant1

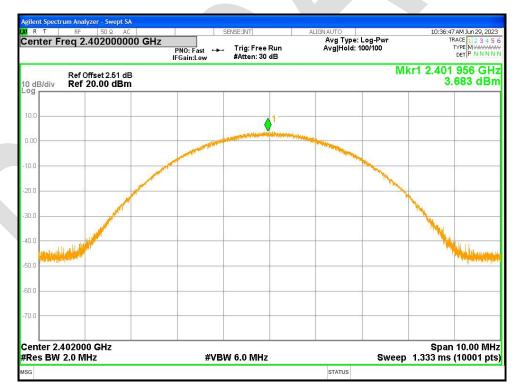


Agilent Spectrum Analyzer - Swept SA

W R T RF SO Q AC

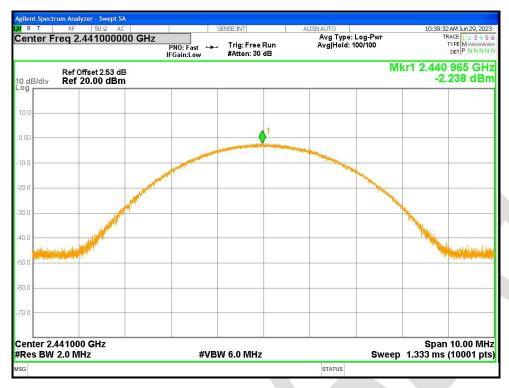
PNO: Fast PRO: Gast IFGain: Low
PNO: Fast IFGain: Low
PNO: Gast IFGain: Low

Power NVNT 3-DH1 2402MHz Ant1



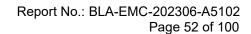
Power NVNT 3-DH1 2441MHz Ant1





Power NVNT 3-DH1 2480MHz Ant1







21.2 -20DB BANDWIDTH

Condition	Mode	Frequency	Antenna	-20 dB Bandwidth	Limit -20 dB	Verdict
		(MHz)		(MHz)	Bandwidth (MHz)	
NVNT	1-DH1	2402	Ant1	0.859	0	Pass
NVNT	1-DH1	2441	Antl	0.856	0	Pass
NVNT	1-DH1	2480	Ant1	0.867	0	Pass
NVNT	2-DH1	2402	Antl	1.259	0	Pass
NVNT	2-DH1	2441	Ant1	1.259	0	Pass
NVNT	2-DH1	2480	Ant1	1.254	0	Pass
NVNT	3-DH1	2402	Ant1	1.219	0	Pass
NVNT	3-DH1	2441	Ant1	1.22	0	Pass
NVNT	3-DH1	2480	Antl	1.22	0	Pass

-20dB Bandwidth NVNT 1-DH1 2402MHz Ant1



-20dB Bandwidth NVNT 1-DH1 2441MHz Ant1





-20dB Bandwidth NVNT 1-DH1 2480MHz Ant1



-20dB Bandwidth NVNT 2-DH1 2402MHz Ant1



10:10:24 AM Jun 29, 2023 Center Freq: 2.402000000 GHz Trig: Free Run Avg #Atten: 30 dB Center Freq 2.402000000 GHz Radio Std: None Avg|Hold: 300/300 Radio Device: BTS #IFGain:Low Mkr3 2.402637 GHz Ref Offset 2.51 dB Ref 22.51 dBm -20.243 dBm 10 dB/div Span 2 MHz Sweep 2.667 ms Center 2.402 GHz #Res BW 30 kHz **#VBW 100 kHz Total Power** 7.87 dBm Occupied Bandwidth 1.1648 MHz **Transmit Freq Error** 7.215 kHz **OBW Power** 99.00 % x dB Bandwidth 1.259 MHz x dB -20.00 dB

-20dB Bandwidth NVNT 2-DH1 2441MHz Ant1



-20dB Bandwidth NVNT 2-DH1 2480MHz Ant1



10:18:31 AM Jun 29, 2023 Center Freq: 2.480000000 GHz Trig: Free Run Avg #Atten: 30 dB Center Freq 2.480000000 GHz Radio Std: None Avg|Hold: 300/300 Radio Device: BTS #IFGain:Low Mkr3 2.480634 GHz Ref Offset 2.58 dB Ref 22.58 dBm -20.653 dBm 10 dB/div Span 2 MHz Sweep 2.667 ms Center 2.48 GHz #Res BW 30 kHz **#VBW 100 kHz Total Power** 7.10 dBm Occupied Bandwidth 1.1609 MHz **Transmit Freq Error** 6.923 kHz **OBW Power** 99.00 % x dB Bandwidth 1.254 MHz x dB -20.00 dB

-20dB Bandwidth NVNT 3-DH1 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH1 2441MHz Ant1



10:39:49 AM Jun 29, 2023 Center Freq: 2.441000000 GHz Trig: Free Run Avg #Atten: 30 dB Center Freq 2.441000000 GHz Radio Std: None Avg|Hold: 300/300 Radio Device: BTS #IFGain:Low Ref Offset 2.53 dB Ref 22.53 dBm Mkr3 2.441631 GHz -26.330 dBm 10 dB/div Span 2 MHz Sweep 2.667 ms Center 2.441 GHz #Res BW 30 kHz **#VBW 100 kHz Total Power** 2.32 dBm Occupied Bandwidth 1.1470 MHz **Transmit Freq Error** 20.919 kHz **OBW Power** 99.00 % x dB Bandwidth 1.220 MHz -20.00 dB x dB

-20dB Bandwidth NVNT 3-DH1 2480MHz Ant1





21.3 OCCUPIED CHANNEL BANDWIDTH

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	1-DH1	2402	Ant1	0.81809
NVNT	1-DH1	2441	Ant1	0.80368
NVNT	1-DH1	2480	Ant1	0.80508
NVNT	2-DH1	2402	Ant1	1.1636
NVNT	2-DH1	2441	Ant1	1.1670
NVNT	2-DH1	2480	Ant1	1.1648
NVNT	3-DH1	2402	Ant1	1.1462
NVNT	3-DH1	2441	Ant1	1.14720
NVNT	3-DH1	2480	Ant1	1.1420

OBW NVNT 1-DH1 2402MHz Ant1



OBW NVNT 1-DH1 2441MHz Ant1





OBW NVNT 1-DH1 2480MHz Ant1



OBW NVNT 2-DH1 2402MHz Ant1





OBW NVNT 2-DH1 2441MHz Ant1



OBW NVNT 2-DH1 2480MHz Ant1





OBW NVNT 3-DH1 2402MHz Ant1



OBW NVNT 3-DH1 2441MHz Ant1