

TEST REPORT

Report Number: 15496278-E7V3

Applicant : APPLE INC.
1 APPLE PARK WAY
CUPERTINO, CA 95014, U.S.A.

Model : A3519, A3520, A3521

Brand : APPLE

FCC ID : BCG-E8951A, BCG-E8952A, BCG-E8953A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART E

Date Of Issue:
2025-08-20

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REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	2025-08-15	Initial Review	---
V2	2025-08-18	Addressed TCB Feedback on sections 1, 6, 9, and 10	Tony Li
V3	2025-08-20	Addressed TCB Feedback on sections 1, 10, and Appendix A	Tony Li

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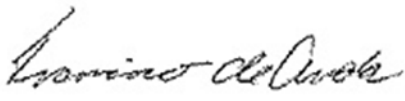
1. ATTESTATION OF TEST RESULTS

Applicant Name and Address	APPLE INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	A3519, A3520, A3521
Brand	APPLE
FCC ID	BCG-E8951A, BCG-E8952A, BCG-E8953A
EUT Description	SMARTPHONE
Serial Number (Variant)	J6HHH5000RL0000YAU (Conducted) KJGD9H4QFC (Radiated)
Serial Number (Reference)	J6HHH5000210000WEZ (Conducted) J3XKVHG144 (Radiated)
Sample Receipt Date	2025-07-01
Date Tested	2025-04-08 to 2025-08-06
Applicable Standards	CFR 47 Part 15 Subpart E
Test Results	COMPLIES

UL Verification Services Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested can demonstrate compliance with the requirements as documented in this report.

The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. All samples tested were in good operating condition throughout the entire test program. Measurement Uncertainties are published for informational purposes only and were not taken into account unless noted otherwise.

This document may not be altered or revised in any way unless done so by UL Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by A2LA, NIST, any agency of the Federal Government, or any agency of the U.S. government.

Approved & Released By:	Prepared & Reviewed By:
	
Francisco de Anda Staff Engineer UL Verification Services, Inc..	Tony Li, Benjamin Dobbins UL Verification Services, Inc.

2. TEST RESULT SUMMARY

This report contains data provided by the customer which can impact the validity of results. UL Verification Services Inc. is only responsible for correctly integrating customer-provided data with measurements performed by UL Verification Services Inc.

Below is a list of the data provided by the customer:

1. Antenna gain and type (see section 6.3)
2. Cable loss (see section 6.3)

FCC Clause	Requirement	Result	Comment
See Comment	Duty Cycle	Reporting purposes only	Per ANSI C63.10, Section 12.2.
See Comment	26dB BW/99% OBW	Reporting purposes only	Per ANSI C63.10 Sections 6.9.2 and 6.9.3
15.407 (e)	6 dB BW	Complies	Per ANSI C63.10, Section 12.5.1
15.407 (a) (1 & 3)	Output Power	Complies	Per ANSI C63.10, Section 12.4.3.2
15.407 (a) (1 & 3)	PSD	Complies	Per ANSI C63.10, Section 12.6
15.209, 15.205, 15.407 (b)	Radiated Emissions	Complies	Per ANSI C63.10, Section 12.7
15.207	AC Mains Conducted Emissions	Complies	Per ANSI C63.10, Section 6.2

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with:

- *ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024
- FCC 47 CFR Part 2
- FCC 47CFR Part 15
- FCC KDB 414788 D01 Radiated Test Site
- FCC KDB 662911 D01 Multiple Transmitter Output
- FCC KDB 789033 D02 General UNII Test Procedures New Rules

*Note: The use of ANSI C63.10-2020 + Cor. 1-2023 + C63.10a-2024 does not deviate from the testing procedures of ANSI C63.10-2020.

4. FACILITIES AND ACCREDITATION

UL Verification Services Inc. is accredited by A2LA, certification #0751.05, for all testing performed within the scope of this report. Testing was performed at the locations noted below.

	Address	ISED CABID	ISED Company Number	FCC Registration
☒	Building 1: 47173 Benicia Street, Fremont, CA 94538, USA	US0104	2324A	550739
☒	Building 2: 47266 Benicia Street, Fremont, CA 94538, USA			
☒	Building 3: 843 Auburn Court, Fremont, CA 94538, USA			
☒	Building 4: 47658 Kato Rd, Fremont, CA 94538, USA			
☒	Building 5: 47670 Kato Rd, Fremont, CA 94538, USA			

5. DECISION RULES AND MEASUREMENT UNCERTAINTY

5.1. METROLOGICAL TRACEABILITY

All test and measuring equipment utilized to perform the tests documented in this report are calibrated on a regular basis, with a maximum time between calibrations of one year or the manufacturers' recommendation, whichever is less, and where applicable is traceable to recognized national standards.

5.2. DECISION RULES

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4:2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	U _{LAB}
Conducted Antenna Port Emission Measurement	1.94 dB
Power Spectral Density	2.47 dB
Time Domain Measurements Using SA	3.39 %
RF Power Measurement Direct Method Using Power Meter	1.30 (Peak), 0.45 (Ave)
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.2%
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.78 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.40 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.87 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	6.01 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.73 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.51 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.29 dB

Uncertainty figures are valid to a confidence level of 95%.

5.4. SAMPLE CALCULATION

RADIATED EMISSIONS

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

$36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} = 28.9 \text{ dBuV/m}$

MAINS CONDUCTED EMISSIONS

Where relevant, the following sample calculation is provided:

Final Voltage (dBuV) = Measured Voltage (dBuV) + Cable Loss (dB) + Limiter Factor (dB) + LISN Insertion Loss.

$36.5 \text{ dBuV} + 0 \text{ dB} + 10.1 \text{ dB} + 0 \text{ dB} = 46.6 \text{ dBuV}$

6. EQUIPMENT UNDER TEST

6.1. EUT DESCRIPTION

The Apple iPhone is a smartphone with cellular GSM, GPRS, EGPRS, WCDMA, LTE, 5G NR1, IEEE 802.11a/b/g/n/ac/ax/be, Bluetooth (BT), Ultra-Wideband (UWB), Global Positioning System (GPS), Near-Field Communication (NFC), Narrow-Band (NB) UNII, 802.15.4, 802.15.4ab-Narrow Band (NB), Wireless Power Transfer (WPT) and Mobile Satellite Service (MSS) technologies. The rechargeable battery is not user accessible. This device is not user-serviceable and requires special tools to disassemble.

This report covers the NB UNII-1 and UNII-3 bands.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

UNII-1 Frequency Range (MHz)	Mode	Antenna	Configuration	Output Power (dBm)	Output Power (mW)
5162 - 5245	BDR	Ant 6	High Power	9.96	9.91
			Low Power	2.99	1.99
		Ant 5	High Power	9.98	9.95
			Low Power	2.23	1.67
		BF, Ant 6 + Ant 5	High Power	10.00	10.00
			Low Power	5.63	3.66
5162 - 5245	HDT2	Ant 6	High Power	12.45	17.58
			Low Power	-0.02	1.00
		Ant 5	High Power	12.48	17.70
			Low Power	-1.02	0.79
		BF, Ant 6 + Ant 5	High Power	12.50	17.78
			Low Power	2.50	1.78
5162 - 5245	LE1M	Ant 6	High Power	10.24	10.57
			Low Power	2.98	1.99
		Ant 5	High Power	10.21	10.50
			Low Power	2.24	1.67
		BF, Ant 6 + Ant 5	High Power	10.24	10.57
			Low Power	5.64	3.66
5162 - 5245	LE2M	Ant 6	High Power	10.99	12.56
			Low Power	2.95	1.97
		Ant 5	High Power	10.97	12.50
			Low Power	2.20	1.66
		BF, Ant 6 + Ant 5	High Power	10.99	12.56
			Low Power	5.63	3.66
5162 - 5245	HDR4	Ant 6	High Power	12.23	16.71
			Low Power	-0.04	0.99
		Ant 5	High Power	12.24	16.75
			Low Power	-1.05	0.79
		BF, Ant 6 + Ant 5	High Power	12.25	16.79
			Low Power	2.52	1.79
5162 - 5245	HDRPM8	Ant 6	High Power	14.24	26.55
			Low Power	-0.02	1.00
		Ant 5	High Power	13.49	22.34
			Low Power	-1.02	0.79
		BF, Ant 6 + Ant 5	High Power	15.00	31.62
			Low Power	2.51	1.78
5162 - 5245	XHDRPM16	Ant 6	High Power	12.24	16.75
			Low Power	-3.01	0.50
		Ant 5	High Power	11.49	14.09
			Low Power	-4.01	0.40
		BF, Ant 6 + Ant 5	High Power	14.89	30.83
			Low Power	-0.50	0.89
5164 - 5242	HDRPL8	Ant 6	High Power	14.22	26.42
			Low Power	-0.01	1.00
		Ant 5	High Power	13.49	22.34
			Low Power	-1.01	0.79
		BF, Ant 6 + Ant 5	High Power	16.89	48.87
			Low Power	2.53	1.79

UNII-3 Frequency Range (MHz)	Worst-Case Mode	Bandwidth (MHz)	Antenna	Configuration	Output Power (dBm)	Output Power (mW)
5733 - 5844	BDR	0.94	Ant 6	High Power	19.49	88.92
				Low Power	3.74	2.37
			Ant 5	High Power	18.74	74.82
				Low Power	2.24	1.67
			BF, Ant 6 + Ant 5	High Power	22.13	163.31
				Low Power	6.06	4.04
5733 - 5844	HDT2	2.36	Ant 6	High Power	14.45	27.86
				Low Power	0.48	1.12
			Ant 5	High Power	13.74	23.66
				Low Power	-1.02	0.79
			BF, Ant 6 + Ant 5	High Power	17.12	51.52
				Low Power	2.79	1.90
5733 - 5844	LE1M	1	Ant 6	High Power	19.48	88.72
				Low Power	3.73	2.36
			Ant 5	High Power	18.74	74.82
				Low Power	2.23	1.67
			BF, Ant 6 + Ant 5	High Power	22.11	162.55
				Low Power	6.05	4.03
5733 - 5844	LE2M	2	Ant 6	High Power	19.48	88.72
				Low Power	3.74	2.37
			Ant 5	High Power	18.73	74.64
				Low Power	2.24	1.67
			BF, Ant 6 + Ant 5	High Power	22.13	163.31
				Low Power	6.05	4.03
5733 - 5844	HDR4	2.34	Ant 6	High Power	14.48	28.05
				Low Power	0.48	1.12
			Ant 5	High Power	13.73	23.60
				Low Power	-1.03	0.79
			BF, Ant 6 + Ant 5	High Power	17.11	51.40
				Low Power	2.81	1.91
5733 - 5844	HDR8	5	Ant 6	High Power	14.48	28.05
				Low Power	0.48	1.12
			Ant 5	High Power	13.73	23.60
				Low Power	-1.04	0.79
			BF, Ant 6 + Ant 5	High Power	17.13	51.64
				Low Power	2.80	1.91
5733 - 5844	HDRPL8	10	Ant 6	High Power	14.49	28.12
				Low Power	0.44	1.11
			Ant 5	High Power	13.74	23.66
				Low Power	-1.05	0.79
			BF, Ant 6 + Ant 5	High Power	17.13	51.64
				Low Power	2.78	1.90

6.3. DESCRIPTION OF AVAILABLE ANTENNAS

The antenna(s) gain and type (PIFA), as provided by the manufacturer' are as follows:

Frequency Range (MHz)	Antenna 6 (dBi)	Antenna 5 (dBi)	Uncorrelated Chains (dBi)	Correlated Chains (dBi)
5150 - 5250 UNII - 1	-1.80	-4.10	-2.80	0.14
5725 - 5825 UNII 3	-0.30	-2.20	-1.15	1.81

Note: antenna C0 and antenna C1 indicated in power tune-up document pertain to Ant 6 and ANT 5 of this report respectively.

Frequency Range (MHz)	Cable Loss	
	Antenna 6 (dBi)	Antenna 5 (dBi)
5150 - 5250 UNII - 1	2.37	2.53
5725 - 5825 UNII 3	2.52	2.55

The cables were used for RF antenna port tests that had been offset to the test equipment during testing.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was 23A258.

6.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y and Z on ANT 6, ANT 5 and 2TX. It was determined that Z (Portrait) was the worst-case orientation for ANT 6 and X (Flatbed) orientation for ANT5 and 2TX beamforming.

For Radiated band edge test, all test modes have been investigated with power setting equal or higher than FCC conducted SISO modes as worst-case scenario and no emissions at both lower and upper band edges were found.

For the radiation spurious harmonics testing, we have investigated both SISO and MIMO modes under low power and high power, only high power mode data is included in the report, as this represents the worst case.

2TX Beamforming modes were used to perform on radiated harmonic spurious final test to cover all SISO modes. Max power was tuned to maximum based among all the modes. For testing purposes, radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-40GHz, and power line conducted emissions were performed with the EUT set at the 2TX Beamforming mode with power setting equal or higher than FCC conducted SISO modes as worst-case scenario.

Below 1GHz tests were performed with EUT connected to AC power adapter as the worst case; and for above 1GHz, the worst-case configuration reported was tested with EUT only. For AC line conducted emission, test was investigated with AC power adapter and with laptop. There were no emissions found below 30MHz within 20dB of the limit.

For simultaneous transmission of multiple channels in the 2.4GHz BT and NB UNII 5GHz bands, no noticeable emission was found.

After the investigation, the worst case of power and PSD modes selected for test are as shown in the table below.

5G			UNII-1			UNII-3		
Mode	BW (MHz)	Modulation	Frequency Range (MHz)	Worst Case Tone		Frequency Range (MHz)	Worst Case Tone	
				Power	PSD		Power	PSD
BT5G	1MHz	BDR	5162-5245	X	X	5733-5844	X	X
	1.5MHz	EDR	5162-5245			5733-5844		
LE	1MHz	LE Adv	5162-5245			5733-5844		
		LE1M		X	X		X	X
		LELR125k						
		LELR500k						
	2MHz	LE2M	5162-5245	X	X	5733-5844	X	X
	2.5MHz	HDT2	5162-5245	X	X	5733-5844	X	X
		HDT3						
		HDT4						
		HDT6						
		HDT8						
HDR	2.5MHz	HDR4	5162-5245	X	X	5733-5844	X	X
		HDRPS2						
		XHDRPS2						
	5MHz	HDR8	5162-5245			5733-5844	X	X
		HDRPM4						
		HDRPM6						
		HDRPM8			X			
		XHDR8						
		XHDRPM6						
		XHDRPM8						
		HDRPM12						
		HDRPM16						
		XHDRPM12						
		XHDRPM16		X				
	9MHz	HDRPL8	5164-5242	X	X	5733-5844	X	X
		HDRPL12						
		HDRPL16						
		XHDRPL8						
		XHDRPL12						
		XHDRPL16						
		HDRPL24						
		HDRPL32						
		XHDRPL24						
		XHDRPL32						

6.5.1. REUSE STATEMENT AND COMPARISON TABLE

The maximum output power for reference model A3258 (FCC ID: BCG-E8947A and IC: 579C-E8947A) and variant models A3519 (FCC ID: BCG-E8960A and IC: 579C-E8960A), A3520 (FCC ID: BCG-E8961A and IC: 579C-E8961A), and A3521 (FCC ID: BCG-E8962A and IC: 579C-E8962A) are identical across all power tables for ANT6 and ANT5. The only difference is antenna gain increased on ANT6.

As there is no change in output power between parent model and variant model, all conducted data from the reference model is reused for this variant model. Spotchecks to verify output power is the same for the variant model compared reference model is included in Appendix A.

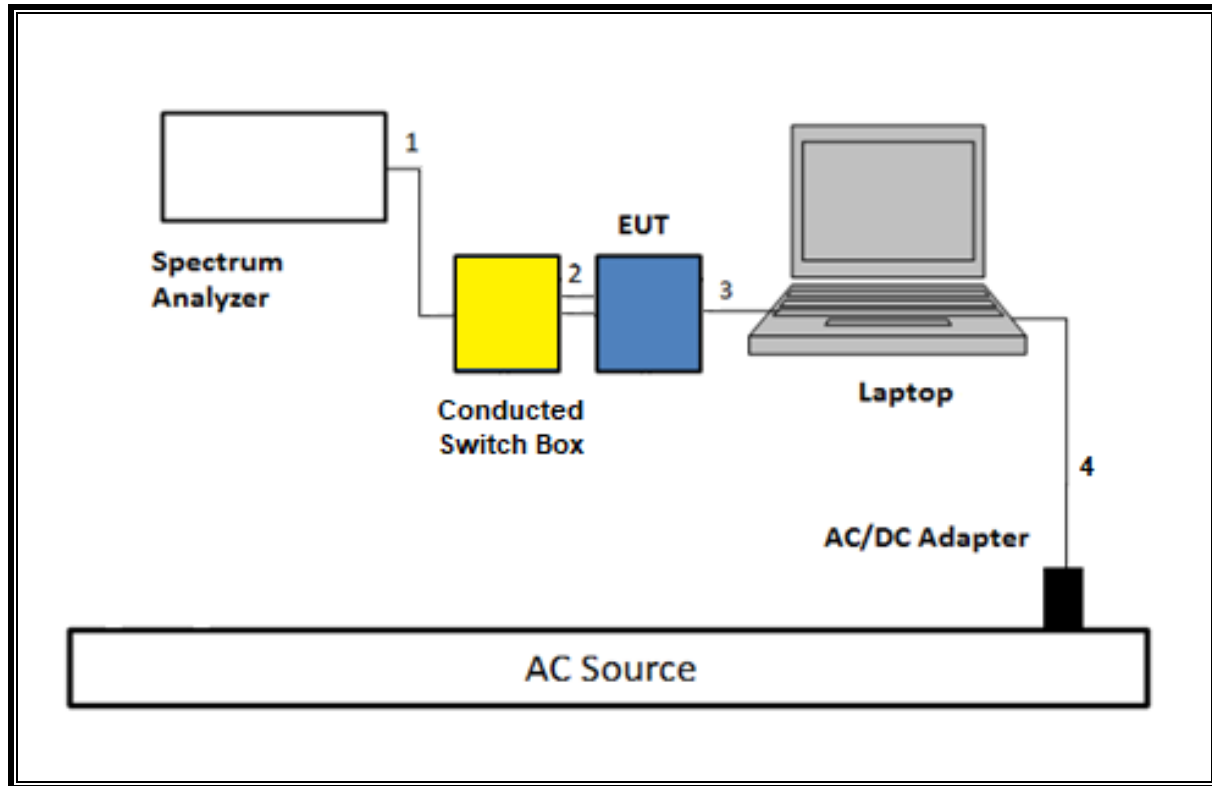
Radiated measurements are also reusing the reference model data for the antenna 5 SISO modes. Radiated measurements are repeated in full on the variant model for the band edge and spurious emissions from 30MHz to 40GHz frequency range for the antenna 6 SISO and MIMO modes. After investigation, it was confirmed that the emissions remained the same as those for the reference model and were either below the noise floor (above 18GHz) or were limited to non-transmitter-related emissions (below 1GHz).

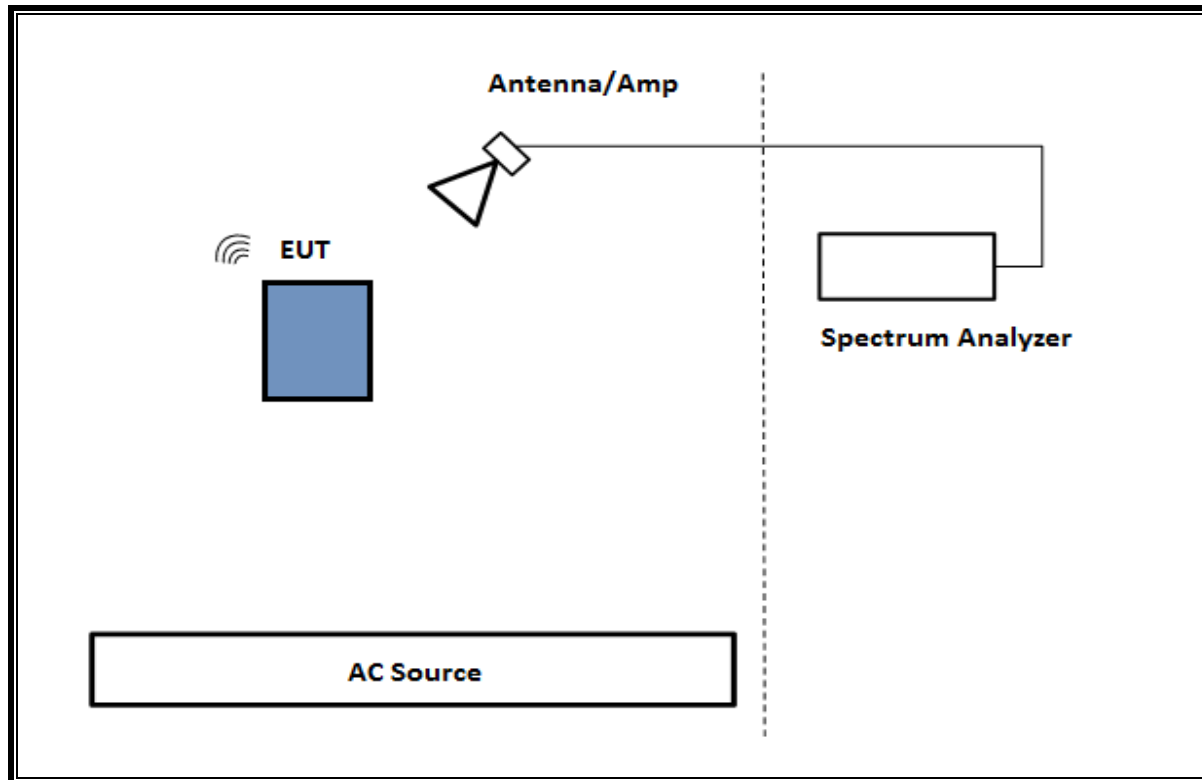
6.6. DESCRIPTION OF TEST SETUP

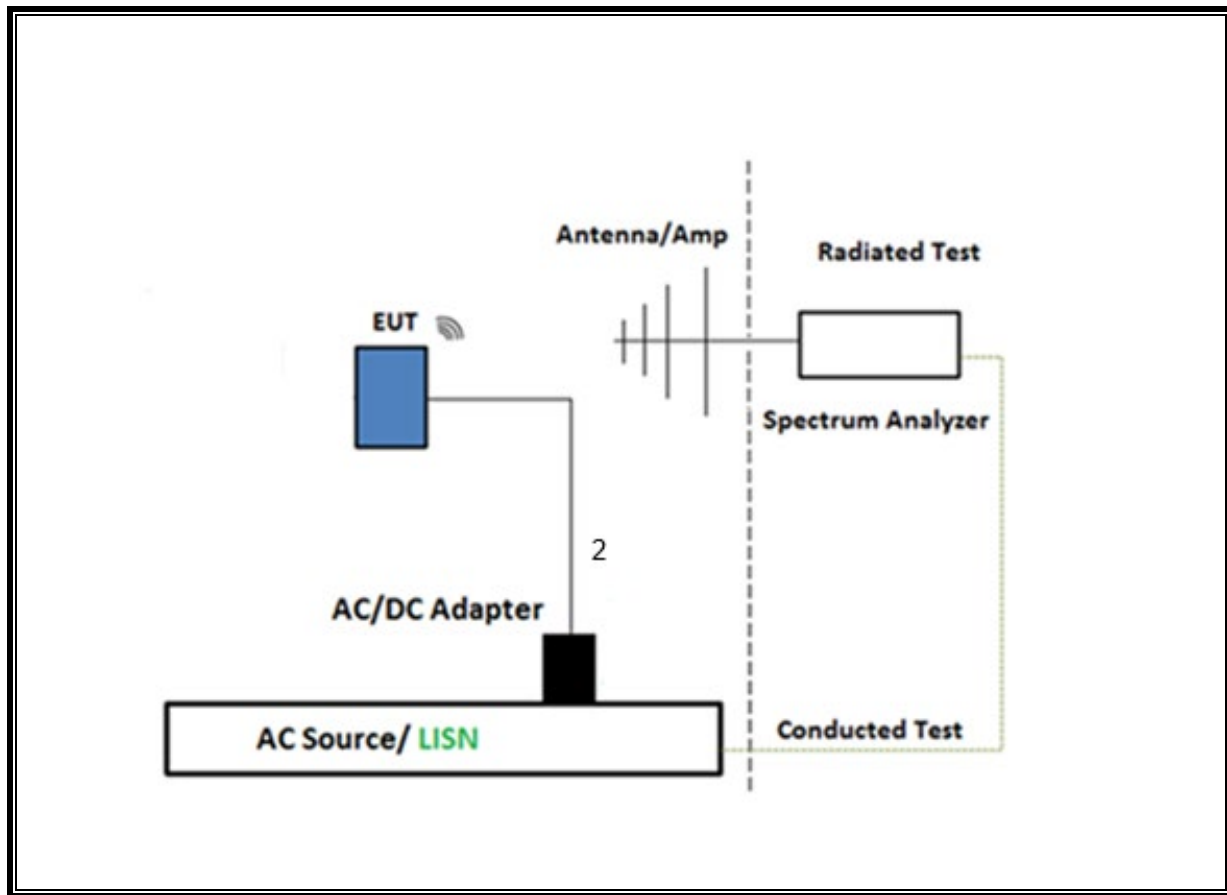
SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	Macbook	G2YKJ9LWH5		N/A
Laptop AC/DC adapter		Apple	N/A	C4H238408AEP M0WAS		DoC
EUT AC/DC adapter		Apple	N/A	C4H238505ARPM0WAP		DoC
Conducted Switch Box		UL	N/A	245782		N/A
I/O CABLES (RF CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	SMA	1	SMA	Shielded	0.2	To spectrum Analyzer
2	Antenna	2	SMA	Shielded	0.2	EUT to Switchbox
3	USB	1	USB-C	Shielded	1.0	N/A
4	DC	1	DC	Shielded	2	N/A
I/O CABLES (RF RADIATED AND AC LINE CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	DC	1	DC	Shielded	2	N/A
2	USB	1	USB-C	Shielded	1	N/A

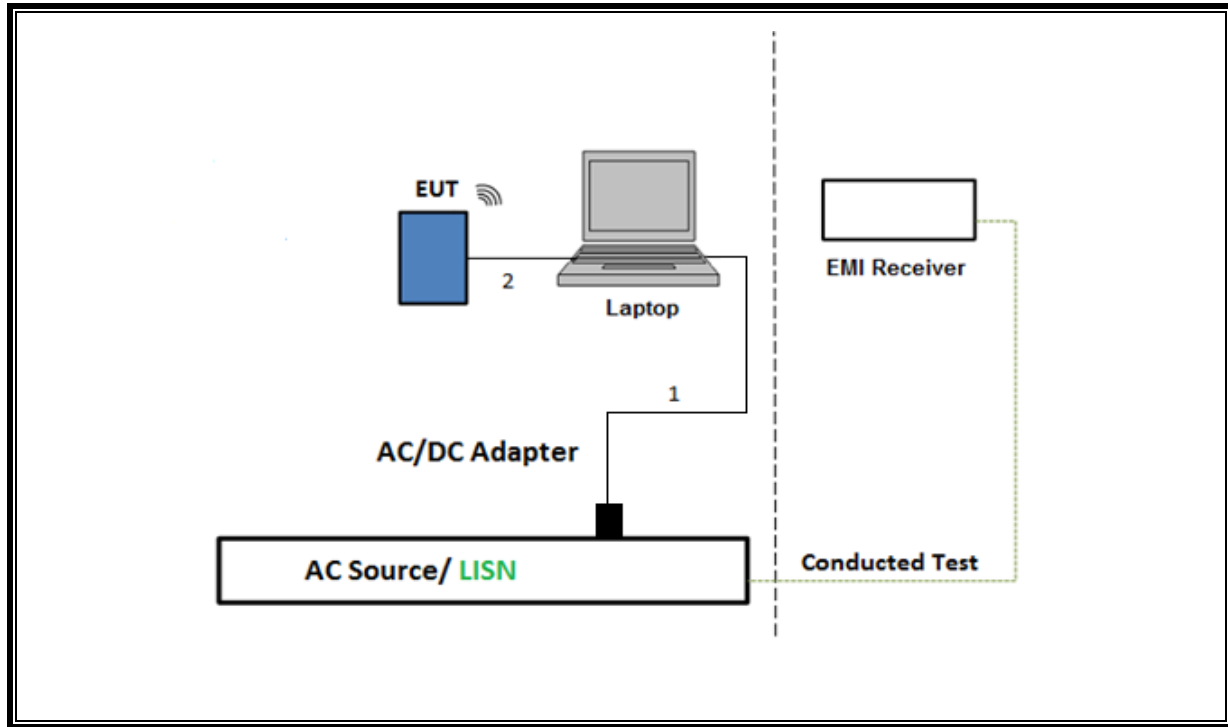
TEST SETUP

The EUT setup is shown as below. Test software exercised the radio card.

SETUP DIAGRAM FOR CONDUCTED TESTS

SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz

SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST

TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION

7. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment were utilized for the tests documented in this report:

Description	Manufacturer	Model	ID Num	Cal Due
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80707	2026-06-30
RF Filter Box, 1-18GHz, 6 Port	UL-FR1	RATS 1.0	171875	2026-03-31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	245268	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	222740	2026-09-29
RF Filter Box, 1-18GHz, 6 Port	UL-FR1	RATS 1.0	171389	2026-03-30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201497	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	230300	2027-03-31
RF Filter Box, 1-18GHz, 17 Port	UL-FR1	RATS 2.0	225474	2026-05-30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201501	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	206808	2026-04-30
RF Filter Box, 1-18GHz, 8 Port	UL-FR1	RATS 1.0	197920	2026-03-31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	225688	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	80402	*2025/07/31
Filter box, 1-18GHz, 12 Port	UL-FR1	Frankenstein	216812	2026-01-31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	230548	2026-02-28
Antenna, Passive Loop, 30Hz - 1MHz	Electro-Metrics	EM-6871	170014	2025-08-31
Antenna, Passive Loop, 100kHz to 30MHz	Electro-Metrics	EM-6872	170016	2025-08-31
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310N	170649	2025-08-31
EMI TEST RECEIVER, with B8 option	Rohde & Schwarz	ESW44	169937	2026-02-28
Amplifier 9 KHz - 1 GHz	SONOMA INSTRUMENT	310N	230311	2026-05-31
Antenna, Broadband Hybrid, 30MHz to 3GHz	Sunol Sciences Corp.	JB3	80813	2026-06-30
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	226673	2026-02-28
Filter box, 1-18GHz, 12 Port	UL-FR1	Frankenstein	231874	2026-06-29
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	169933	2026-02-28
Antenna, Horn 18-26.5GHz	A.R.A.	MWH-1826/B	172353	2026-07-31
Link File, RF Amplifier Assembly, 18-26.5GHz, 60dB Gain	Amplical	AMP18G26.5-60	220194	2026-04-29
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	230299	2027-02-28
RF Filter Box, 1-18GHz, 17 Port	UL-FR1	RATS 2.0	226780	2026-05-31
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	226079	2026-05-31
Antenna, Horn 26.5 to 40GHz	A.R.A.	MWH-2640/B	172369	2025-11-30
Link File, RF Amplifier Assembly, 26-40GHz, 60dB Gain	Amplical	AMP26G40-60	220537	*2025/7/31
RF Filter Box, 1-18GHz, 17 Port	UL-FR1	RATS 2.0	225575	2025-11-30
EMI TEST RECEIVER	Rohde & Schwarz	ESW44	201498	2026-02-28
Spectrum Analyzer, PXA, 3Hz to 44GHz	N9030A	Keysight Technologies Inc	80398	2026/01/31
Spectrum Analyzer, PXA, 3Hz to 44GHz	N9030A	Keysight Technologies Inc	87738	2026/01/31
Conducted Switch Box	UL-FR1	CSB	262287	2026/04/30
Conducted Switch Box	UL-FR1	CSB	235783	2026/06/30
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90715	2026-01-31
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	81319	2026-01-31

AC Line Conducted				
Description	Manufacturer	Model	ID Num	Cal Due
EMI Test Receiver 9kHz-7GHz	Rohde & Schwarz	ESR	171646	2026-02-28
LISN for Conducted Emissions CISPR-16	Fischer Custom Communications	FCC-LISN-50/250-25-2-01-480V	175765	2026-01-31
Transient Limiter	TE	TBFL1	207996	2025-09-30
UL AUTOMATION SOFTWARE				
Conducted Software	UL	Station Tool	Ver 6.1	
Radiated Software	UL	UL EMC	Ver 9.5, May 01, 2023; May 21, 2024; Aug 15, 2024; Oct 22, 2024; Jan 06, 2025	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, Jan 09, 2023	

*Testing was completed before equipment calibration date.

8. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v02r01, Section B.

6 dB Emission BW: KDB 789033 D02 v02r01, Section C.2

26 dB Emission BW: KDB 789033 D02 v02r01, Section C.1

99% Occupied BW: KDB 789033 D02 v02r01, Section D.

Conducted Output Power: KDB 789033 D02 v02r01

Power Spectral Density: KDB 789033 D02 v02r01, Section F

Unwanted emissions in restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v02r01, Sections G.3, G.4, and G.5.

AC Power Line Conducted Emissions: ANSI C63.10-2020, Section 6.2.

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2020 Section 6.4

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

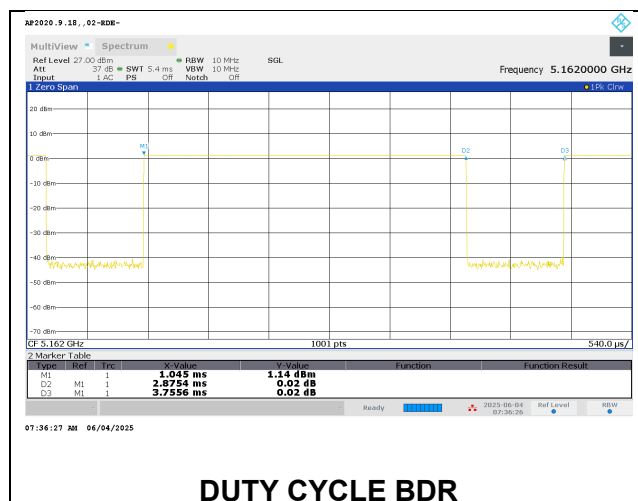
ANSI C63.10, Section 12.2: Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Worst-Case Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
BDR	2.88	3.76	0.765	76.5%	1.16	0.348
LE1M	2.12	2.50	0.847	84.7%	0.72	0.471
LE2M	1.05	1.87	0.560	56.0%	2.52	0.954
HDT2	2.12	2.20	0.964	96.4%	0.16	0.473
HDR4	2.92	3.75	0.778	77.8%	1.09	0.343
HDRPM8	8.13	8.73	0.930	93.0%	0.31	0.123
XHDRPM16	3.20	3.67	0.872	87.2%	0.60	0.313
HDR8	2.94	3.76	0.782	78.2%	1.07	0.341
HDRPL8	3.56	3.75	0.950	95.0%	0.22	0.281

Note: There are the same DCCF on 1TX and 2TX.

DUTY CYCLE PLOTS



9.2. 26 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

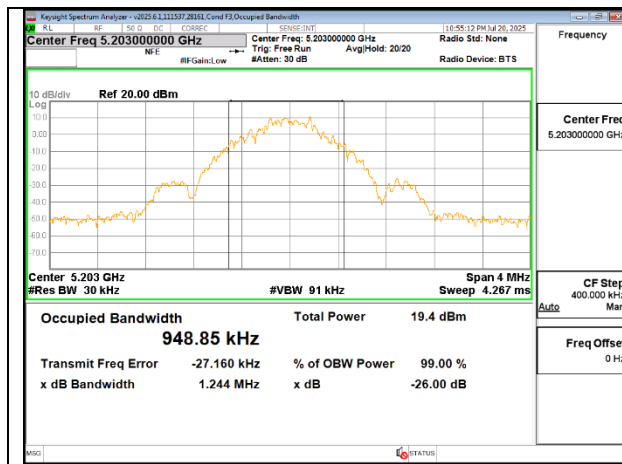
The transmitter output is connected to a spectrum analyzer. The RBW is set to $\geq 1\%$ of the 20 dB bandwidth. The VBW is set to $\geq 3 \times \text{RBW}$. The sweep time is coupled.

RESULTS

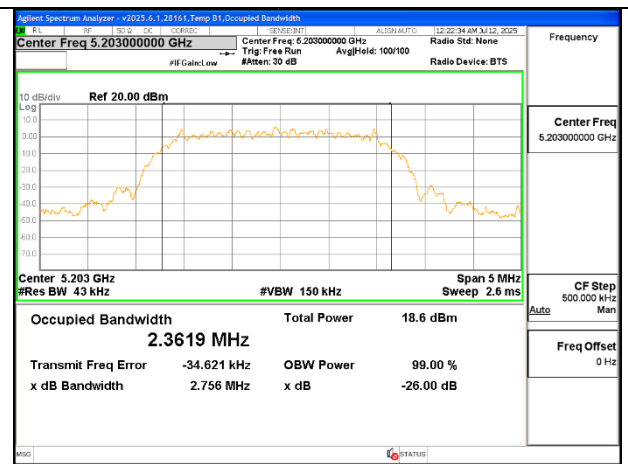
Only High Power modes result is reported, it covers all Low Power modes. Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

9.2.1. HIGH POWER SISO MODE

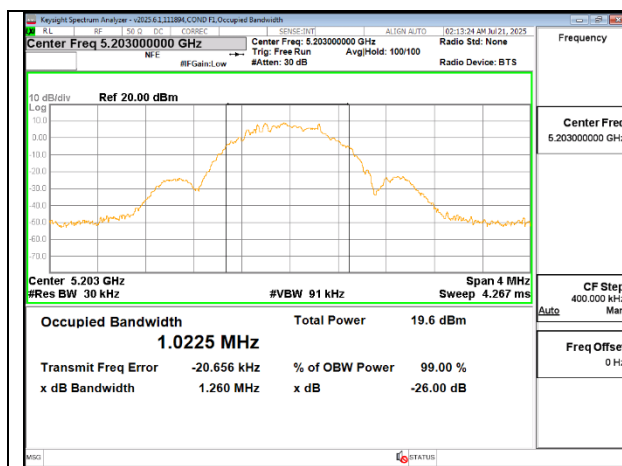
Worst-Case Mode (SISO)	Frequency (MHz)	Channel Number	26 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Ant 6	Ant 5	Ant 6	Ant 5
BDR	5162	Low	1.262	1.260	0.9579	0.9693
	5203	Mid	1.227	1.254	0.9308	0.9578
	5245	High	1.230	1.231	0.9548	0.9515
LE1M	5162	Low	1.247	1.254	0.9445	0.9472
	5203	Mid	1.256	1.262	0.9476	0.9491
	5245	High	1.254	1.258	0.9355	0.9456
LE2M	5162	Low	2.498	2.414	1.9095	1.9185
	5203	Mid	2.414	2.411	1.9367	1.9058
	5245	High	2.415	2.414	1.8996	1.9033
HDT2	5162	Low	2.765	2.756	2.3660	2.3635
	5203	Mid	2.761	2.756	2.3619	2.3619
	5245	High	2.757	2.758	2.3605	2.3669
HDR4	5162	Low	2.682	2.743	2.3362	2.3567
	5203	Mid	2.677	2.784	2.3550	2.3630
	5245	High	2.686	2.760	2.3341	2.3626
HDRPM8	5162	Low	5.611	5.366	4.7404	4.7299
	5203	Mid	5.420	5.400	4.7492	4.7463
	5245	High	5.382	5.358	4.7432	4.7365
XHDRPM16	5162	Low	5.385	5.402	4.6850	4.7124
	5203	Mid	5.387	5.403	4.6854	4.7001
	5245	High	5.391	5.388	4.7045	4.6981
HDRPL8	5164	Low	10.560	10.660	9.3714	9.4319
	5203	Mid	11.170	10.820	9.4303	9.4336
	5242	High	11.090	10.630	9.4110	9.3562



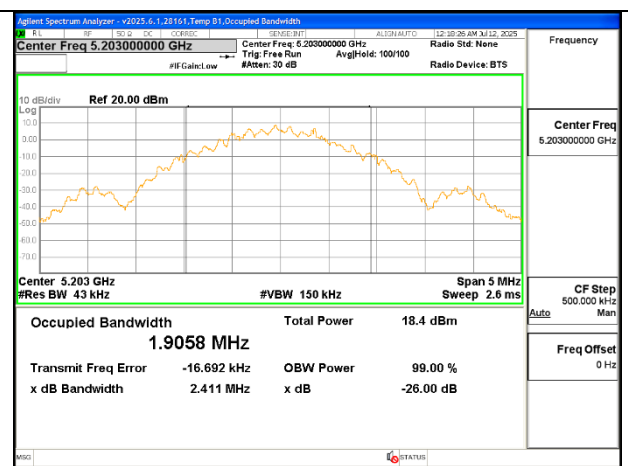
Mid Channel (UNII-1 BDR) – Ant 6



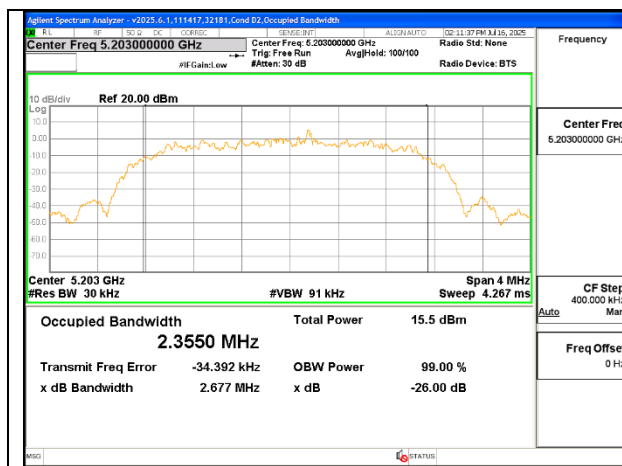
Mid Channel (UNII-1 HDT2) – Ant 5



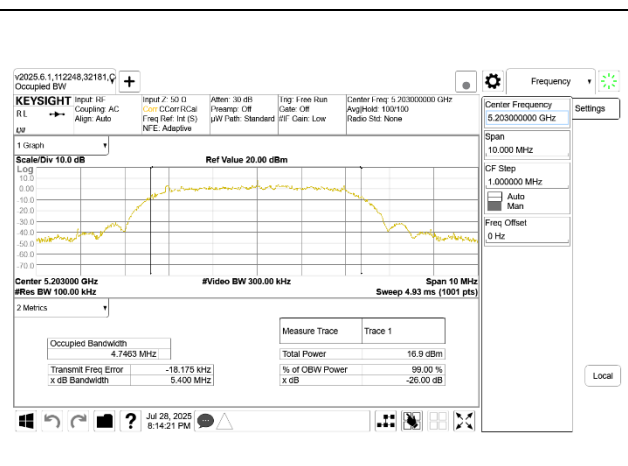
Mid Channel (UNII-1 LE1M) – Ant 6



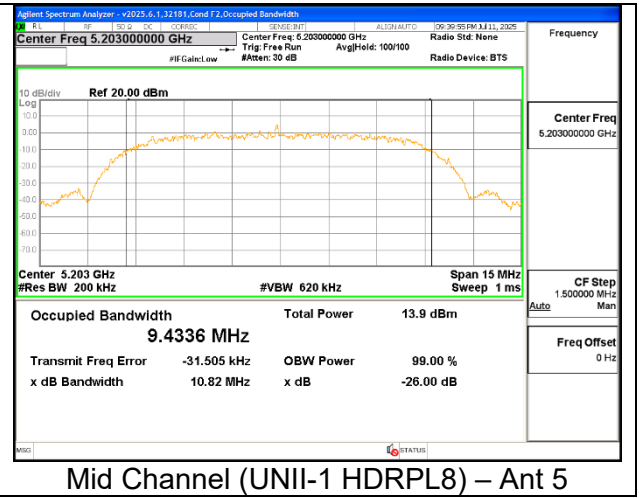
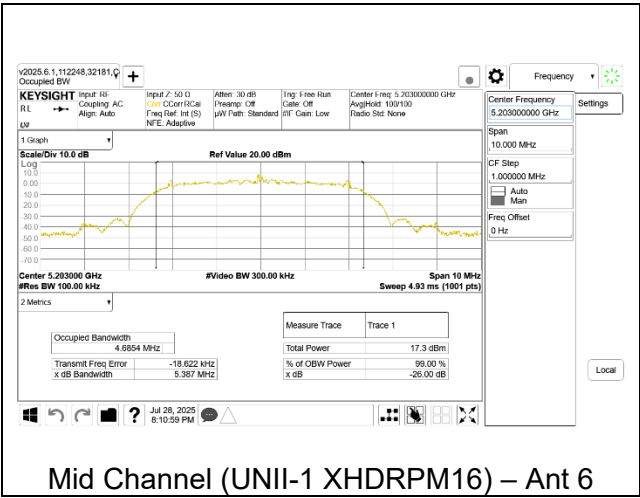
Mid Channel (UNII-1 LE2M) – Ant 5



Mid Channel (UNII-1 HDR4) – Ant 6

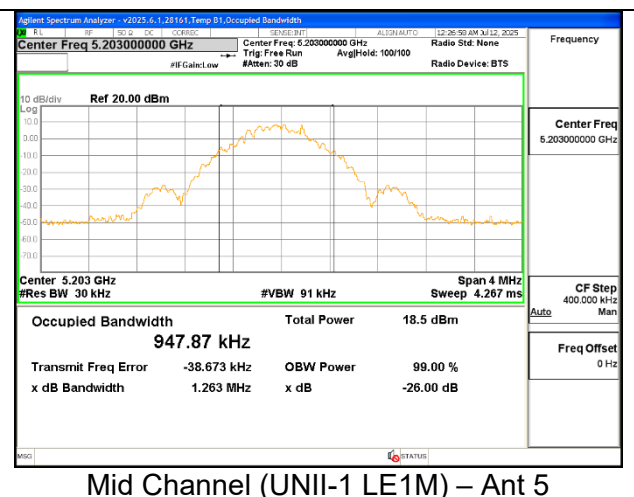
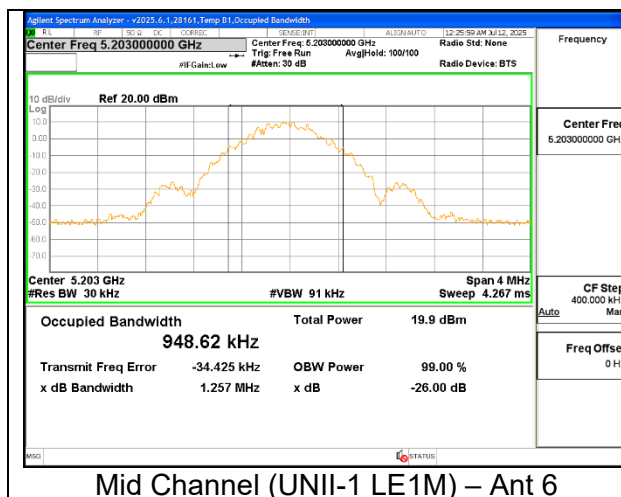
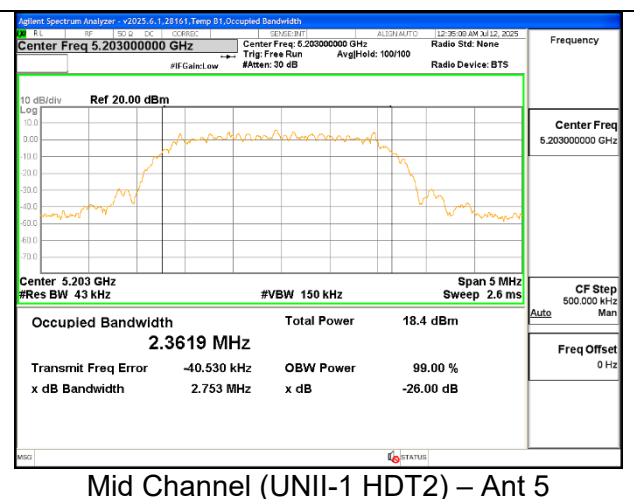
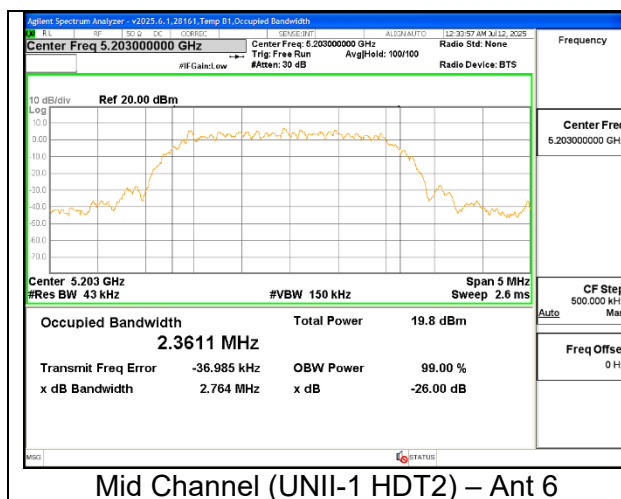
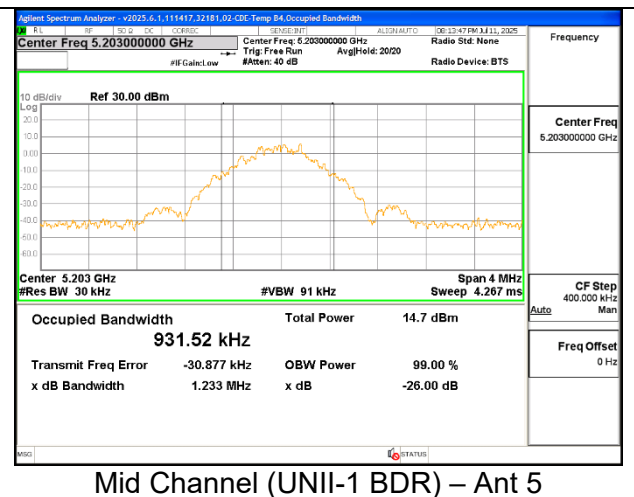
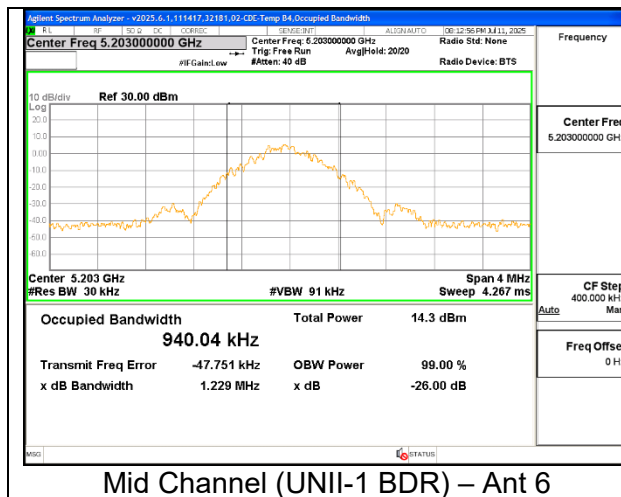


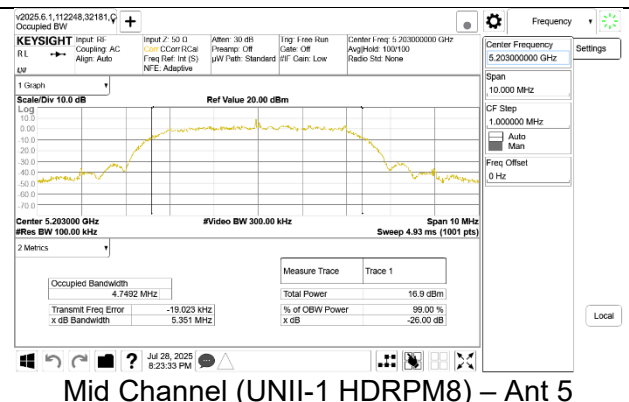
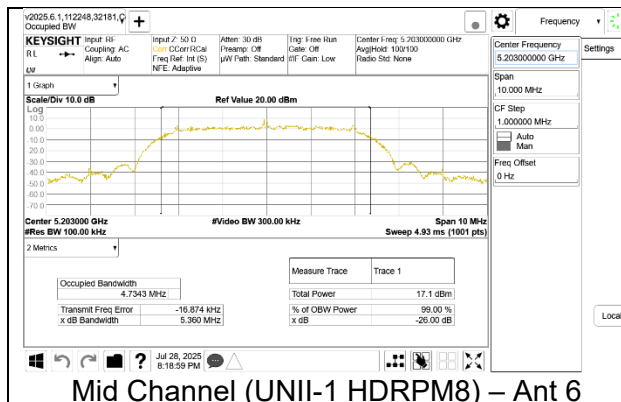
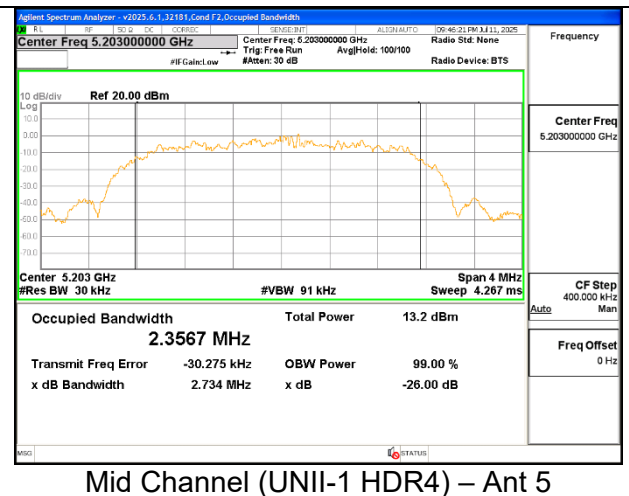
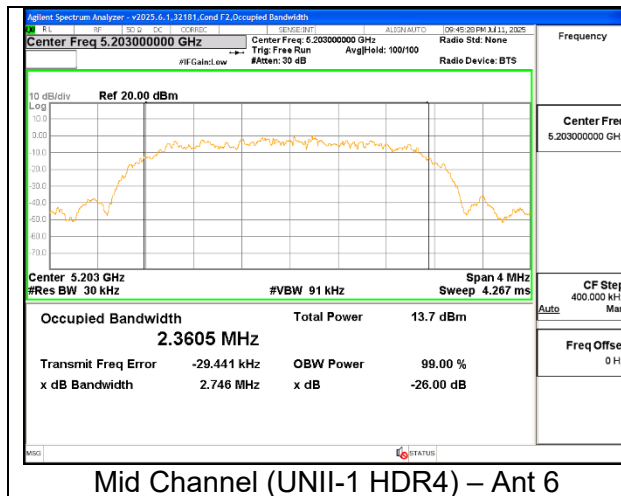
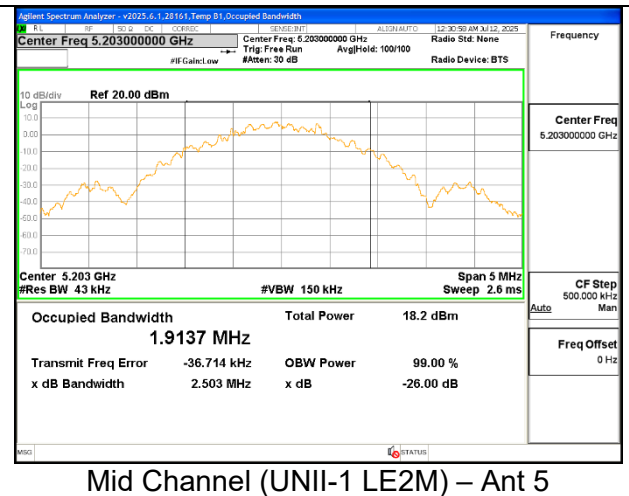
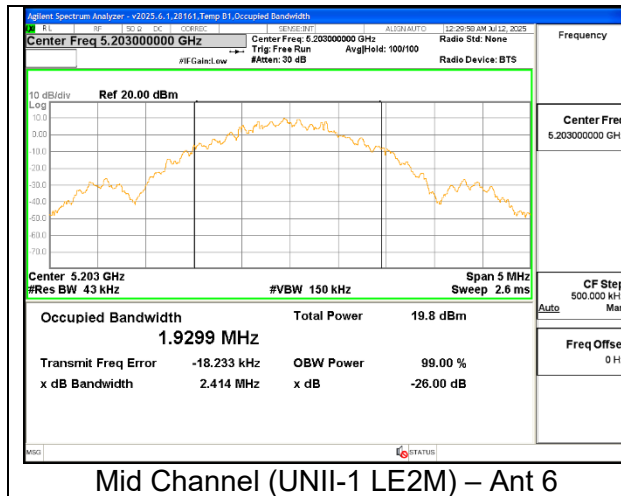
Mid Channel (UNII-1 HDRPM8) – Ant 5

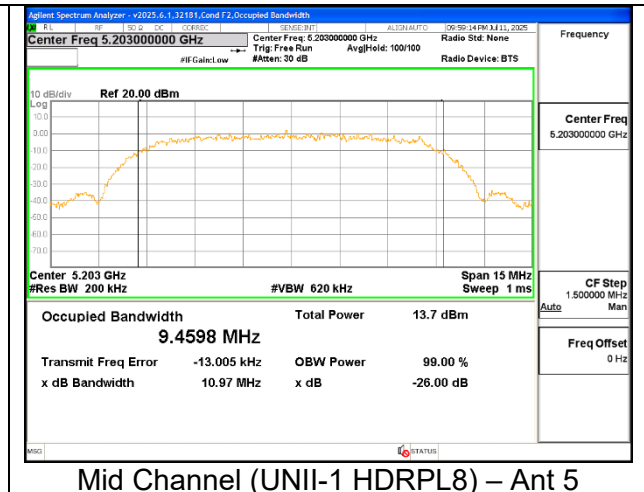
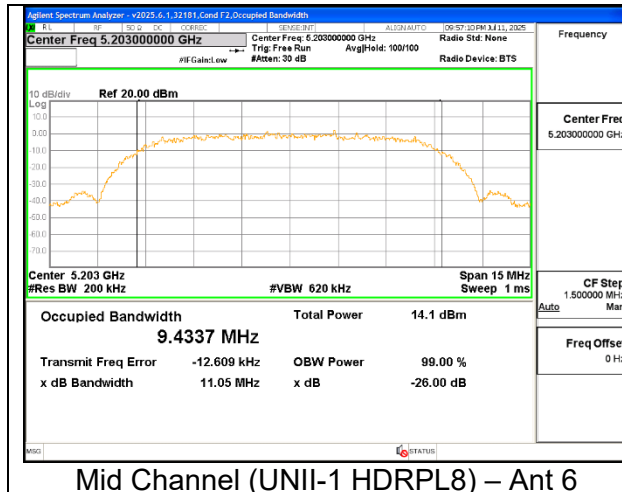
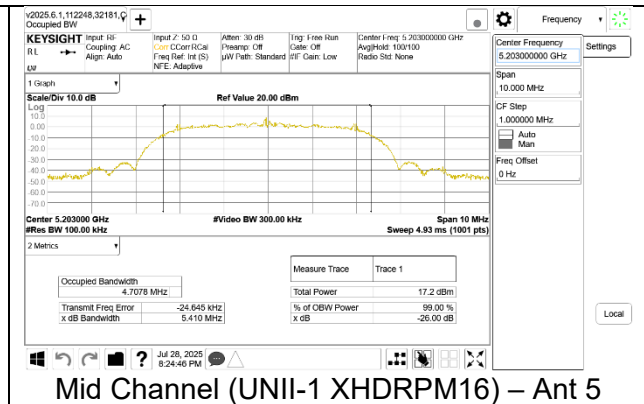
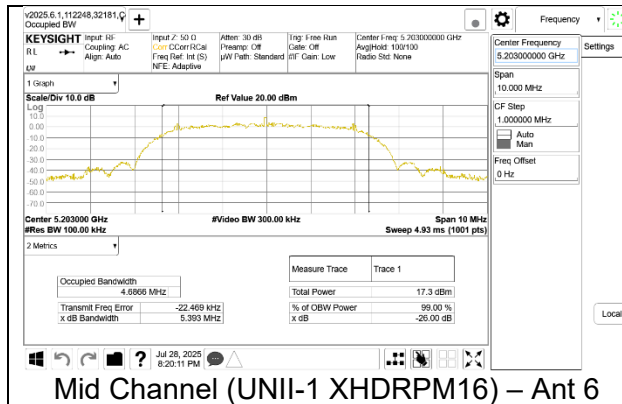


9.2.2. HIGH POWER TXBF MODE

Worst-Case Mode (MIMO)	Frequency (MHz)	Channel Number	26 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Ant 6	Ant 5	Ant 6	Ant 5
BDR	5162	Low	1.265	1.183	0.93358	0.92214
	5203	Mid	1.229	1.233	0.94004	0.93152
	5245	High	1.158	1.245	0.94702	0.943
HDT2	5162	Low	2.758	2.759	2.3632	2.3587
	5203	Mid	2.764	2.753	2.3611	2.3619
	5245	High	2.762	2.75	2.363	2.3635
LE1M	5162	Low	1.261	1.264	0.93906	0.95243
	5203	Mid	1.257	1.263	0.94862	0.94787
	5245	High	1.261	1.243	0.94624	0.95026
LE2M	5162	Low	2.414	2.483	1.8935	1.9088
	5203	Mid	2.414	2.503	1.9299	1.9137
	5245	High	2.418	2.418	1.9464	1.9003
HDR4	5162	Low	2.71	2.688	2.3498	2.3639
	5203	Mid	2.746	2.734	2.3605	2.3567
	5245	High	2.727	2.695	2.3682	2.3448
HDRPM8	5162	Low	5.421	5.376	4.7497	4.7396
	5203	Mid	5.36	5.351	4.7343	4.7492
	5245	High	5.382	5.392	4.739	4.7438
XHDRPM16	5162	Low	5.366	5.373	4.6999	4.6986
	5203	Mid	5.393	5.41	4.6866	4.7078
	5245	High	5.39	5.392	4.705	4.7006
HDRPL8	5164	Low	10.59	11.04	9.4156	9.4639
	5203	Mid	11.05	10.97	9.4337	9.4598
	5242	High	11.2	10.95	9.4716	9.3821

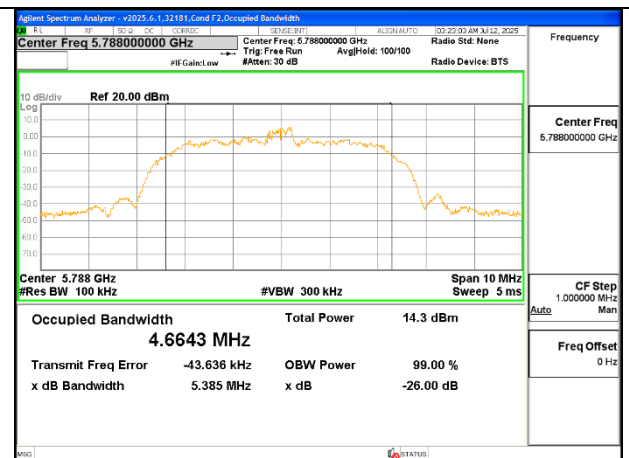
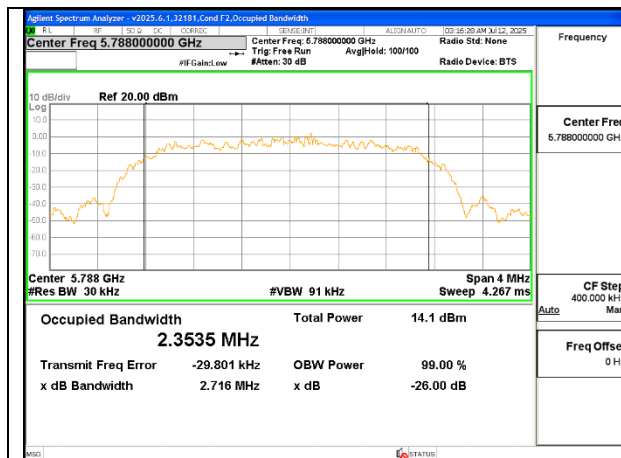
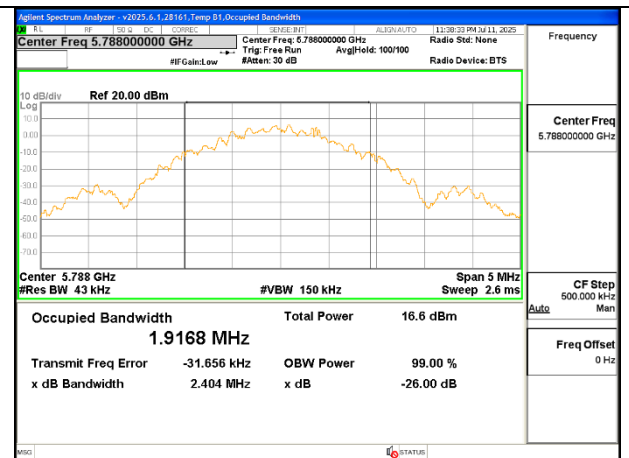
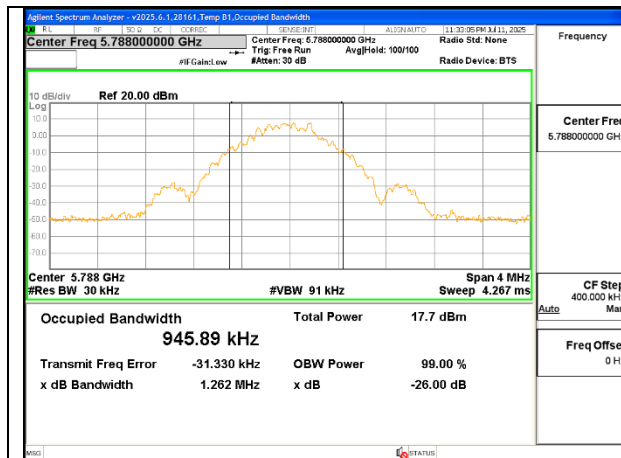
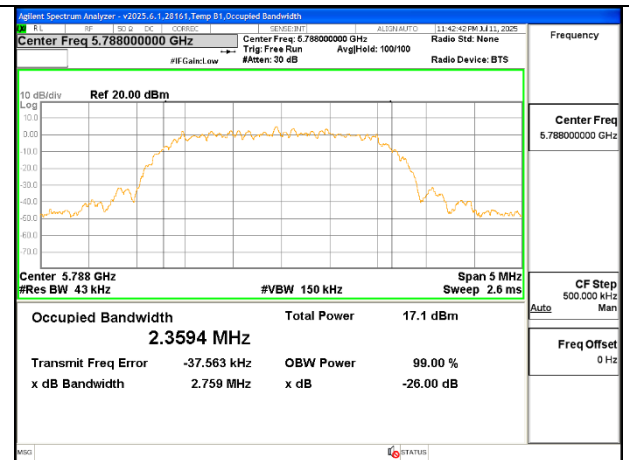
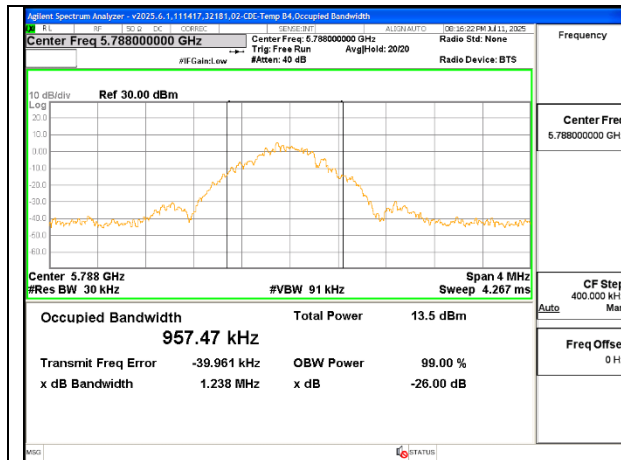


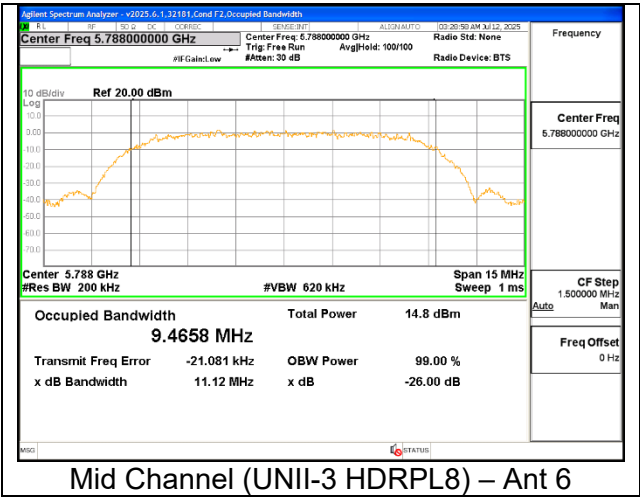




9.2.3. UNII-3 HIGH POWER SISO MODE

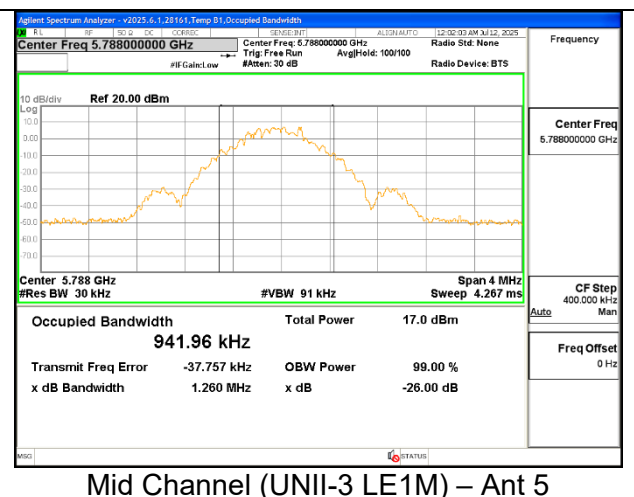
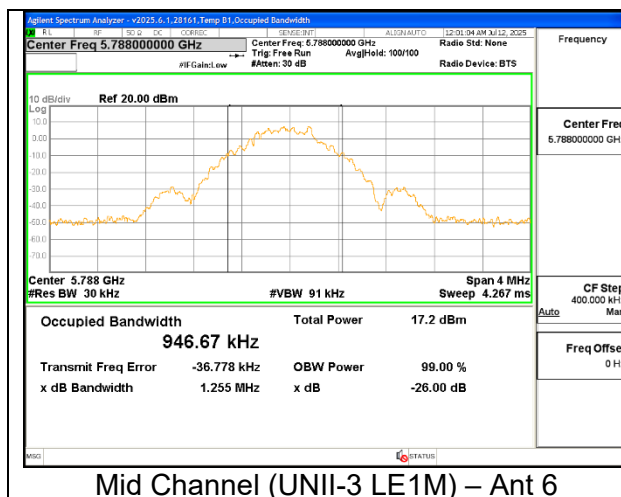
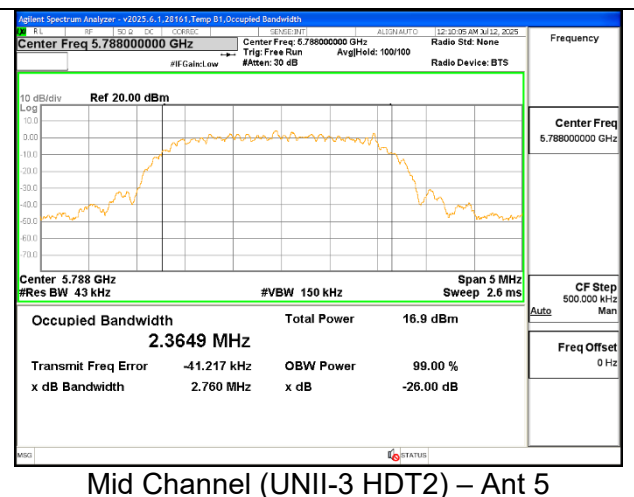
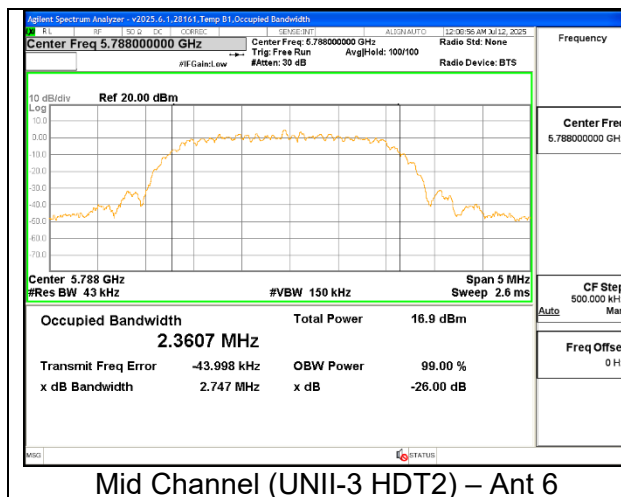
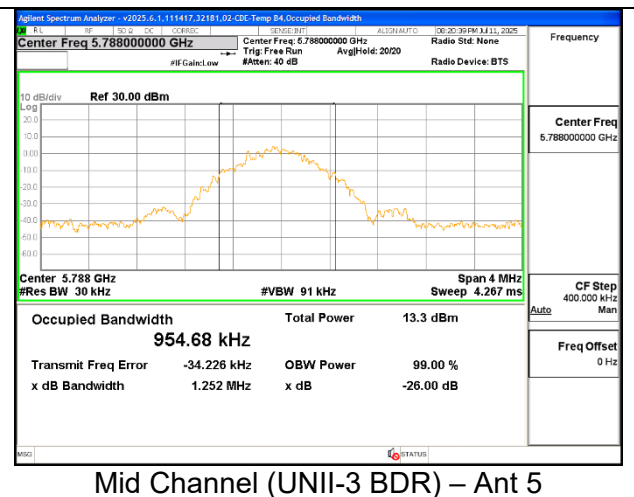
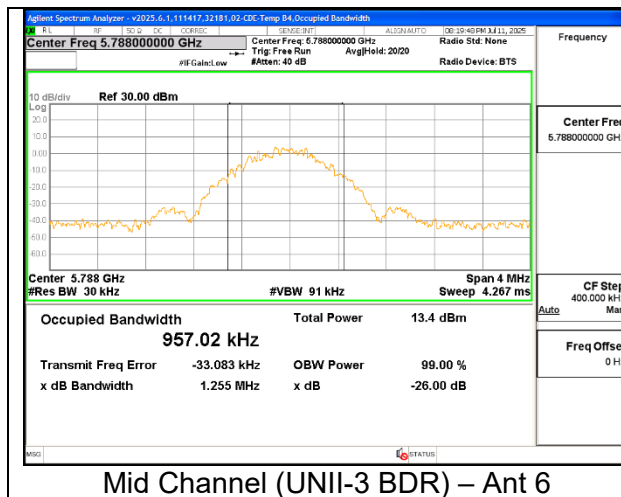
Worst-Case Mode (SISO)	Frequency (MHz)	Channel Number	26 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Ant 6	Ant 5	Ant 6	Ant 5
BDR	5733	Low	1.241	1.260	0.9458	0.9693
	5788	Mid	1.238	1.254	0.9574	0.9578
	5844	High	1.241	1.231	0.9592	0.9515
HDT2	5733	Low	2.755	2.758	2.3645	2.3620
	5788	Mid	2.753	2.759	2.3643	2.3594
	5844	High	2.756	2.756	2.3604	2.3566
LE1M	5733	Low	1.255	1.251	0.9381	0.9425
	5788	Mid	1.262	1.260	0.9458	0.9471
	5844	High	1.260	1.258	0.9452	0.9442
LE2M	5733	Low	2.503	2.413	1.9176	1.9089
	5788	Mid	2.402	2.404	1.8990	1.9168
	5844	High	2.504	2.408	1.8963	1.9202
HDR4	5733	Low	2.678	2.704	2.3377	2.3419
	5788	Mid	2.716	2.679	2.3535	2.3361
	5844	High	2.674	2.727	2.3405	2.3532
HDR8	5733	Low	5.371	5.436	4.6634	4.7044
	5788	Mid	5.383	5.385	4.6872	4.6643
	5844	High	5.457	5.369	4.7305	4.6562
HDRPL8	5733	Low	11.170	11.020	9.4537	9.4440
	5788	Mid	11.120	11.140	9.4658	9.4831
	5844	High	10.650	11.080	9.4140	9.4907

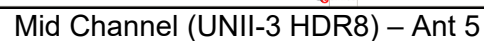
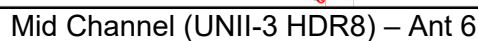
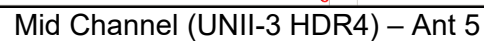
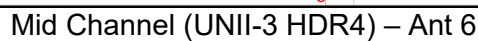


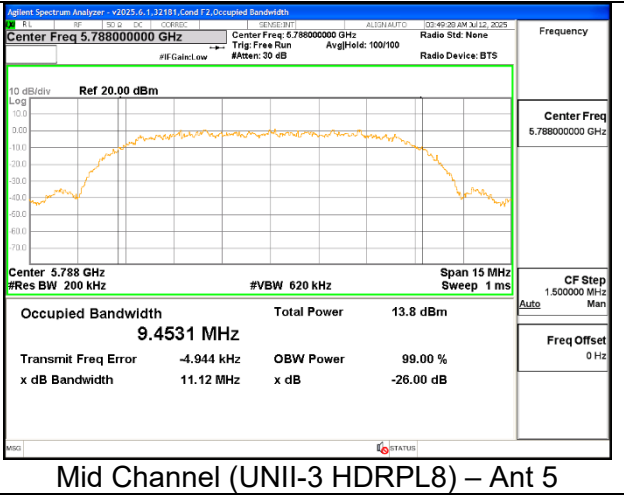
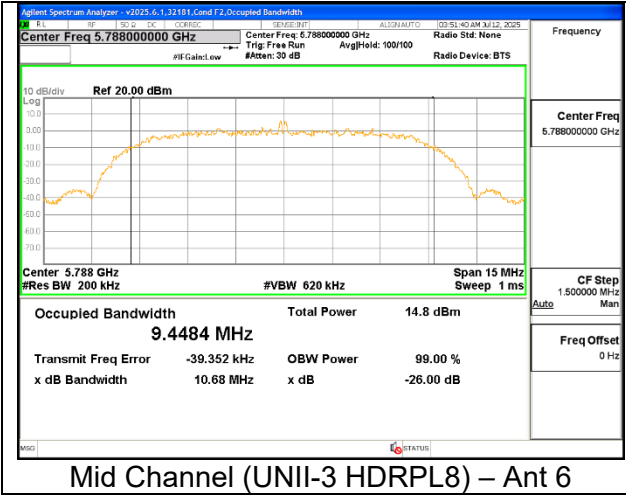


9.2.4. UNII-3 HIGH POWER TXBF MODE

Worst-Case Mode (TxBF)	Frequency (MHz)	Channel Number	26 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Ant 6	Ant 5	Ant 6	Ant 5
BDR	5733	Low	1.241	1.254	0.94966	0.97834
	5788	Mid	1.255	1.252	0.95702	0.95468
	5844	High	1.264	1.254	0.95433	0.94178
HDT2	5733	Low	2.760	2.757	2.3621	2.3551
	5788	Mid	2.747	2.760	2.3607	2.3649
	5844	High	2.749	2.758	2.3592	2.3579
LE1M	5733	Low	1.260	1.250	0.94037	0.94903
	5788	Mid	1.255	1.260	0.94667	0.94196
	5844	High	1.260	1.261	0.94393	0.94598
LE2M	5733	Low	2.410	2.410	1.9052	1.9114
	5788	Mid	2.396	2.501	1.9168	1.8821
	5844	High	2.490	2.503	1.9099	1.9182
HDR4	5733	Low	2.790	2.684	2.3619	2.3386
	5788	Mid	2.691	2.678	2.3461	2.3344
	5844	High	2.766	2.711	2.3629	2.3636
HDR8	5733	Low	5.369	5.408	4.6854	4.6987
	5788	Mid	5.367	5.409	4.6562	4.6618
	5844	High	5.432	5.380	4.6939	4.6717
HDRPL8	5733	Low	11.06	10.68	9.4584	9.3803
	5788	Mid	10.68	11.12	9.4484	9.4531
	5844	High	11.15	11.15	9.4594	9.4529







9.3. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

The minimum 6 dB bandwidth shall be at least 500 kHz.

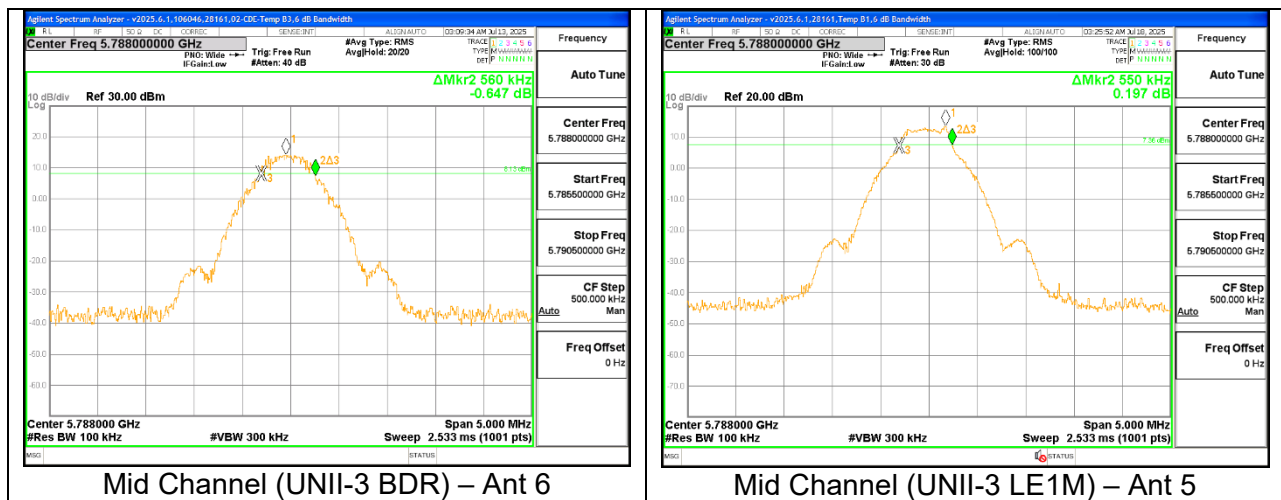
RESULTS

For 6dB bandwidth measurements, the narrowest bandwidths of BDR and LE1M modes were set to test as the worst-case scenario.

Only High Power modes result reported, it covers all Low Power modes. Only Mid channel plot is reported to show setting parameter complies with testing method/procedure.

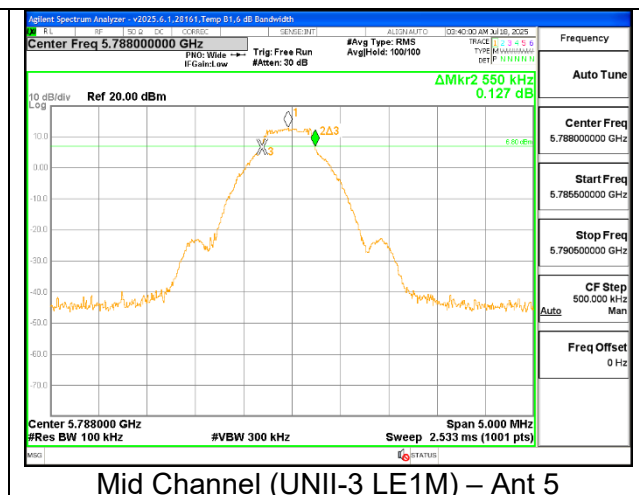
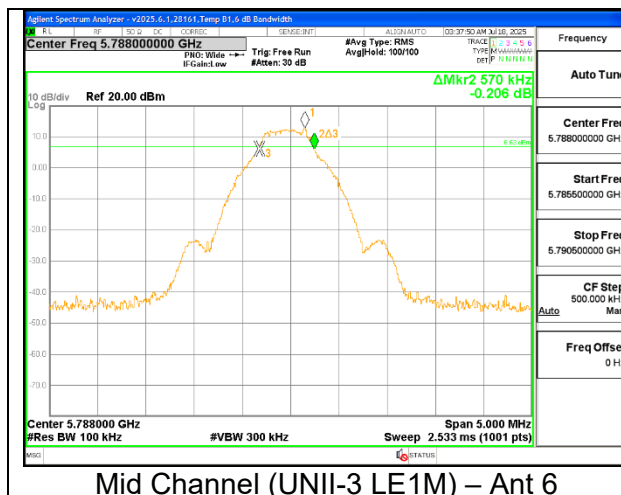
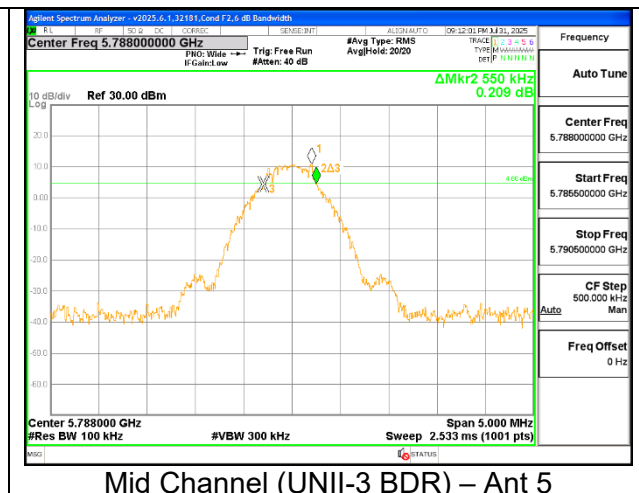
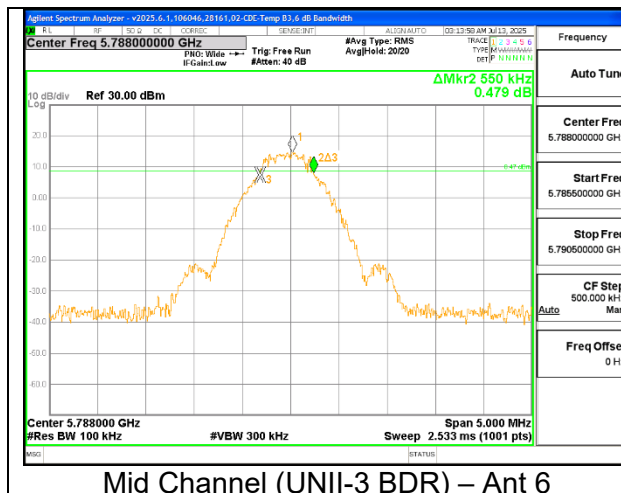
9.3.1. HIGH OUTPUT SISO MODE IN THE UNII-3 BAND

UNII-3 (SISO)	Frequency (MHz)	Channel Number	6 dB BW (MHz)	
			Ant 6	Ant 5
BDR	5733	Low	0.555	0.565
	5788	Mid	0.560	0.555
	5844	High	0.550	0.555
LE1M	5733	Low	0.570	0.570
	5788	Mid	0.555	0.550
	5844	High	0.560	0.560



9.3.2. HIGH OUTPUT TXBF MODE IN THE UNII-3 BAND

UNII-3 (TxBF)	Frequency (MHz)	Channel Number	6 dB BW (MHz)	
			Ant 6	Ant 5
BDR	5733	Low	0.555	0.550
	5788	Mid	0.550	0.550
	5844	High	0.555	0.510
LE1M	5733	Low	0.565	0.555
	5788	Mid	0.570	0.550
	5844	High	0.555	0.565



9.4. OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Band 5.15–5.25 GHz

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Band 5.725-5.85 GHz

The maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

TEST PROCEDURE

The measurement method used for output power is KDB 789033 D02, Section E.3.b (Method PM-G).

The measurement method used for power spectral density is KDB 789033 D02, Section F.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

For 2 TX:

Tx chains are correlated for power and correlated for PSD due to the device supporting TX BF in all MIMO modes. The directional gains are as follows:

Frequency Range (MHz)	Antenna 6 (dBi)	Antenna 5 (dBi)	Uncorrelated Chains (dBi)	Correlated Chains (dBi)
5150 - 5250 UNII - 1	-1.80	-4.10	-2.80	0.14
5725 - 5825 UNII 3	-0.30	-2.20	-1.15	1.81

RESULTS:**DIRECTIONAL GAIN CALCULATION:**

ANSI C63.10-2020 section 14.6.3

Uncorrelated directional gain= $10 \cdot \log((10^{(\text{Ant6}/10)} + 10^{(\text{Ant5}/10)})/2)$

Correlated directional gain= $10 \cdot \log(((10^{(\text{Ant6}/20)} + 10^{(\text{Ant5}/20)})^2)/2)$

Sample Calculation:

Ant6=-1.80, Ant5=-4.10

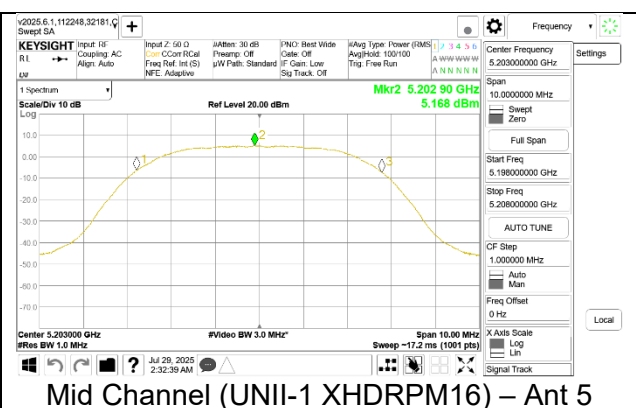
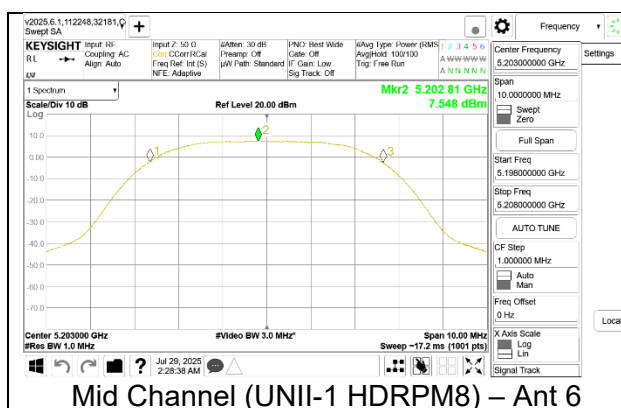
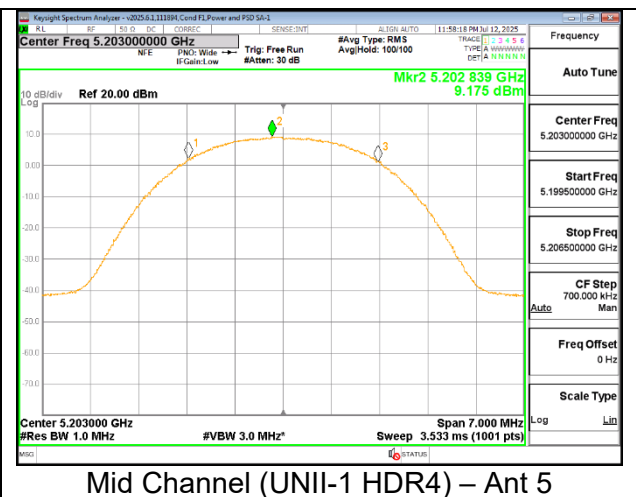
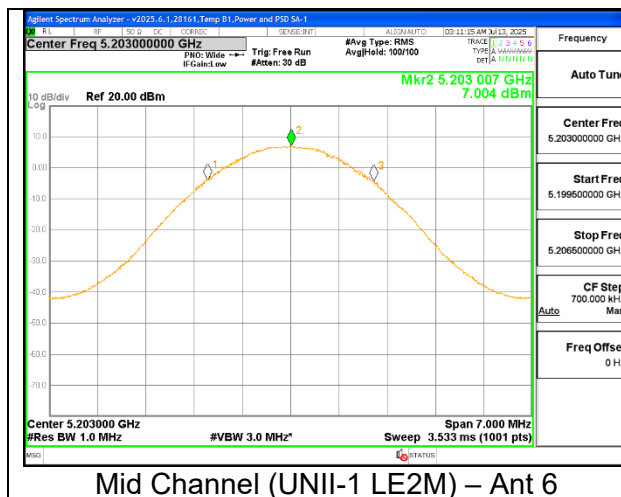
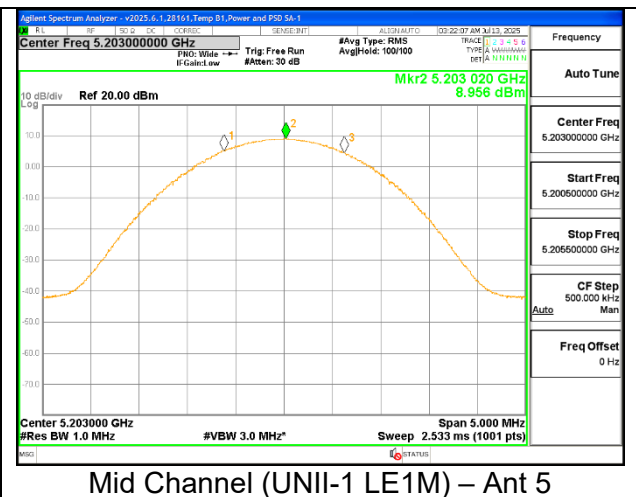
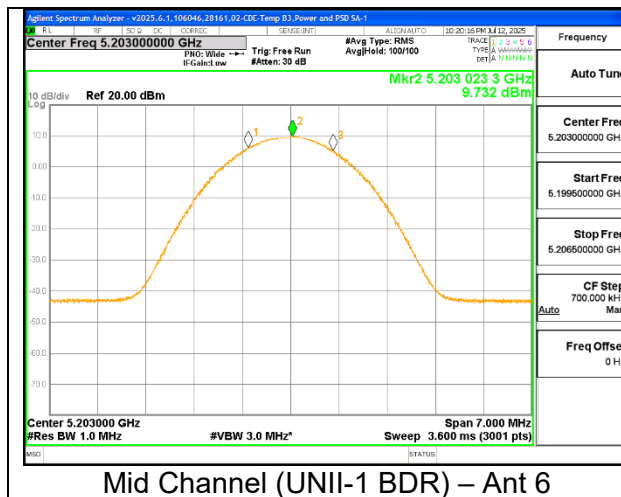
Uncorrelated Antenna gain= $10 \log[(10^{(-1.80/10)} + 10^{(-4.10/10)})/2] = -2.80 \text{ dBi}$

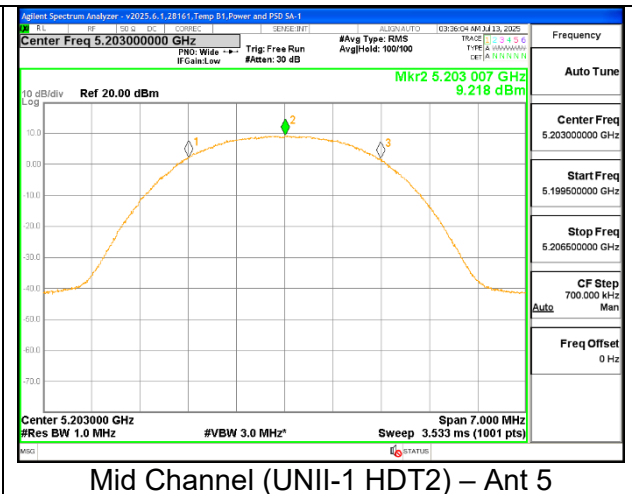
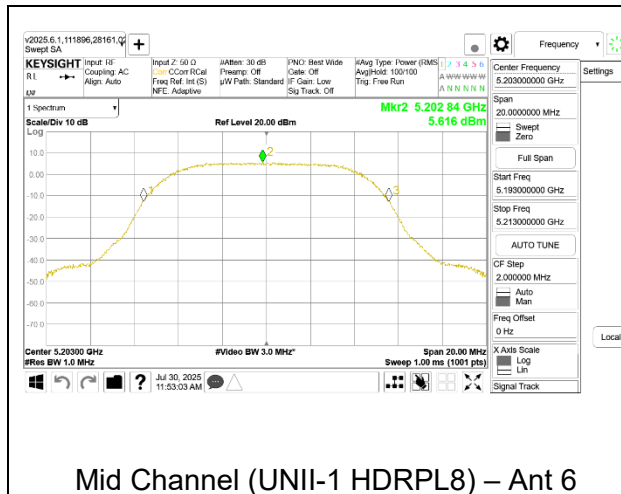
Correlated Antenna gain= $10 \log[(10^{(-1.80/20)} + 10^{(-4.10/20)})^2/2] = 0.14 \text{ dBi}$

9.4.1. UNII-1 BAND SISO MODE

UNII-1 (SISO) (5162 - 5245MHz)	
Ant 6 (dBi)	-1.80
Ant 5 (dBi)	-4.10

UNII-1 (SISO)	Power Config.	Freq (MHz)	Ch. #	Duty Cycle (dB)	Minimum Bandwidth (MHz)		Power Limit (dBm)		Output Power (Gated) (dBm)		Total Corrected Power (dBm)		PSD Limit (dBm/MHz)		PSD (dBm/MHz)		Total Corrected PSD (dBm/MHz)	
					Ant 6	Ant 5	Ant 6	Ant5	Ant 6	Ant 5	Ant 6	Ant 5	Ant 6	Ant5	Ant 6	Ant 5	Ant 6	Ant 5
BDR	High	5162	Low	1.16	--	24	24	9.96	9.87	9.96	9.87	11	11	9.614	9.748	10.774	10.908	
		5203	Mid					9.95	9.95	9.95	9.95			9.732	9.834	10.892	10.994	
		5245	High					9.94	9.98	9.94	9.98			9.456	9.567	10.616	10.727	
	Low	5162	Low					2.97	2.22	2.97	2.22			1.225	0.511	2.385	1.671	
		5203	Mid					2.98	2.21	2.98	2.21			1.291	0.763	2.451	1.923	
		5245	High					2.99	2.23	2.99	2.23			1.868	1.020	3.028	2.180	
HDT2	High	5162	Low	12.44				12.34	12.44	12.34	8.874			9.166	9.034	9.326		
		5203	Mid	12.39				12.36	12.39	12.36	9.079			9.218	9.239	9.378		
		5245	High	12.45				12.48	12.45	12.48	9.335			8.894	9.495	9.054		
	Low	5162	Low	-0.14				-1.10	-0.14	-1.10	-3.607			-4.588	-3.447	-4.428		
		5203	Mid	-0.02				-1.04	-0.02	-1.04	-3.244			-4.149	-3.084	-3.989		
		5245	High	-0.05				-1.02	-0.05	-1.02	-3.130			-4.191	-2.970	-4.031		
LE1M	High	5162	Low	10.23				10.21	10.23	10.21	8.671			8.873	9.391	9.593		
		5203	Mid	10.24				10.20	10.24	10.20	8.724			8.956	9.444	9.676		
		5245	High	10.18				10.21	10.18	10.21	8.722			8.764	9.442	9.484		
	Low	5162	Low	2.94				2.22	2.94	2.22	1.474			0.676	2.194	1.396		
		5203	Mid	2.93				2.17	2.93	2.17	1.623			0.905	2.343	1.625		
		5245	High	2.98				2.24	2.98	2.24	1.487			1.093	2.207	1.813		
LE2M	High	5162	Low	10.96				10.97	10.96	10.97	7.247			7.303	9.767	9.823		
		5203	Mid	10.99				10.86	10.99	10.86	7.004			7.355	9.524	9.875		
		5245	High	10.90				10.88	10.90	10.88	7.325			7.275	9.845	9.795		
	Low	5162	Low	2.88				2.18	2.88	2.18	-0.987			-1.470	1.533	1.050		
		5203	Mid	2.95				2.17	2.95	2.17	-0.588			-1.083	1.932	1.437		
		5245	High	2.89				2.20	2.89	2.20	-0.565			-1.358	1.955	1.162		
HDR4	High	5162	Low	12.23				12.13	12.23	12.13	8.922			8.971	10.012	10.061		
		5203	Mid	12.16				12.24	12.16	12.24	8.940			9.175	10.030	10.265		
		5245	High	12.21				12.08	12.21	12.08	9.002			8.853	10.092	9.943		
	Low	5162	Low	-0.13				-1.06	-0.13	-1.06	-3.423			-4.440	-2.333	-3.350		
		5203	Mid	-0.04				-1.08	-0.04	-1.08	-3.070			-4.284	-1.980	-3.194		
		5245	High	-0.13				-1.05	-0.13	-1.05	-3.050			-4.504	-1.960	-3.414		
HDRPM8	High	5162	Low	14.23				13.48	14.23	13.48	7.600			7.352	7.910	7.662		
		5203	Mid	14.23				13.45	14.23	13.45	7.548			7.183	7.858	7.493		
		5245	High	14.24				13.49	14.24	13.49	7.867			7.469	8.177	7.779		
	Low	5162	Low	-0.03				-1.05	-0.03	-1.05	-6.655			-7.525	-6.345	-7.215		
		5203	Mid	-0.02				-1.02	-0.02	-1.02	-6.586			-7.506	-6.276	-7.196		
		5245	High	-0.04				-1.11	-0.04	-1.11	-6.371			-7.495	-6.061	-7.185		
XHDRPM16	High	5162	Low	12.21				11.49	12.21	11.49	5.865			5.305	6.465	5.905		
		5203	Mid	12.19				11.47	12.19	11.47	5.548			5.168	6.148	5.768		
		5245	High	12.24				11.48	12.24	11.48	5.788			5.380	6.388	5.980		
	Low	5162	Low	-3.01				-4.02	-3.01	-4.02	-9.368			-10.199	-8.768	-9.599		
		5203	Mid	-3.03				-4.01	-3.03	-4.01	-8.946			-10.211	-8.346	-9.611		
		5245	High	-3.03				-4.06	-3.03	-4.06	-8.766			-10.426	-8.166	-9.826		
HDRPL8	High	5164	Low	14.22				13.43	14.22	13.43	5.589			4.608	5.809	4.828		
		5203	Mid	14.19				13.49	14.19	13.49	5.616			4.847	5.836	5.067		
		5242	High	14.22				13.41	14.22	13.41	5.908			4.815	6.128	5.035		
	Low	5164	Low	-0.03				-1.05	-0.03	-1.05	-8.772			-9.928	-8.552	-9.708		
		5203	Mid	-0.01				-1.03	-0.01	-1.03	-8.711			-9.643	-8.491	-9.423		
		5242	High	-0.01				-1.01	-0.01	-1.01	-8.555			-9.422	-8.335	-9.202		





9.4.2. UNII-1 BAND MIMO TXBF MODE

UNII-1 (MIMO BF) (5162 - 5245MHz)	
Un-Correlated Gain (dBi)	-2.80
Correlated Gain (dBi)	0.14

UNII-1 (MIMO BF)	Power Config.	Freq (MHz)	Ch. #	Duty Cycle (dB)	Min BW (MHz)	Power Limit (dBm)	Output Power (Gated) (dBm)		Total MIMO Corrected Power (dBm)	PSD Limit (dBm/MHz)	PSD (dBm/MHz)		Total MIMO Corrected PSD (dBm/MHz)
							Ant 6	Ant 5			Ant 6	Ant 5	
BDR (FCC)	High	5162	Low	1.16	--	24	6.95	6.99	9.98	11	5.988	5.920	10.124
		5203	Mid				6.97	6.98	9.99		5.769	5.873	9.992
		5245	High				6.98	6.99	10.00		5.844	5.854	10.019
	Low	5162	Low				2.91	2.23	5.59		1.498	0.790	5.329
		5203	Mid				2.96	2.24	5.63		1.674	1.185	5.607
		5245	High				2.99	2.19	5.62		1.666	1.038	5.534
HDT2	High	5162	Low	0.16			9.43	9.48	12.47		6.149	5.959	9.225
		5203	Mid				9.49	9.48	12.50		6.414	6.009	9.387
		5245	High				9.39	9.47	12.44		6.186	6.048	9.288
	Low	5162	Low				-0.06	-1.01	2.50		-3.530	-4.136	-0.652
		5203	Mid				-0.03	-1.06	2.50		-3.124	-3.861	-0.307
		5245	High				-0.04	-1.10	2.47		-3.350	-4.014	-0.499
LE1M	High	5162	Low	0.72			7.23	7.17	10.21		5.679	5.852	9.497
		5203	Mid				7.24	7.22	10.24		5.999	6.038	9.749
		5245	High				7.22	7.24	10.24		5.804	5.802	9.533
	Low	5162	Low				2.99	2.22	5.63		1.553	1.084	5.055
		5203	Mid				2.98	2.23	5.63		1.446	1.282	5.095
		5245	High				2.98	2.24	5.64		1.654	1.167	5.148
LE2M (FCC)	High	5162	Low	2.52			7.98	7.91	10.96		4.843	4.517	10.213
		5203	Mid				7.96	7.96	10.97		4.922	5.044	10.514
		5245	High				7.99	7.96	10.99		5.174	4.798	10.520
	Low	5162	Low				2.93	2.21	5.60		-1.099	-1.455	4.257
		5203	Mid				2.99	2.22	5.63		-0.455	-1.033	4.796
		5245	High				2.97	2.24	5.63		-0.748	-1.084	4.618
HDR4	High	5162	Low	1.09			9.15	9.23	12.20		5.780	6.005	9.994
		5203	Mid				9.24	9.23	12.25		5.746	6.029	9.990
		5245	High				9.24	9.22	12.24		5.940	6.075	10.108
	Low	5162	Low				-0.12	-1.06	2.45		-3.536	-4.548	0.088
		5203	Mid				-0.05	-1.03	2.50		-3.498	-4.923	-0.052
		5245	High				-0.02	-1.01	2.52		-3.218	-4.984	0.088
HDRPM8	High	5162	Low	0.31			11.99	11.98	15.00		6.067	6.044	9.376
		5203	Mid				11.98	11.99	15.00		6.062	6.031	9.367
		5245	High				11.97	11.97	14.98		6.265	6.042	9.475
	Low	5162	Low				-0.02	-1.03	2.51		-6.490	-7.539	-3.663
		5203	Mid				-0.07	-1.04	2.48		-6.781	-7.385	-3.752
		5245	High				-0.02	-1.05	2.51		-6.233	-7.385	-3.451
XHDRPM16	High	5162	Low	0.6			12.24	11.49	14.89		6.038	5.457	9.368
		5203	Mid				12.20	11.48	14.87		6.224	5.466	9.472
		5245	High				12.23	11.47	14.88		6.368	5.444	9.541
	Low	5162	Low				-3.03	-4.05	-0.50		-8.878	-9.981	-5.784
		5203	Mid				-3.07	-4.03	-0.51		-9.046	-10.302	-6.018
		5245	High				-3.08	-4.05	-0.53		-8.863	-10.177	-5.860
HDRPL8	High	5164	Low	0.22			14.23	13.49	16.89		6.492	5.074	9.071
		5203	Mid				14.21	13.48	16.87		6.277	4.895	8.871
		5242	High				14.24	13.47	16.88		6.699	5.054	9.184
	Low	5164	Low				-0.02	-1.04	2.51		-8.419	-10.096	-5.947
		5203	Mid				-0.01	-1.05	2.51		-8.210	-10.012	-5.788
		5242	High				-0.01	-1.01	2.53		-8.212	-9.637	-5.636