

TEST REPORT

Report Number: 15496224-E9V3

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

Model : A3256

Brand : APPLE

FCC ID : BCG-E8949A
IC : 579C-E8949A

EUT Description : SMARTPHONE

Test Standard(s) : FCC 47 CFR PART 15 SUBPART E
ISED RSS-248 Issue 3
ISED RSS-GEN Issue 5 + A1 + A2

Date Of Issue:
2025-07-31

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REPORT REVISION HISTORY



Rev.	Issue Date	Revisions	Revised By
V1	2025-07-11	Initial Review	Tony Li
V2	2025-07-16	Addressed TCB Questions on section 1, 3, 6, 8, and 9, 10	Tony Li
V3	2025-07-31	Updated Section 9.3.2	Tina Chu

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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	A3256
Brand	APPLE
FCC ID	BCG-E8949A
IC	579C-E8949A
EUT Description	SMARTPHONE
Serial Number	C07HC90002Z0000X9L (Conducted) HC6YLC6QDY (Radiated)
Sample Receipt Date	2025-02-21
Date Tested	2025-05-09 to 2025-07-15
Applicable Standards	CFR 47 Part 15 Subpart E ISED RSS-248 Issue 3 ISED RSS-GEN Issue 5 + A1 + A2
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 considered 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 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	
Approved & Released By:	Prepared & Reviewed By:
	
Francisco de Anda Staff Engineer UL Verification Services, Inc.	Tony Li, Benjamin Dobbins Lead Test Engineer, Senior Test Engineer 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)

Requirement Description	Requirement Clause Number (FCC)	Result	Comment
Duty Cycle	See Comment	Reporting purposes only	ANSI C63.10 Section 12.2
99% BW	§15.407 (a) (11) KDB 987594 D03 v02 Q18	Compliant	ANSI C63.10 Section 6.9.3
26dB BW			
Output Power EIRP	§15.407 (a) (7), (8), (9)	Compliant	Dual Client
PSD EIRP	§15.407 (a) (7), (8), (9)	Compliant	Dual Client
Emissions outside 5.925-7.125 GHz band	§15.407 (b) (6) (7)	Compliant	None
Emissions within 5.925-7.125 GHz Band (Emissions Mask)	§15.407 (b) (7)	Compliant	None
Unwanted emissions in restricted bands	§15.205	Compliant	None
Radiated Spurious Emissions	§15.209	Compliant	None
AC Mains Conducted Emissions	§15.207	Compliant	None
Transmit Power Control Mechanism	§15.407 (d) (10)	Compliant	Very Low Power Device

ISED:

Requirement Description	Requirement Clause Number (ISED)	Result	Comment
Duty Cycle	See Comment	Reporting purposes only	ANSI C63.10 Section 12.2
99% BW	RSS-248 4.4 KDB 987594 D03 v02 Q18	Compliant	ANSI C63.10 Section 6.9.3
26dB BW		Reporting purposes only	
Output Power EIRP	RSS-248 4.5.3, 4.5.5, 4.5.6	Compliant	Dual Client
PSD EIRP	RSS-248 4.5.3, 4.5.5, 4.5.6	Compliant	Dual Client
Emissions outside 5.925-7.125 GHz band	RSS-248 4.6.2(a)	Compliant	None
Emissions within 5.925-7.125 GHz Band (Emissions Mask)	RSS-248 4.6.2(b)	Compliant	None
Unwanted emissions in restricted bands	RSS-GEN 8.10	Compliant	None
Radiated Spurious Emissions	RSS-GEN 8.9	Compliant	None
AC Mains Conducted Emissions	RSS-GEN 8.8	Compliant	None
Transmit Power Control Mechanism	RSS-248 4.5.6	Compliant	Very Low Power Device

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
- FCC KDB 987594 D01 General Requirements
- FCC KDB 987594 D02 EMC Measurement
- RSS-248 Issue 3
- RSS-GEN Issue 5 + A1 +A2

*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	1.940 dB
Power Spectral Density	2.466 dB
Time Domain Measurements Using SA	3.39 %
RF Power Measurement Direct Method Using Power Meter	0.450 dB (Ave) 1.300 dB (Peak)
Radio Frequency (Spectrum Analyzer)	141.16 Hz
Occupied Bandwidth	1.22%
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, 5GNR1, 5GNR2, 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 report covers the UNII-5 NB, which operates in the frequency range of 6106-6420MHz, equipped with VLP client device.

6.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum EIRP output power as follows:

UNII-5 Frequency Range (MHz)	Mode	Antenna	Configuration	Output Power EIRP (dBm)	Output Power EIRP (mW)
6106 -6420	BDR	Ant 6	High Power	-6.07	0.25
			Low Power	-6.05	0.25
		Ant 5	High Power	-7.73	0.17
			Low Power	-7.78	0.17
		BF, Ant 6 + Ant 5	High Power	-6.53	0.22
			Low Power	-6.52	0.22
6106 -6420	LE1M	Ant 6	High Power	-5.74	0.27
			Low Power	-5.77	0.26
		Ant 5	High Power	-7.41	0.18
			Low Power	-7.45	0.18
		BF, Ant 6 + Ant 5	High Power	-6.12	0.24
			Low Power	-6.13	0.24
6106 -6420	LE2M	Ant 6	High Power	-4.91	0.32
			Low Power	-4.92	0.32
		Ant 5	High Power	-4.64	0.34
			Low Power	-6.62	0.22
		BF, Ant 6 + Ant 5	High Power	-5.29	0.30
			Low Power	-5.32	0.29
6106 -6420	HDT4	Ant 6	High Power	-3.39	0.46
			Low Power	-3.31	0.47
		Ant 5	High Power	-5.05	0.31
			Low Power	-6.43	0.23
		BF, Ant 6 + Ant 5	High Power	-3.85	0.41
			Low Power	-3.81	0.42
6106 -6420	HDR4	Ant 6	High Power	-3.75	0.42
			Low Power	-3.73	0.42
		Ant 5	High Power	-5.41	0.29
			Low Power	-6.47	0.23
		BF, Ant 6 + Ant 5	High Power	-4.13	0.39
			Low Power	-4.12	0.39
6106 -6420	XHDRPS2	Ant 6	High Power	-3.75	0.42
			Low Power	-3.71	0.43
		Ant 5	High Power	-5.42	0.29
			Low Power	-6.47	0.23
		BF, Ant 6 + Ant 5	High Power	-4.22	0.38
			Low Power	-4.23	0.38
6107 -6420	HDRPM8	Ant 6	High Power	-0.98	0.80
			Low Power	-0.94	0.81
		Ant 5	High Power	-2.66	0.54
			Low Power	-6.47	0.23
		BF, Ant 6 + Ant 5	High Power	-1.31	0.74
			Low Power	-1.32	0.74
6109 -6417	XHDRPL16	Ant 6	High Power	2.19	1.66
			Low Power	2.14	1.64
		Ant 5	High Power	0.48	1.12
			Low Power	-6.46	0.23
		BF, Ant 6 + Ant 5	High Power	1.67	1.47
			Low Power	1.69	1.48

6.3. DESCRIPTION OF AVAILABLE ANTENNAS AND CABLE LOSS

The antenna(s) gain and type, cable loss as provided by the manufacturers are as follows:

Antenna Type is IFA

Frequency Range (MHz)	Sub-band (MHz)	Antenna 6 (dBi)	Antenna 5 (dBi)	Uncorrelated Chains (dBi)	Correlated Chains (dBi)
6105 - 6425 UNII-5	Sub-band 2 (6115 - 6255)	4.10	-6.60	1.44	3.31
	Sub-band 3 (6275 - 6415)	2.20	-6.80	-0.30	1.83

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

Cable: SMA

Cable Loss		
Frequency Range (MHz)	Antenna 6 (dBi)	Antenna 5 (dBi)
5925-6105	-3.30	-2.90
6105-6265	-3.30	-2.90
6265-6425	-3.30	-2.90

Cable loss used for RF antenna port tests was included in offset of the test equipment during testing.

6.4. SOFTWARE AND FIRMWARE

The EUT firmware is Luck23A256.

6.5. WORST-CASE CONFIGURATION AND MODE

This report is to document the very low power client mode only.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Z (Portrait) orientation was worst-case orientation for ANT6 and Y (Landscape) was the worst-case orientation for ANT5 and 2TX.

For the radiated bandedge testing, we investigated and found that there were no emissions at both lower and upper bandedges.

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

For radiated harmonics spurious below 1GHz, 1-18GHz L/M/H channels, 18-26GHz, 26-40GHz and power line conducted emissions were performed with the EUT set at the 2TX BF at high power mode with power setting equal or higher than 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 tests, the worst-case configuration reported was with EUT only. There were no emissions found below 30MHz within 20dB of the limit. For AC line conducted emission, test was investigated with AC power adapter and with laptop.

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

UNII-5				
Mode	Modulation	Frequency Range (MHz)	Worst Case Tone	
			Power	PSD
BT5G	BDR	6106-6420	X	X
	EDR2	N5		
	EDR3			
LE	LE Adv	6106-6420		
	LE1M		X	X
	LELR8			
	LELR2			
	LE2M	6106-6420	X	X
	HDT2	6106-6420		
	HDT3			
	HDT4		X	X
	HDT6			
	HDT8			
HDR	HDR4	6106-6420	X	X
	HDRPS2			
	XHDRPS2		X	X
	HDR8	6107-6420		
	HDRPM4			
	HDRPM6			
	HDRPM8		X	X
	XHDRPM4			
	XHDRPM6			
	XHDRPM8			
	HDRPM12			
	HDRPM16			
	XHDRPM12			
	XHDRPM16			
	HDRPL8	6109-6417		
	HDRPL12			
	HDRPL16			
	XHDRPL8			
	XHDRPL12			
	XHDRPL16		X	X
	HDRPL24			
	HDRPL32			
	XHDRPL24			
	XHDRPL32			

6.6. DESCRIPTION OF TEST SETUP

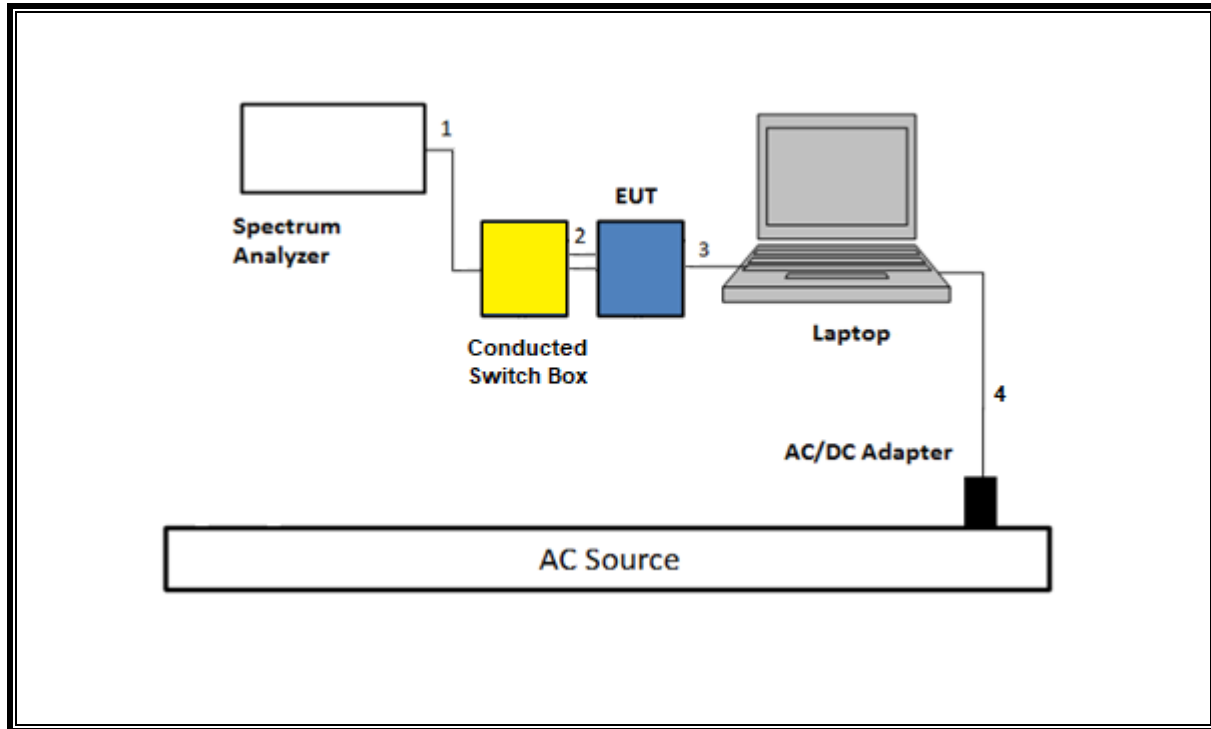
SUPPORT TEST EQUIPMENT						
Description		Manufacturer	Model	Serial Number		FCC ID/ DoC
Laptop		Apple	Macbook	G2YKJ9LWH5		N/A
Laptop AC/DC adapter		Apple	N/A	C4H238408AEPM0WAS		DoC
EUT AC/DC adapter		Apple	N/A	C4H238505ARPM0WAP		DoC
Conducted Switch Box		UL	N/A	245782		N/A
I/O CABLES (RF CONDUCTED TEST)						
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
I/O CABLES (TPC CONDUCTED TEST)						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	2-Prong	Un-shielded	1	DC to AC Mains
2	DC	1	DC	Shielded	1.5	
3	USB-C	1	USB-C	Shielded	1.0	N/A
4	SMA	4	SMA	Shielded	0.75	To PXA, coupler, step attenuator and companion device

TEST SETUP

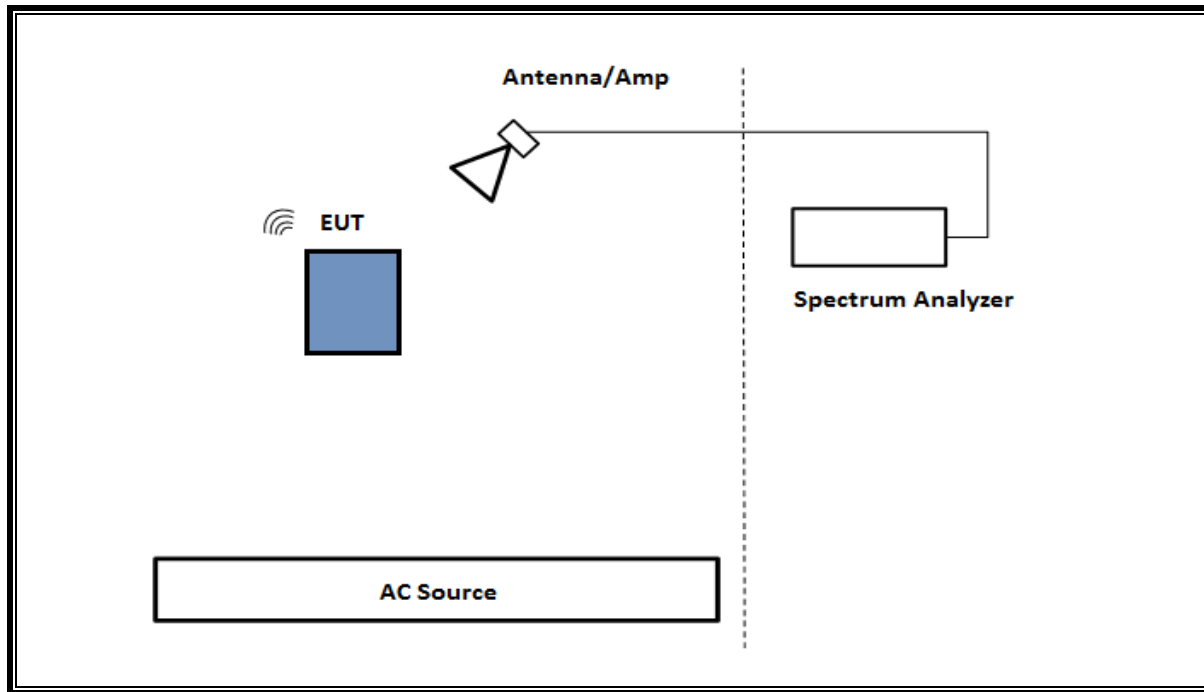
The EUT setup is shown as below. Test software exercised the radio card.

Note, For TPC test, companion device is same device type and model as the EUT and is used to establish a peer-to-peer link.

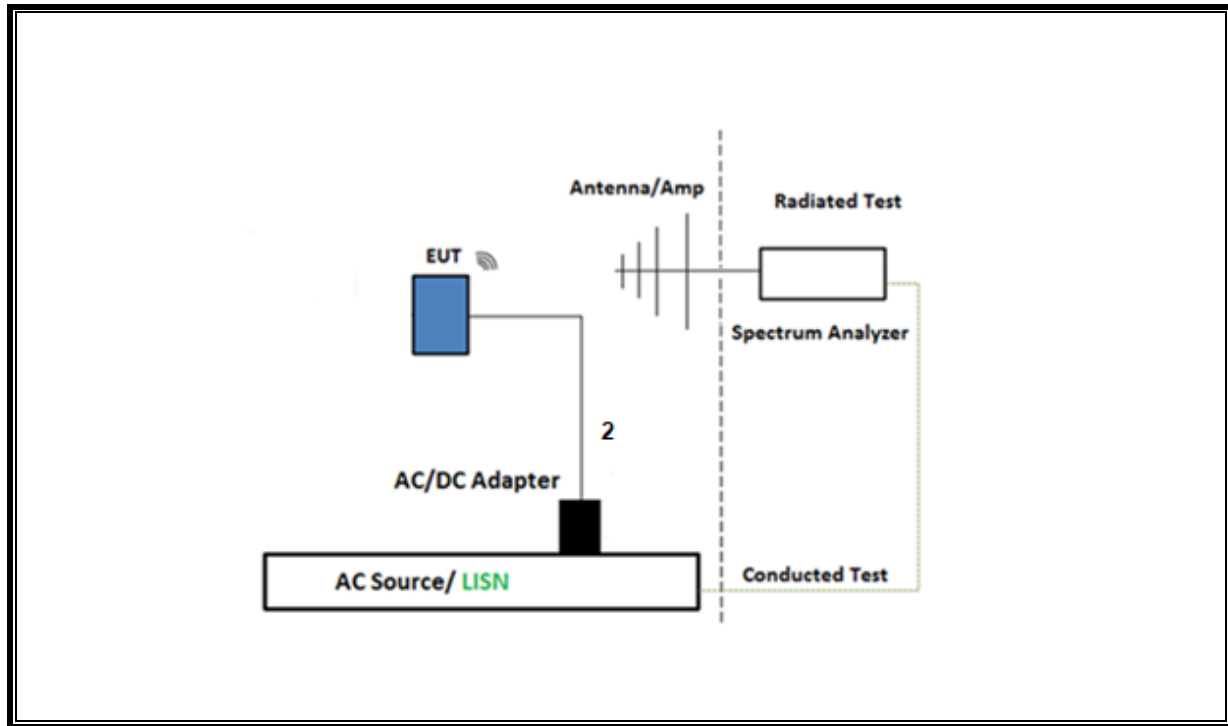
SETUP DIAGRAM FOR CONDUCTED TESTS



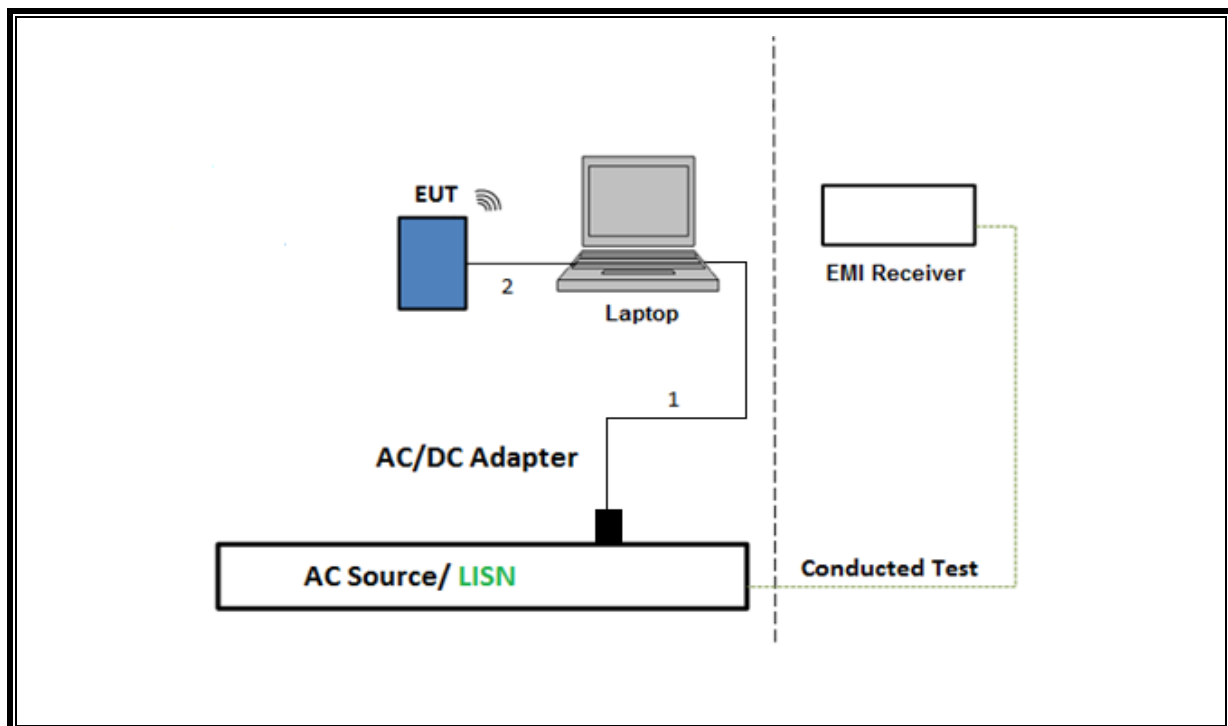
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



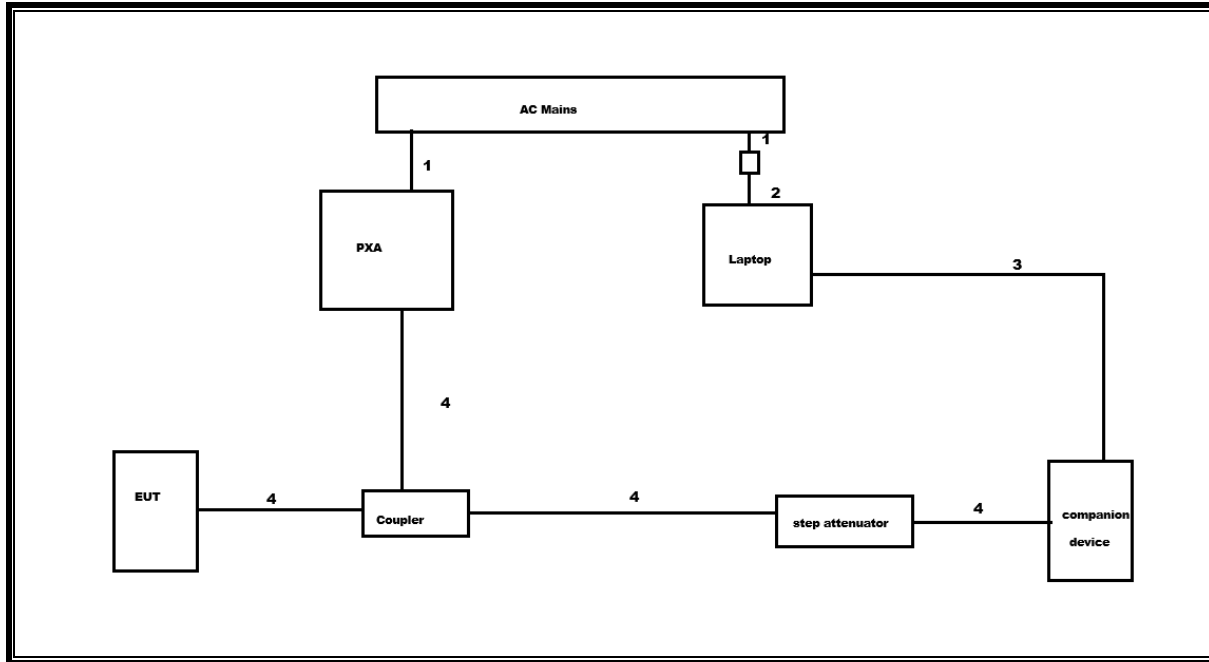
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



SETUP DIAGRAM FOR TPC TEST



7. MEASUREMENT METHOD

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

26 dB Emission BW: KDB 789033 D02, Section II-C.

99% Occupied Bandwidth: KDB 789033 D02, Section II-D

Conducted Output Power: KDB 789033 D02, Section II E.3.b (Method PM-G).

Power Spectral Density (PSD): KDB 789033 D02, Section II- F

Spurious emissions within 5.925-7.125 GHz Band (Emissions Mask): KDB 987594 D02 EMC Measurement Section II-J

Unwanted emissions in restricted bands: KDB 789033 D02, Section II-G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02, Section II- 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

8. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	ID Num	Cal Due
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A-544	90238	2026-01-31
Spectrum Analyzer, PXA, 3Hz to 50GHz w/Ext. Mixer	Keysight Technologies Inc	N9030A	80400	2026-01-31
Power Meter, P-series single channel	Keysight Technologies Inc	N1911A	90718	2026-03-31
Power Sensor, P - series, 50MHz to 18GHz, Wideband	Keysight Technologies Inc	N1921A	257704	2026-03-31
RF Device, Switch	UL	CSB	245262	2026-04-30
RF Device, Switch	UL	CSB	262287	2026-04-30
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	41112	2026-10-31
RF Filter Box, 1-18GHz	UL-FR1	RATS 3.1	243707	2026-04-30
EMI Test Receiver	Rohde & Schwarz	ESW44	169927	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	81887	2027-03-31
RF Filter Box, 1-18GHz	UL-FR1	RATS 2.0	225575	2025-11-30
EMI Test Receiver	Rohde & Schwarz	ESW44	201498	2026-02-28
Antenna, Horn 1-18GHz	ETS-Lindgren	3117	230299	2027-02-28
RF Filter Box, 1-18GHz	UL-FR1	RATS 2.0	226780	2026-05-31
EMI Test Receiver	Rohde & Schwarz	ESW44	226079	2026-02-28
Antenna, Broadband Hybrid 30 MHz - 2 or 3 GHz	Sunol Sciences Corp.	JB3	171863	2026-11-30
Link File, 3m, 9kHz-1000MHz Hybrid Path Loss	UL-FR1	Port 0 Factors	230919	2026-05-30
EMI Test Receiver	Rohde & Schwarz	ESW44	201502	2026-02-28
Antenna, Horn 18-26.5GHz	A.R.A	MWH-1826/B	81139	2025-08-31
Link File, RF Amplifier Assembly, 18-26.5GHz, 60dB Gain	Ampical	AMP18G26.5-60	220194	2026-04-29
Antenna, Horn 26.5-40GHz	A.R.A	MWH-2640/B	81105	2025-08-31
Link File, RF Amplifier Assembly, 26.5-40GHz, 65dB Gain	Ampical	AMP26G40-65	220193	2026-04-30
EMI Test Receiver	Rohde & Schwarz	ESW44	226078	2026-02-28
Antenna, Passive Loop 30Hz - 1MHz	ELECTRO-METRICS	EM-6871	170013	2025-07-31
Antenna, Passive Loop 100KHz - 30MHz	ELECTRO-METRICS	EM-6872	170015	2025-07-31

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	Antenna Port	Ver 2022.8.16, 2024.2.23	
Conducted Software	UL	Station Tool	Ver 5.3, 6.0, 6.1	
Radiated Software	UL	UL EMC	Ver 9.5, May 1 , 2023	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, Mar 3, 2023	

TPC CONDUCTED TEST				
Description	Manufacturer	Model	ID Num	Cal Due
Spectrum Analyzer, PXA, 3Hz to 44GHz	Keysight Technologies Inc	N9030A	80400	2026-01-31
Step Attenuator 70dB	HP	8495B	2406A01354	N/A
Directional Coupler	Pasternack Enterprises	PE2204-6	246270	2026-05-31

9. ANTENNA PORT TEST RESULTS

9.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

PROCEDURE

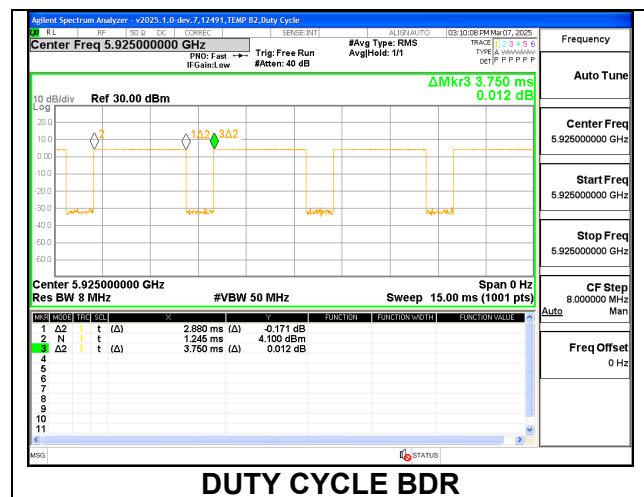
KDB 789033 Zero-Span Spectrum Analyzer Method.

ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time T (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
BDR	2.88	3.75	0.768	76.8	1.15	0.347
LE1M	2.13	2.50	0.852	85.2	0.70	0.469
LE2M	1.08	1.88	0.574	57.4	2.41	0.926
HDT4	1.11	1.18	0.936	93.6	0.29	0.905
HDR4	2.78	3.75	0.741	74.1	1.30	0.360
XHDRPS2	16.10	16.27	0.990	99.0	0.00	0.010
HDRPM8	8.16	8.75	0.933	93.3	0.30	0.123
XHDRPL16	3.58	3.75	0.955	95.5	0.20	0.279

Note: The same DCCF is used for both 1TX and 2TX

DUTY CYCLE PLOTS



9.2. 26 dB AND 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

PROCEDURE

ANSI C63.10: 2020, Section 6.9.3

Worst-Case Mode	RBW (kHz)	VBW (kHz)
BDR	30	91
LE1M	30	91
LE2M	43	150
HDT4	43	150
HDR4	30	91
XHDRPS2	30	91
HDRPM8	100	300
XHDRPL16	200	620

RESULTS

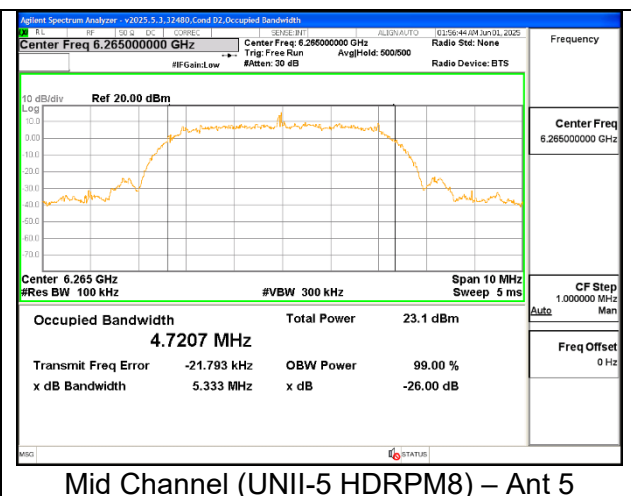
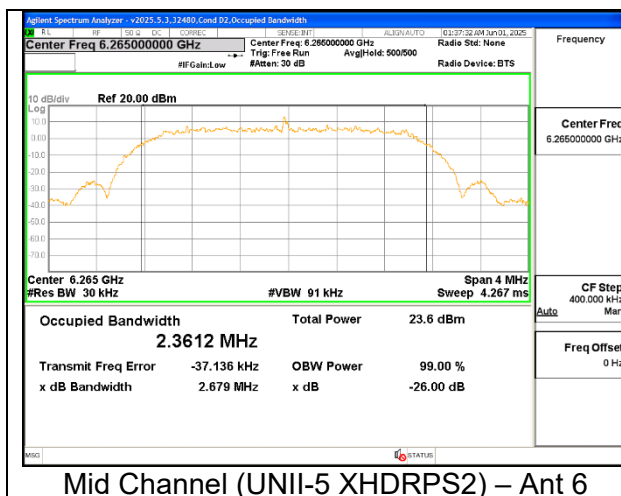
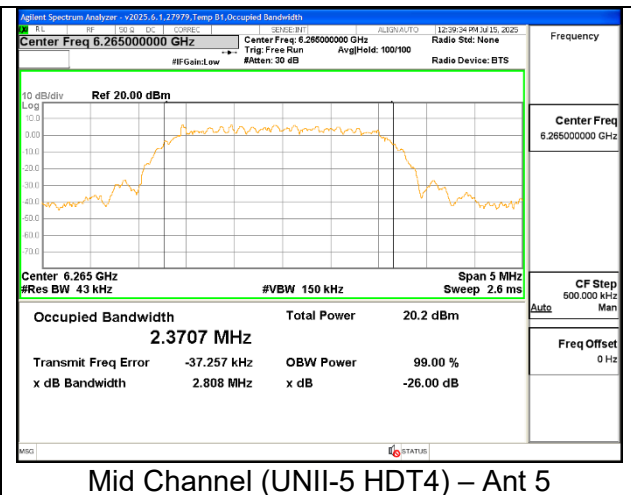
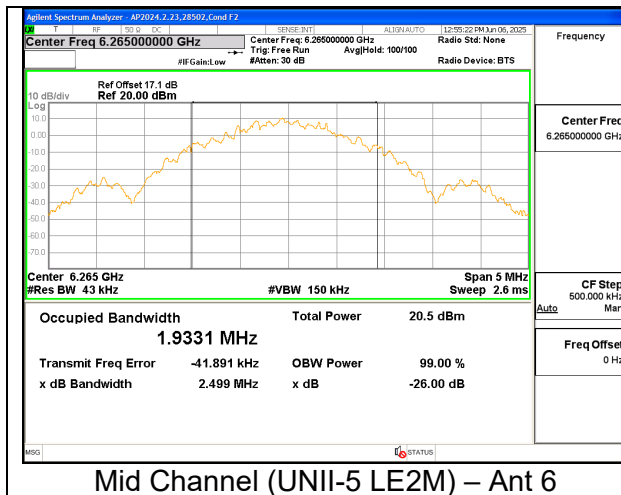
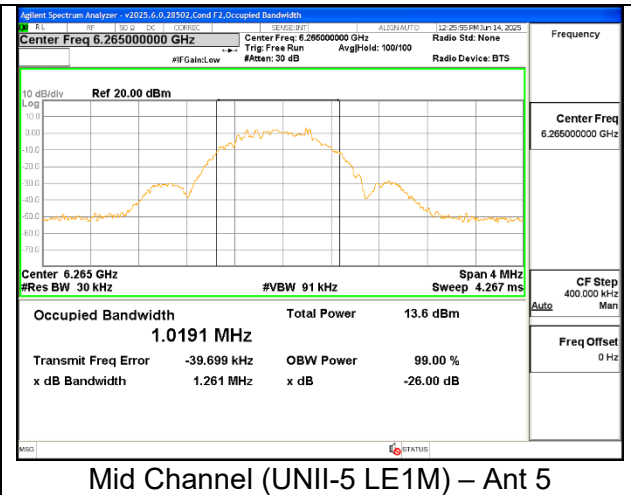
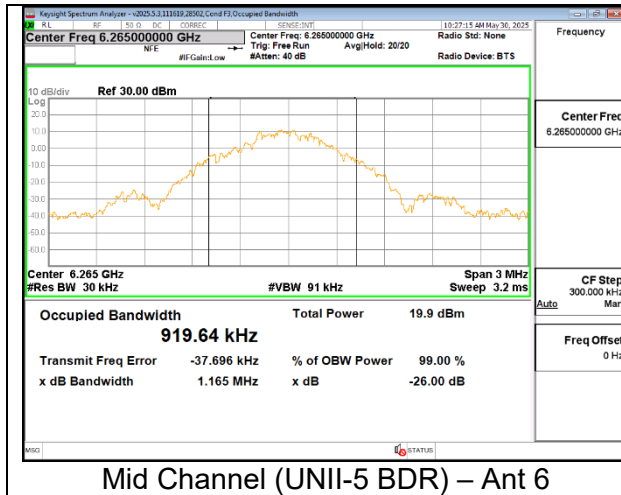
ID:	32480	Date:	2025-07-15
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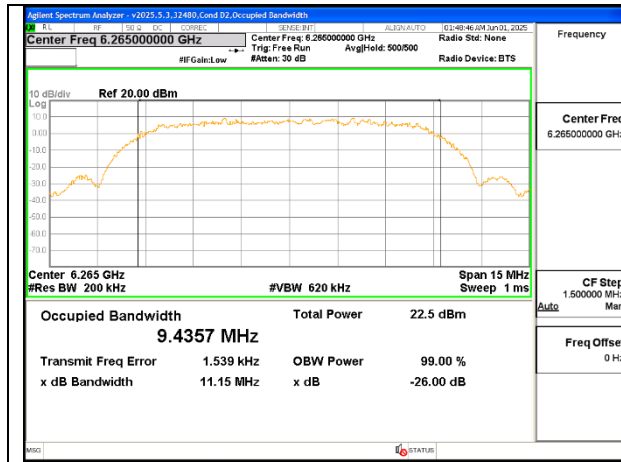
The plots in these sections are for reference settings only for different bandwidths and different antennas.

The tests performed on this device show that both 99% and 26dB bandwidths are less than 320 MHz. for all supported channel bandwidths.

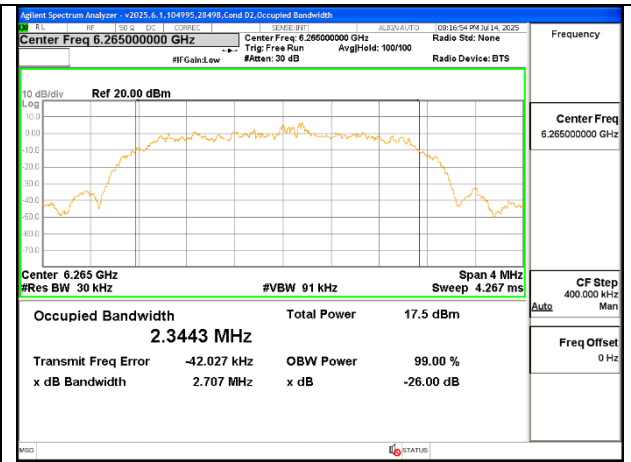
9.2.1. UNII-5 BAND SISO MODE

Worst-Case Mode (SISO)	Frequency (MHz)	Channel Number	26 dB Bandwidth (MHz)		99% Bandwidth (MHz)	
			Ant 6	Ant 5	Ant 6	Ant 5
BDR	6106	Low	1.206	1.249	0.93155	0.95056
	6265	Mid	1.165	1.230	0.91964	0.93525
	6420	High	1.233	1.256	0.93995	0.95232
LE1M	6106	Low	1.261	1.260	1.02550	1.02000
	6265	Mid	1.261	1.261	1.01820	1.01910
	6420	High	1.260	1.262	1.01480	1.01840
LE2M	6106	Low	2.480	2.369	1.88950	1.90160
	6265	Mid	2.499	2.400	1.93310	1.93560
	6420	High	2.489	2.415	1.90900	1.87850
HDT4	6106	Low	2.809	2.803	2.37160	2.37150
	6265	Mid	2.803	2.808	2.36850	2.37070
	6420	High	2.810	2.803	2.36900	2.36990
HDR4	6106	Low	2.874	2.716	2.36000	2.36280
	6265	Mid	2.703	2.707	2.33910	2.34430
	6420	High	2.681	2.709	2.34860	2.35560
XHDRPS2	6106	Low	2.684	2.745	2.37740	2.38710
	6265	Mid	2.679	2.680	2.36120	2.37130
	6420	High	2.691	2.685	2.37950	2.38580
HDRPM8	6107	Low	5.371	5.401	4.71670	4.73000
	6265	Mid	5.375	5.333	4.71240	4.72070
	6420	High	5.375	5.321	4.71700	4.71910
XHDRPL16	6109	Low	10.630	10.630	9.40860	9.40430
	6265	Mid	11.150	10.710	9.43570	9.36350
	6417	High	10.660	10.700	9.40730	9.36120





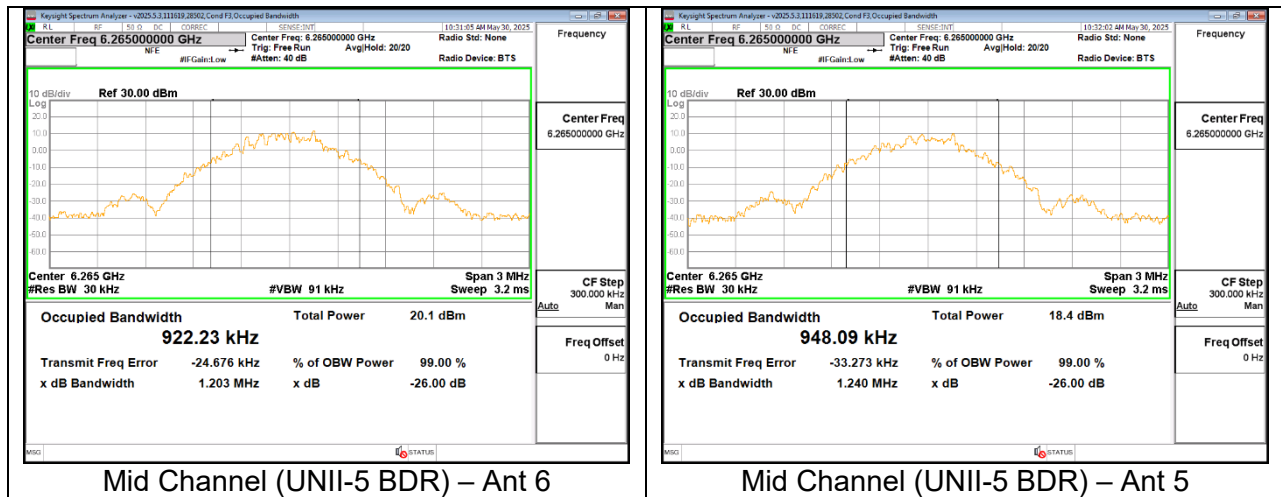
Mid Channel (UNII-5 XHDRPL16) – Ant 6



Mid Channel (UNII-5 HDR4) – Ant 5

9.2.2. UNII-5 BAND MIMO 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	6106	Low	1.227	1.262	0.93364	0.93877
	6265	Mid	1.203	1.240	0.92223	0.94809
	6420	High	1.272	1.243	0.94802	0.93526
LE1M	6106	Low	1.262	1.261	1.01940	1.01470
	6265	Mid	1.261	1.260	1.01690	1.01890
	6420	High	1.260	1.262	1.02230	1.01940
LE2M	6106	Low	2.380	2.483	1.89640	1.90230
	6265	Mid	2.492	2.417	1.91360	1.92970
	6420	High	2.409	2.502	1.90830	1.94230
HDT4	6106	Low	2.812	2.809	2.37100	2.37120
	6265	Mid	2.806	2.807	2.37400	2.37280
	6420	High	2.818	2.805	2.37080	2.37280
HDR4	6106	Low	2.676	2.701	2.35280	2.34720
	6265	Mid	2.750	2.736	2.35780	2.36660
	6420	High	2.683	2.696	2.33130	2.34350
XHDRPS2	6106	Low	2.689	2.699	2.37340	2.39130
	6265	Mid	2.757	2.678	2.37460	2.38340
	6420	High	2.698	2.676	2.37780	2.38150
HDRPM8	6107	Low	5.376	5.339	4.72850	4.71070
	6265	Mid	5.329	5.331	4.72040	4.72110
	6420	High	5.348	5.343	4.72810	4.72150
XHDRPL16	6109	Low	10.690	10.750	9.36870	9.37900
	6265	Mid	10.710	10.800	9.37140	9.39830
	6417	High	10.710	10.700	9.35140	9.41530



9.3. VLP OUTPUT POWER AND PSD

LIMITS

FCC §15.407

Bands: 5.925–6.425 GHz and 6.525–6.875 GHz

(9) For very low power devices operating in the 5.925-6.425 GHz and 6.525-6.875 GHz bands, the maximum power spectral density must not exceed –5 dBm e.i.r.p in any 1-megahertz band and the maximum e.i.r.p must not exceed 14 dBm.

RSS 248 4.5.6

Power limits for very low-power devices

Both of the following limits shall apply to very low-power devices:

- a. the maximum e.i.r.p. spectral density shall not exceed –5 dBm/MHz
- b. the maximum e.i.r.p. shall not exceed 14 dBm

TEST PROCEDURE

Conducted Output Power: KDB 789033 D02 v02r01, Section II E.3.b (Method PM-G). Gated power measurement is used to calculate EIRP. Power does not include any corrections for duty factor.

The measurement method used for power spectral density is KDB 789033 D02 v02r01, Section F

RESULTS

The plots in these sections are for reference settings only for different bandwidths and different antenna ports.

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:

BF MIMO Tx chains used correlated gain for power EIRP calculation and correlated gain for PSD EIRP calculation; For the straddle channels, the higher antenna gains were chosen between two bands where straddle channels are located. The directional gains are as follows:

Frequency Range (MHz)	Sub-band (MHz)	Antenna 6 (dBi)	Antenna 5 (dBi)	Uncorrelated Chains (dBi)	Correlated Chains (dBi)
5925 - 6425 UNII-5	Sub-band 2 (6115 - 6255)	4.10	-6.60	1.44	3.31
	Sub-band 3 (6275 - 6415)	2.20	-6.80	-0.30	1.83

DIRECTIONAL GAIN CALCULATION:

ANSI C63.10-2013 section 14.4.3

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

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

Sample Calculation at UNII-5 Band:

Ant 6=4.10, Ant5=-6.60

Uncorrelated Antenna gain= $10 \log[(10^{(4.10/10)} + 10^{(-6.60/10)})/2] = 1.44 \text{ dBi}$

Correlated Antenna gain= $10 \log[(10^{(4.10/20)} + 10^{(-6.60/20)})^2/2] = 3.31 \text{ dBi}$

EIRP Calculation:

1Tx

EIRP corr'd power = Ant6 + Antenna Gain

Sample Calculation at UNII-5 Band:

Ant 6 Power = -10.17 dBm

EIRP corr'd power = -10.17 + (4.10) = -6.07 dBm

2Tx

EIRP corr'd power = $10 \cdot \log(10^{(\text{Ant6}/10)} + 10^{(\text{Ant5}/10)}) + \text{correlated directional gain}$

Sample Calculation at UNII-5 Band:

Ant 6 Power = -12.87 dBm, Ant5 Power = -12.93 dBm

EIRP corr'd power = $10 \cdot \log(10^{(-12.87/10)} + 10^{(-12.93/10)}) + (3.31) = -3.27 \text{ dBm}$

EIRP PSD Calculation:

1Tx

EIRP corr'd PSD = DCCF + Ant6 + Antenna Gain

Sample Calculation at UNII-5 Band:

Ant 6 PSD = -12.708 dBm/1MHz

EIRP corr'd PSD = 1.15 + (-12.708) + (4.10) = -7.458 dBm/1MHz

2Tx (OFDMA)

EIRP corr'd PSD = $(10 \cdot \log(10^{((\text{DCCF} + \text{Ant6})/10)} + 10^{((\text{DCCF} + \text{Ant5})/10)})) + \text{correlated directional gain}$

Sample Calculation at UNII-5 Band:

Ant 6 PSD = -15.821 dBm/1MHz, Ant5 PSD = -15.699 dBm/1MHz

EIRP corr'd PSD = $(10 \cdot \log(10^{((0 + (-15.821))/10)} + 10^{((0 + (-15.699))/10)})) + (3.31) = -8.289 \text{ dBm/1MHz}$

9.3.1. UNII-5 BAND SISO MODE

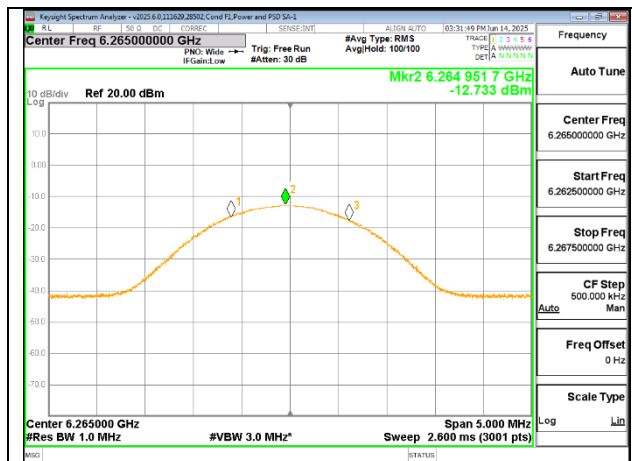
UNII-5 (SISO) (6105 - 6425MHz)	Low CH	Mid CH	High CH
Ant 6 (dBi)	4.10	4.10	2.20
Ant 5 (dBi)	-6.60	-6.60	-6.80

UNII-5 (SISO)	Power Config.	Freq (MHz)	Ch. #	Duty Cycle (dB)	Conducted Power (Gated) (dBm)		EIRP Power (Limit = 14dBm EIRP)		Conducted PSD (dBm/MHz)		EIRP PSD (Limit = -5dBm/MHz EIRP)	
					Ant 6	Ant 5	Ant 6	Ant 5	Ant 6	Ant 5	Ant 6	Ant 5
BDR	High	6106	Low	1.15	-10.17	-1.13	-6.07	-7.73	-12.708	-2.803	-7.458	-8.253
		6265	Mid		-10.17	-1.16	-6.07	-7.76	-12.733	-2.819	-7.483	-8.269
		6420	High		-10.18	-1.19	-7.98	-7.99	-12.269	-2.513	-8.919	-8.163
	Low	6106	Low		-10.15	-1.18	-6.05	-7.78	-13.650	-6.727	-8.400	-12.177
		6265	Mid		-10.18	-1.20	-6.08	-7.80	-13.428	-6.614	-8.178	-12.064
		6420	High		-10.18	-1.18	-7.98	-7.98	-13.244	-6.081	-9.894	-11.731
LE1M	High	6106	Low	0.70	-9.84	-0.81	-5.74	-7.41	-9.963	-1.755	-5.163	-7.655
		6265	Mid		-9.85	-0.89	-5.75	-7.49	-9.870	-1.674	-5.070	-7.574
		6420	High		-9.85	-0.85	-7.65	-7.65	-9.904	-1.829	-7.004	-7.929
	Low	6106	Low		-9.87	-0.88	-5.77	-7.48	-10.832	-1.681	-6.032	-7.581
		6265	Mid		-9.88	-0.85	-5.78	-7.45	-10.489	-1.496	-5.689	-7.396
		6420	High		-9.88	-0.81	-7.68	-7.61	-10.484	-1.647	-7.584	-7.747
LE2M	High	6106	Low	2.41	-9.07	-0.04	-4.97	-6.64	-11.676	-3.013	-5.166	-7.203
		6265	Mid		-9.01	-0.05	-4.91	-6.65	-11.668	-3.018	-5.158	-7.208
		6420	High		-9.04	-0.01	-6.84	-6.81	-11.475	-3.145	-6.865	-7.535
	Low	6106	Low		-9.02	-0.05	-4.92	-6.65	-12.506	-2.615	-5.996	-6.805
		6265	Mid		-9.10	-0.02	-5.00	-6.62	-12.398	-2.458	-5.888	-6.648
		6420	High		-9.09	-0.04	-6.89	-6.84	-12.245	-2.586	-7.635	-6.976
HDT4	High	6106	Low	0.29	-7.49	1.51	-3.39	-5.09	-11.177	-2.163	-6.787	-8.473
		6265	Mid		-7.51	1.55	-3.41	-5.05	-11.237	-2.131	-6.847	-8.441
		6420	High		-7.55	1.57	-5.35	-5.23	-10.772	-1.706	-8.282	-8.216
	Low	6106	Low		-7.44	0.17	-3.34	-6.43	-10.991	-3.591	-6.601	-9.901
		6265	Mid		-7.41	0.14	-3.31	-6.46	-10.942	-3.493	-6.552	-9.803
		6420	High		-7.50	0.18	-5.30	-6.62	-10.874	-3.403	-8.384	-9.913
HDR4	High	6106	Low	1.30	-7.85	1.14	-3.75	-5.46	-12.016	-2.373	-7.916	-8.973
		6265	Mid		-7.89	1.19	-3.79	-5.41	-12.182	-2.206	-8.082	-8.806
		6420	High		-7.86	1.15	-5.66	-5.65	-11.902	-2.490	-9.702	-9.290
	Low	6106	Low		-7.83	0.12	-3.73	-6.48	-12.288	-3.179	-8.188	-9.779
		6265	Mid		-7.87	0.13	-3.77	-6.47	-12.167	-3.242	-8.067	-9.842
		6420	High		-7.88	0.13	-5.68	-6.67	-12.090	-3.330	-9.890	-10.130
XHDPSP2	High	6106	Low	0.00	-7.89	1.18	-3.79	-5.42	-10.761	-1.558	-6.661	-8.158
		6265	Mid		-7.85	1.18	-3.75	-5.42	-10.714	-1.714	-6.614	-8.314
		6420	High		-7.94	1.15	-5.74	-5.65	-10.890	-1.747	-8.690	-8.547
	Low	6106	Low		-7.81	0.13	-3.71	-6.47	-10.794	-2.486	-6.694	-9.086
		6265	Mid		-7.87	0.12	-3.77	-6.48	-10.740	-2.388	-6.640	-8.988
		6420	High		-7.81	0.13	-5.61	-6.67	-10.819	-2.324	-8.619	-9.124
HDRPM8	High	6107	Low	0.30	-5.08	3.94	-0.98	-2.66	-11.373	-1.280	-6.973	-7.580
		6265	Mid		-5.09	3.92	-0.99	-2.68	-10.916	-1.397	-6.516	-7.697
		6420	High		-5.10	3.95	-2.90	-2.85	-10.916	-1.185	-8.416	-7.685
	Low	6107	Low		-5.04	0.13	-0.94	-6.47	-10.951	-5.289	-6.551	-11.589
		6265	Mid		-5.10	0.12	-1.00	-6.48	-10.716	-5.505	-6.316	-11.805
		6420	High		-5.01	0.12	-2.81	-6.68	-10.663	-5.277	-8.163	-11.777
XHDPRL16	High	6109	Low	0.20	-1.96	7.08	2.14	0.48	-9.999	-0.754	-5.699	-7.154
		6265	Mid		-1.91	7.05	2.19	0.45	-10.201	-0.835	-5.901	-7.235
		6417	High		-1.92	7.01	0.28	0.21	-10.108	-0.723	-7.708	-7.323
	Low	6109	Low		-1.99	0.14	2.11	-6.46	-10.255	-7.974	-5.955	-14.374
		6265	Mid		-1.96	0.13	2.14	-6.47	-10.224	-7.909	-5.924	-14.309
		6417	High		-1.95	0.12	0.25	-6.68	-9.822	-7.956	-7.422	-14.556

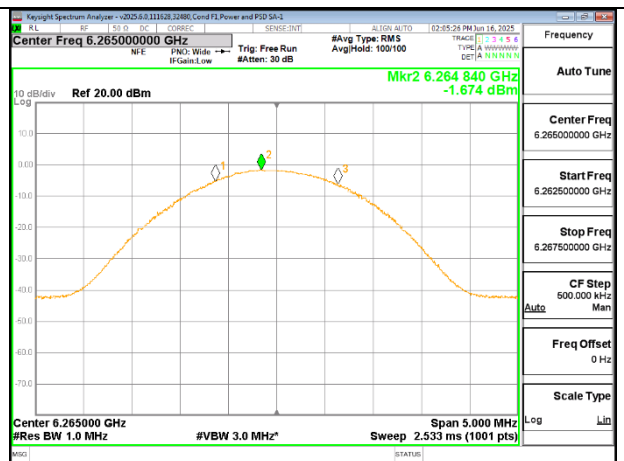
Note:

EIRP Output Power (dBm) = Measured Conducted Power (dBm)+ Peak Antenna Gain (dBi)

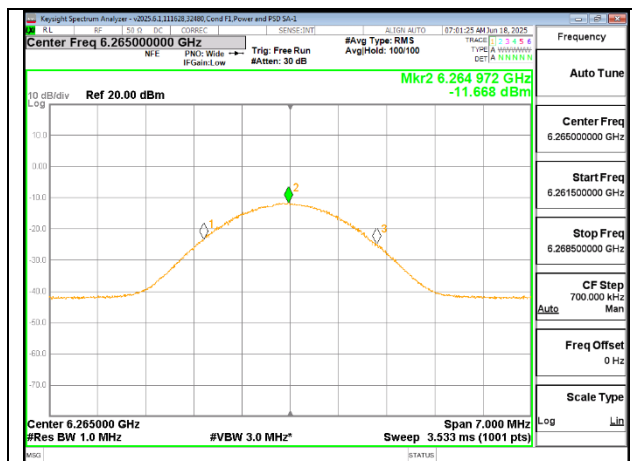
EIRP PSD (dBm/MHz) = Measured Conducted PSD (dBm/MHz) + Duty Factor (dB) + Peak Antenna Gain (dBi)



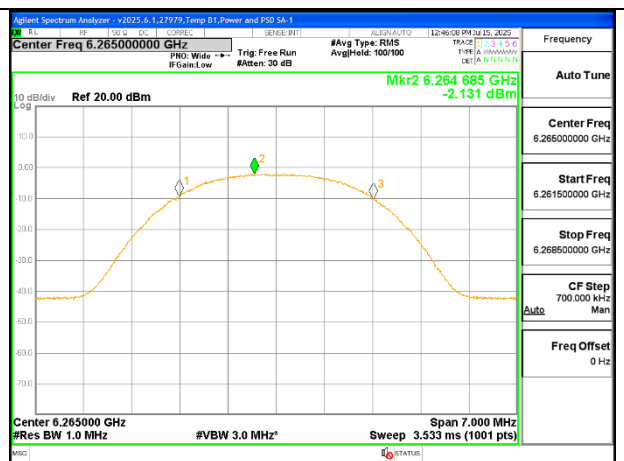
Mid Channel (UNII-5 BDR) – Ant 6



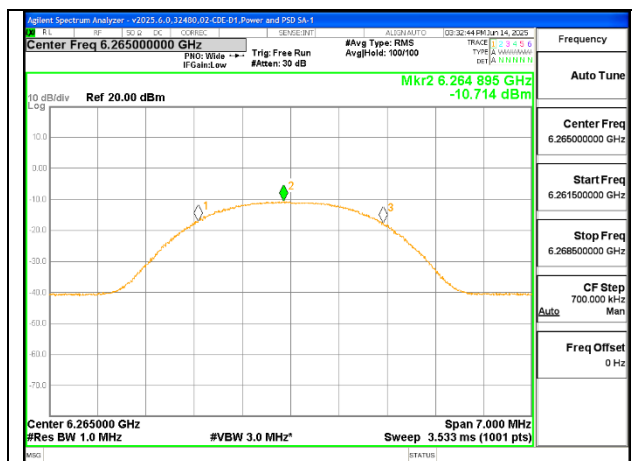
Mid Channel (UNII-5 LE1M) – Ant 5



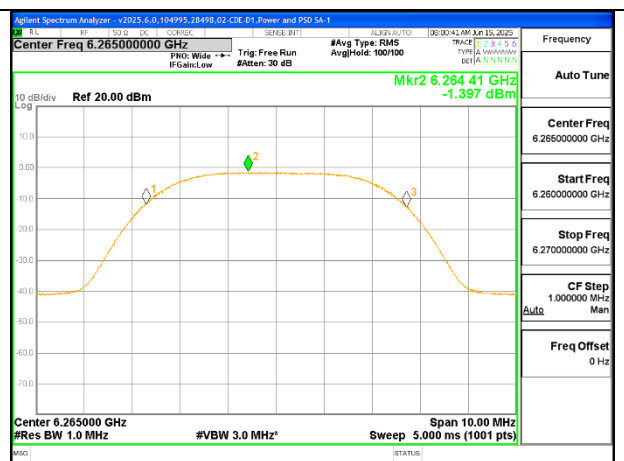
Mid Channel (UNII-5 LE2M) – Ant 6



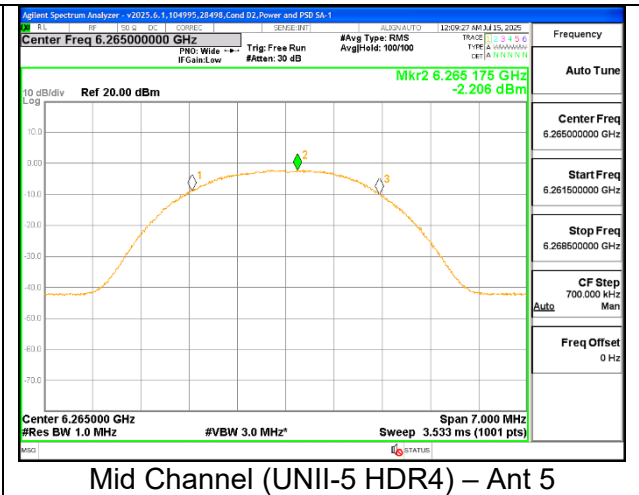
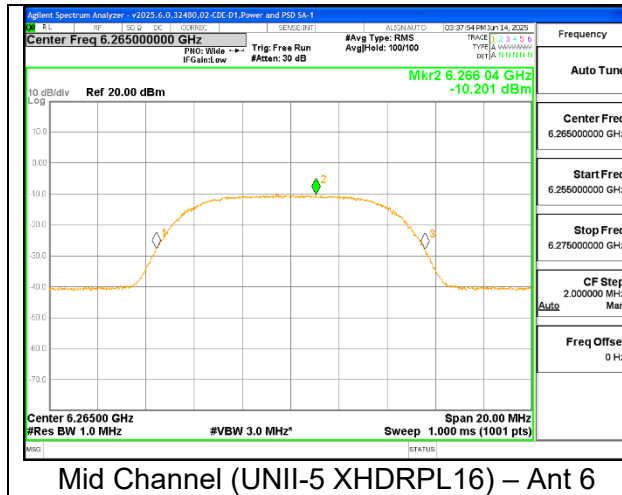
Mid Channel (UNII-5 HDT4) – Ant 5



Mid Channel (UNII-5 XHDRPS2) – Ant 6



Mid Channel (UNII-5 HDRPM8) – Ant 5



9.3.2. UNII-5 BAND MIMO TXBF MODE

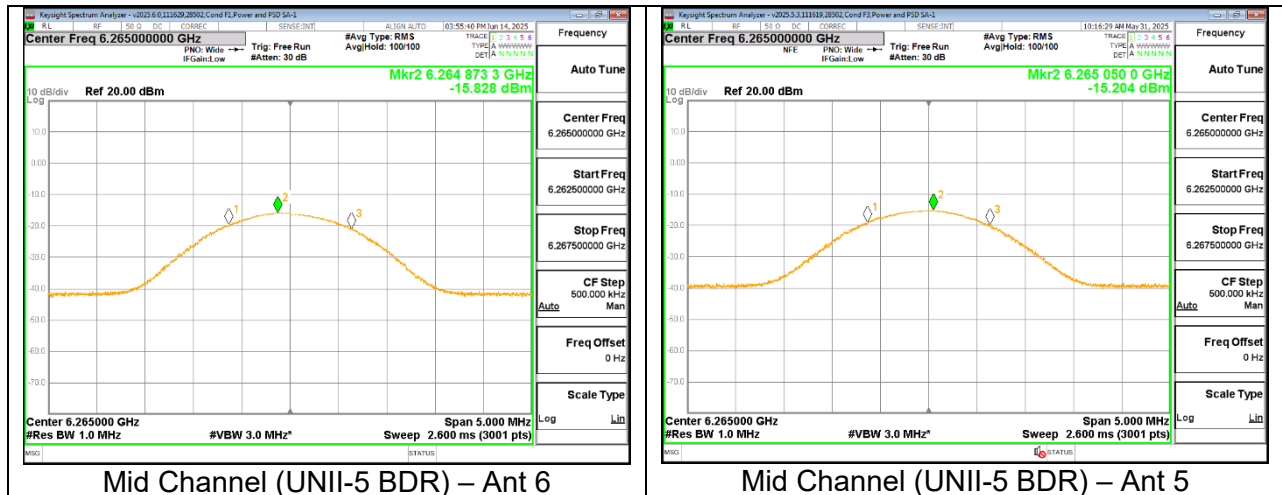
UNII-5 (MIMO BF) (6105 - 6425MHz)	Low CH	Mid CH	High CH
Un-Correlated Gain (dBi)	1.44	1.44	-0.30
Correlated Gain (dBi)	3.31	3.31	1.83

UNII-5 (MIMO BF)	Power Config.	Freq (MHz)	Ch. #	Duty Cycle (dB)	Conducted Power (Gated) (dBm)		EIRP Power (Limit = 14dBm EIRP)	Conducted PSD (dBm/MHz)		EIRP PSD (Limit = -5dBm/MHz EIRP)
					Ant 6	Ant 5		Ant 6	Ant 5	
BDR	High	6106	Low	1.15	-12.87	-12.93	-6.58	-15.821	-15.699	-8.289
		6265	Mid		-12.85	-12.86	-6.53	-15.828	-15.204	-8.035
		6420	High		-12.83	-12.83	-7.99	-15.676	-15.566	-9.630
	Low	6106	Low		-12.83	-12.86	-6.52	-15.015	-15.511	-7.786
		6265	Mid		-12.86	-12.87	-6.54	-15.379	-15.553	-7.995
		6420	High		-12.82	-12.85	-7.99	-14.995	-15.805	-9.391
LE1M	High	6106	Low	0.70	-12.47	-12.41	-6.12	-12.421	-12.649	-5.513
		6265	Mid		-12.49	-12.48	-6.16	-12.506	-12.674	-5.569
		6420	High		-12.46	-12.47	-7.62	-12.223	-12.587	-6.861
	Low	6106	Low		-12.45	-12.45	-6.13	-13.262	-12.594	-5.895
		6265	Mid		-12.49	-12.49	-6.17	-13.171	-12.254	-5.668
		6420	High		-12.48	-12.45	-7.62	-13.263	-12.481	-7.314
LE2M	High	6106	Low	2.41	-11.64	-11.65	-5.32	-14.673	-14.673	-5.943
		6265	Mid		-11.61	-11.61	-5.29	-14.295	-14.859	-5.838
		6420	High		-11.70	-11.66	-6.84	-14.553	-14.769	-7.409
	Low	6106	Low		-11.68	-11.69	-5.36	-15.553	-15.655	-6.873
		6265	Mid		-11.66	-11.63	-5.32	-15.573	-15.378	-6.744
		6420	High		-11.64	-11.66	-6.81	-14.974	-15.538	-7.997
HDT4	High	6106	Low	0.29	-10.14	-10.20	-3.85	-13.673	-13.964	-7.206
		6265	Mid		-10.29	-10.28	-3.96	-13.889	-14.030	-7.349
		6420	High		-10.12	-10.15	-5.29	-13.681	-13.718	-8.569
	Low	6106	Low		-10.20	-10.20	-3.88	-13.807	-13.823	-7.205
		6265	Mid		-10.12	-10.14	-3.81	-13.683	-13.563	-7.012
		6420	High		-10.18	-10.11	-5.30	-13.544	-13.588	-8.436
HDR4	High	6106	Low	1.30	-10.43	-10.48	-4.13	-14.451	-13.517	-6.339
		6265	Mid		-10.46	-10.48	-4.15	-14.322	-13.438	-6.237
		6420	High		-10.48	-10.47	-5.63	-14.271	-13.430	-7.690
	Low	6106	Low		-10.46	-10.43	-4.12	-14.787	-13.728	-6.605
		6265	Mid		-10.54	-10.46	-4.18	-14.456	-13.806	-6.499
		6420	High		-10.54	-10.46	-5.66	-14.443	-13.585	-7.853
XHDRPS2	High	6106	Low	0.00	-10.53	-10.64	-4.26	-13.326	-13.409	-7.047
		6265	Mid		-10.51	-10.58	-4.22	-13.661	-13.429	-7.223
		6420	High		-10.57	-10.55	-5.72	-13.327	-13.264	-8.455
	Low	6106	Low		-10.57	-10.54	-4.23	-13.276	-13.095	-6.864
		6265	Mid		-10.55	-10.55	-4.23	-13.289	-13.041	-6.843
		6420	High		-10.52	-10.55	-5.69	-13.233	-13.074	-8.312
HDRPM8	High	6107	Low	0.30	-7.66	-7.62	-1.32	-13.582	-13.635	-6.988
		6265	Mid		-7.62	-7.65	-1.31	-13.743	-13.733	-7.118
		6420	High		-7.65	-7.66	-2.81	-13.483	-13.421	-8.312
	Low	6107	Low		-7.61	-7.67	-1.32	-13.086	-13.069	-6.457
		6265	Mid		-7.65	-7.67	-1.34	-13.054	-13.211	-6.511
		6420	High		-7.63	-7.69	-2.82	-13.179	-13.116	-8.007
XHDRPL16	High	6109	Low	0.20	-4.68	-4.63	1.67	-12.950	-13.447	-6.671
		6265	Mid		-4.64	-4.66	1.67	-13.010	-13.424	-6.692
		6417	High		-4.76	-4.66	0.13	-13.149	-12.989	-8.028
	Low	6109	Low		-4.63	-4.63	1.69	-12.901	-12.688	-6.273
		6265	Mid		-4.66	-4.66	1.66	-12.705	-12.795	-6.229
		6417	High		-4.61	-4.61	0.23	-12.944	-12.661	-7.760

Note:

EIRP MIMO Output Power (dBm) = Measured Conducted Power (dBm) (Ant 1 + Ant 2) + Un-Correlated Antenna Gain (dBi)

EIRP MIMO PSD (dBm/MHz) = Measured Conducted PSD (dBm/MHz) (Ant 1 + Ant 2) + Duty Factor (dB) + Correlated Antenna Gain (dBi)



9.4. VLP SPURIOUS EMISSIONS IN-BAND– EMISSION MASK

LIMITS

FCC §15.407

(b)(7) For transmitters operating within the 5.925-7.125 GHz bands: power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

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b. the e.i.r.p. spectral density of unwanted emissions falling into the 5925-7125 MHz frequency band shall be attenuated below the reference power spectral density by:

- i. 20 dB at 1 MHz away from the channel edges
- ii. a value, linearly interpolated in a dB scale, between 20 dB and 28 dB at frequencies between 1 MHz outside of channel edges and 1 channel bandwidth away from the operating channel centre, respectively
- iii. 28 dB at 1 channel bandwidth away from the operating channel centre
- iv. a value, linearly interpolated in a dB scale, between 28 dB and 40 dB at frequencies between 1 channel bandwidth away from the operating channel centre and 1.5 times the channel bandwidth away from the operating channel centre, respectively
- v. 40 dB at one- and one-half (1.5) times the channel bandwidth away from the channel centre; and
- vi. a minimum of 40 dB at frequencies that are further away than one and one-half (1.5) times the channel bandwidth from the channel centre.

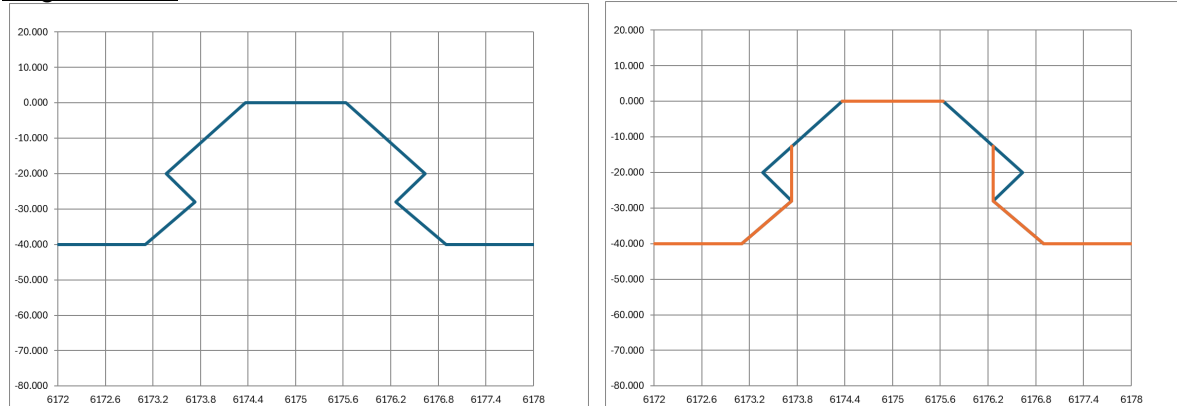
TEST PROCEDURE

Follow KDB 987594 D02, Section II-J, RBW & VBW settings were based on 26dB bandwidth test settings.

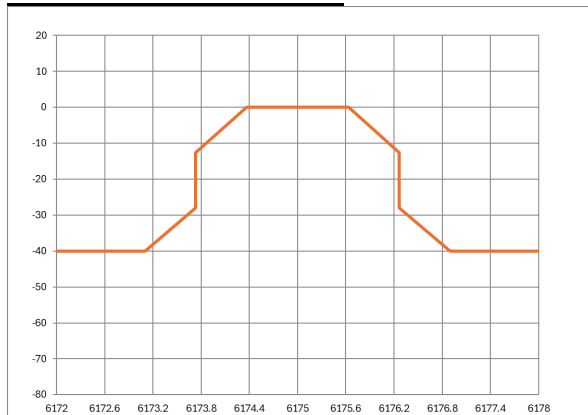
Worst-Case Mode	RBW (kHz)	VBW (kHz)
BDR	30	91
LE1M	30	91
LE2M	43	150
HDT4	43	150
HDR4	30	91
XHDRPS2	30	91
HDRPM8	100	300
XHDRPL16	200	620

For the emission mask of EBW < 2MHz, we have created and used real limits (using the FCC formula) and removed the 'bulge', as shown in the images below.

Original Mask:



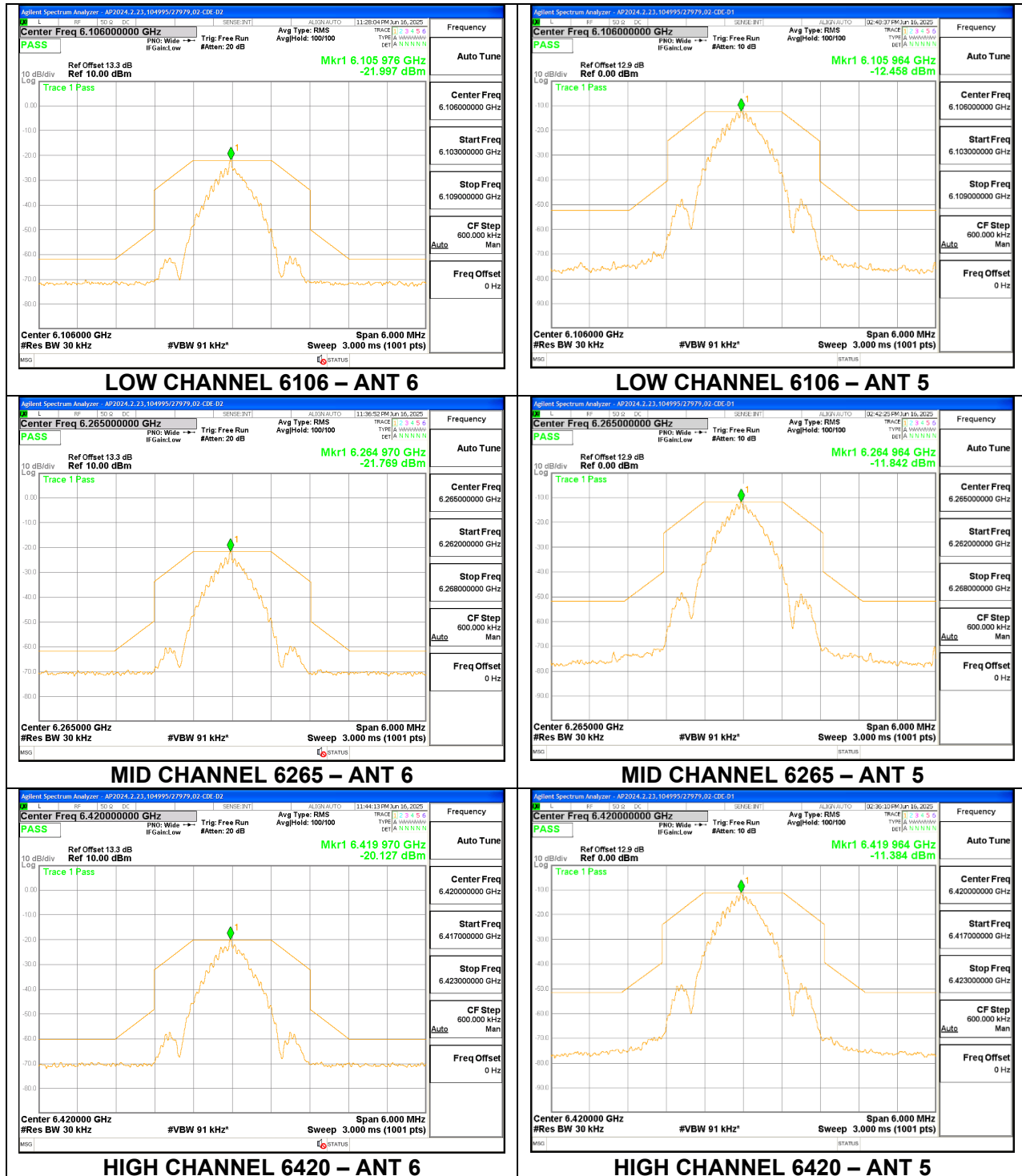
Final Mask for submission:



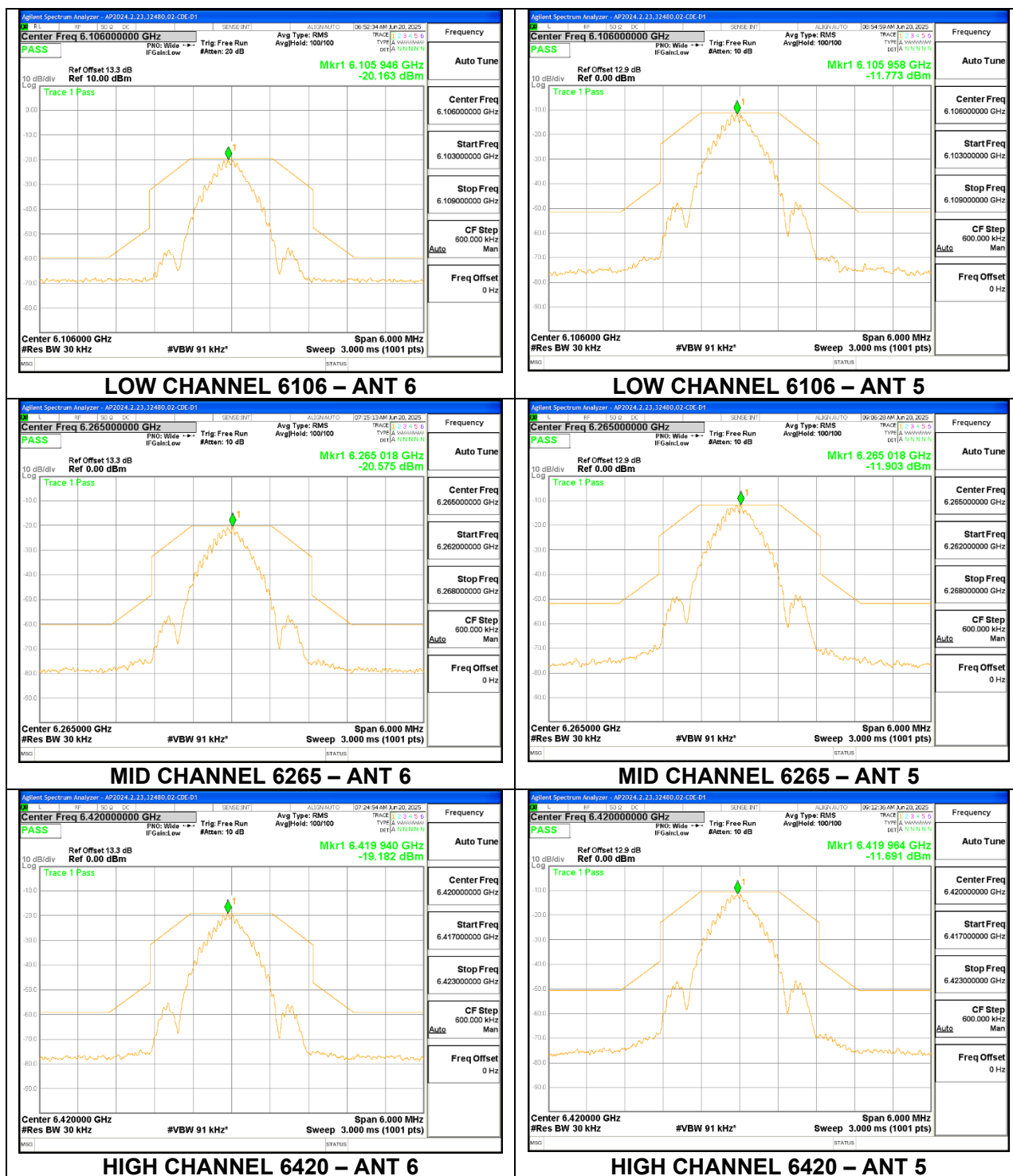
RESULTS

9.4.1. HIGH POWER UNII-5 BAND SISO MODE

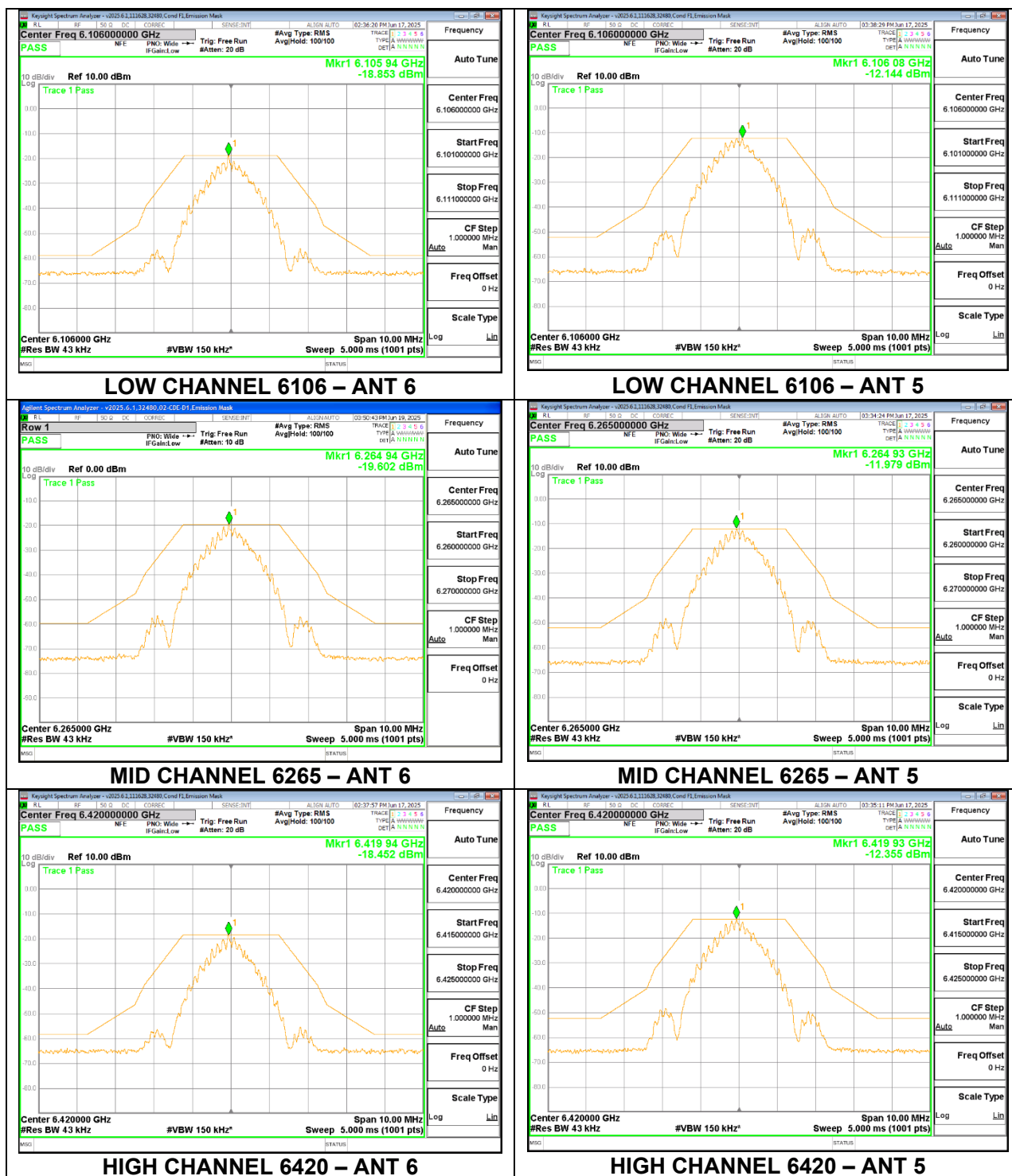
BDR



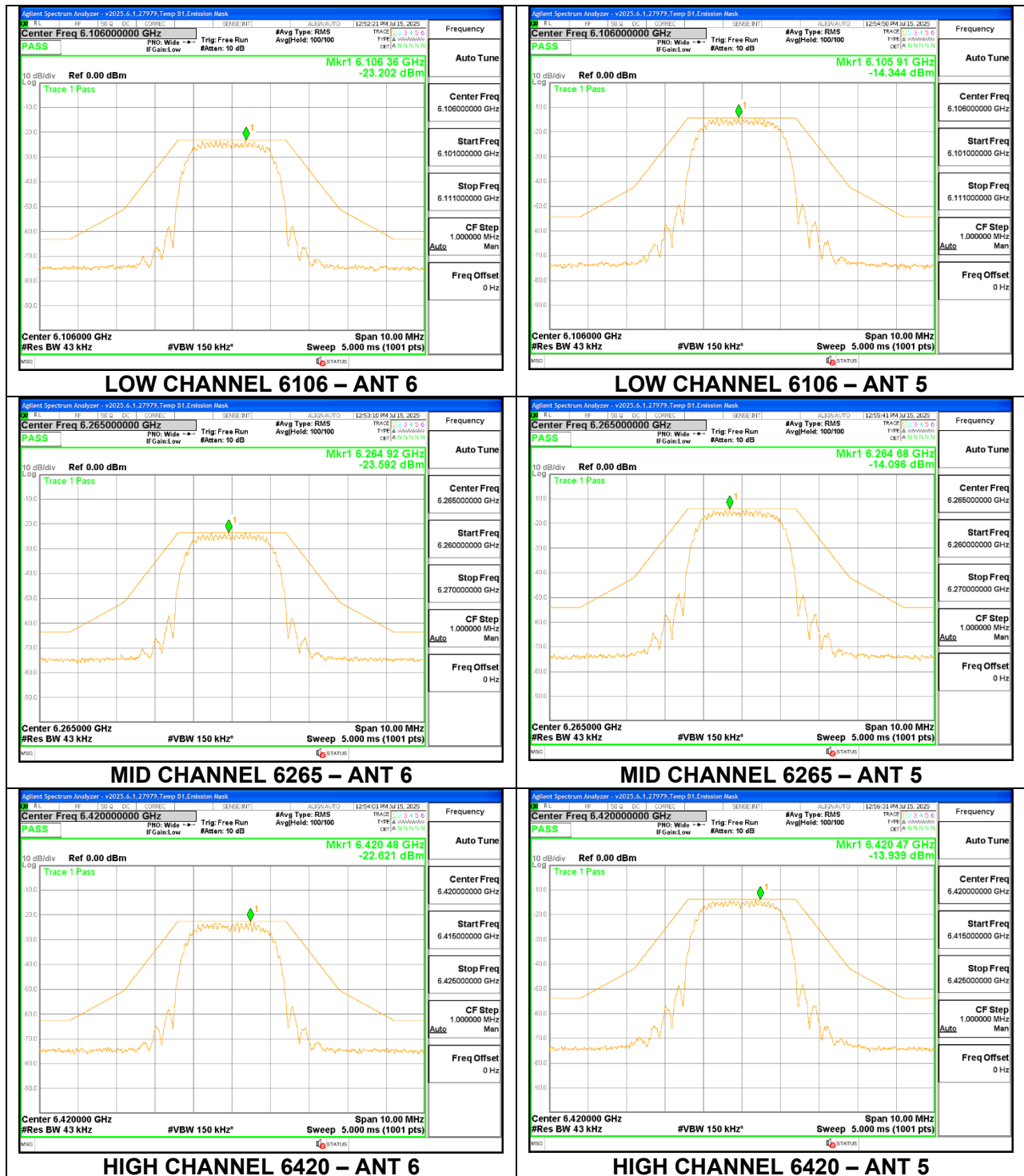
LE1M



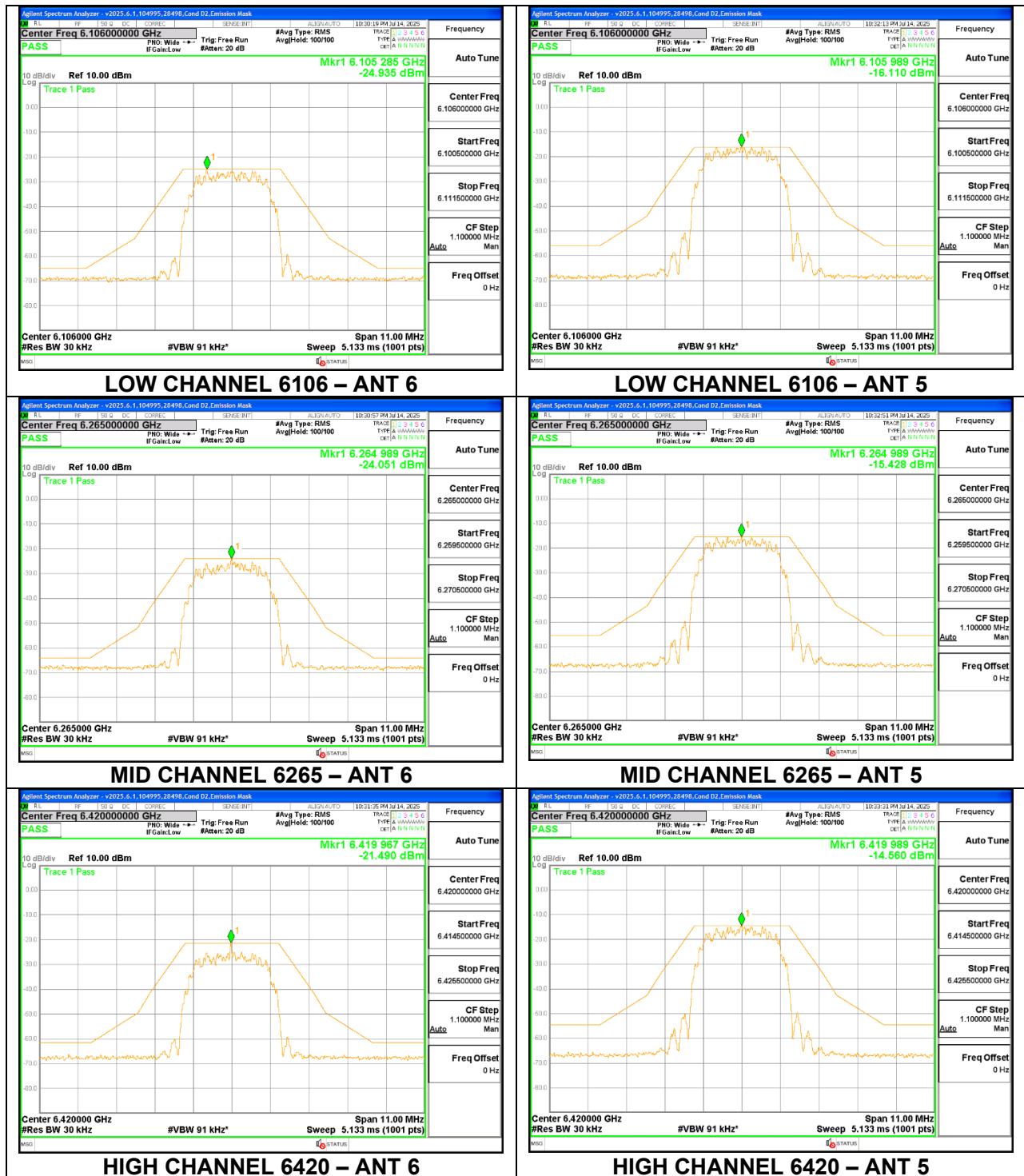
LE2M



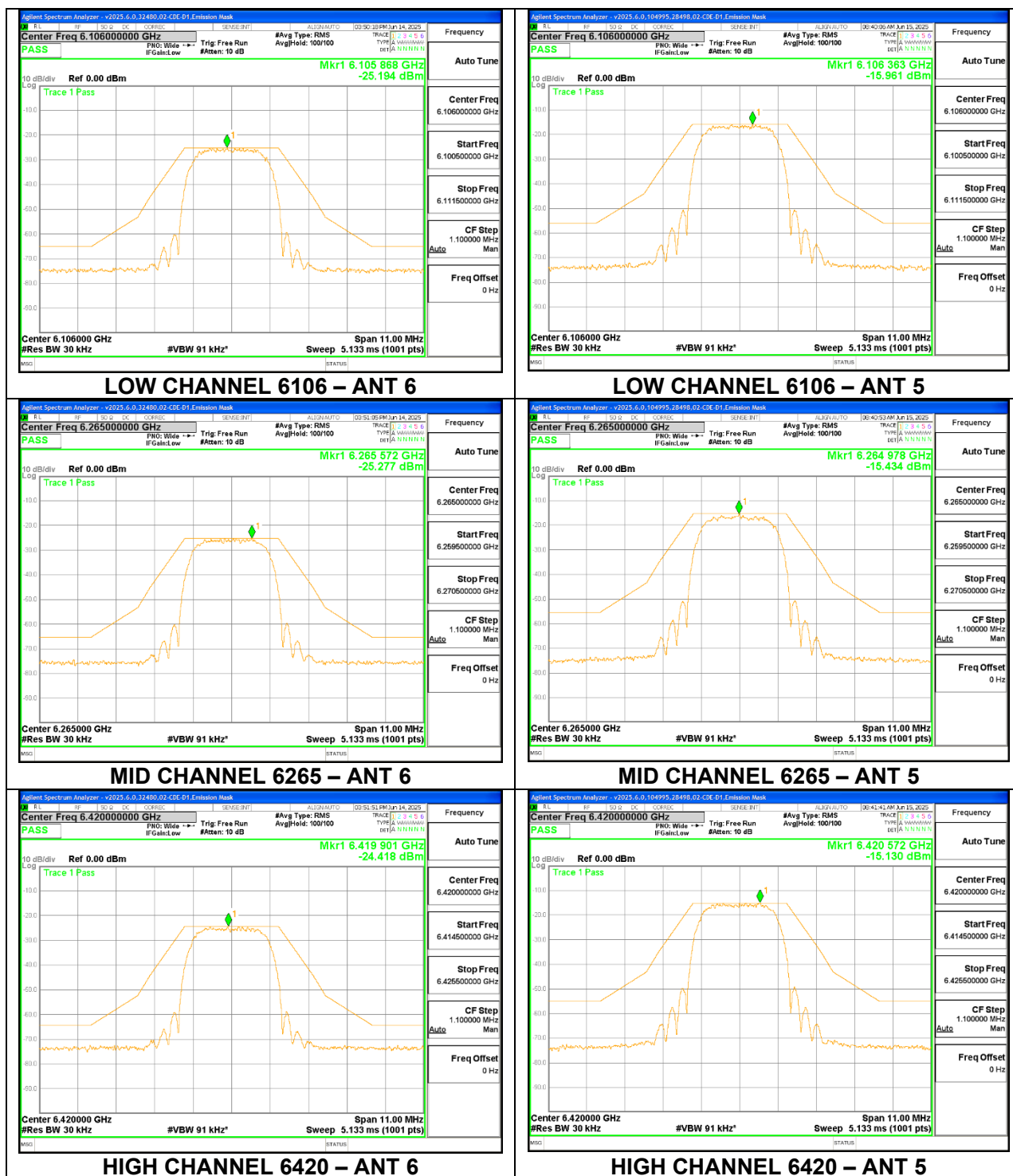
HDT4



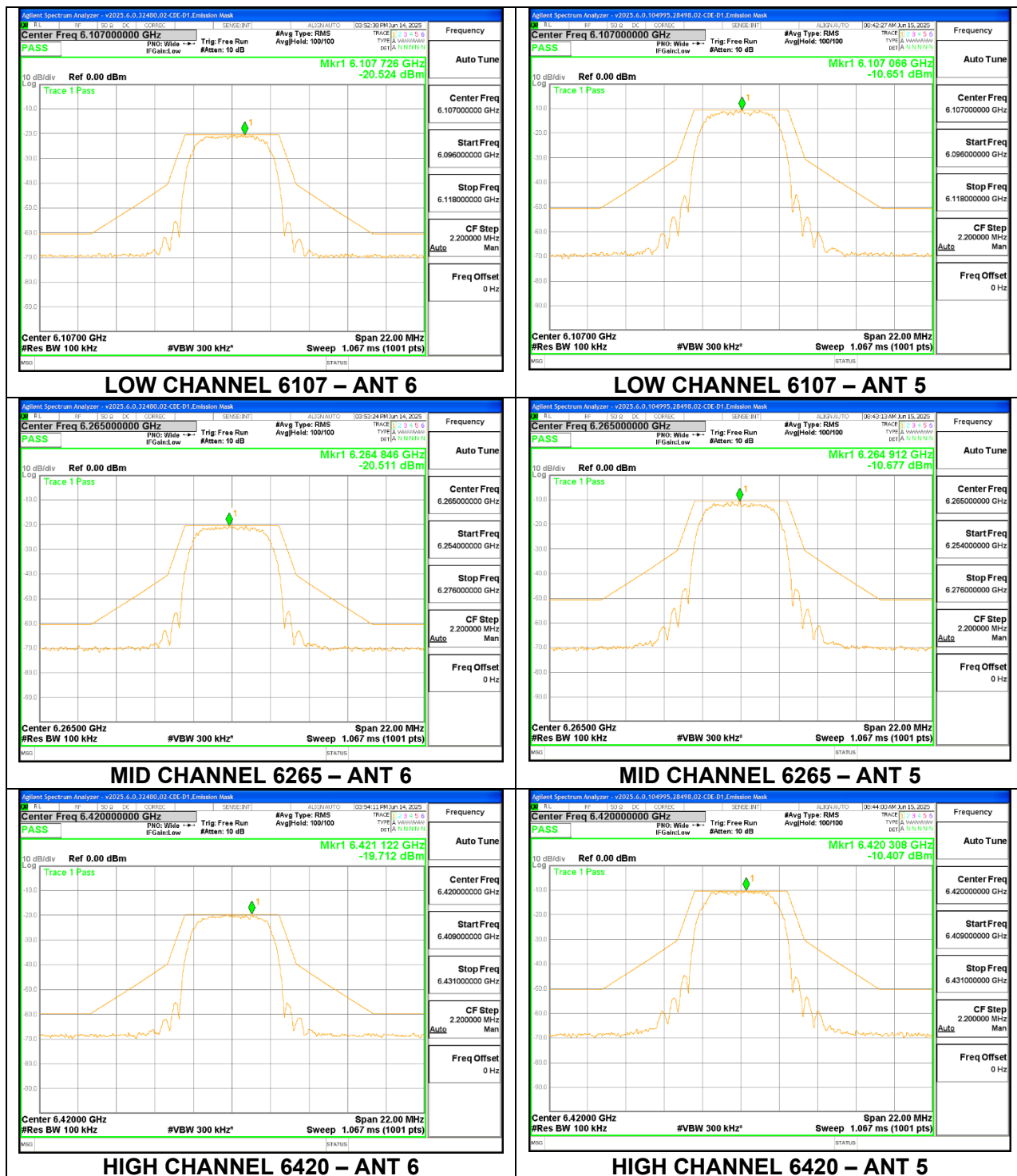
HDR4



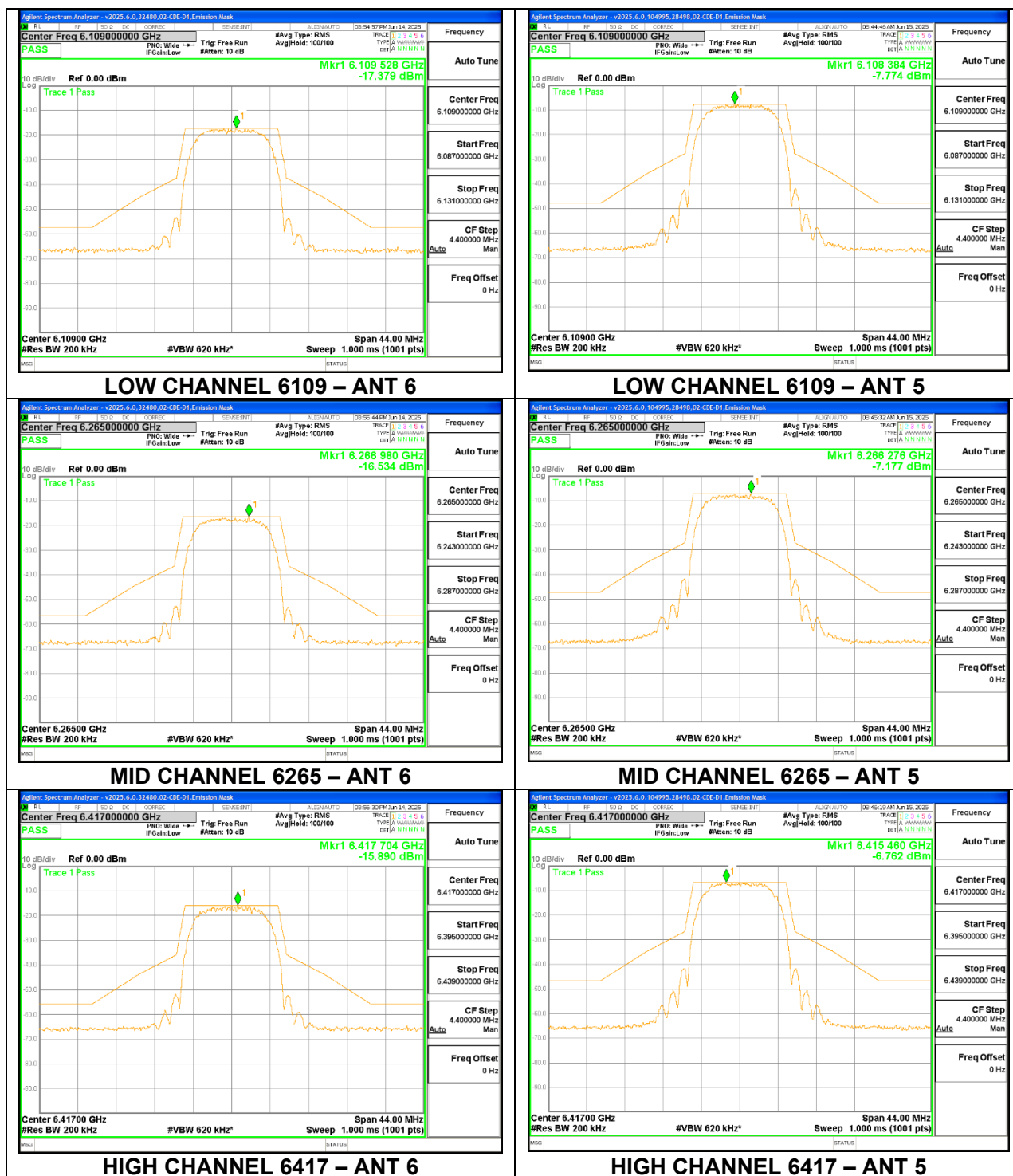
XHDRPS2



HDRPM8



XHDRPL16



9.4.2. HIGH POWER UNII-5 BAND MIMO TXBF MODE

BDR

