CERTIFICATION TEST REPORT

Report Number. : 12901678-E1V2

Applicant	:	APPLE, INC. 1 APPLE PARK WAY CUPERTINO, CA 95014, U.S.A.
Model	:	A2161, A2219, AND A2220
FCC ID	:	BCG-E3306A
IC	:	579C-E3306A
EUT Description	:	SMARTPHONE
Test Standard(s)	:	FCC 47 CFR PART 15 SUBPART C ISED RSS-247 ISSUE 2 ISED RSS-GEN ISSUE 5

Date Of Issue:
August 21, 2019

Prepared by:
UL Verification Services Inc.
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NVLAP Lab code: 200065-0

REPORT REVISION HISTORY

Rev.	Issue Date	Revisions	Revised By
V1	8/16/2019	Initial Issue	Chin Pang
V2	8/21/2019	Addressed TCB Feedback on Sections 5.1, 5.5, 6, 7, and 8	Tony Li

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1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: SMARTPHONE

MODEL: A2161, A2219, AND A2220

SERIAL NUMBER: G6TYW007N397 (Conducted), G6TYW009N395 (Radiated)

DATE TESTED: APRIL 16, 2019 – AUGUST 21, 2019

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Complies
ISED RSS-247 Issue 2	Complies
ISED RSS-GEN Issue 5	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 is capable of demonstrating 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 NVLAP, NIST, any agency of the Federal Government, or any agency of the U.S. government.

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Prepared By:

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, ANSI C63.10-2013, KDB 558074 D01 15.247 Meas Guidance v05r02, RSS-GEN Issue 5, and RSS-247 Issue 2.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, and 47658 Kato Road, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street	47658 Kato Rd.
☐ Chamber A (IC:2324B-1)	☐ Chamber D (IC:22541-1)	☐ Chamber I (IC: 2324A-5)
☐ Chamber B (IC:2324B-2)	☒ Chamber E (IC:22541-2)	☐ Chamber J (IC: 2324A-6)
☐ Chamber C (IC:2324B-3)	☒ Chamber F (IC:22541-3)	☐ Chamber K (IC: 2324A-1)
	☒ Chamber G (IC:22541-4)	☐ Chamber L (IC: 2324A-3)
	☐ Chamber H (IC:22541-5)	

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers above are covered under Industry Canada company address and respective code

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. 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 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 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 dBuV + 0 dB +10.1 dB+ 0 dB = 46.6 dBuV

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4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Worst Case Conducted Disturbance, 9KHz to 0.15 MHz	3.84 dB
Worst Case Conducted Disturbance, 0.15 to 30 MHz	3.65 dB
Worst Case Radiated Disturbance, 9KHz to 30 MHz	2.52 dB
Worst Case Radiated Disturbance, 30 to 1000 MHz	4.88 dB
Worst Case Radiated Disturbance, 1000 to 18000 MHz	4.24 dB
Worst Case Radiated Disturbance, 18000 to 26000 MHz	4.37 dB
Worst Case Radiated Disturbance, 26000 to 40000 MHz	5.17 dB

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

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5. EQUIPMENT UNDER TEST

5.1. EUT DESCRIPTION

The EUT is a smartphone with multimedia functions (music, application support, and video), cellular GSM, GPRS, EGPRS, UMTS, LTE, TD-SCDMA, CDMA, IEEE 802.11a/b/g/n/ac/ax, Bluetooth, Ultra-Wide band, GPS and NFC. All models support at least one UICC based SIM. The second SIM, if present, is either UICC based pSIM (physical SIM) or e-SIM (electronic SIM). The device has a built-in inductive charging receiver. The rechargeable battery is also not user accessible

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum peak conducted output power as follows:

Antenna	Configuration	Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
Antenna 4	High Power	2404 - 2478	HDR4	14.41	27.61
	Low Power			8.95	7.85
	High Power		HDR8	15.45	35.08
	Low Power			9.79	9.53
Antenna 3	High Power	2404 - 2478	HDR4	14.45	27.86
	Low Power			9.01	7.96
	High Power		HDR8	15.23	33.34
	Low Power			9.78	9.51
BF, Antenna 4 + Antenna 3	High Power	2404 - 2478	HDR4	17.46	55.72
	Low Power			12.10	16.22
	High Power		HDR8	18.27	67.14
	Low Power			12.31	17.02

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Frequency Range (GHz)	Ant. 4 (Core 0) (dBi)	Ant. 3 (Core 1) (dBi)
2.4	-0.9	-2.3

5.4. SOFTWARE AND FIRMWARE

The EUT firmware installed during testing was FW Version: 17.1.140.1283.

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5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was investigated in three orthogonal orientations X, Y and Z on both Ant 4 (Antenna 4) and Ant 3 (Antenna 4), it was determined that X (Flatbed) orientation was the worst-case orientation for Ant 4, Ant 3 and 2TX beamforming.

Radiated band edge, harmonic, and spurious emissions from 1GHz to 18GHz were performed with the EUT set to transmit at highest power on Low/Middle/High channels.

Radiated emissions below 30MHz, below 1GHz, 18-26GHz and power line conducted emissions were performed with the EUT transmits at the channel with the highest output power as worst-case scenario.

For 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. 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.

There are two vendors of the WiFi/Bluetooth radio modules: variant 1 and variant 2. The Wi-Fi/Bluetooth radio modules have the same mechanical outline (e.g., the same package dimension and pin-out layout), use the same on-board antenna matching circuit, have an identical antenna structure, and are built and tested to conform to the same specifications and to operate within the same tolerances.

Baseline testing was performed on the two variants to determine the worst case on all conducted power and radiated emissions.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
laptop	Apple	A1398	C02PM012G3QD	QDS-BRCM1069
Laptop AC/DC adapter	Liteon Technology	PA-1450-BA1	B123	NA
EUT AC Adapter	Apple	A1385	D29325SM03XDHLHC9	NA

I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	Antenna	1	SMA	Un-Shielded	0.2	To spectrum Analyzer
2	USB	1	USB	Shielded	1	N/A
3	AC	1	AC	Un-shielded	2	N/A

I/O CABLES (BELOW 1GHz AND AC POWER LINE TEST WITH ADAPTER AND LAPTOP)

I/O Cable List						
Cable No	**Port**	**# of identical**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Un-shielded	2	N/A
2	USB	1	USB	Un-shielded	1	N/A

TEST SETUP

The EUT is connected to a test laptop during the tests. Test software exercised the radio card.

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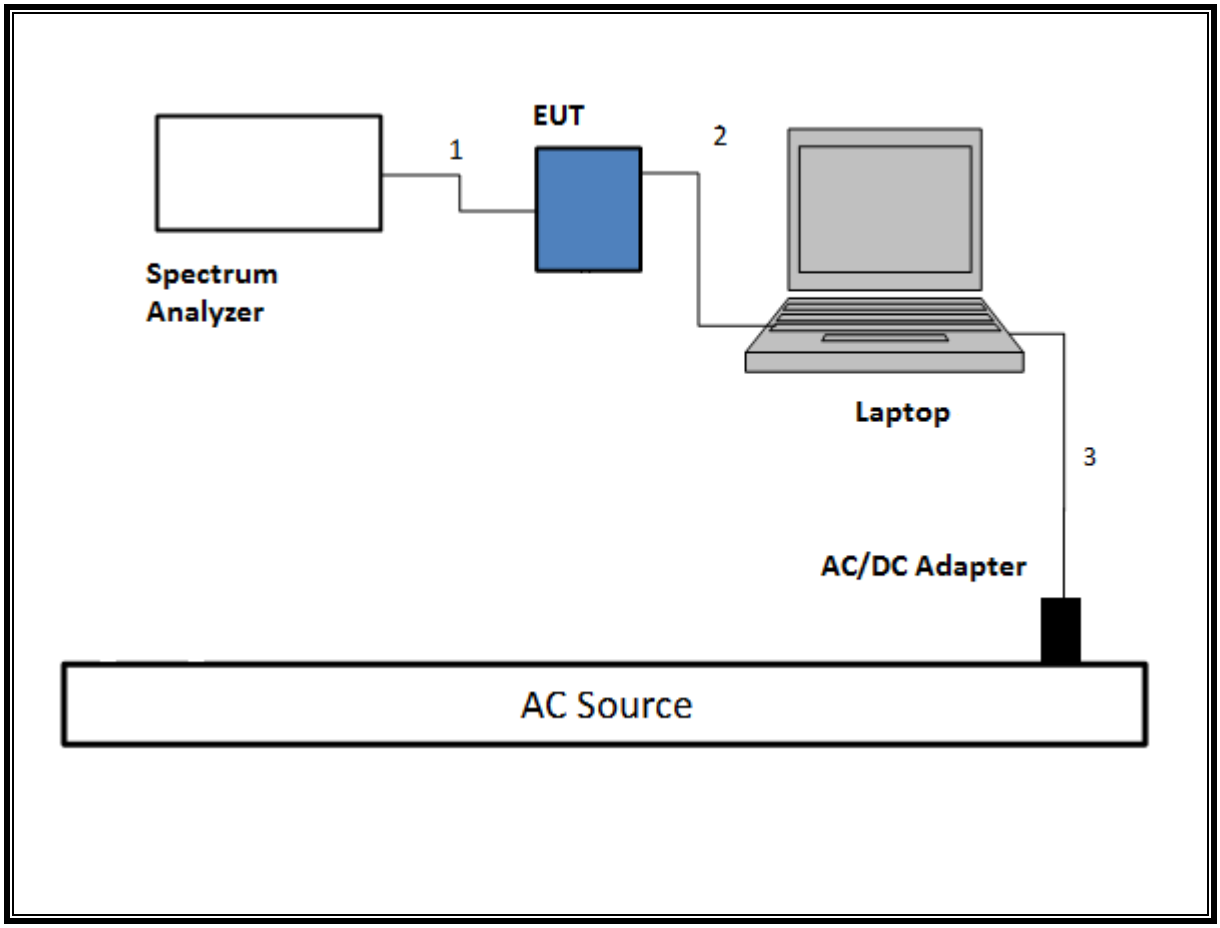
SETUP DIAGRAM FOR CONDUCTED TESTS



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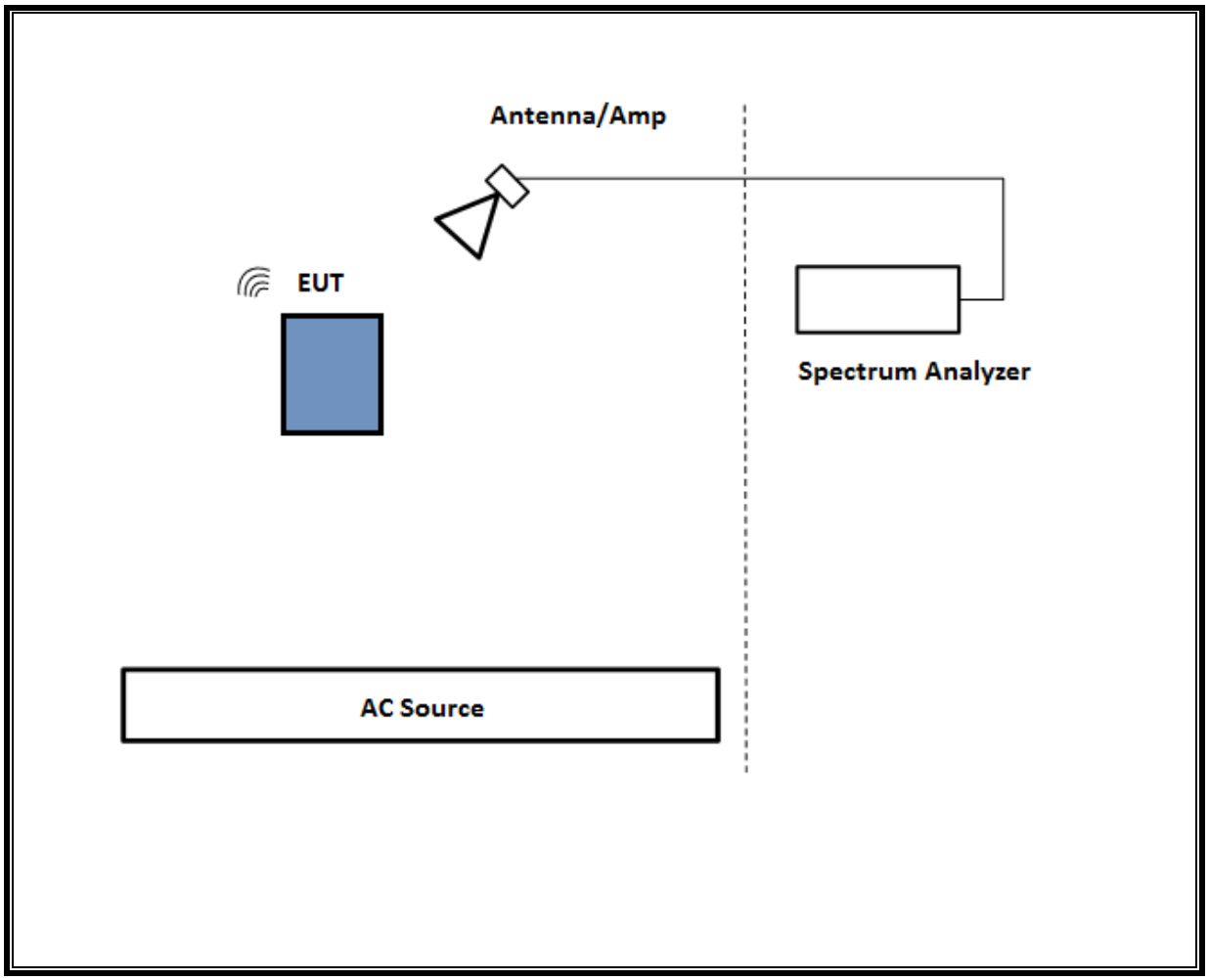
SETUP DIAGRAM FOR RADIATED TESTS Above 1 GHz



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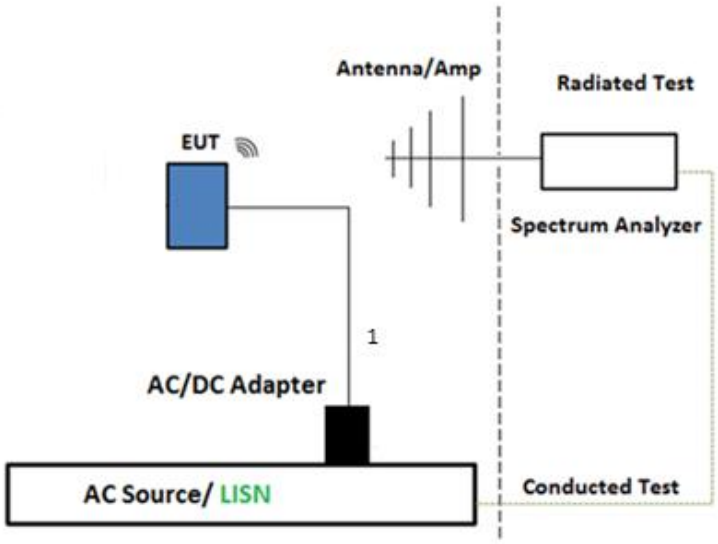
SETUP DIAGRAM FOR Below 1GHz and AC LINE CONDUCTED TEST



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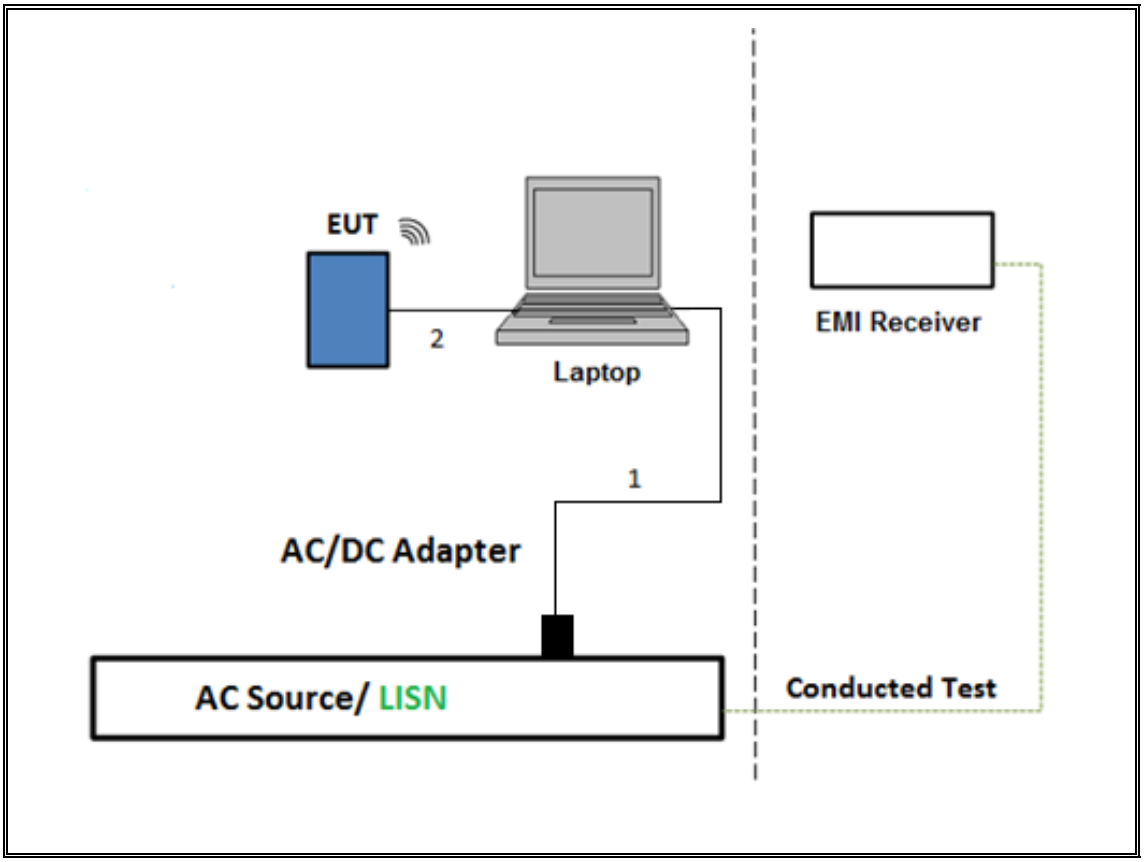
TEST SETUP- AC LINE CONDUCTED: LAPTOP CONFIGURATION



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6. MEASUREMENT METHOD

On Time and Duty Cycle: KDB 558074 D01 v05r02, Section 6.

6 dB BW: ANSI C63.10 Subclause -11.8.1 RBW ≥ DTS BW

Occupied BW (99%): ANSI C63.10-2013 Section 6.9.3

Output Power: ANSI C63.10 Subclause -11.9.1.3 Method PKPM1 Peak-reading power meter

Output Power: ANSI C63.10 Subclause -11.9.2.3.2 Measurement using gated average power meter

PSD: ANSI C63.10 Subclause -11.10.2 Method PKPSD (peak PSD)

Radiated emissions restricted frequency bands: ANSI C63.10 Subclause -11.12.1

Conducted emissions in restricted frequency bands: ANSI C63.10 Subclause -11.12.2

Band-edge: ANSI C63.10 Subclause -11.13.3.2 Integration method -Peak detection

Band-edge: ANSI C63.10 Subclause -11.13.3.3 Integration method -Trace averaging with continuous transmission at full power

AC Power Line Conducted Emissions: ANSI C63.10-2013, Section 6.2.

Radiated Spurious Emissions Below 30MHz: ANSI C63.10-2013 Section 6.4

NOTE: All conducted antenna port tests for Beamforming applied the same test procedures as BLE 1Mbps and BLE 2Mbps normal modes

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7. 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**
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T345	04/20/2019
Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T742	12/15/2019
Spectrum Analyzer, PXA 3Hz to 50GHz	Keysight	N9030A	T342	01/23/2020
*Antenna, Horn 1-18GHz	ETS Lindgren	3117	T120	05/10/2019
*Amplifier, 1 to 18GHz	Miteq	AFS42-00101800-25-S-42	T491	05/30/2019
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A-544	T1113	01/22/2020
Antenna, Horn 1-18GHz	ETS Lindgren	3117	T119	03/22/2020
Amplifier, 1 to 18GHz	Miteq	AMF-4D-01000800-30-29	T1169	09/15/2019
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T1466	01/23/2020
*Antenna Horn, 18 to 26GHz	ARA	MWH-1826	T447	06/16/2019
Pre-Amp 18-26GHz	Agilent Technology	8449B	T404	03/23/2020
Power Meter, P-series single channel	Keysight	N1911A	PRE0126090	01/29/2020
*Power Sensor	Keysight	N1921A	T1228	07/10/2019
Antenna, Broadband Hybrid, 30MHz to 3GHz	SunAR rf motion	JB3	T477	07/24/2019
Amplifier, 9KHz to 1GHz, 32dB	SONOMA INSTRUMENT	310	T834	06/01/2020
Spectrum Analyzer, PXA 3Hz to 44GHz	Keysight	N9030A	T905	1/24/2020

AC Line Conducted				
EMI Test Receiver 9Khz-7GHz	Rohde & Schwarz	ESCI7	T1436	02/14/2020
Power Cable, Line Conducted Emissions	UL	PG1	T861	08/31/2019
*LISN for Conducted Emissions CISPR-16	Fischer	50/250-25-2-01	T1310	06/19/2019
UL AUTOMATION SOFTWARE				
Radiated Software	UL	UL EMC	Ver 9.5, April 26, 2016	
Conducted Software	UL	UL EMC	Ver 5.4, October 13, 2016	
AC Line Conducted Software	UL	UL EMC	Ver 9.5, May 26, 2015	

*Testing is completed before equipment expiration date and/or set to test after calibration was completed.

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8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

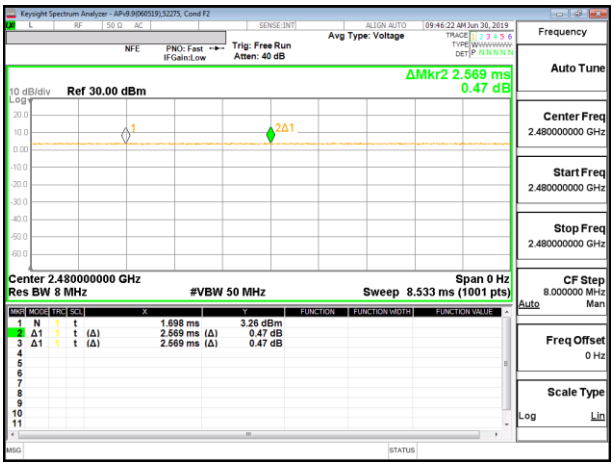
PROCEDURE

KDB 558074 Zero-Span Spectrum Analyzer Method.

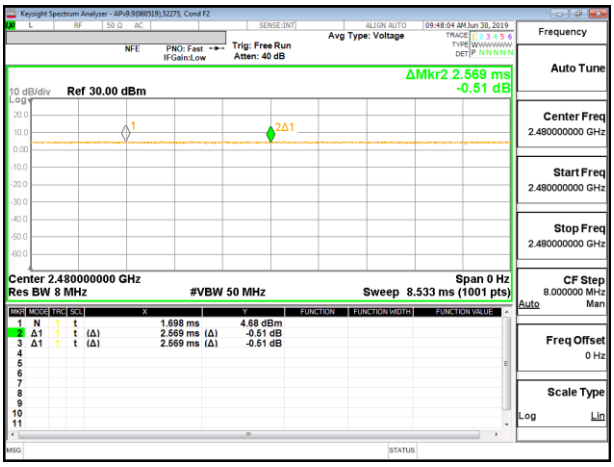
ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
2.4GHz Band						
HDR4 TxBF	2.569	2.569	1.000	100.00%	0.00	0.010
HDR8 TxBF	2.569	2.569	1.000	100.00%	0.00	0.010
HDR4	2.569	2.569	1.000	100.00%	0.00	0.010
HDR8	2.569	2.569	1.000	100.00%	0.00	0.010

DUTY CYCLE PLOTS



HDR4 TxBF



HDR8 TxBF

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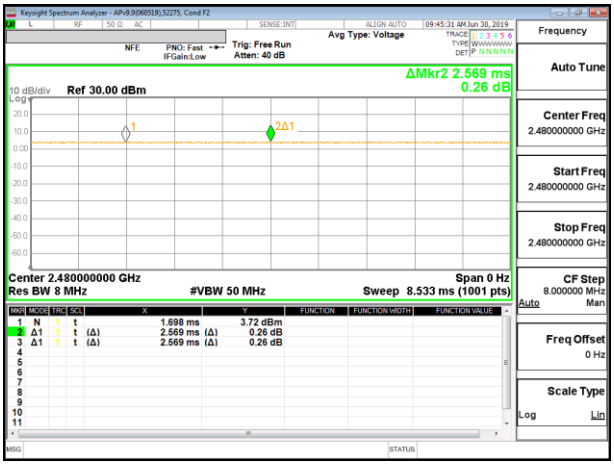
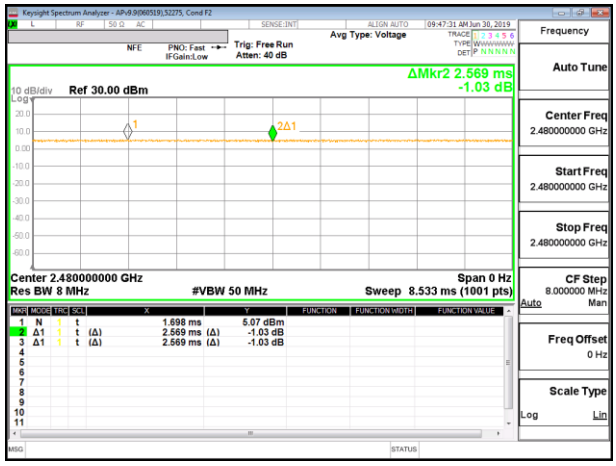


HDR4



HDR8

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8.2. 99% BANDWIDTH

LIMITS

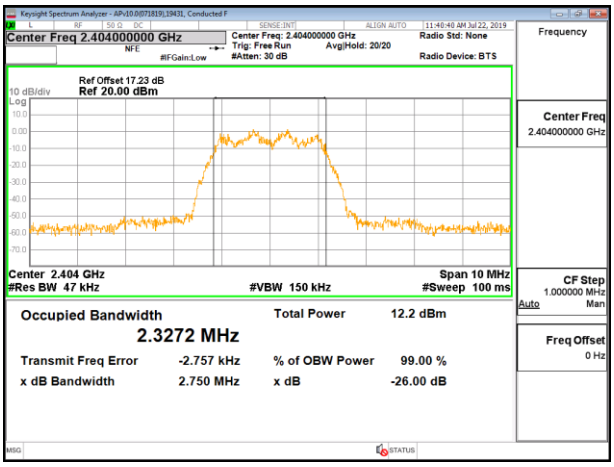
None; for reporting purposes only.

RESULTS

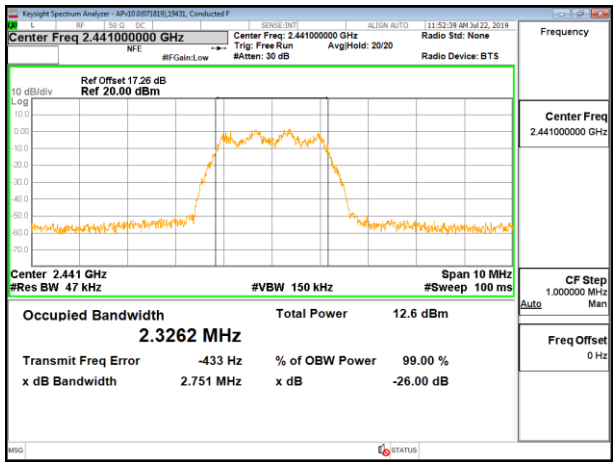
8.2.1. HIGH POWER HDR (HDR4)

Antenna 4

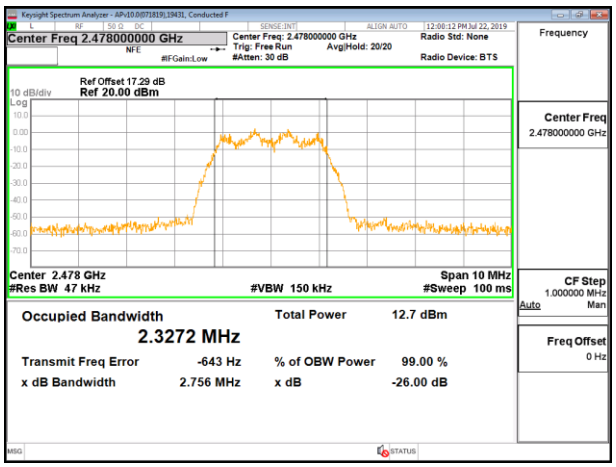
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	2.3272
Middle	2441	2.3262
High	2478	2.3272



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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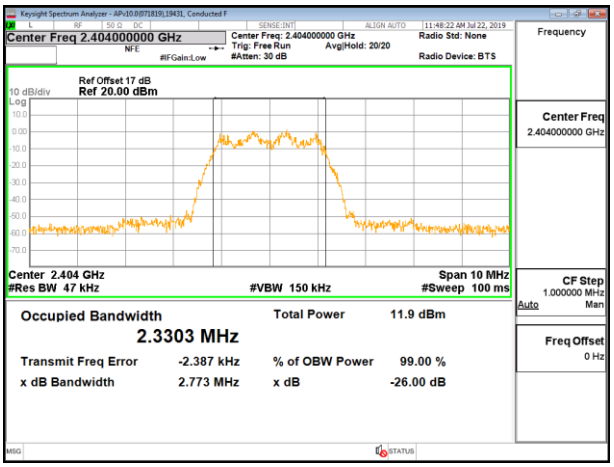
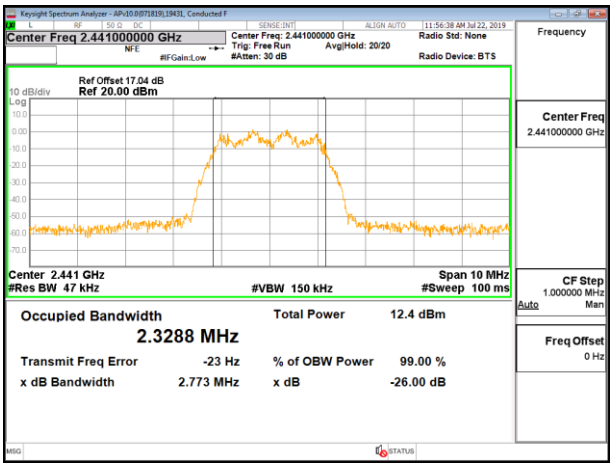
Antenna 3

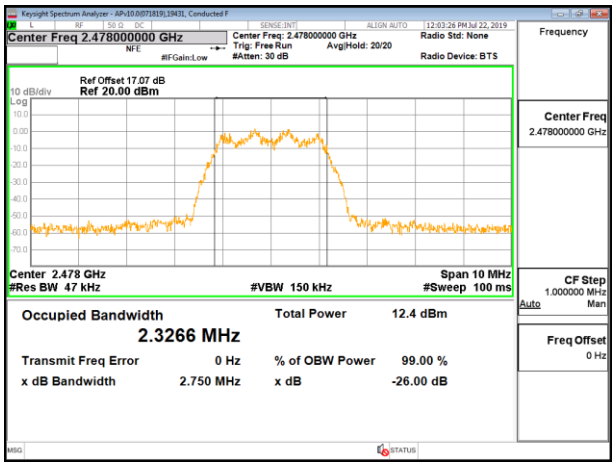
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	2.3303
Middle	2441	2.3288
High	2478	2.3266



LOW CHANNEL



MID CHANNEL



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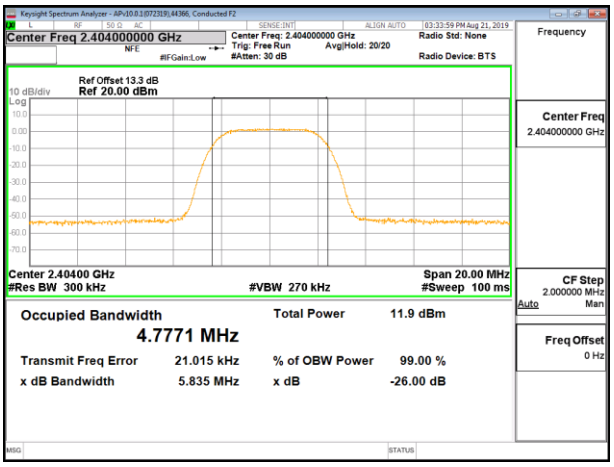
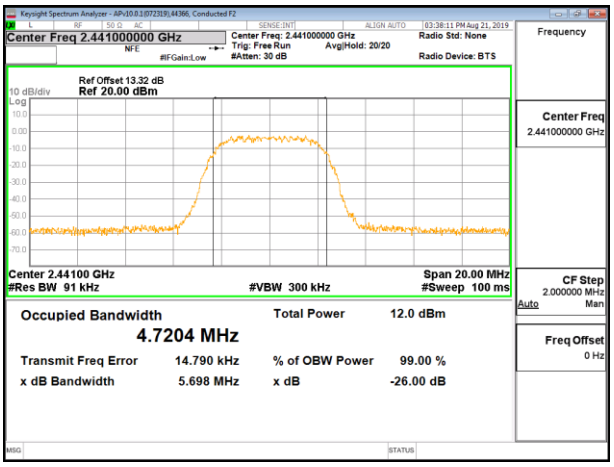
8.2.2. HIGH POWER HDR (HDR8)

Antenna 4

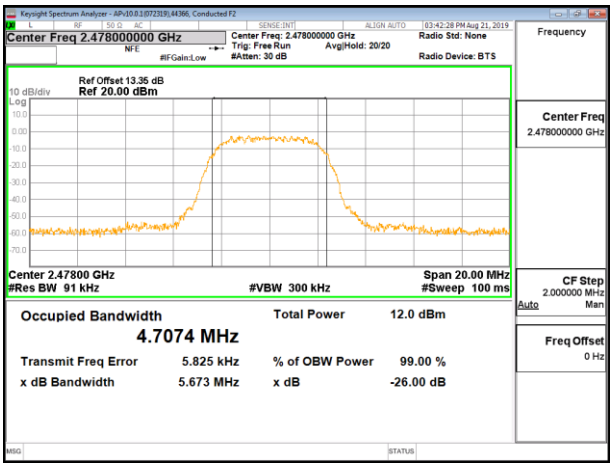
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	4.7771
Middle	2441	4.7204
High	2478	4.7074



LOW CHANNEL



MID CHANNEL



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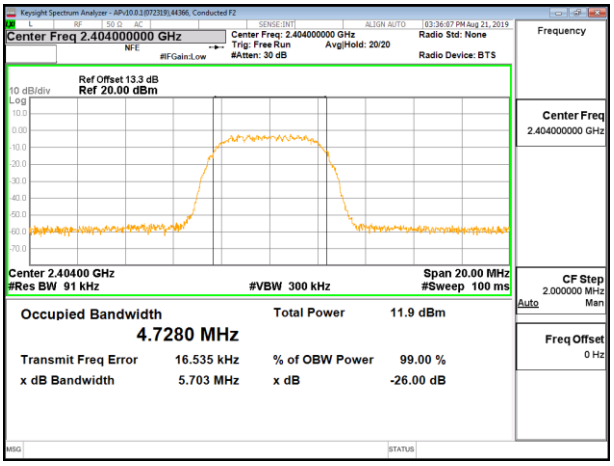
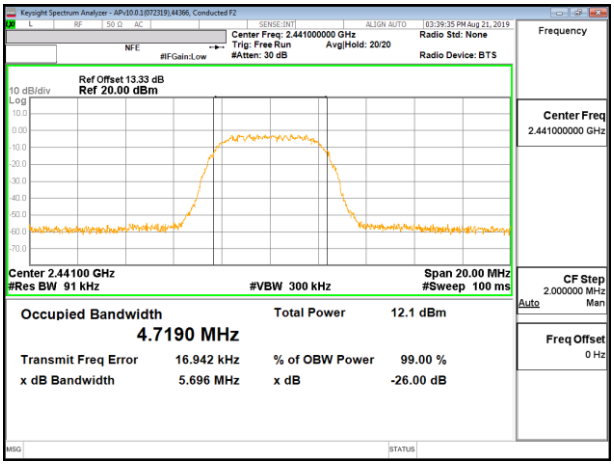
Antenna 3

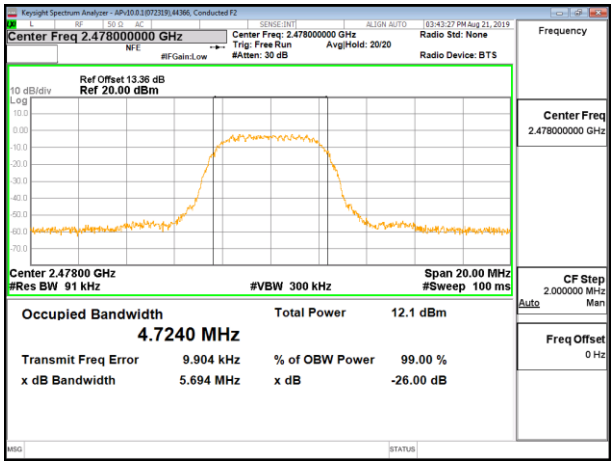
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	4.7280
Middle	2441	4.7190
High	2478	4.7240



LOW CHANNEL



MID CHANNEL



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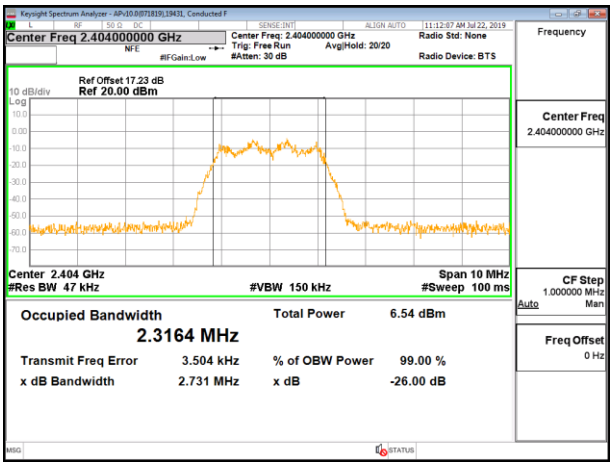
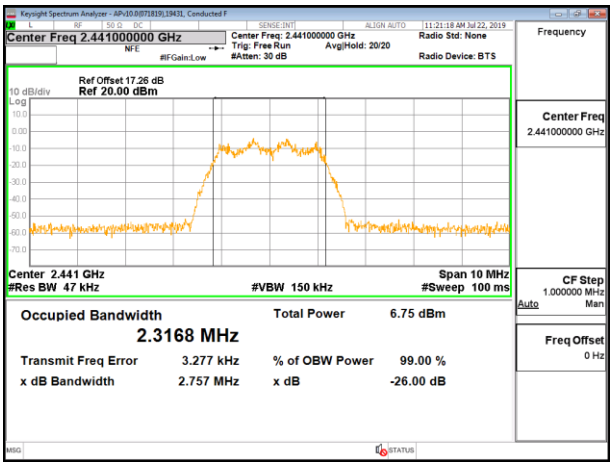
8.2.3. LOW POWER HDR (HDR4)

Antenna 4

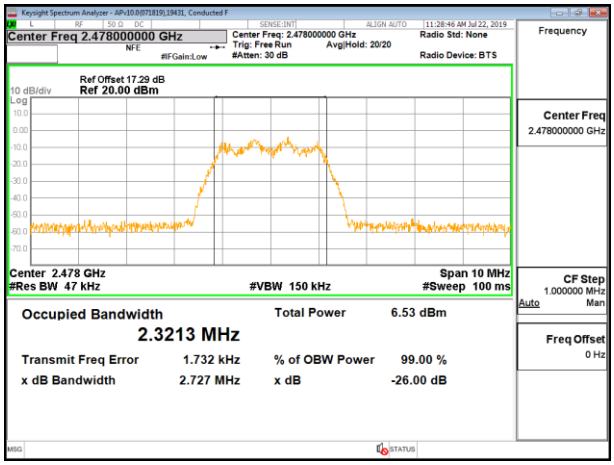
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	2.3164
Middle	2441	2.3168
High	2478	2.3123



LOW CHANNEL



MID CHANNEL



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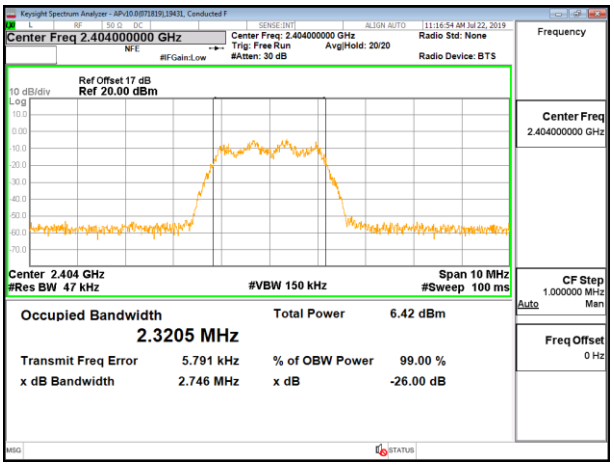
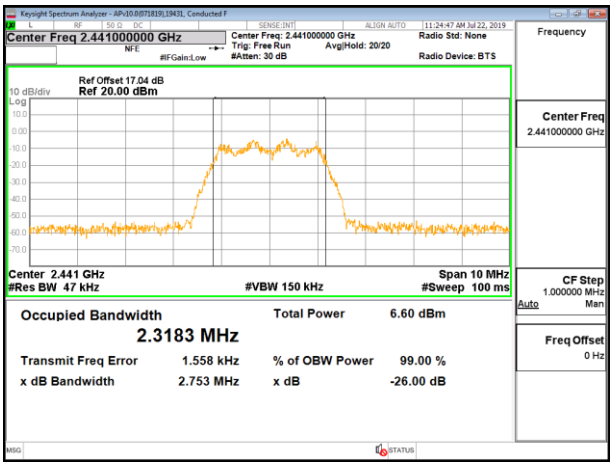
Antenna 3

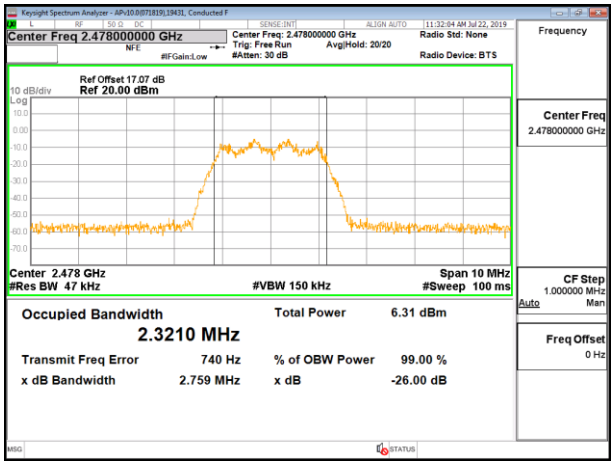
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	2.3205
Middle	2441	2.3183
High	2478	2.3210



LOW CHANNEL



MID CHANNEL



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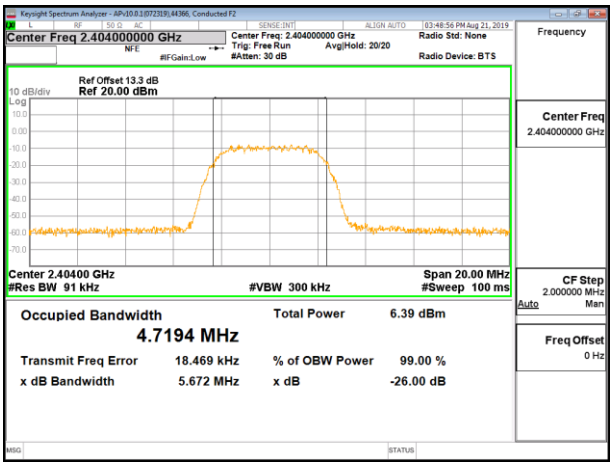
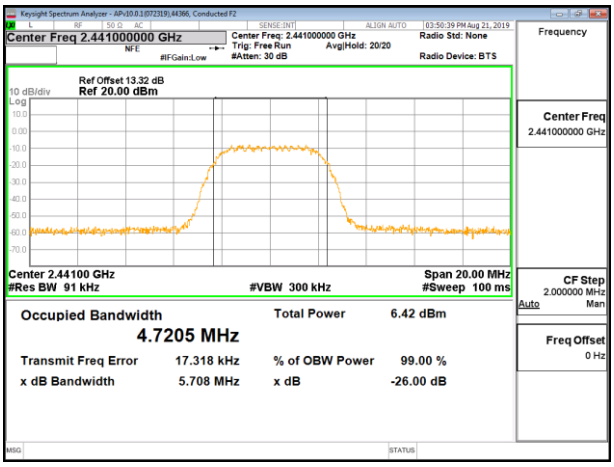
8.2.4. LOW POWER HDR (HDR8)

Antenna 4

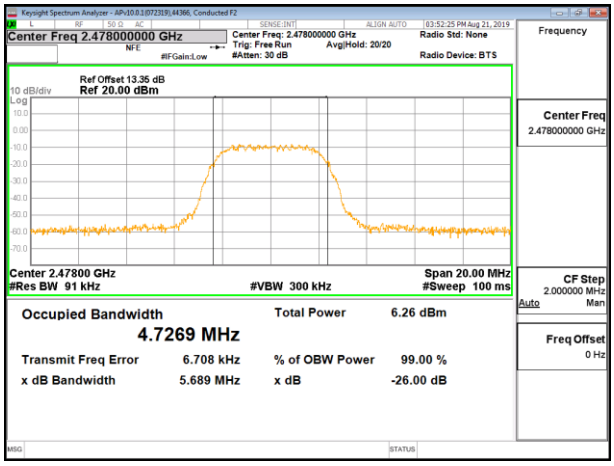
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	4.7194
Middle	2441	4.7205
High	2478	4.7269



LOW CHANNEL



MID CHANNEL



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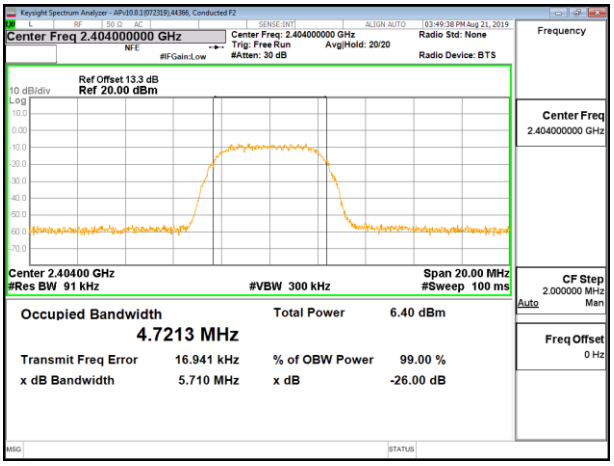
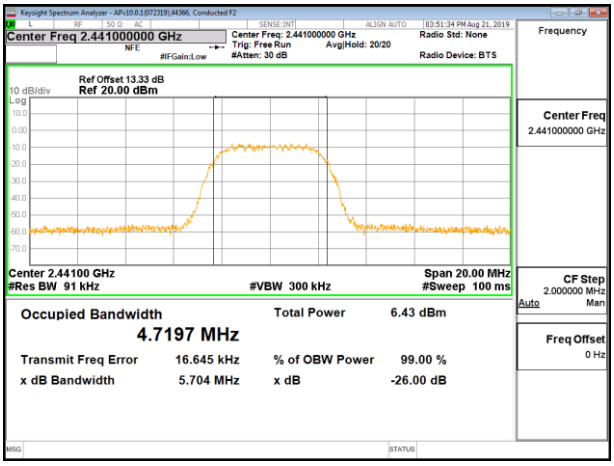
Antenna 3

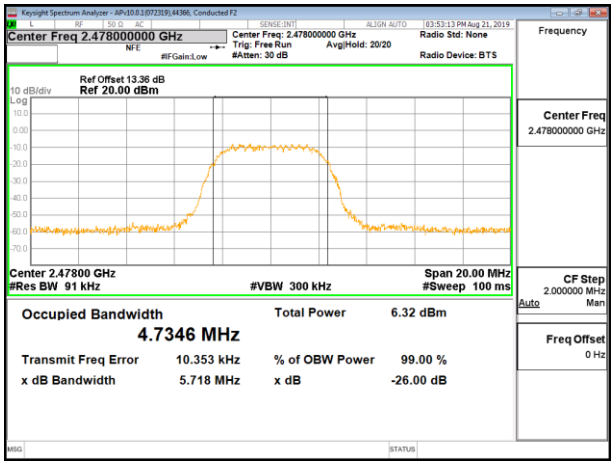
Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	2404	4.7213
Middle	2441	4.7197
High	2478	4.7346



LOW CHANNEL



MID CHANNEL



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8.3. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

RSS-247 5.2 (a)

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

RESULTS

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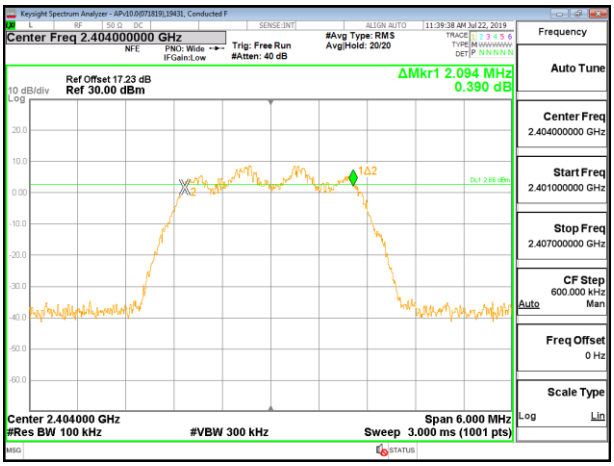
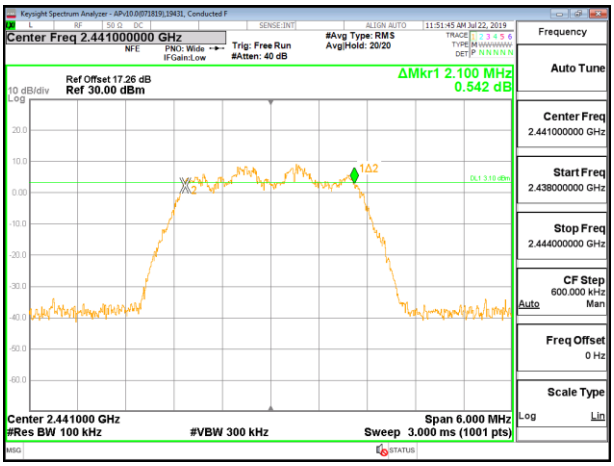
8.3.1. HIGH POWER HDR (HDR4)

Antenna 4

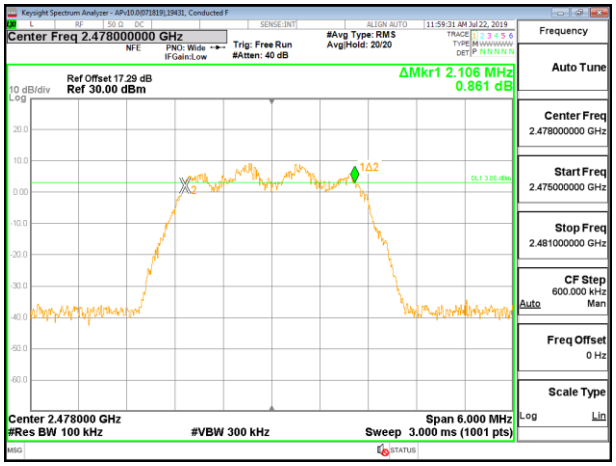
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	2.094	0.5
Middle	2441	2.100	0.5
High	2478	2.106	0.5



LOW CHANNEL



MID CHANNEL



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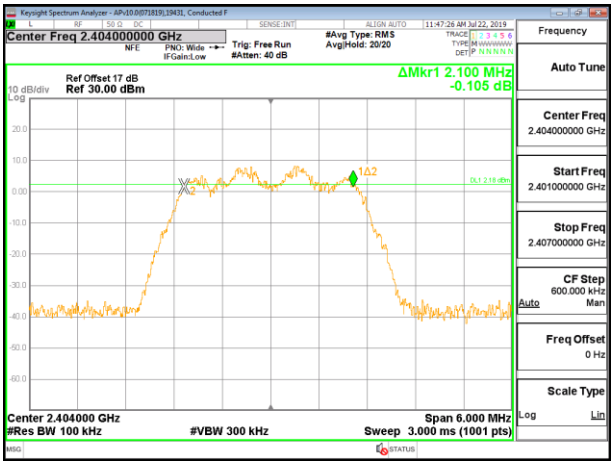
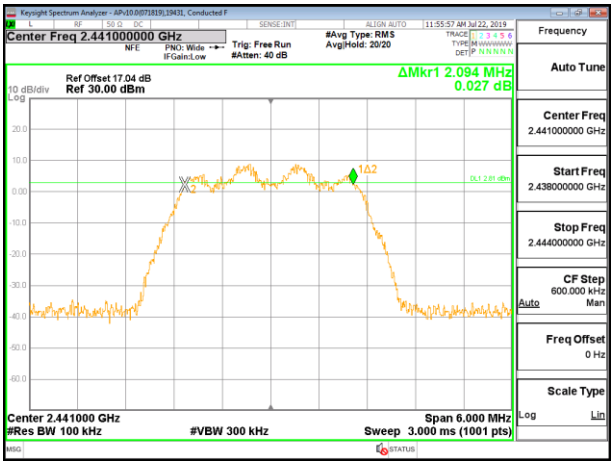
Antenna 3

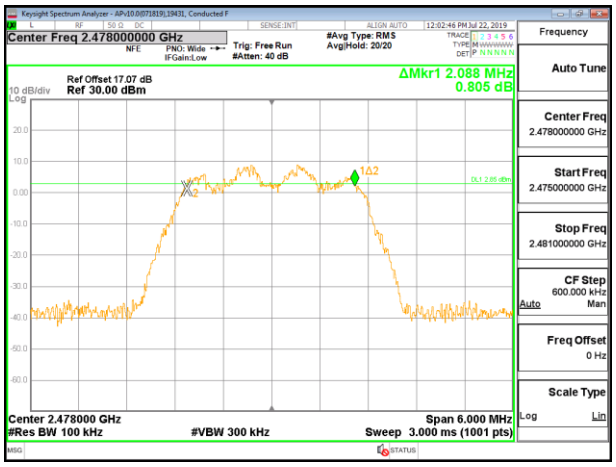
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	2.100	0.5
Middle	2441	2.094	0.5
High	2478	2.088	0.5



LOW CHANNEL



MID CHANNEL



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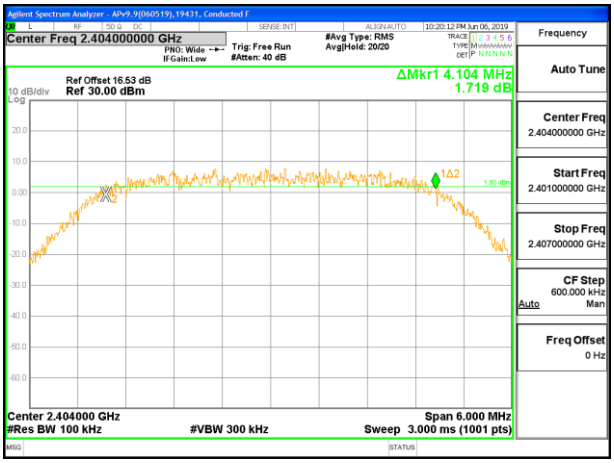
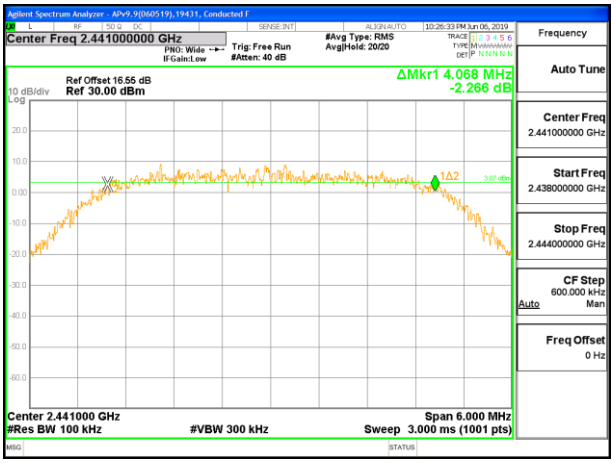
8.3.2. HIGH POWER HDR (HDR8)

Antenna 4

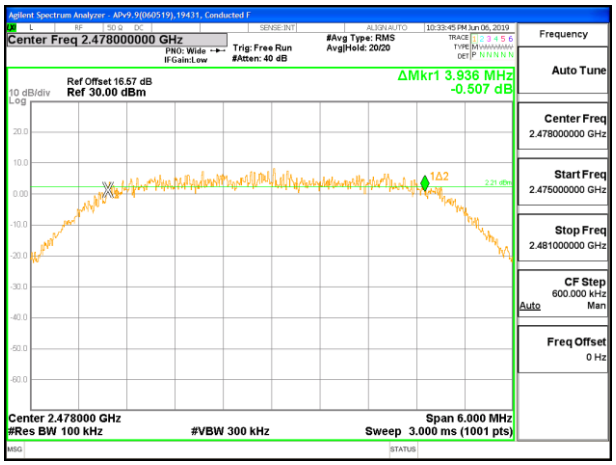
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	4.104	0.5
Middle	2441	4.058	0.5
High	2478	3.936	0.5



LOW CHANNEL



MID CHANNEL



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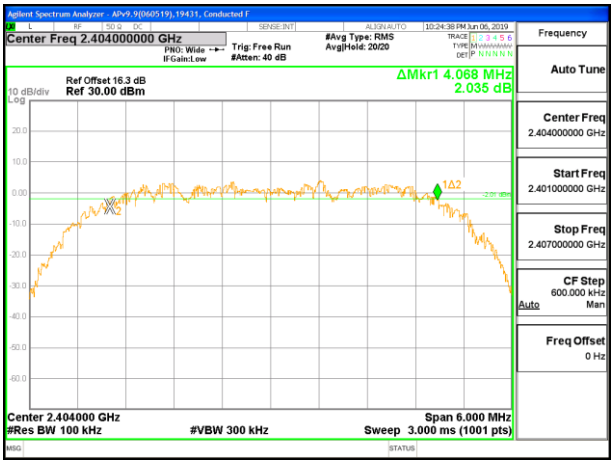
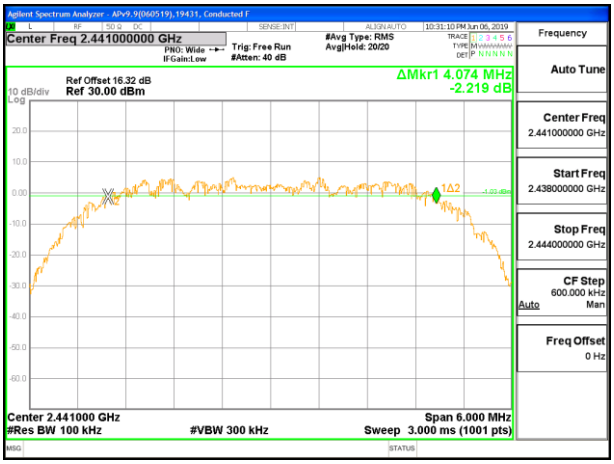
Antenna 3

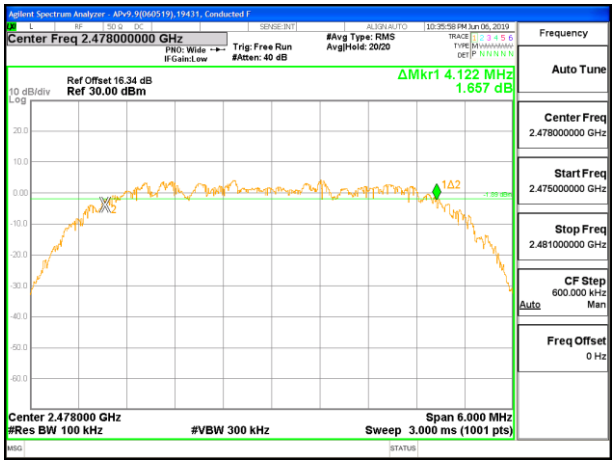
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	4.068	0.5
Middle	2441	4.074	0.5
High	2478	4.122	0.5



LOW CHANNEL



MID CHANNEL



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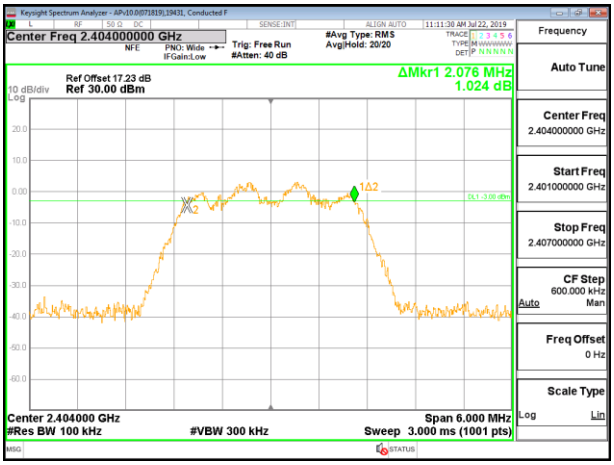
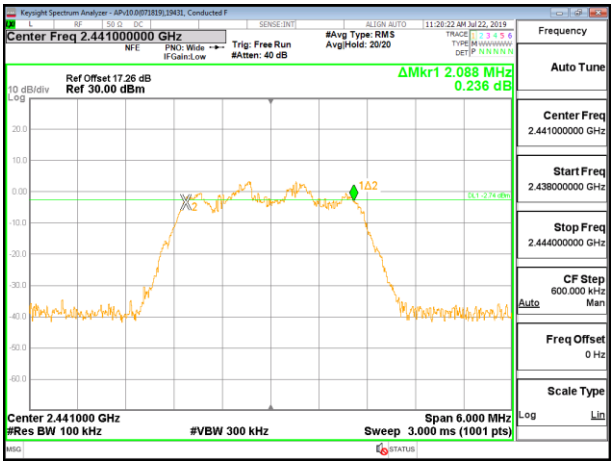
8.3.3. LOW POWER HDR (HDR4)

Antenna 4

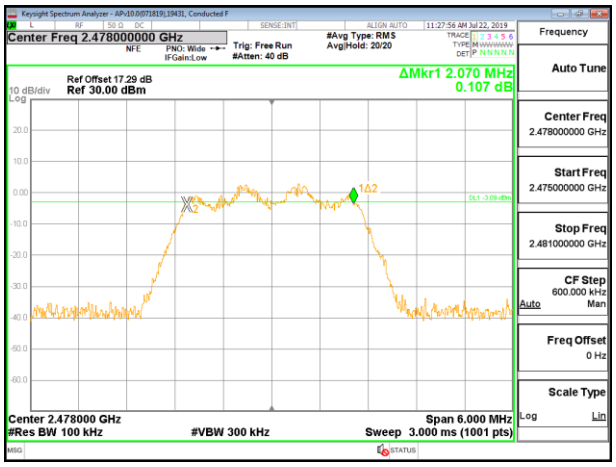
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	2.076	0.5
Middle	2441	2.088	0.5
High	2478	2.070	0.5



LOW CHANNEL



MID CHANNEL



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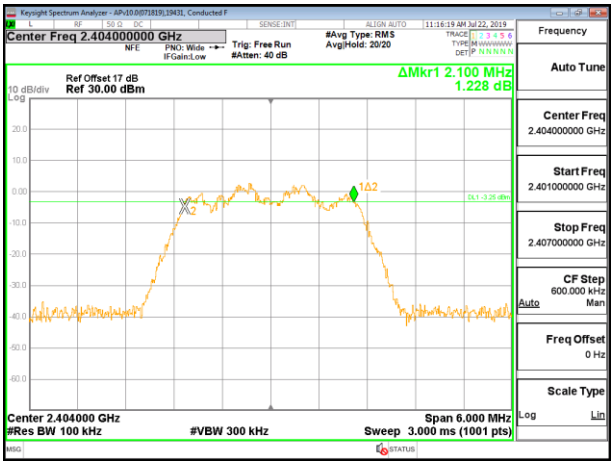
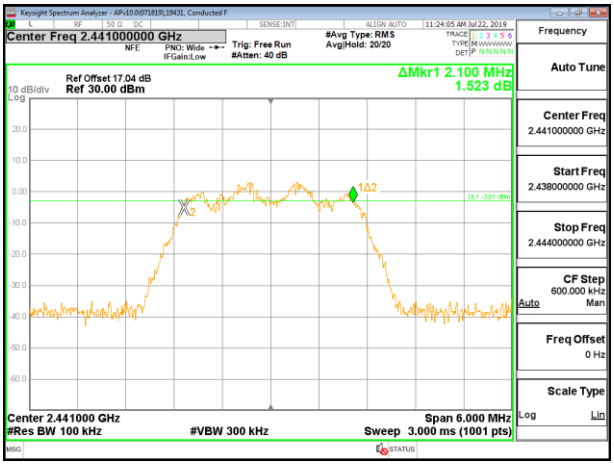
Antenna 3

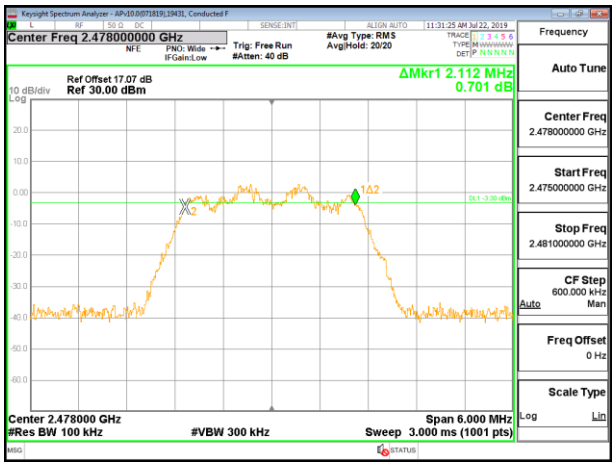
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	2.100	0.5
Middle	2441	2.100	0.5
High	2478	2.112	0.5



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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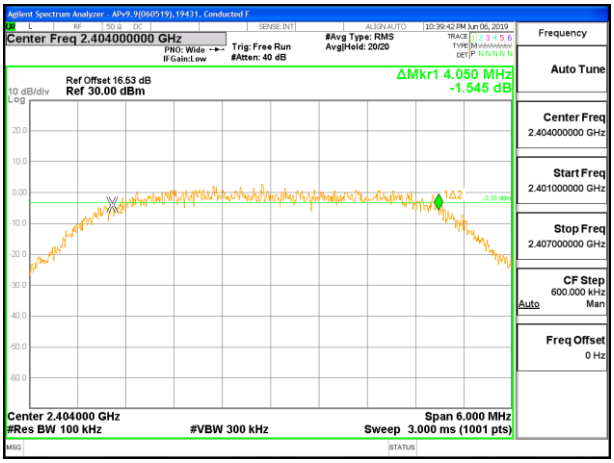
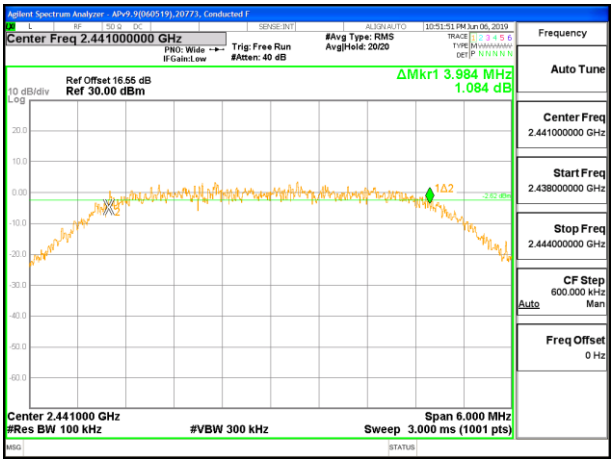
8.3.4. LOW POWER HDR (HDR8)

Antenna 4

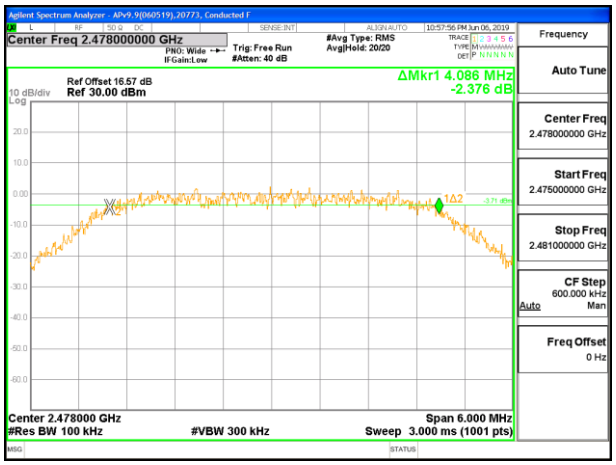
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	4.050	0.5
Middle	2441	3.984	0.5
High	2478	4.086	0.5



LOW CHANNEL



MID CHANNEL



HIGH CHANNEL

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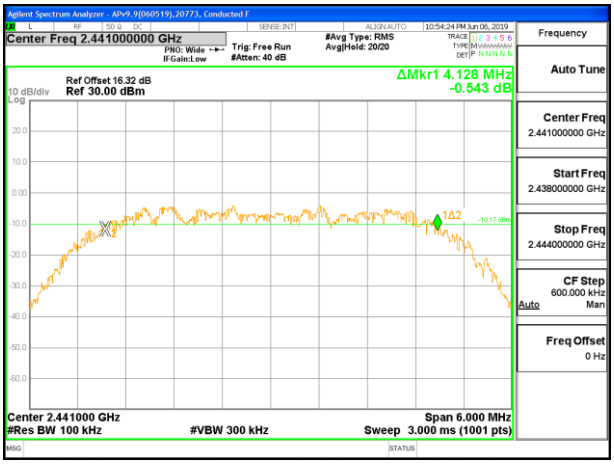
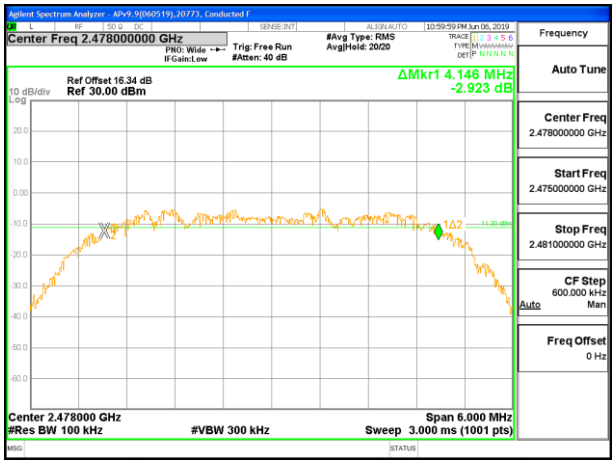
Antenna 3

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	2404	4.122	0.5
Middle	2441	4.128	0.5
High	2478	4.146	0.5

LOW CHANNEL



MID CHANNEL



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8.4. OUTPUT POWER

LIMITS

FCC §15.247 (b) (3)

RSS-247 5.4 (d)

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

RESULTS

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8.4.1. HIGH POWER HDR (HDR4)

Antenna 4

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	14.37	30	-15.630
Middle	2441	14.38	30	-15.620
High	2478	14.41	30	-15.590

Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	14.41	30	-15.590
Middle	2441	14.42	30	-15.580
High	2478	14.45	30	-15.550

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8.4.2. HIGH POWER HDR (HDR8)

Antenna 4

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	15.45	30	-14.550
Middle	2441	15.42	30	-14.580
High	2478	15.38	30	-14.620

Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	15.18	30	-14.820
Middle	2441	15.23	30	-14.770
High	2478	15.22	30	-14.780

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8.4.3. LOW POWER HDR (HDR4)

Antenna 4

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	8.89	30	-21.110
Middle	2441	8.95	30	-21.050
High	2478	8.91	30	-21.090

Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	8.96	30	-21.040
Middle	2441	9.01	30	-20.990
High	2478	8.95	30	-21.050

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8.4.4. LOW POWER HDR (HDR8)

Antenna 4

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	9.75	30	-20.250
Middle	2441	9.79	30	-20.210
High	2478	9.72	30	-20.280

Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Peak Power Reading (dBm)	Limit (dBm)	Margin (dB)
Low	2404	9.73	30	-20.270
Middle	2441	9.78	30	-20.220
High	2478	9.71	30	-20.290

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8.5. BEAMFORMING OUTPUT POWER

8.5.1 HIGH POWER HDR (HDR4)

Antenna 4 + Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Output Power Antenna 4 (dBm)	Output Power Antenna 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2404	14.43	14.38	17.42	30	-12.58
Middle	2441	14.40	14.49	17.46	30	-12.54
High	2478	14.42	14.41	17.43	30	-12.57

8.5.2 HIGH POWER HDR (HDR8)

Antenna 4 + Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Output Power Antenna 4 (dBm)	Output Power Antenna 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2404	15.18	15.23	18.22	30	-11.78
Middle	2441	15.24	15.27	18.27	30	-11.73
High	2478	15.20	15.24	18.23	30	-11.77

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8.5.3 LOW POWER HDR (HDR4)

Antenna 4 + Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Output Power Antenna 4 (dBm)	Output Power Antenna 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2404	8.98	9.01	12.01	30	-17.99
Middle	2441	9.08	9.10	12.10	30	-17.90
High	2478	9.04	9.03	12.05	30	-17.95

8.5.4 LOW POWER HDR (HDR8)

Antenna 4 + Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	Output Power Antenna 4 (dBm)	Output Power Antenna 3 (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2404	9.31	9.28	12.31	30	-17.69
Middle	2441	9.28	9.24	12.27	30	-17.73
High	2478	9.24	9.22	12.24	30	-17.76

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8.6. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE
The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.5 dB (including 10 dB pad and 0.5 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power.

RESULTS

8.6.1. HIGH POWER HDR (HDR4)

Antenna 4

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	AV power (dBm)
Low	2404	11.87
Middle	2441	11.89
High	2478	11.91

Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	AV power (dBm)
Low	2404	11.88
Middle	2441	11.91
High	2478	11.93

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8.6.2. HIGH POWER HDR (HDR8)

Antenna 4

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	AV power (dBm)
Low	2404	11.98
Middle	2441	11.97
High	2478	11.94

Antenna 3

Tested By:	12492
Date:	7/23/2019

Channel	Frequency (MHz)	AV power (dBm)
Low	2404	11.89
Middle	2441	11.94
High	2478	11.91

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