TEST REPORT

Reference No.	:	WTU16S0755914E
FCC ID................................	:	2AARJ-WD50UK4550
Applicant	:	Avision Technology (changzhou)Co., Ltd.
Address	:	No. 28 Xinsi Road, Xinbei District, Changzhou, China.
Manufacturer	:	Avision Technology (changzhou)Co., Ltd.
Address	:	No. 28 Xinsi Road, Xinbei District, Changzhou, China.
Product Name	:	LED TV
Model No.	:	WD50UK4550, WD50UT4490
Standards	:	FCC CFR47 Part 15 C Section 15.247:2015
Date of Receipt sample.....	:	Jul. 15, 2016
Date of Test	:	Jul. 16 – 30, 2016
Date of Issue	:	Aug. 09, 2016
Test Result	:	**Pass**

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company.
The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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Compiled by:

Zero Zhou / Test Engineer

Approved by:

Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Radiated Emissions	15.247 15.205(a) 15.209(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3),(4)	PASS
Power Spectral Density	15.247(e)	PASS
Band Edge	15.247(d)	PASS
Antenna Requirement	15.203	PASS
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	PASS

3 Contents

4 General Information

4.1 General Description of E.U.T.

Product Name:	LED TV
Model No.:	WD50UK4550, WD50UT4490
Model Description:	Only the base model name is different, The model WD50UK4550 is the tested sample.
Operation Frequency:	IEEE 802.11b/g/n(HT20):2412MHz ~ 2462MHz IEEE 802.11n(HT40):2422MHz~2452MHz
The Lowest Oscillator:	16MHz
Antenna Gain:	ANT 0 2.4GHz WIFI:3.2 dBi ANT 1 2.4GHz WIFI:3.2 dBi
Type of modulation:	IEEE 802.11b DSSS(CCK/QPSK/BPSK) IEEE 802.11g OFDM(BPSK/QPSK/16QAM/64QAM) IEEE 802.11n OFDM(BPSK/QPSK/16QAM/64QAM)
Number of transmitter chains:	WIFI:2*2 (MIMO)

The device supports MIMO 2*2, and the MIMO works with STBC(Space-Time Block Coding).The antenna is omnidirectional, does not support any directional gain in any modes.

TX power for MIMO rate, the wifi chip has a power/rate table that controls TX power from chipout, it's preset in nvram, FW don't need to calculate it again when MIMO rate is fixed. Of course the real radiation power is also related to antenna efficient.
Two transmitter signals are not correlated with each other.

4.2 Details of E.U.T.

Technical Data: AC 120V~60Hz, 110W

4.3 Channel List

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2412	2	2417	3	2422	4	2427
5	2432	6	2437	7	2442	8	2447
9	2452	10	2457	11	2462	12	-

4.4 Test Mode

Test Mode Description:

During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product.

Transmitting duty cycle is no less 98%.

The software is installed in operation system, named “RFTestTool.apk” ,Version 1,date 20160518.

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Mode	Data Rate	Channel	TX/RX
Maximum Peak Output Power	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Power Spectral Density	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Band Edge	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	108 Mbps	1/11	TX
	802.11n HT40	150 Mbps	3/9	TX
Transmitter Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	108 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX

Table 2 Tests Carried Out Under FCC part 15.207

Test Item	Test Mode
Conduction Emission, 0.15MHz to 30MHz	Communication

4.5 Test Facility

The test facility has a test site registered with the following organizations:

- **IC – Registration No.: 7760A-1**

  Waltek Services(Shenzhen) Co., Ltd. Has been registered and fully described in a report filed with the Industry Canada. The acceptance letter from the Industry Canada is maintained in our files. Registration number 7760A-1, October 15, 2015

- **FCC Test Site 1#– Registration No.: 880581**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 880581, April 29, 2014.

- **FCC Test Site 2#– Registration No.: 328995**

  Waltek Services(Shenzhen) Co., Ltd. EMC Laboratory `has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 328995, December 3, 2014.

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.14,2015	Sep.13,2016
2.	LISN	R&S	ENV216	101215	Sep.14,2015	Sep.13,2016
3.	Cable	Top	TYPE16(3.5M)	-	Sep.14,2015	Sep.13,2016
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.14,2015	Sep.13,2016
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.14,2015	Sep.13,2016
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.14,2015	Sep.13,2016
4.	Cable	LARGE	RF300	-	Sep.14,2015	Sep.13,2016
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.14,2015	Sep.13,2016
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.14,2015	Sep.13,2016
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Sep.14,2015	Sep.13,2016
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.14,2015	Sep.13,2016
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Sep.14,2015	Sep.13,2016
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Sep.14,2015	Sep.13,2016
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Sep.14,2015	Sep.13,2016
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Sep.14,2015	Sep.13,2016
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date
1	Test Receiver	R&S	ESCI	101296	Sep.14,2015	Sep.13,2016
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.14,2015	Sep.13,2016
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.14,2015	Sep.13,2016
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.14,2015	Sep.13,2016
RF Conducted Testing						

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.14,2015	Sep.13,2016
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.14,2015	Sep.13,2016
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.14,2015	Sep.13,2016

5.2 Description of Support Units

Equipment	Manufacturer	Model No.	Series No.
/	/	/	/

5.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-6}$
RF Power	± 1.0 dB
RF Power Density	± 2.2 dB
Radiated Spurious Emissions test	± 5.03 dB (30M~1000MHz)
	± 5.47 dB (1000M~25000MHz)
Conducted Spurious Emissions test	± 3.64 dB (AC mains 150KHz~30MHz)

5.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

6 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

6.1 E.U.T. Operation

Operating Environment **:**

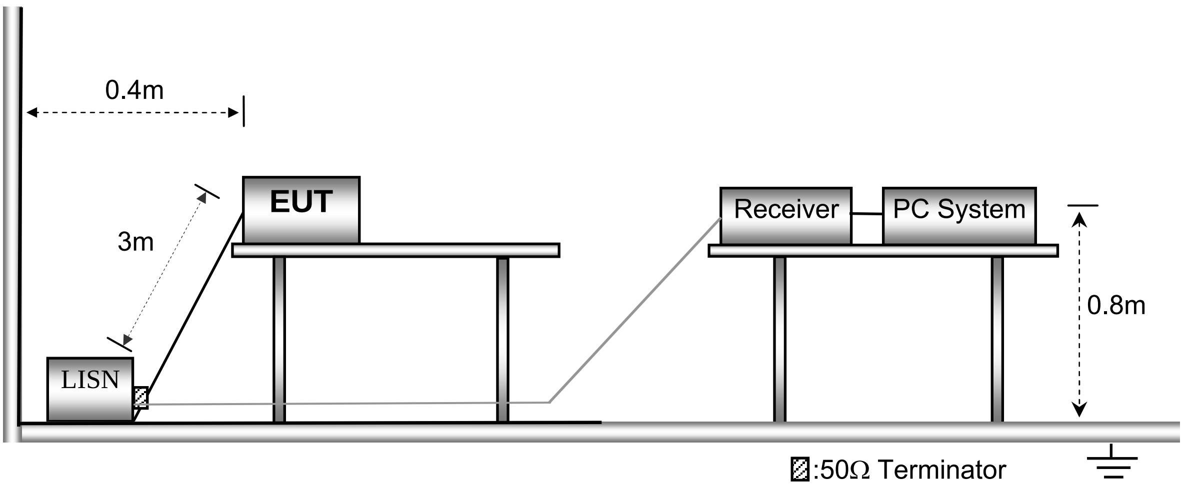
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

The test was performed in transmitting mode, the test data were shown in the report.

6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10



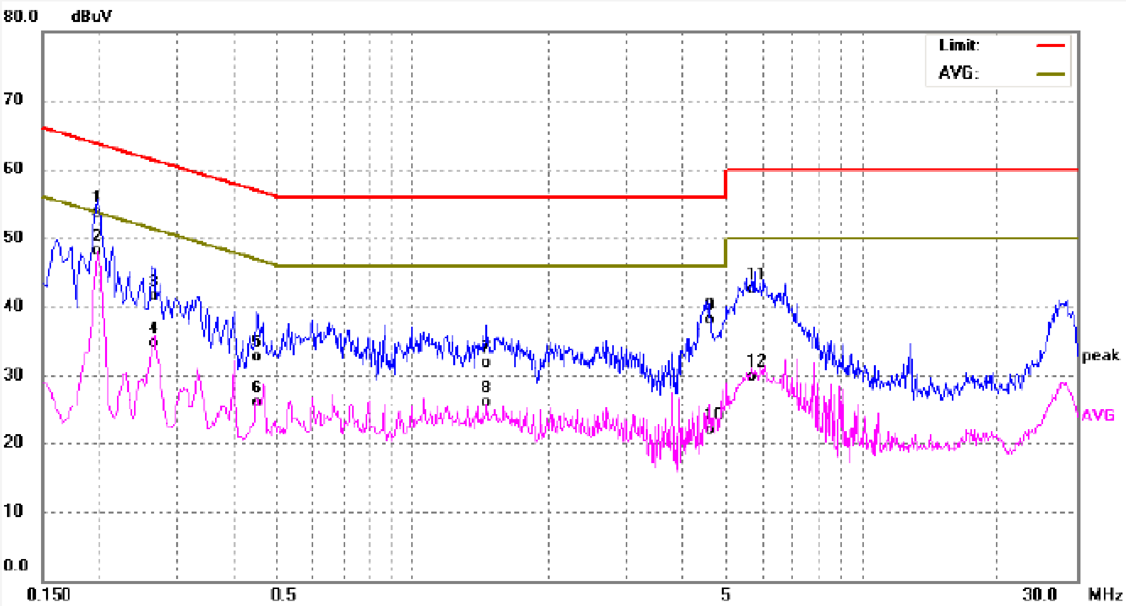
6.3 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

6.4 Conducted Emission Test Result

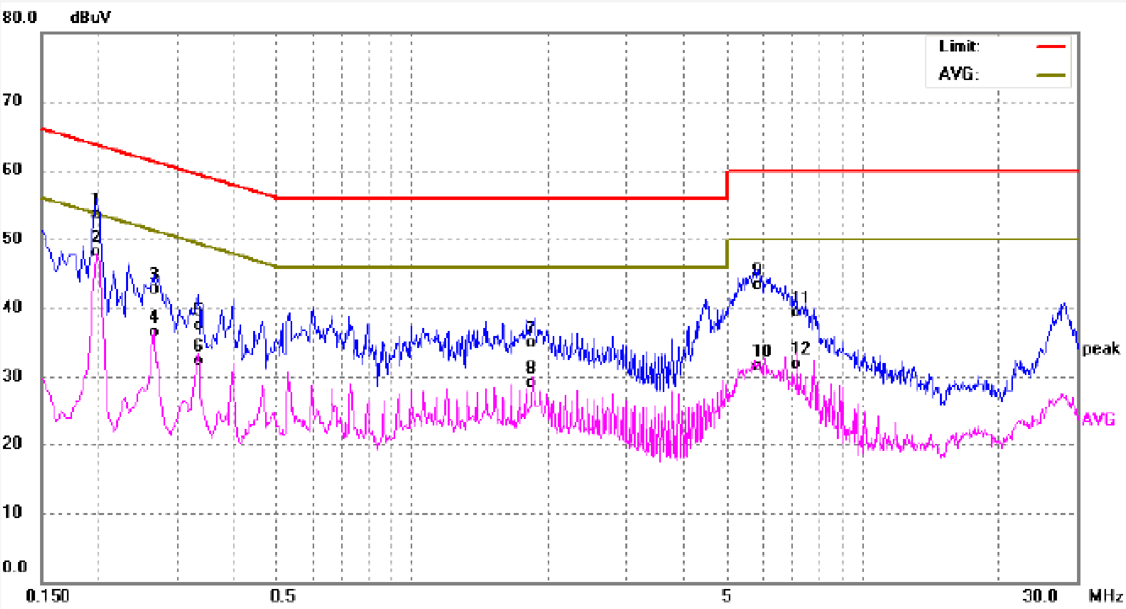
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1980	43.35	10.26	53.61	63.69	-10.08	QP	
2	0.1980	37.90	10.26	48.16	53.69	-5.53	AVG	
3	0.2620	31.32	10.26	41.58	61.36	-19.78	QP	
4	0.2620	24.38	10.26	34.64	51.36	-16.72	AVG	
5	0.4500	22.53	10.26	32.79	56.87	-24.08	QP	
6	0.4500	15.76	10.26	26.02	46.87	-20.85	AVG	
7	1.4580	21.55	10.43	31.98	56.00	-24.02	QP	
8	1.4580	15.71	10.43	26.14	46.00	-19.86	AVG	
9	4.5300	27.58	10.52	38.10	56.00	-17.90	QP	
10	4.5300	11.33	10.52	21.85	46.00	-24.15	AVG	
11	5.7740	31.90	10.58	42.48	60.00	-17.52	QP	
12	5.7740	19.28	10.58	29.86	50.00	-20.14	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1980	43.21	10.26	53.47	63.69	-10.22	QP	
2	0.1980	37.84	10.26	48.10	53.69	-5.59	AVG	
3	0.2660	32.44	10.27	42.71	61.24	-18.53	QP	
4	0.2660	26.25	10.27	36.52	51.24	-14.72	AVG	
5	0.3339	27.22	10.29	37.51	59.35	-21.84	QP	
6	0.3339	21.95	10.29	32.24	49.35	-17.11	AVG	
7	1.8580	24.43	10.46	34.89	56.00	-21.11	QP	
8	1.8580	18.74	10.46	29.20	46.00	-16.80	AVG	
9	5.8380	32.77	10.58	43.35	60.00	-16.65	QP	
10	5.8380	20.83	10.58	31.41	50.00	-18.59	AVG	
11	7.1540	28.65	10.65	39.30	60.00	-20.70	QP	
12	7.1540	21.22	10.65	31.87	50.00	-18.13	AVG	

7 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013

Test Result: PASS

Measurement Distance: 3m

Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	$20\log^{(2400/F(kHz))} + 80$
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))} + 40$
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

7.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

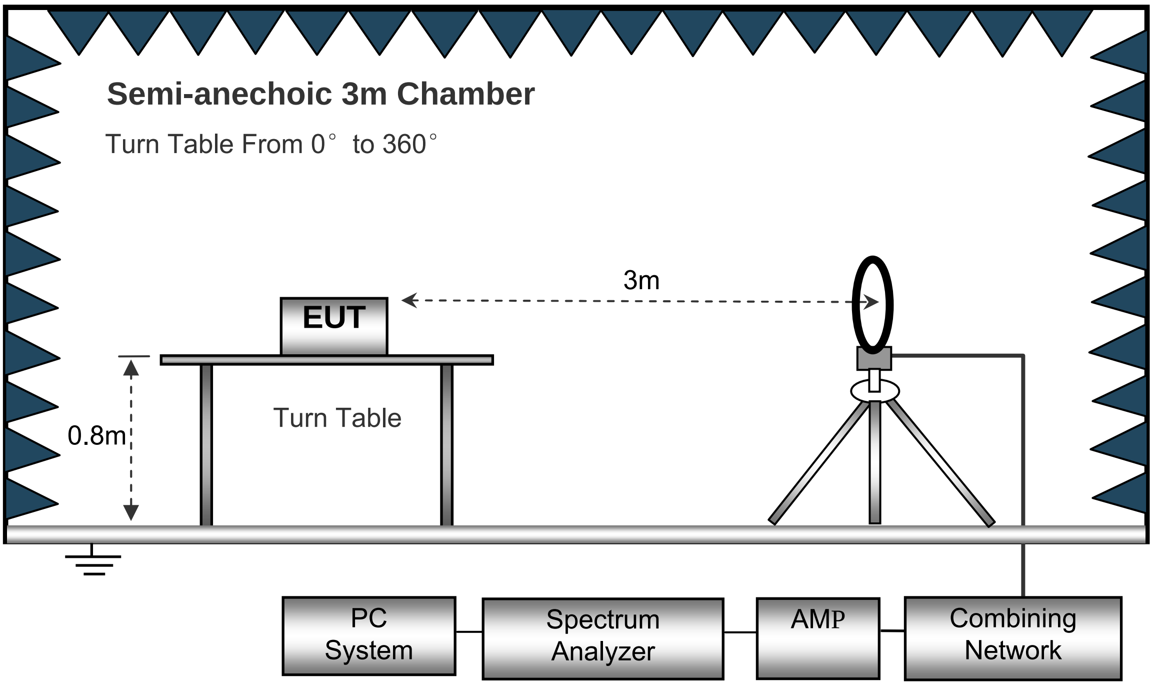
EUT Operation :

The test was performed in transmitting mode, the test data were shown in the report.

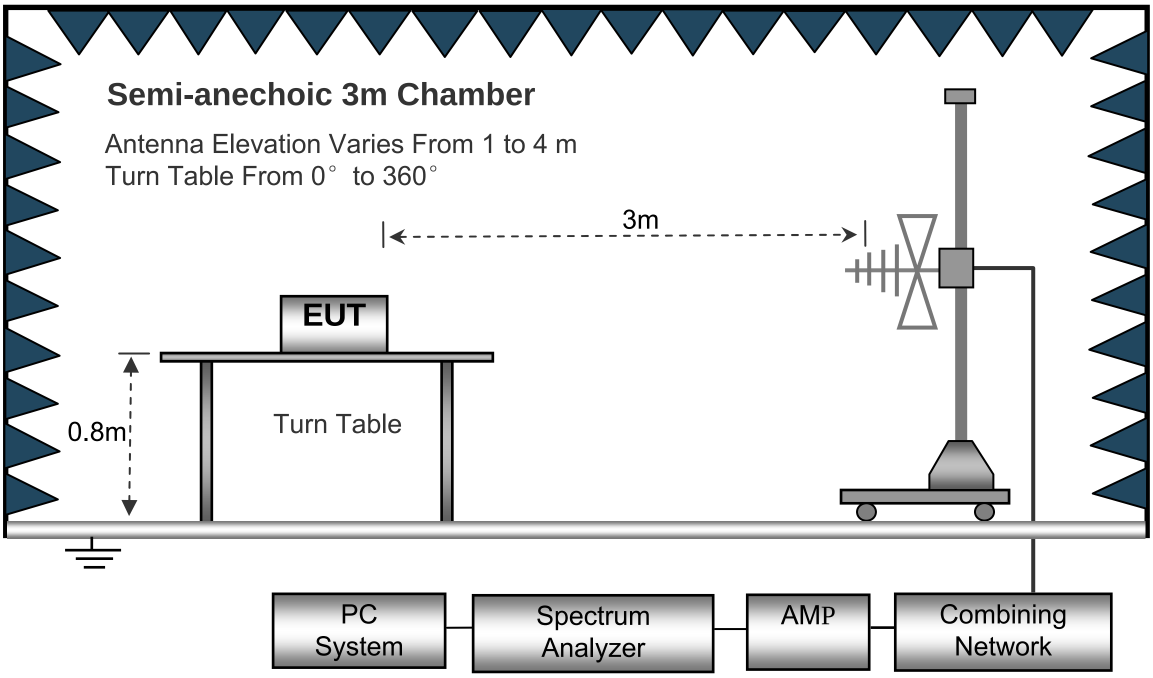
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

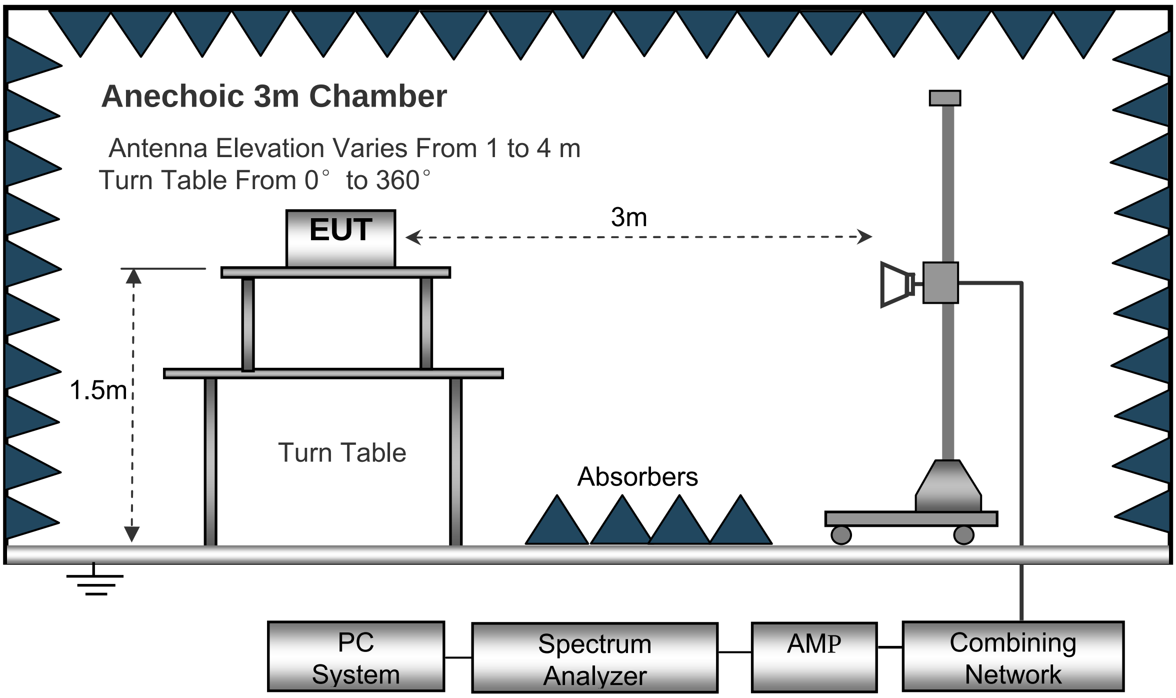
The test setup for emission measurement below 30MHz.



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Below 30MHz

Sweep Speed .... Auto
IF Bandwidth... 10kHz
Video Bandwidth.. 10kHz
Resolution Bandwidth................................ 10kHz

30MHz ~ 1GHz

Sweep Speed .... Auto
Detector .... PK
Resolution Bandwidth................................ 100kHz
Video Bandwidth.. 300kHz

Above 1GHz

Sweep Speed .... Auto
Detector .... PK
Resolution Bandwidth................................ 1MHz
Video Bandwidth.. 3MHz
Detector .... Ave.
Resolution Bandwidth................................ 1MHz
Video Bandwidth.. 10Hz

7.4 Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in X axis,so the worst data were shown as follow.
8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

7.5 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Limit

7.6 Summary of Test Results

Test Frequency: 16MHz~30MHz

Frequency (MHz)	Measurement results	Detector	Correct factor	Extrapolation factor	Measurement results (calculated)	FCC Part 15.247/209/205 Limit	FCC Part 15.247/209/205 Margin
	dBµV/m@3m	PK/QP	dB/m	dB	dBµV/m @30m	dBµV/m @30m	dB
26.531	27.95	QP	20.55	40.00	8.50	29.54	-21.04

Test Frequency : 30MHz ~ 18GHz

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna Height	RX Antenna Polar	Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205 Limit	FCC Part 15.247/209/205 Margin
(MHz)	(dBµV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
ANT0 11b: Low Channel 2412MHz									
469.74	12.59	PK	142	1.9	H	-11.36	1.23	46.00	-44.77
469.74	11.36	PK	288	1.7	V	-11.36	0.00	46.00	-46.00
4824.00	48.54	PK	147	1.8	V	-1.04	47.50	74.00	-26.50
4824.00	47.32	Ave	147	1.8	V	-1.04	46.28	54.00	-7.72
7236.00	45.71	PK	220	1.9	H	1.34	47.05	74.00	-26.95
7236.00	46.27	Ave	220	1.9	H	1.34	47.61	54.00	-6.39
2319.54	45.72	PK	206	1.0	V	-13.19	32.53	74.00	-41.47
2319.54	39.14	Ave	206	1.0	V	-13.19	25.95	54.00	-28.05
2388.37	43.45	PK	220	1.2	H	-13.15	30.30	74.00	-43.70
2388.37	38.11	Ave	220	1.2	H	-13.15	24.96	54.00	-29.04
2485.25	43.90	PK	248	1.6	V	-13.08	30.82	74.00	-43.18
2485.25	36.37	Ave	248	1.6	V	-13.08	23.29	54.00	-30.71

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT0 11b: Middle Channel 2437MHz									
469.74	14.27	PK	52	1.8	H	-11.36	2.91	46.00	-43.09
469.74	11.52	PK	267	1.7	V	-11.36	0.16	46.00	-45.84
4874.00	48.36	PK	118	2.0	V	-0.63	47.73	74.00	-26.27
4874.00	47.75	Ave	118	2.0	V	-0.63	47.12	54.00	-6.88
7311.00	45.93	PK	258	1.9	H	2.21	48.14	74.00	-25.86
7311.00	44.21	Ave	258	1.9	H	2.21	46.42	54.00	-7.58
2324.23	45.98	PK	42	1.0	V	-13.19	32.79	74.00	-41.21
2324.23	39.76	Ave	42	1.0	V	-13.19	26.57	54.00	-27.43
2366.87	42.64	PK	179	1.7	H	-13.14	29.50	74.00	-44.50
2366.87	36.87	Ave	179	1.7	H	-13.14	23.73	54.00	-30.27
2499.15	43.62	PK	17	1.6	V	-13.09	30.53	74.00	-43.47
2499.15	37.28	Ave	17	1.6	V	-13.09	24.19	54.00	-29.81

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT0 11b: High Channel 2462MHz									
469.74	13.78	PK	114	1.8	H	-11.36	2.42	46.00	-43.58
469.74	12.38	PK	48	1.6	V	-11.36	1.02	46.00	-44.98
4924.00	50.34	PK	118	1.4	V	-0.25	50.09	74.00	-23.91
4924.00	48.75	Ave	118	1.4	V	-0.25	48.50	54.00	-5.50
7386.00	48.22	PK	163	1.4	H	2.85	51.07	74.00	-22.93
7386.00	47.31	Ave	163	1.4	H	2.85	50.16	54.00	-3.84
2314.85	45.57	PK	355	1.3	V	-13.19	32.38	74.00	-41.62
2314.85	37.88	Ave	355	1.3	V	-13.19	24.69	54.00	-29.31
2380.36	43.15	PK	305	1.6	H	-13.14	30.01	74.00	-43.99
2380.36	36.91	Ave	305	1.6	H	-13.14	23.77	54.00	-30.23
2498.92	43.84	PK	165	1.9	V	-13.09	30.75	74.00	-43.25
2498.92	38.17	Ave	165	1.9	V	-13.09	25.08	54.00	-28.92

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT1 11b: Low Channel 2412MHz									
469.74	22.07	QP	107	1.4	H	10.59	32.66	46.00	-13.34
469.74	20.84	QP	322	1.0	V	10.59	31.43	46.00	-14.57
4844.00	51.14	PK	42	1.8	V	-1.08	50.06	74.00	-23.94
4804.00	42.72	Ave	42	1.8	V	-1.08	41.64	54.00	-12.36
7266.00	50.54	PK	288	1.0	H	1.34	51.88	74.00	-22.12
7266.00	42.84	Ave	288	1.0	H	1.34	44.18	54.00	-9.82
2315.84	46.88	PK	323	1.4	V	-13.20	33.68	74.00	-40.32
2315.84	38.67	Ave	323	1.4	V	-13.20	25.47	54.00	-28.53
2363.22	44.32	PK	98	1.7	H	-13.12	31.20	74.00	-42.80
2363.22	38.12	Ave	98	1.7	H	-13.12	25.00	54.00	-29.00
2492.15	43.32	PK	219	1.8	V	-13.02	30.30	74.00	-43.70
2492.15	36.95	Ave	219	1.8	V	-13.02	23.93	54.00	-30.07

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT1 11b: Middle Channel 2437MHz									
469.74	20.24	QP	164	1.5	H	10.59	30.83	46.00	-15.17
469.74	20.29	QP	205	2.0	V	10.59	30.88	46.00	-15.12
4874.00	54.80	PK	236	1.9	V	-0.62	54.18	74.00	-19.82
4874.00	41.50	Ave	236	1.9	V	-0.62	40.88	54.00	-13.12
7311.00	50.70	PK	324	1.6	H	2.21	52.91	74.00	-21.09
7311.00	43.55	Ave	324	1.6	H	2.21	45.76	54.00	-8.24
2333.11	46.36	PK	256	1.6	V	-13.19	33.17	74.00	-40.83
2333.11	37.33	Ave	256	1.6	V	-13.19	24.14	54.00	-29.86
2384.66	43.67	PK	115	1.8	H	-13.14	30.53	74.00	-43.47
2384.66	36.03	Ave	115	1.8	H	-13.14	22.89	54.00	-31.11
2486.70	42.28	PK	238	1.8	V	-13.08	29.20	74.00	-44.80
2486.70	36.21	Ave	238	1.8	V	-13.08	23.13	54.00	-30.87

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBµV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
ANT1 11b: High Channel 2462MHz									
469.74	21.01	QP	223	1.9	H	10.59	31.60	46.00	-14.40
469.74	18.18	QP	255	1.5	V	10.59	28.77	46.00	-17.23
4904.00	50.60	PK	256	1.4	V	-0.24	50.36	74.00	-23.64
4904.00	44.85	Ave	256	1.4	V	-0.24	44.61	54.00	-9.39
7356.00	50.19	PK	258	1.6	H	2.84	53.03	74.00	-20.97
7356.00	41.05	Ave	258	1.6	H	2.84	43.89	54.00	-10.11
2343.08	46.44	PK	290	1.9	V	-13.19	33.25	74.00	-40.75
2343.08	38.26	Ave	290	1.9	V	-13.19	25.07	54.00	-28.93
2360.00	43.04	PK	66	1.4	H	-13.14	29.90	74.00	-44.10
2360.00	38.72	Ave	66	1.4	H	-13.14	25.58	54.00	-28.42
2493.51	42.13	PK	105	1.5	V	-13.08	29.05	74.00	-44.95
2493.51	36.15	Ave	105	1.5	V	-13.08	23.07	54.00	-30.93

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT0+ANT1 n20: Low Channel 2412MHz									
469.74	14.14	PK	108	1.8	H	-11.36	2.78	46.00	-43.22
469.74	13.29	PK	22	1.9	V	-11.36	1.93	46.00	-44.07
4824.00	50.58	PK	319	1.1	V	-1.06	49.52	74.00	-24.48
4824.00	48.90	Ave	319	1.1	V	-1.06	47.84	54.00	-6.16
7236.00	47.07	PK	333	1.4	H	1.34	48.41	74.00	-25.59
7236.00	45.54	Ave	333	1.4	H	1.34	46.88	54.00	-7.12
2347.35	45.47	PK	257	1.9	V	-13.19	32.28	74.00	-41.72
2347.35	38.09	Ave	257	1.9	V	-13.19	24.90	54.00	-29.10
2379.59	44.65	PK	208	1.9	H	-13.14	31.51	74.00	-42.49
2379.59	37.44	Ave	208	1.9	H	-13.14	24.30	54.00	-29.70
2489.34	43.17	PK	204	1.4	V	-13.08	30.09	74.00	-43.91
2489.34	37.86	Ave	204	1.4	V	-13.08	24.78	54.00	-29.22

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT0+ANT1 n20: Middle Channel 2437MHz									
469.74	14.15	PK	11	1.7	H	-11.36	2.79	46.00	-43.21
469.74	12.27	PK	50	1.6	V	-11.36	0.91	46.00	-45.09
4874.00	50.64	PK	268	1.4	V	-0.61	50.03	74.00	-23.97
4874.00	47.02	Ave	268	1.4	V	-0.61	46.41	54.00	-7.59
7311.00	43.01	PK	29	1.4	H	2.21	45.22	74.00	-28.78
7311.00	43.14	Ave	29	1.4	H	2.21	45.35	54.00	-8.65
2337.36	45.36	PK	151	1.0	V	-13.19	32.17	74.00	-41.83
2337.36	38.30	Ave	151	1.0	V	-13.19	25.11	54.00	-28.89
2357.53	42.80	PK	58	1.6	H	-13.14	29.66	74.00	-44.34
2357.53	37.26	Ave	58	1.6	H	-13.14	24.12	54.00	-29.88
2485.21	43.80	PK	353	1.5	V	-13.09	30.71	74.00	-43.29
2485.21	38.26	Ave	353	1.5	V	-13.09	25.17	54.00	-28.83

Frequency	Receiver Reading	Detector	Turn table Angle	RX Antenna		Corrected Factor	Corrected Amplitude	FCC Part 15.247/209/205	
				Height	Polar			Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT0+ANT1 n20: High Channel 2462MHz									
469.74	13.10	PK	292	1.2	H	-11.36	1.74	46.00	-44.26
469.74	11.45	PK	115	1.2	V	-11.36	0.09	46.00	-45.91
4924.00	50.14	PK	247	1.4	V	-0.24	49.90	74.00	-24.10
4924.00	48.17	Ave	247	1.4	V	-0.24	47.93	54.00	-6.07
7386.00	48.72	PK	232	1.8	H	2.83	51.55	74.00	-22.45
7386.00	45.55	Ave	232	1.8	H	2.83	48.38	54.00	-5.62
2342.11	45.11	PK	151	1.8	V	-13.19	31.92	74.00	-42.08
2342.11	39.03	Ave	151	1.8	V	-13.19	25.84	54.00	-28.16
2357.69	43.14	PK	216	1.7	H	-13.14	30.00	74.00	-44.00
2357.69	37.83	Ave	216	1.7	H	-13.14	24.69	54.00	-29.31
2489.62	44.43	PK	11	1.8	V	-13.08	31.35	74.00	-42.65
2489.62	38.18	Ave	11	1.8	V	-13.08	25.10	54.00	-28.90

Test Frequency: 18GHz~25GHz

The measurements were more than 20 dB below the limit and not reported.

8 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB558074 D01 DTS Meas Guidance v03r05
Test Limit:	Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).
Test Mode:	Transmitting

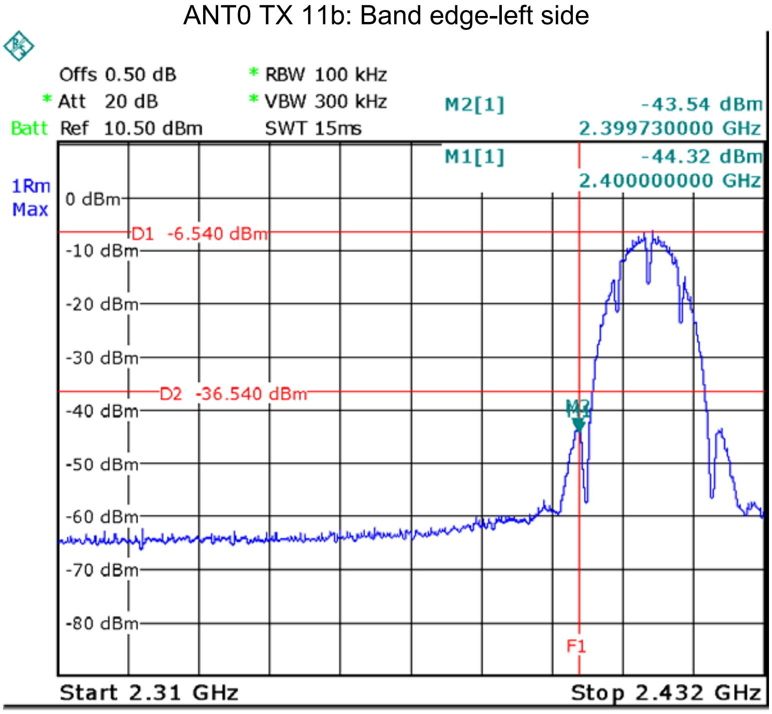
8.1 Test Produce

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

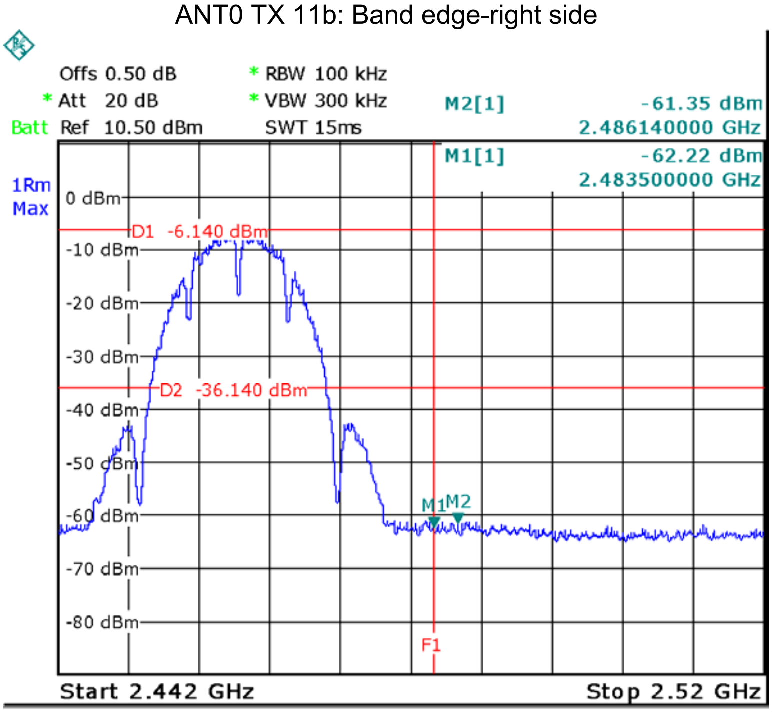
8.2 Test Result

Test result plots shown as follows:

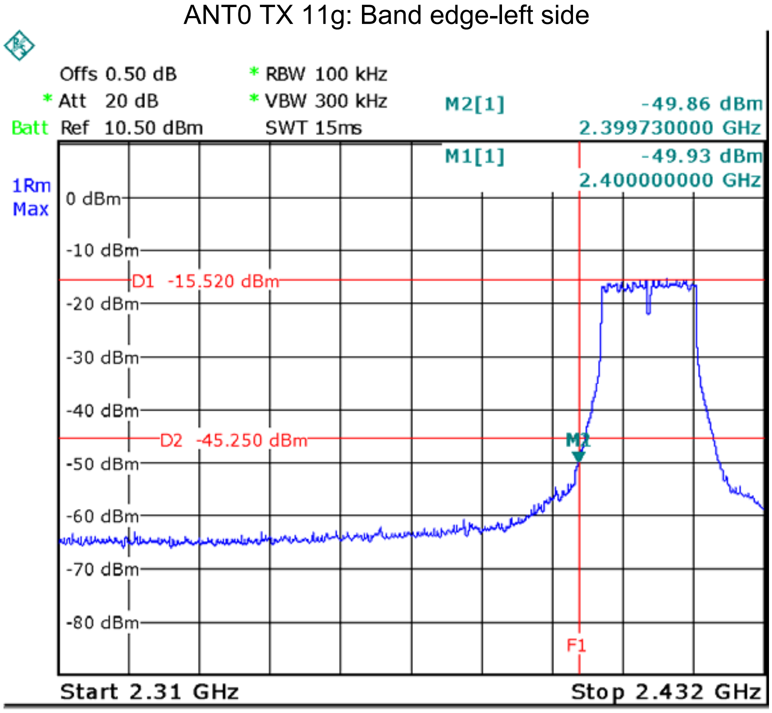
ANT0 TX 11b: Band edge-left side



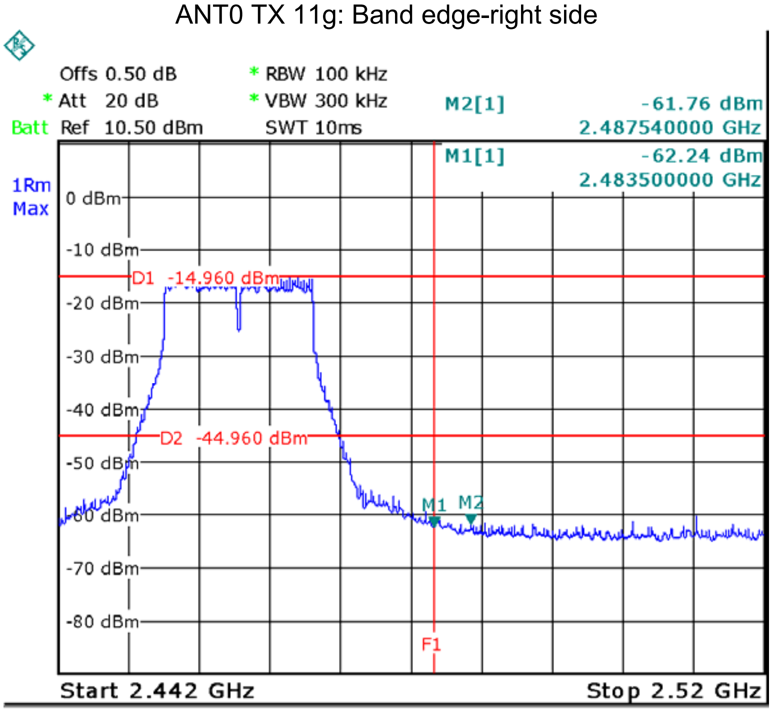
ANT0 TX 11b: Band edge-right side



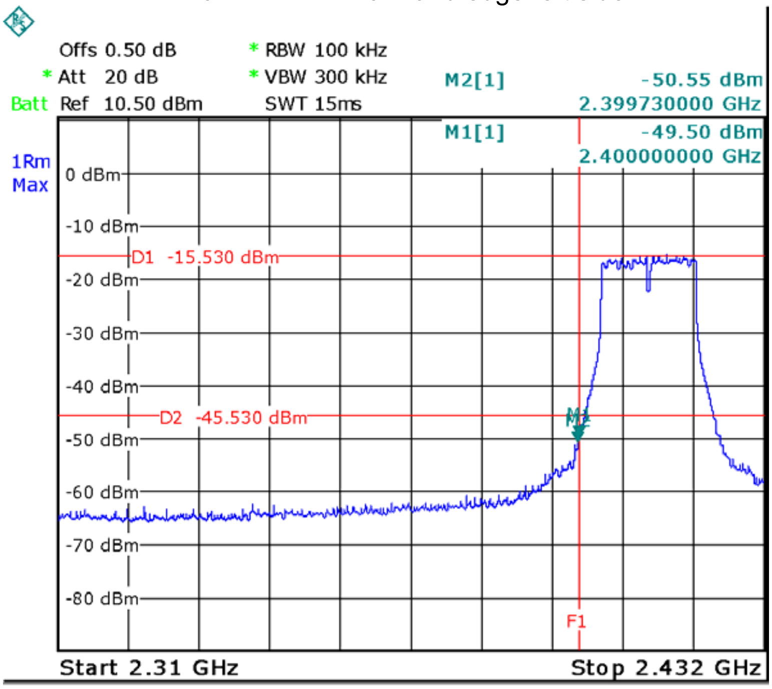
ANT0 TX 11g: Band edge-left side



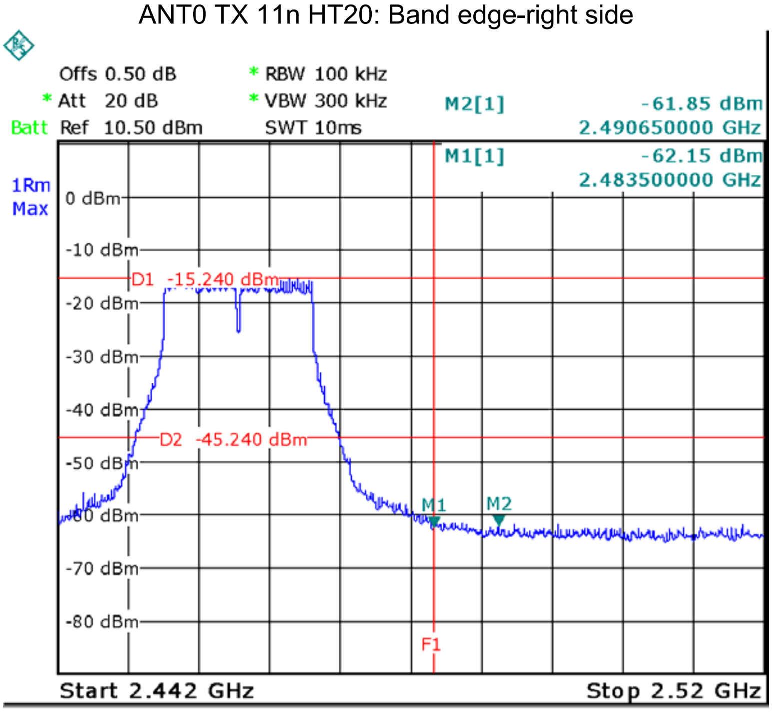
ANT0 TX 11g: Band edge-right side



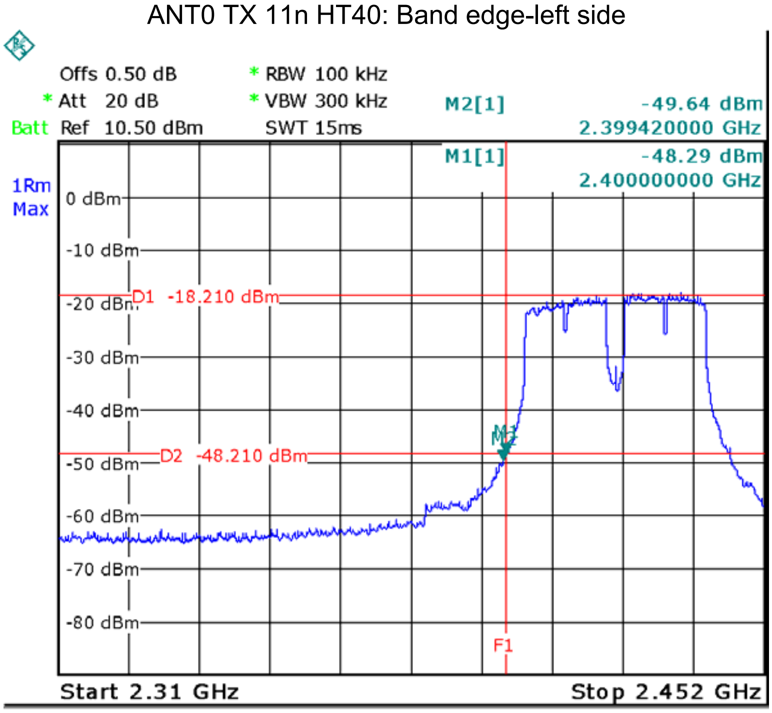
ANT0 TX 11n HT20: Band edge-left side



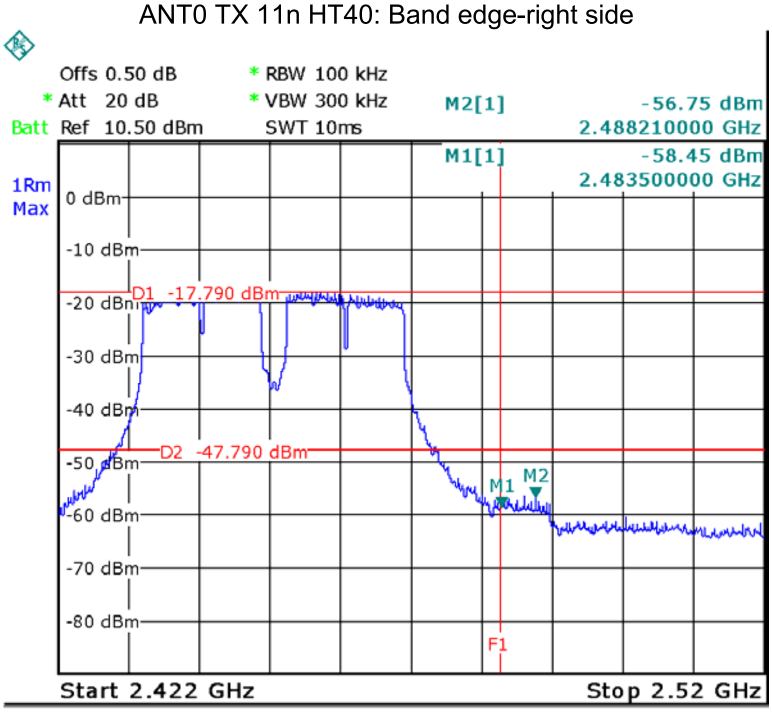
ANT0 TX 11n HT20: Band edge-right side



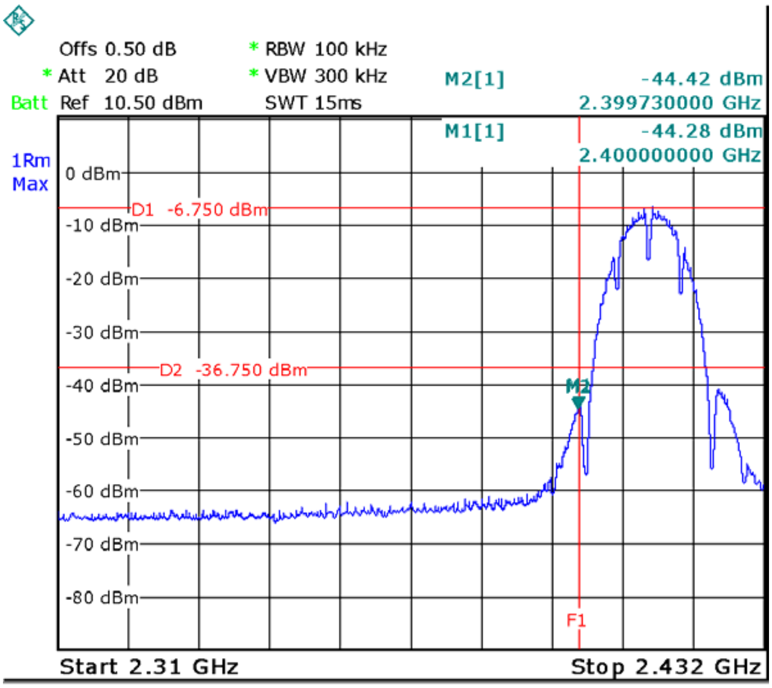
ANT0 TX 11n HT40: Band edge-left side



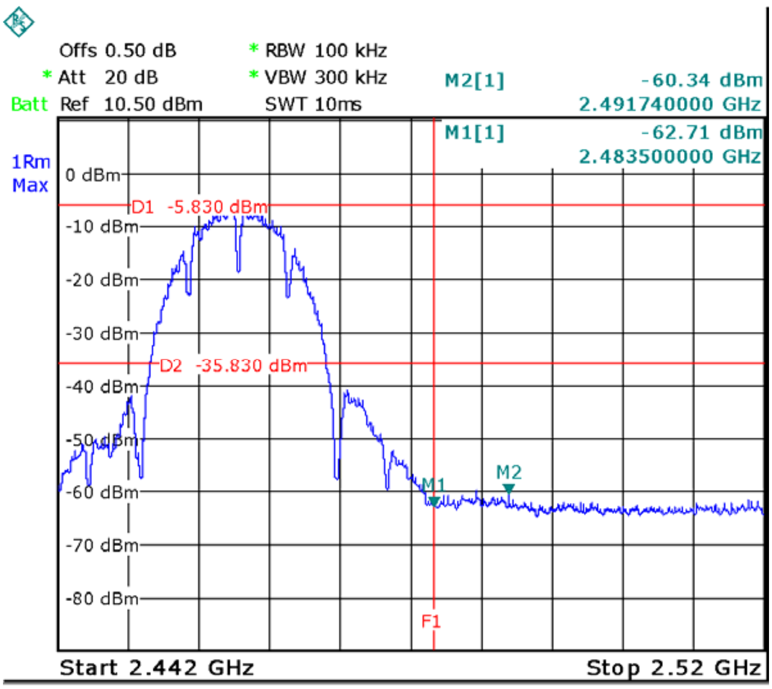
ANT0 TX 11n HT40: Band edge-right side



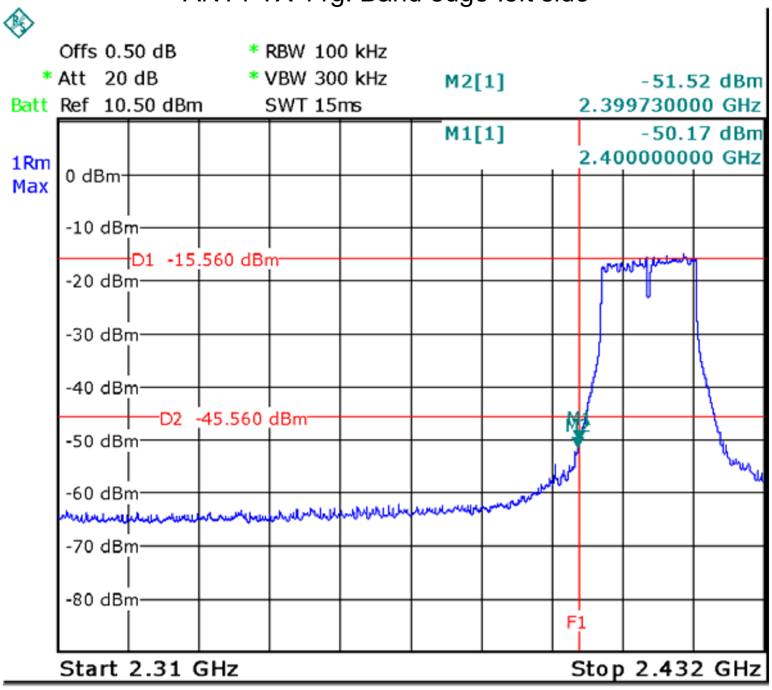
ANT1 TX 11b: Band edge-left side



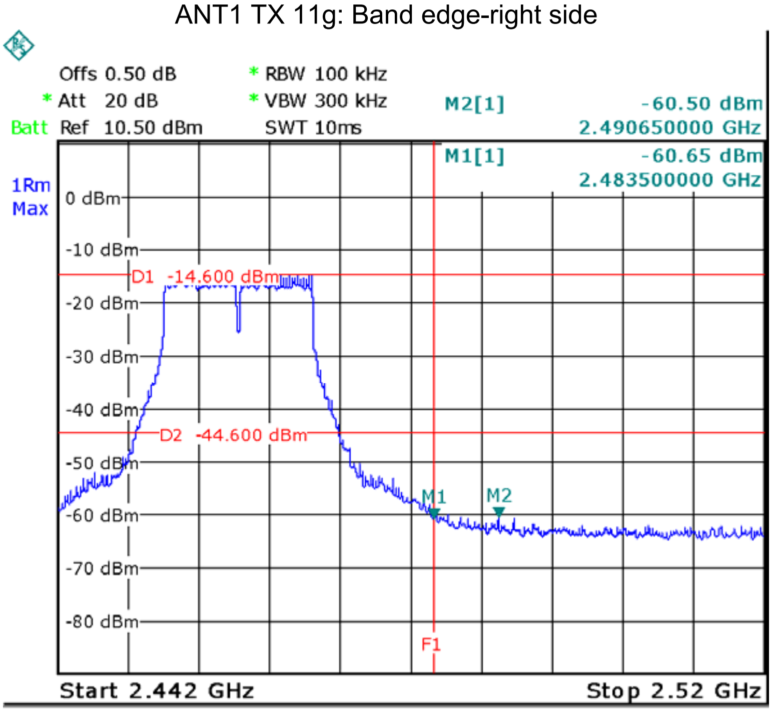
ANT1 TX 11b: Band edge-right side



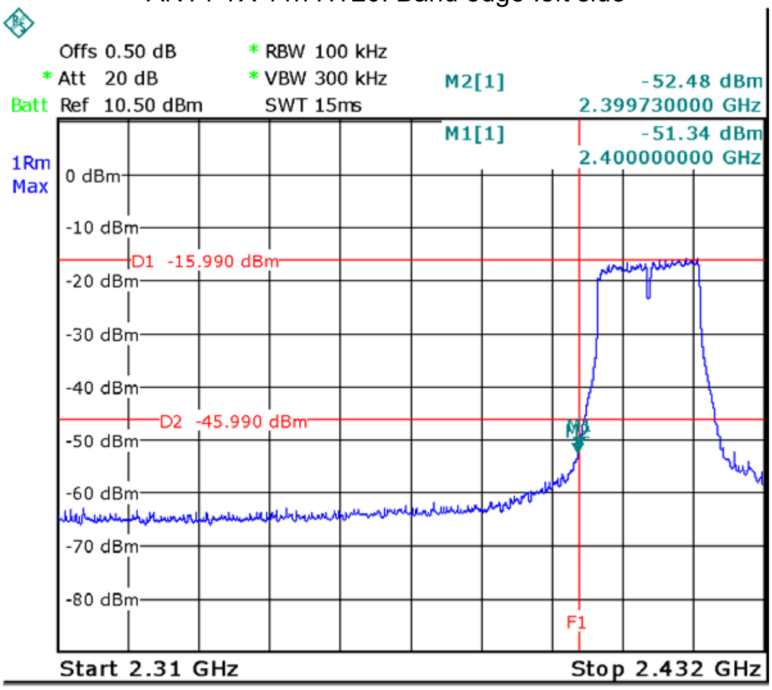
ANT1 TX 11g: Band edge-left side



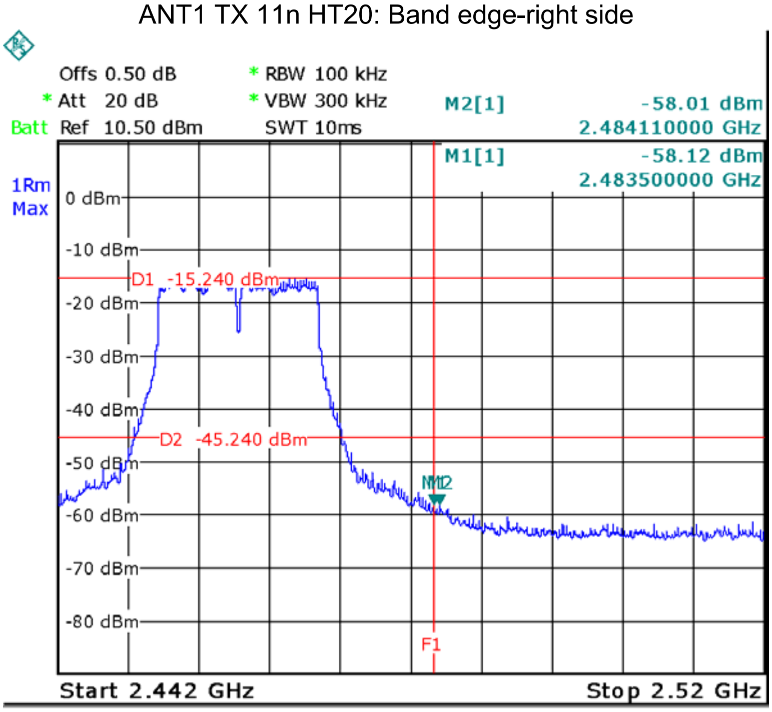
ANT1 TX 11g: Band edge-right side



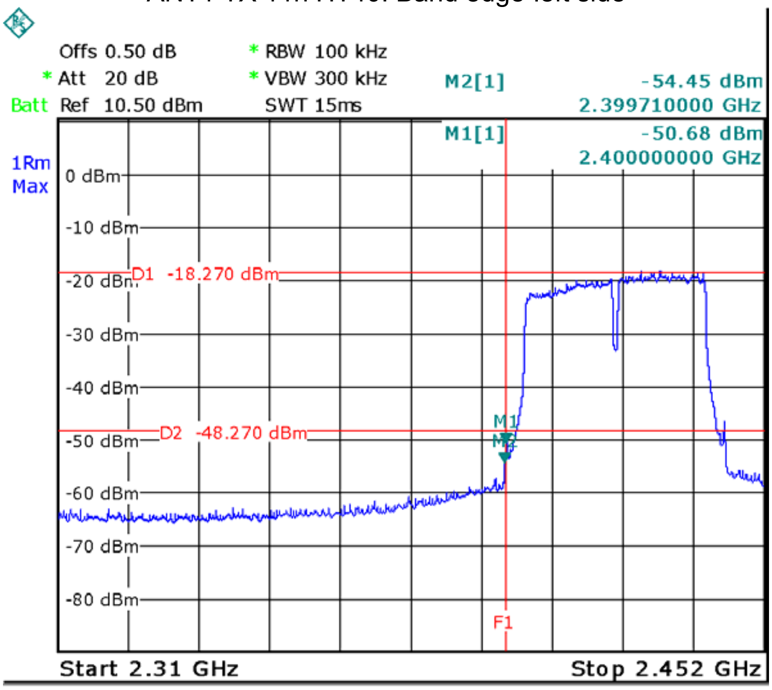
ANT1 TX 11n HT20: Band edge-left side



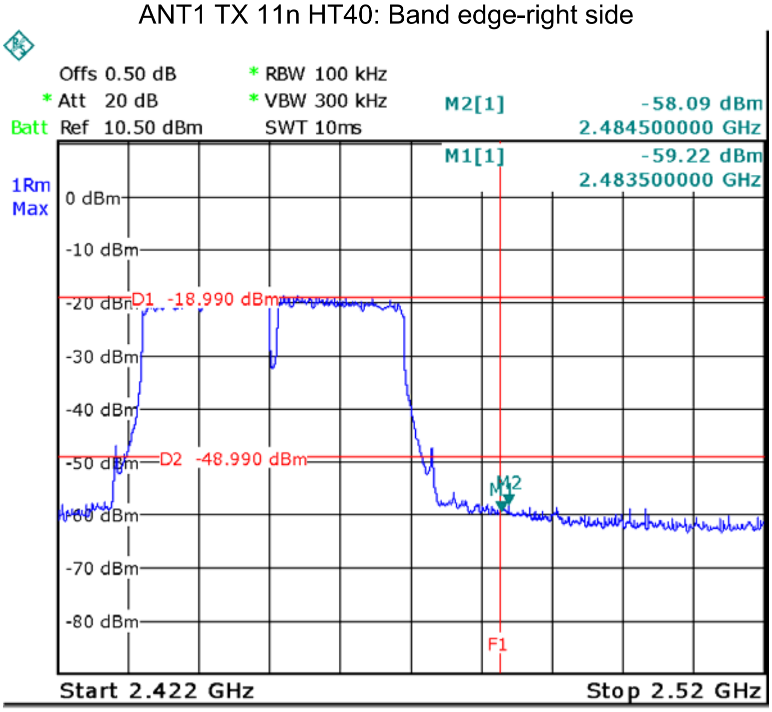
ANT1 TX 11n HT20: Band edge-right side



ANT1 TX 11n HT40: Band edge-left side



ANT1 TX 11n HT40: Band edge-right side



9 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

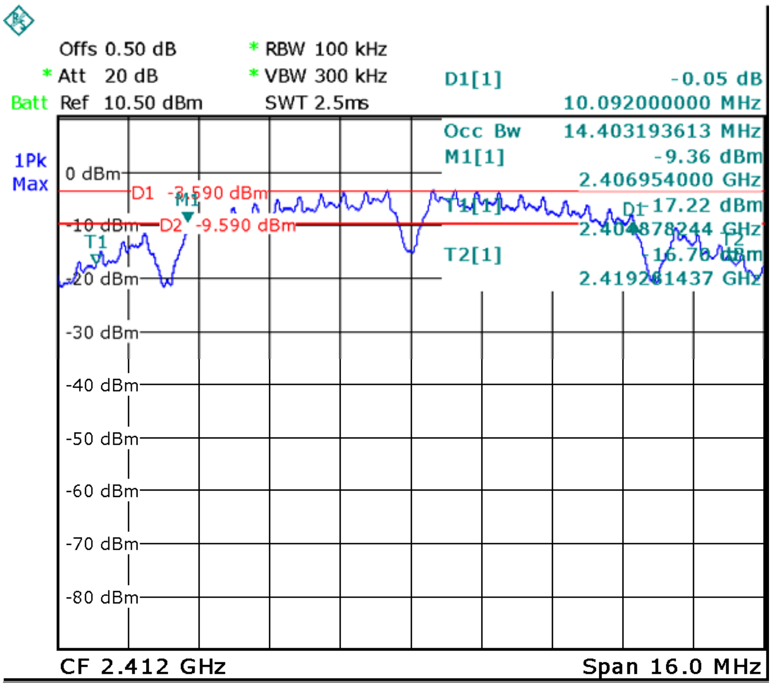
9.1 Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

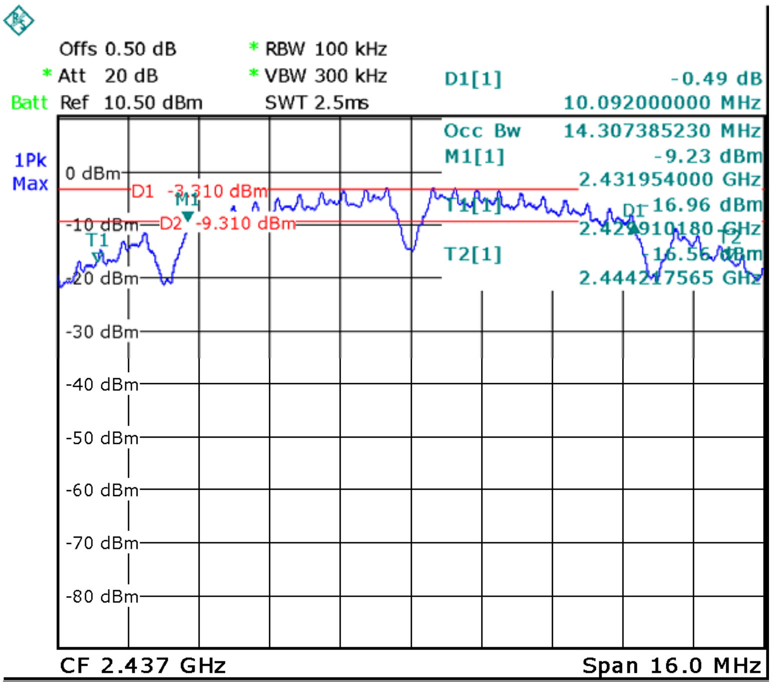
9.2 Test Result:

ANT	Operation mode	Bandwidth (MHz)		
		Low	Middle	High
ANT0	11b	10.092	10.092	10.092
	11g	16.617	16.617	16.617
	11n HT20	16.653	16.653	16.653
	11n HT40	35.560	35.560	35.560
ANT1	11b	10.092	10.092	10.092
	11g	16.567	16.567	16.567
	11n HT20	17.784	17.784	17.784
	11n HT40	36.230	36.230	36.230

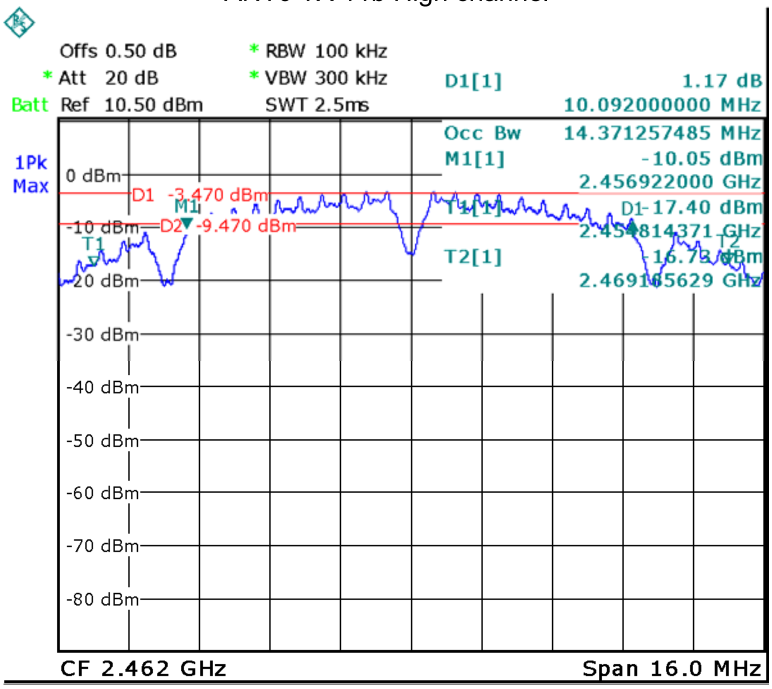
ANT0 TX 11b Low channel



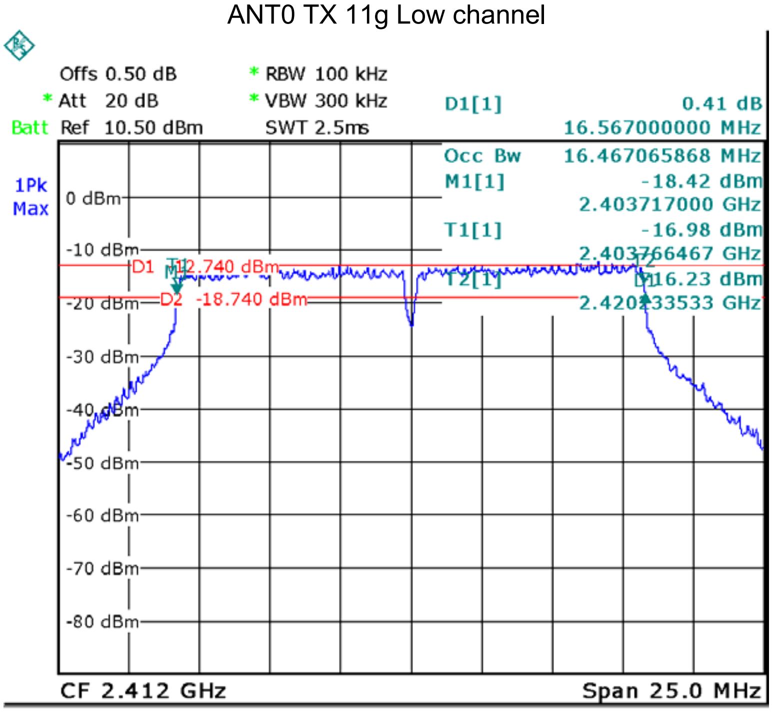
ANT0 TX 11b Middle channel



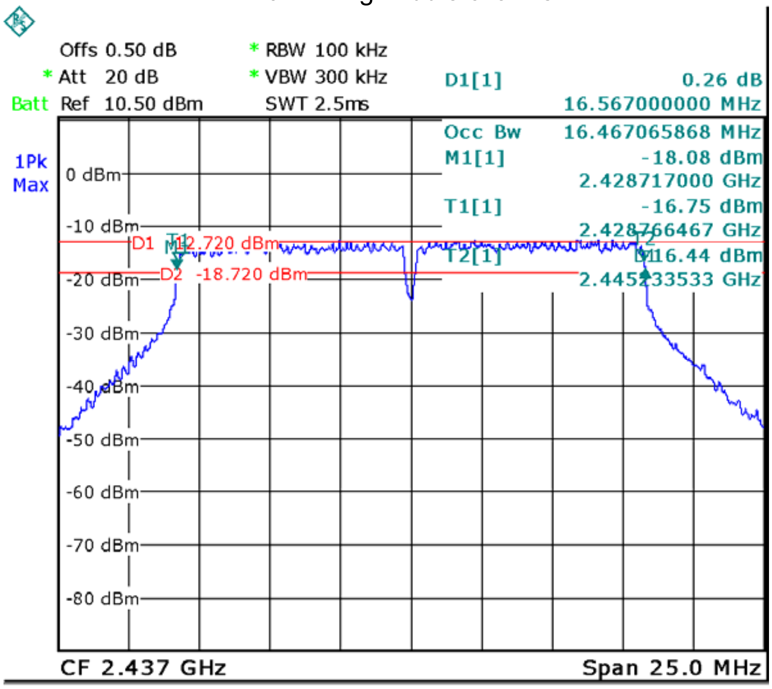
ANT0 TX 11b High channel



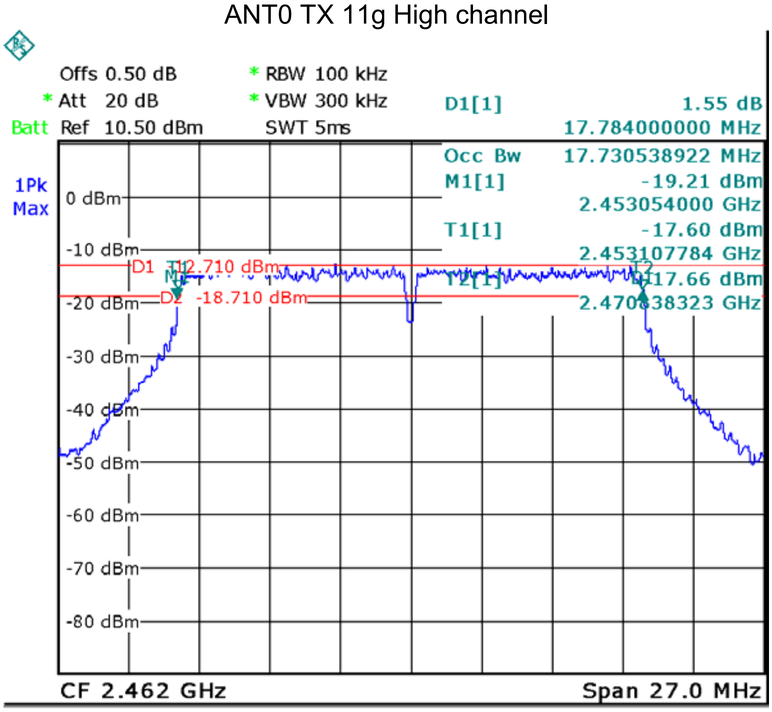
ANT0 TX 11g Low channel



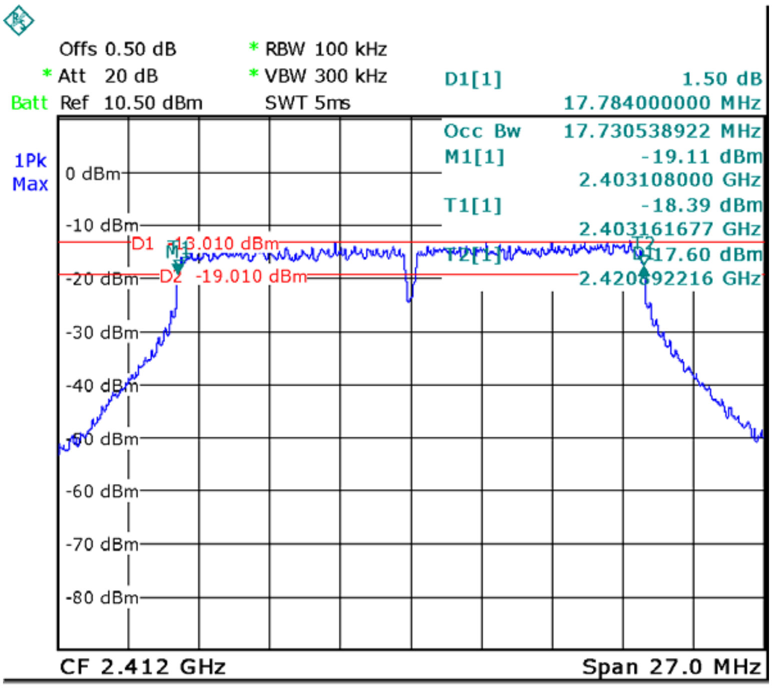
ANT0 TX 11g Middle channel



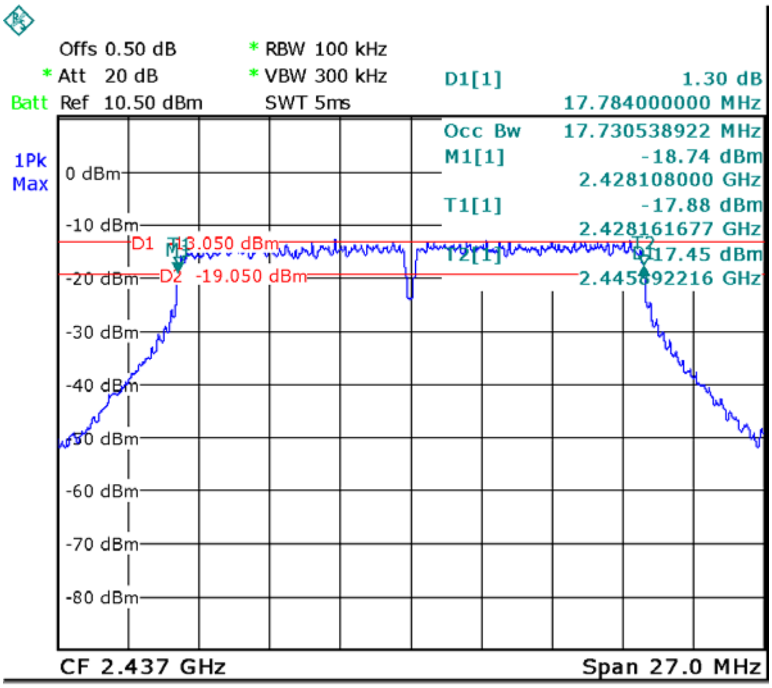
ANT0 TX 11g High channel



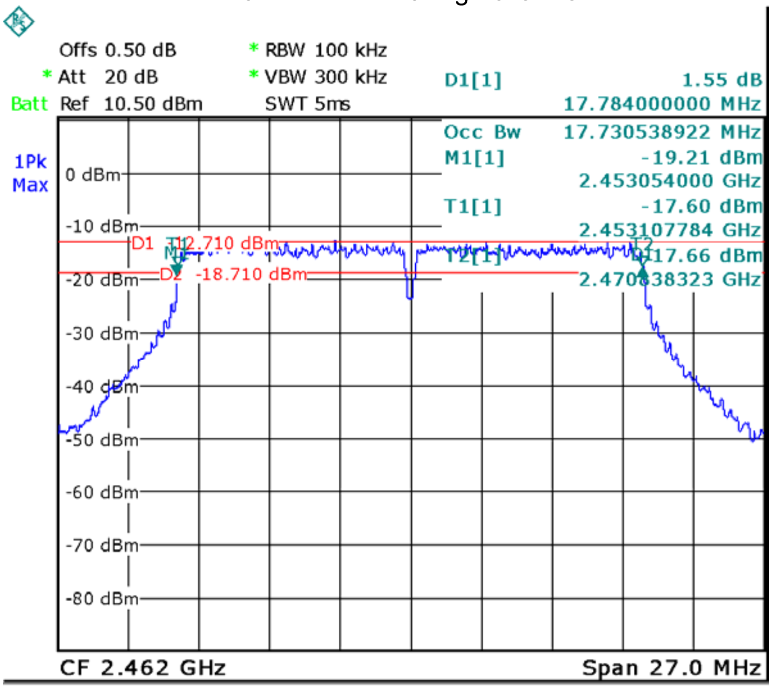
ANT0 TX 11n HT20 Low channel



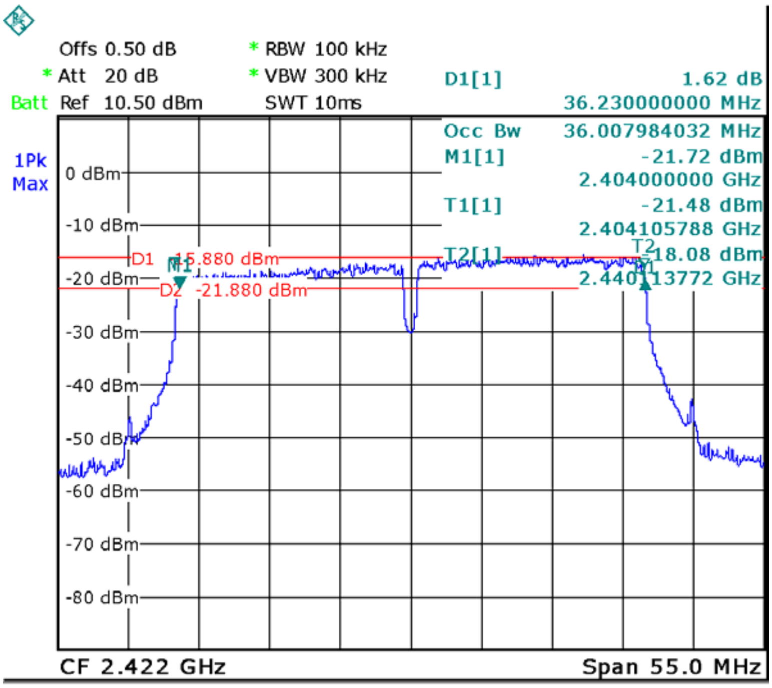
ANT0 TX 11n HT20 Middle channel



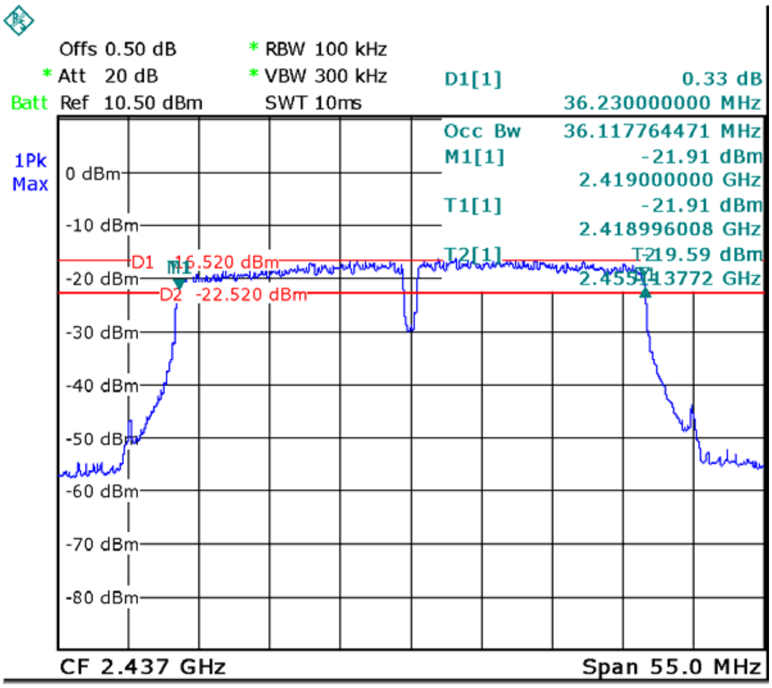
ANT0 TX 11n HT20 High channel



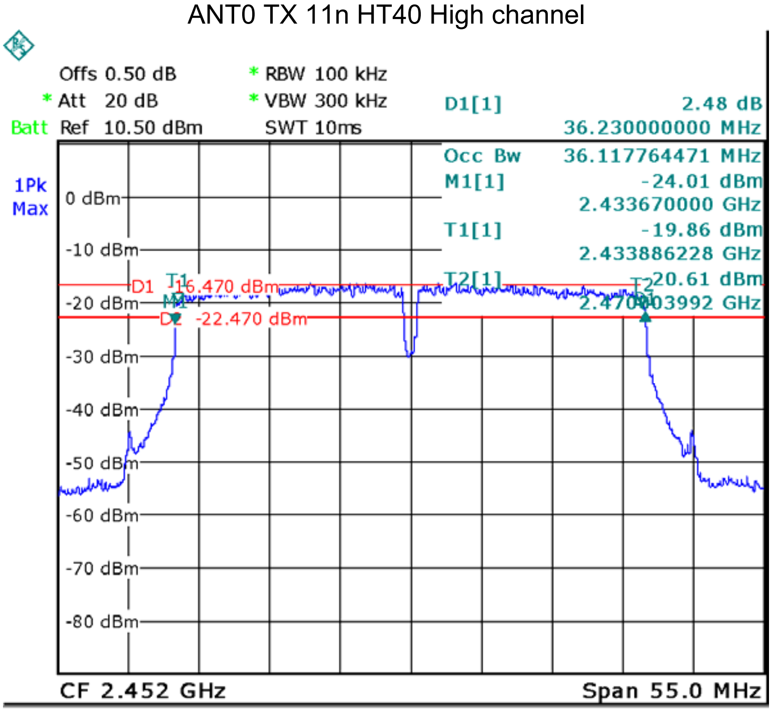
ANT0 TX 11n HT40 Low channel



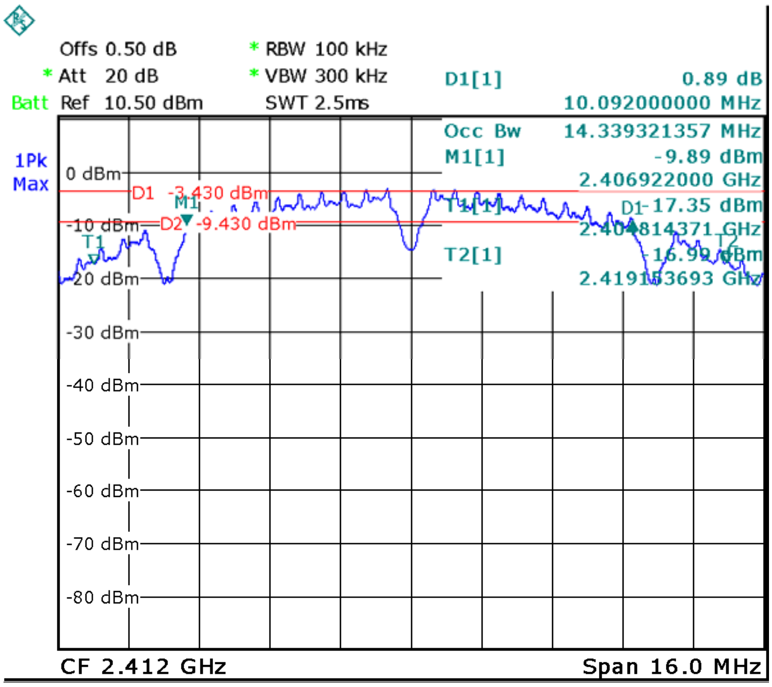
ANT0 TX 11n HT40 Middle channel



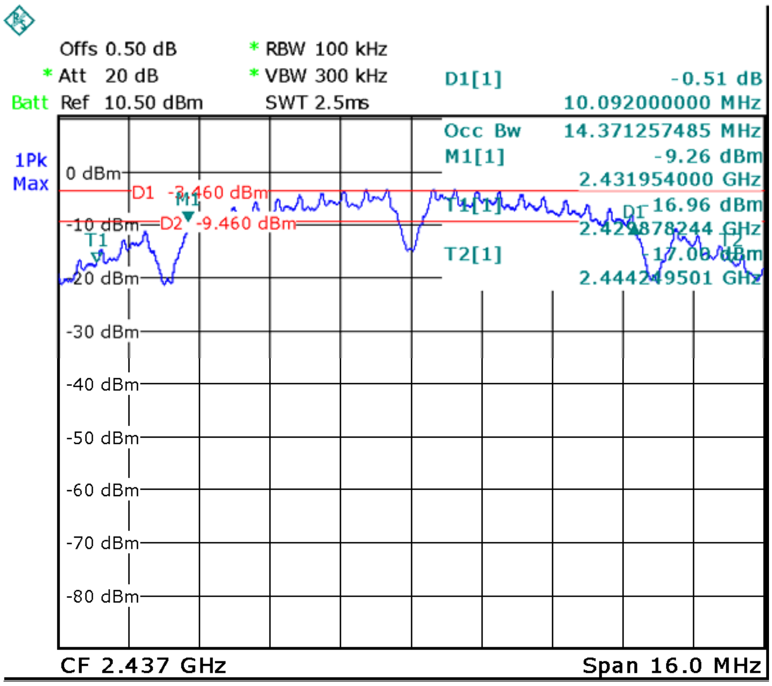
ANT0 TX 11n HT40 High channel



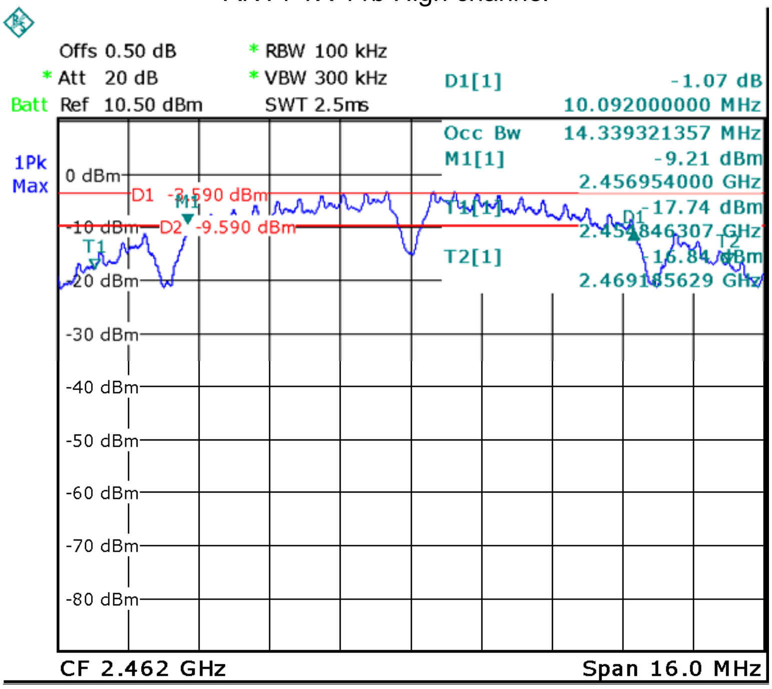
ANT1 TX 11b Low channel



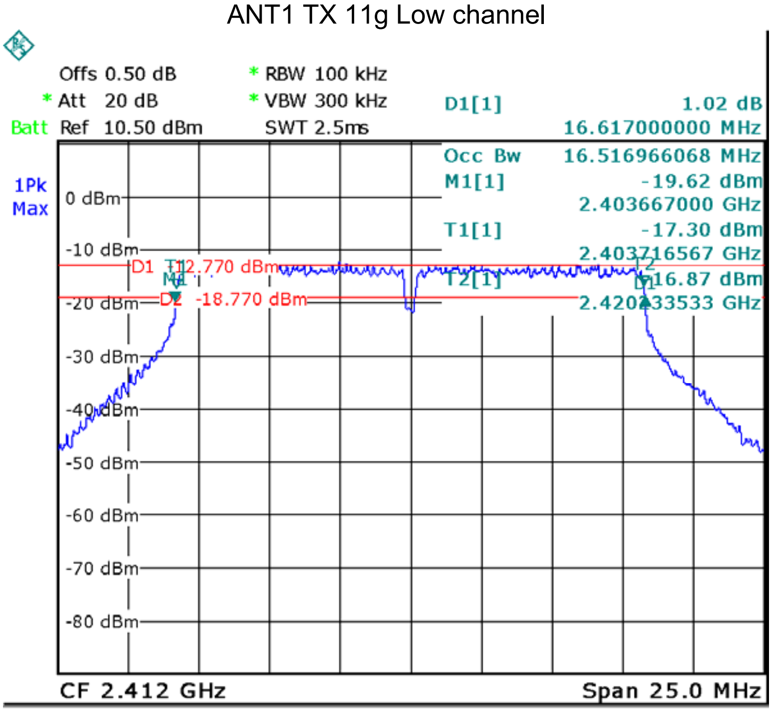
ANT1 TX 11b Middle channel



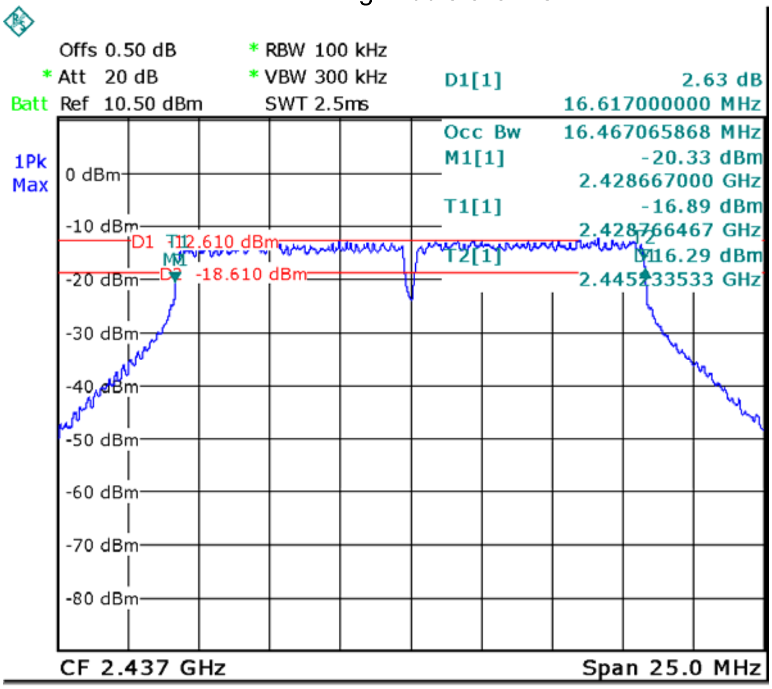
ANT1 TX 11b High channel



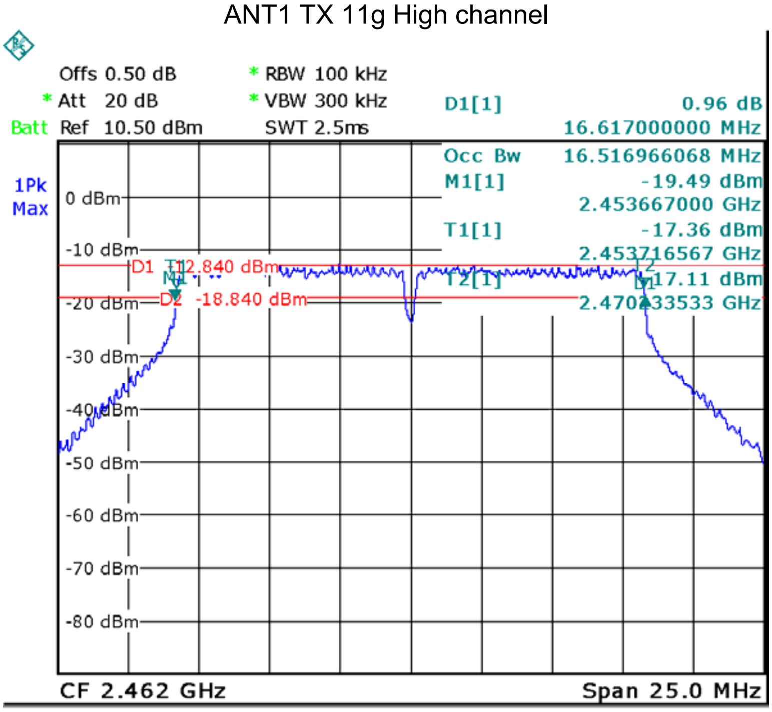
ANT1 TX 11g Low channel



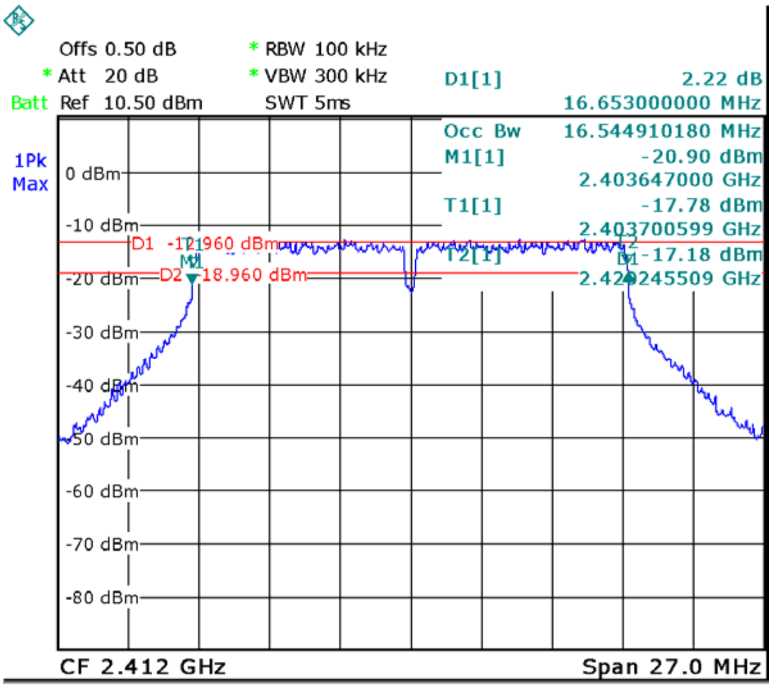
ANT1 TX 11g Middle channel



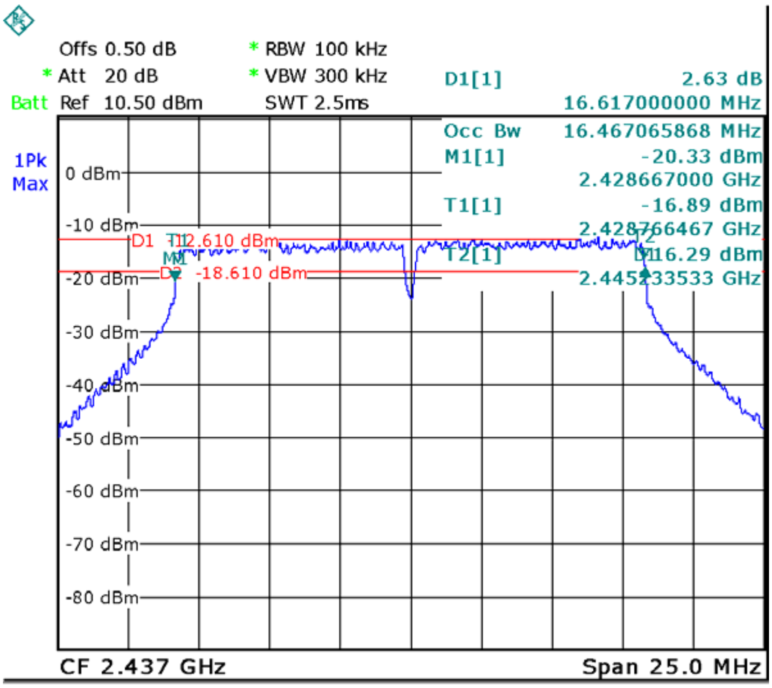
ANT1 TX 11g High channel



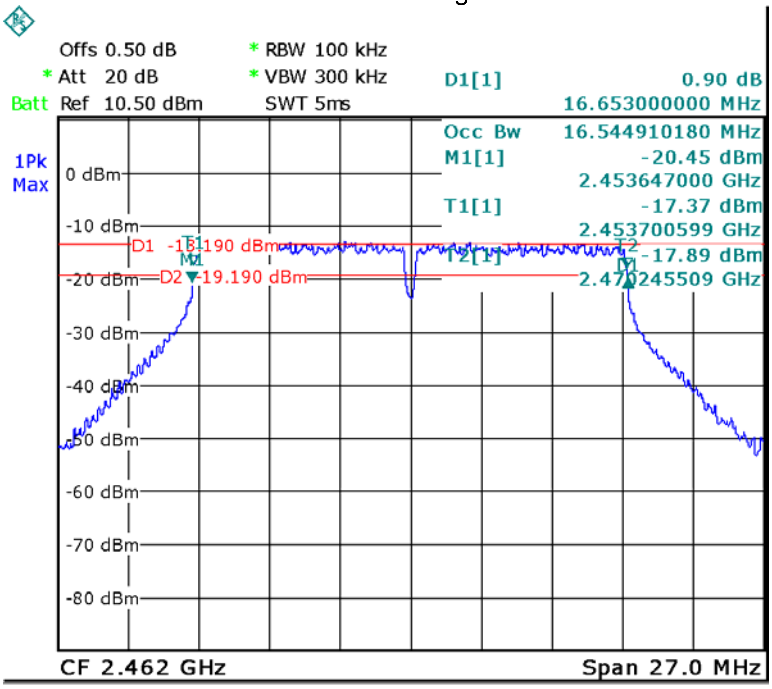
ANT1 TX 11n HT20 Low channel



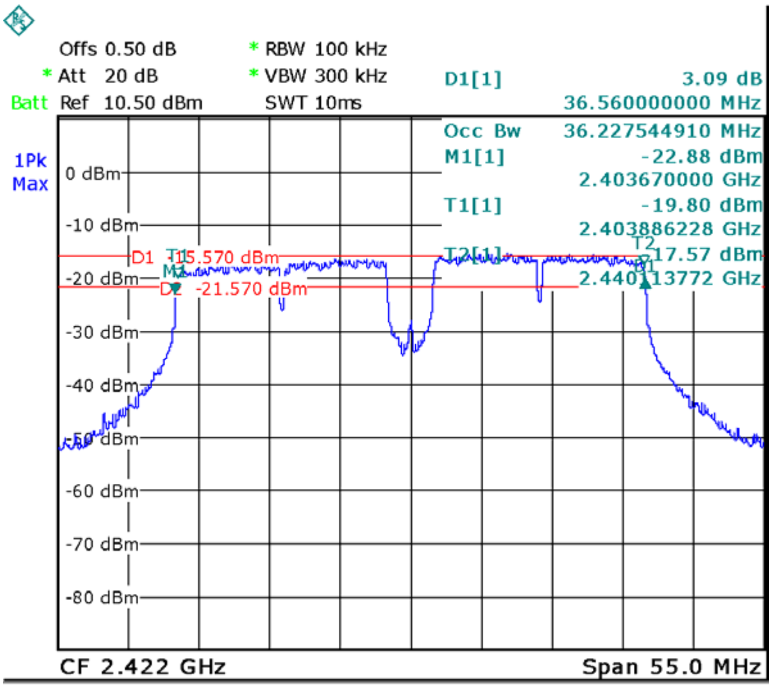
ANT1 TX 11n HT20 Middle channel



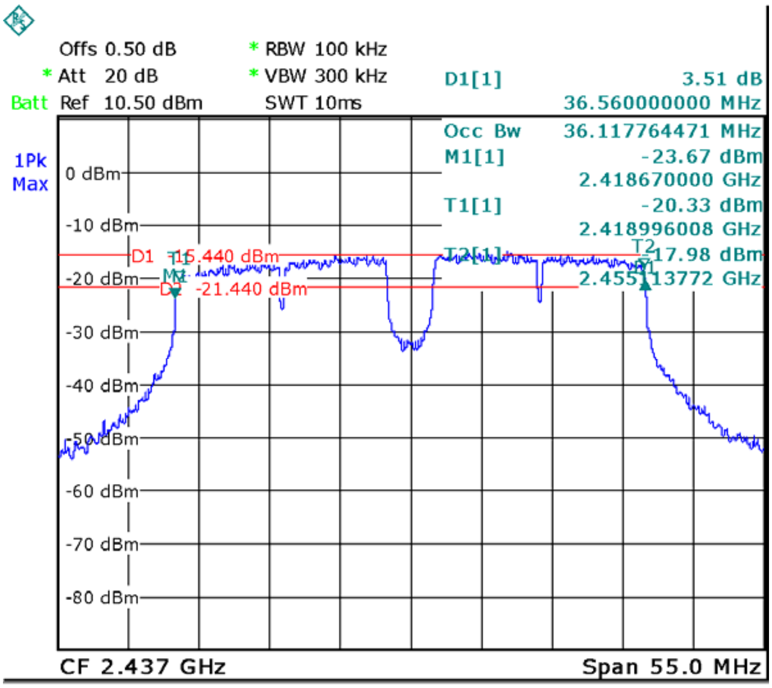
ANT1 TX 11n HT20 High channel



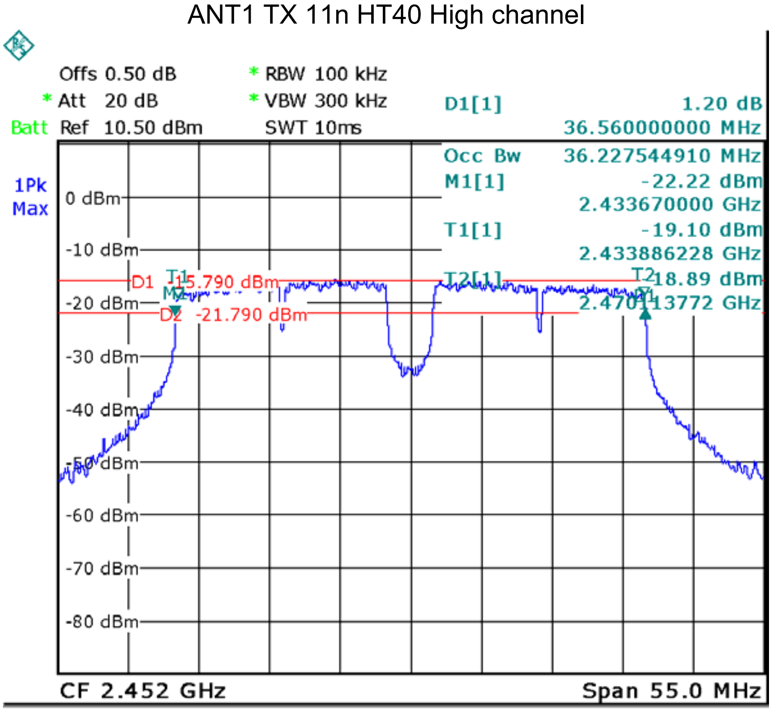
ANT1 TX 11n HT40 Low channel



ANT1 TX 11n HT40 Middle channel



ANT1 TX 11n HT40 High channel



10 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

10.1 Test Procedure:

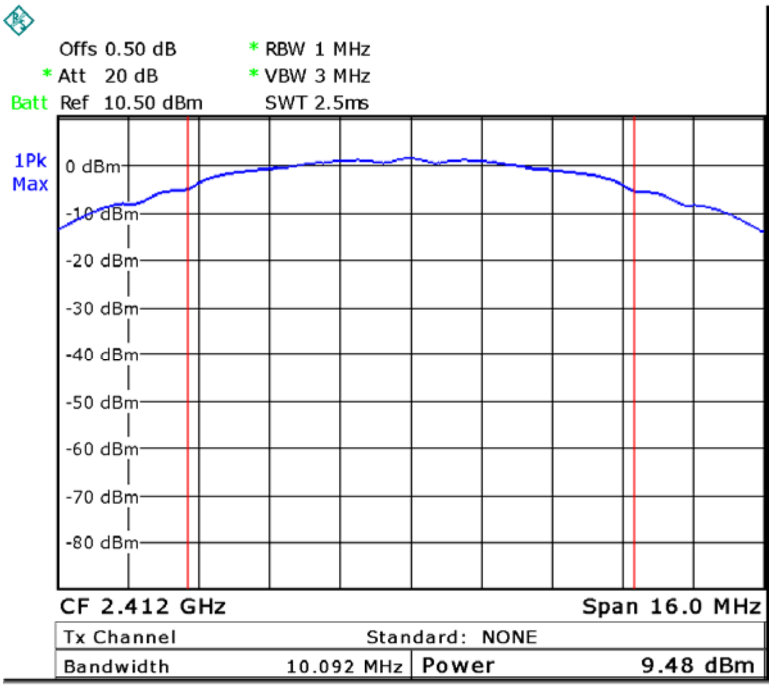
KDB558074 D01 DTS Meas Guidance v03r05 section 9.1.2

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz. VBW = 3 MHz. Sweep = auto; Detector Function = Peak, Set the span to fully encompass the DTS bandwidth.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

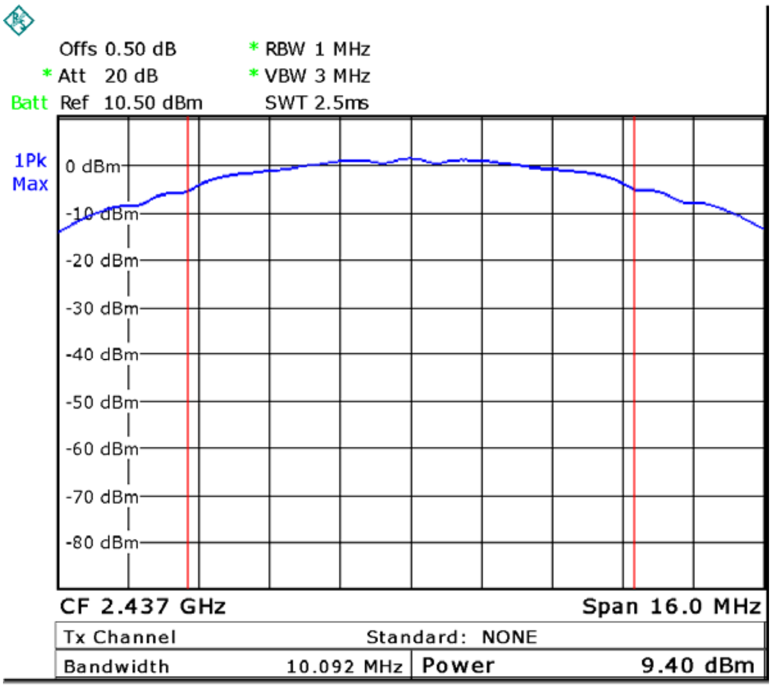
10.2 Test Result:

Operation mode	ANT	Maximum Peak Output Power (dBm)		
		Low	Middle	High
11b	ANT0	9.48	9.4	9.41
	ANT1	9.36	9.37	9.31
11g	ANT0	9.3	9.16	9.25
	ANT1	9.2	9.25	9.45
11n HT20	ANT0	9.48	9.19	9.18
	ANT1	9.03	9.3	9.31
	ANT0+ANT1	**12.27**	12.26	12.26
11n HT40	ANT0	9.43	9.21	9.07
	ANT1	9.01	9.12	9.11
	ANT0+ANT1	12.24	12.18	12.10
Limit				
1W/30dBm				

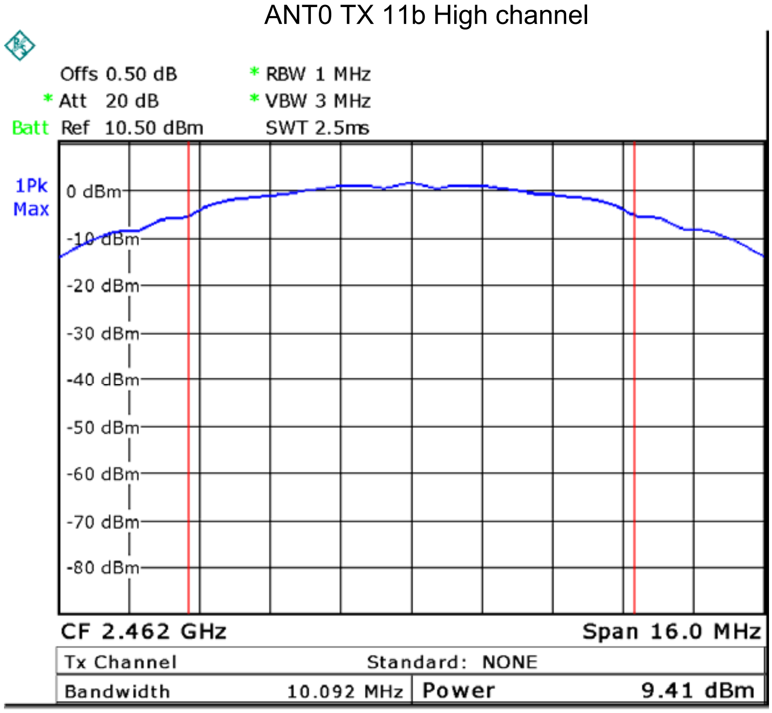
ANT0 TX 11b Low channel



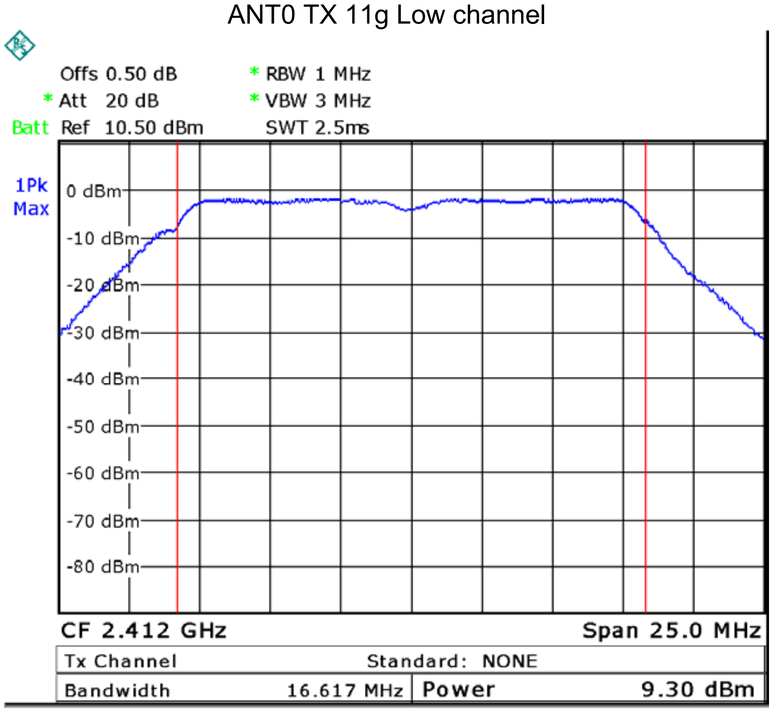
ANT0 TX 11b Middle channel



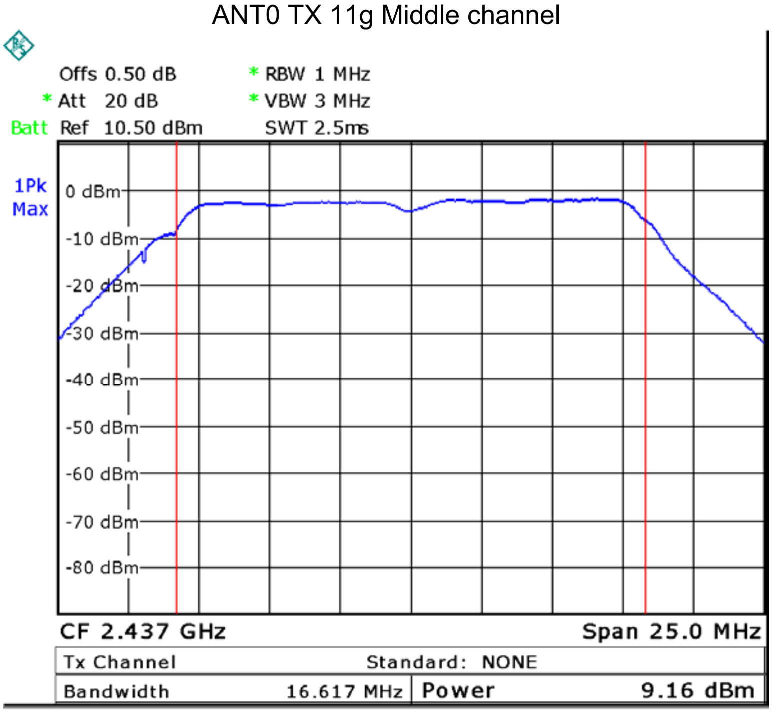
ANT0 TX 11b High channel



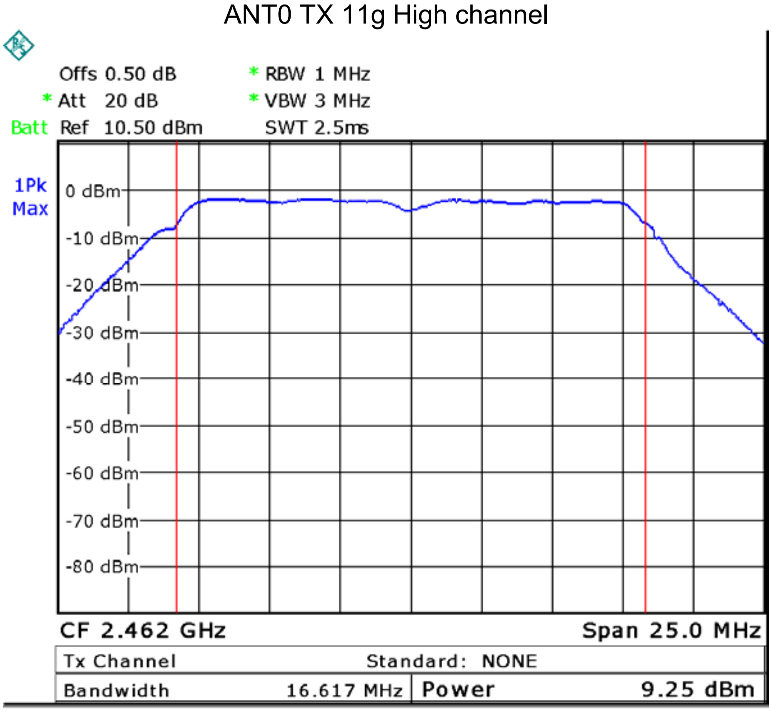
ANT0 TX 11g Low channel



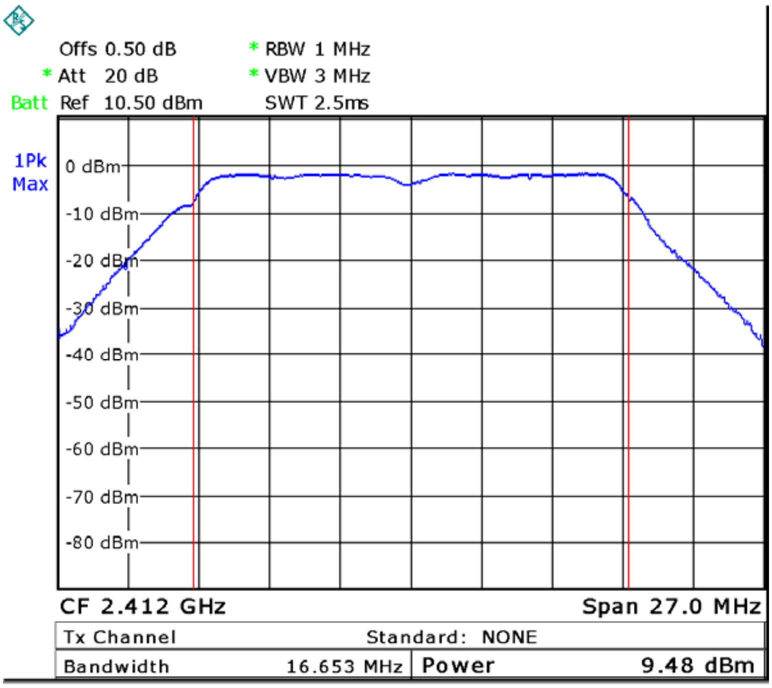
ANT0 TX 11g Middle channel



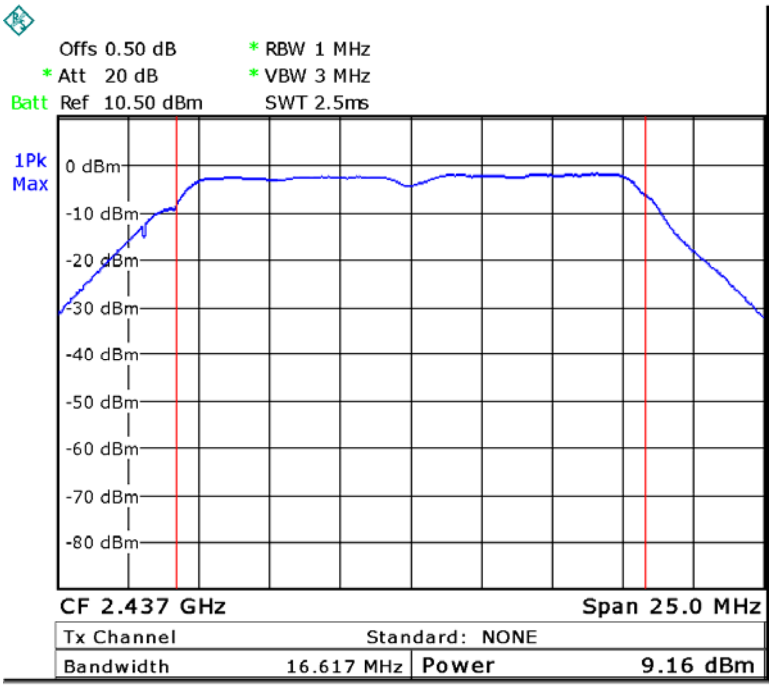
ANT0 TX 11g High channel



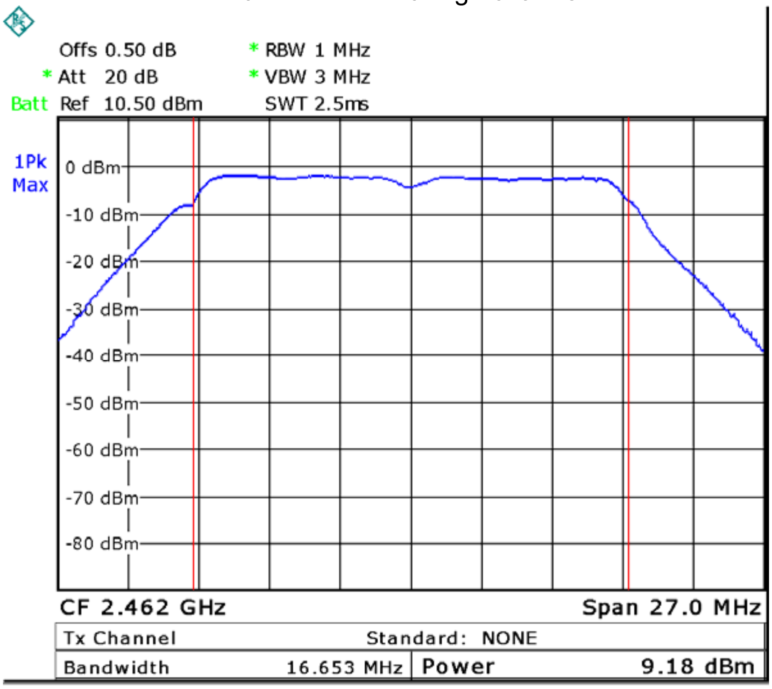
ANT0 TX 11n HT20 Low channel



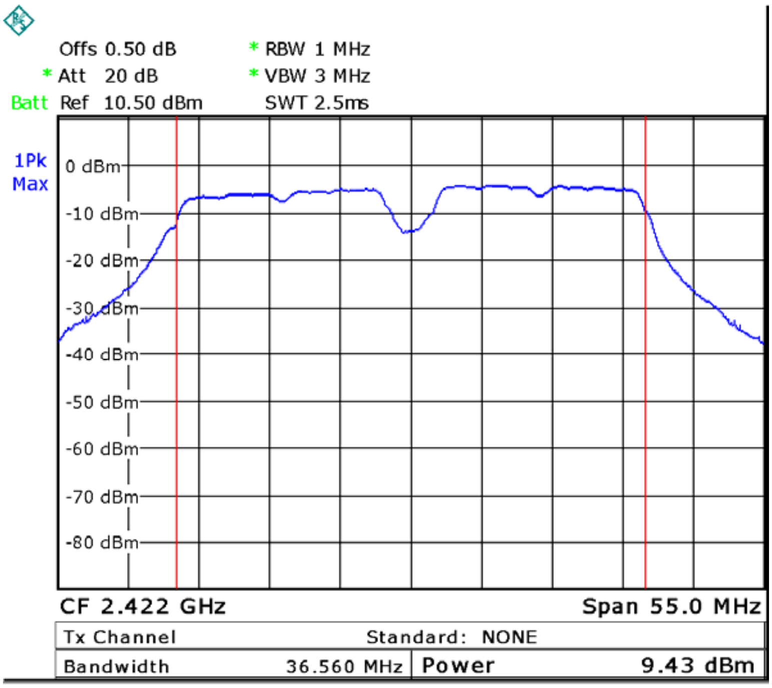
ANT0 TX 11n HT20 Middle channel



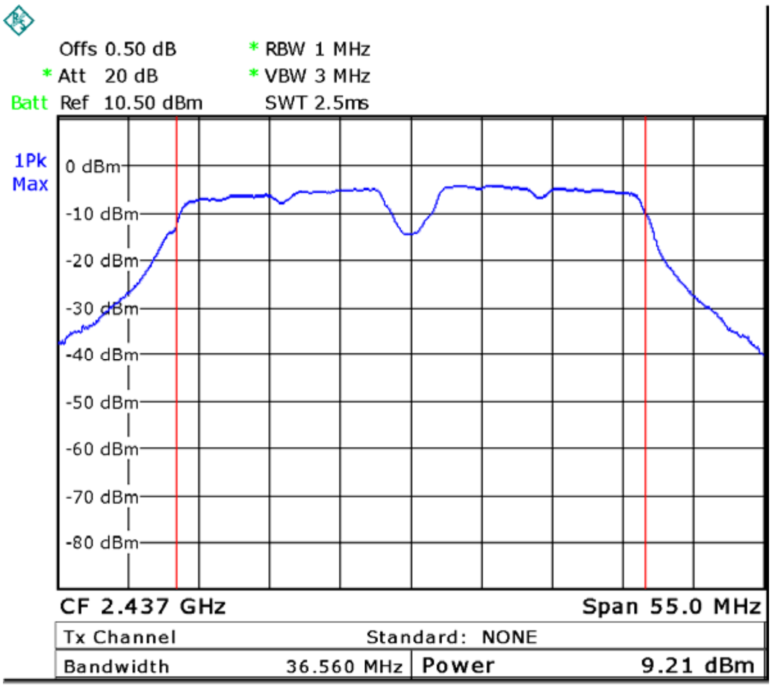
ANT0 TX 11n HT20 High channel



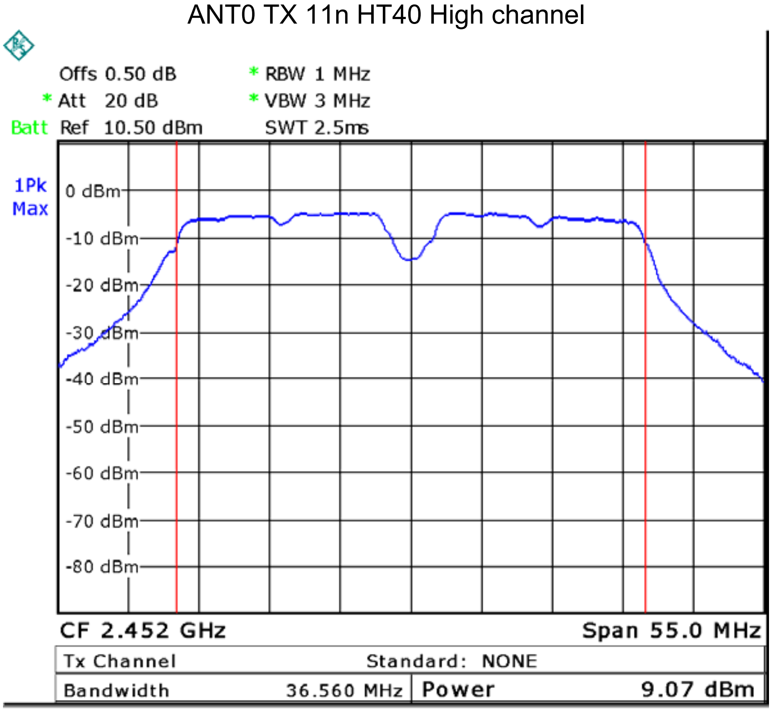
ANT0 TX 11n HT40 Low channel



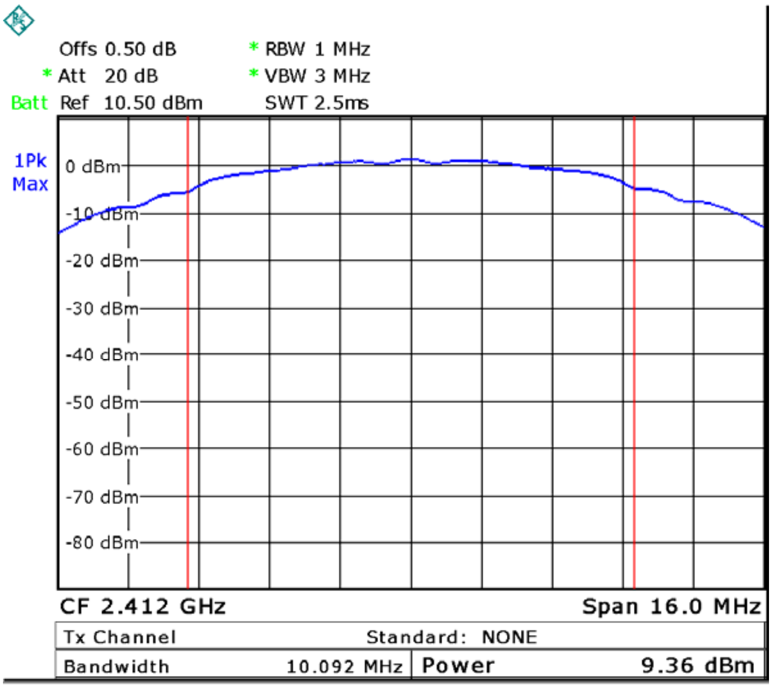
ANT0 TX 11n HT40 Middle channel



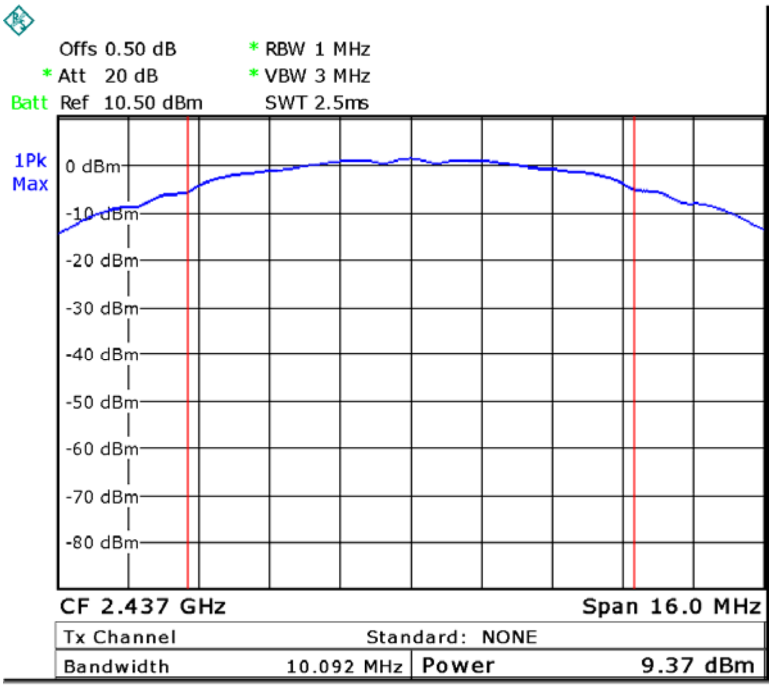
ANT0 TX 11n HT40 High channel



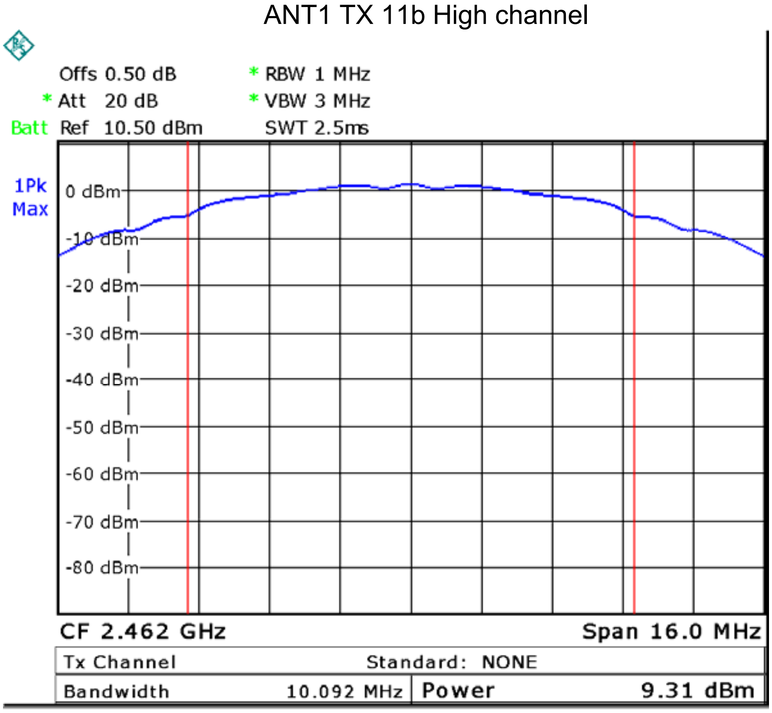
ANT1 TX 11b Low channel



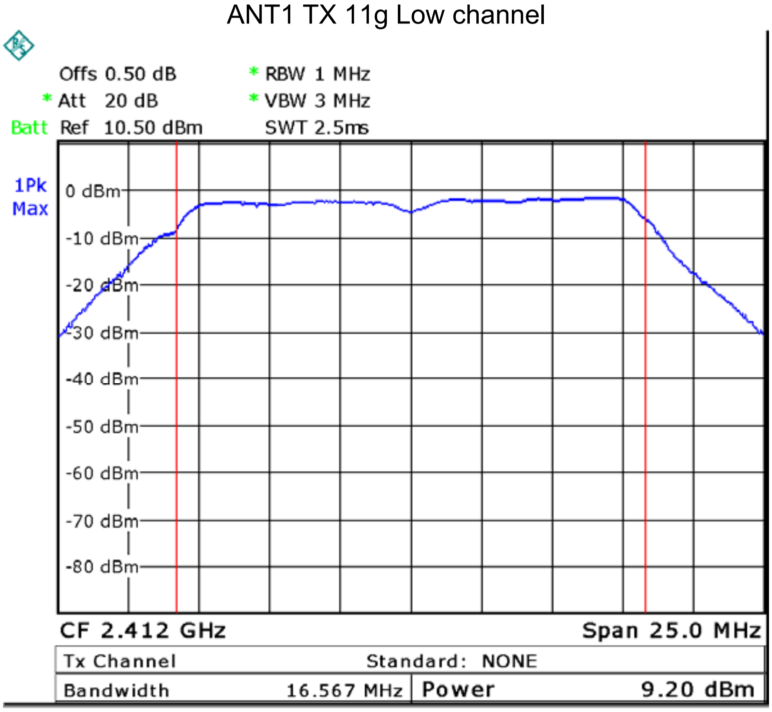
ANT1 TX 11b Middle channel



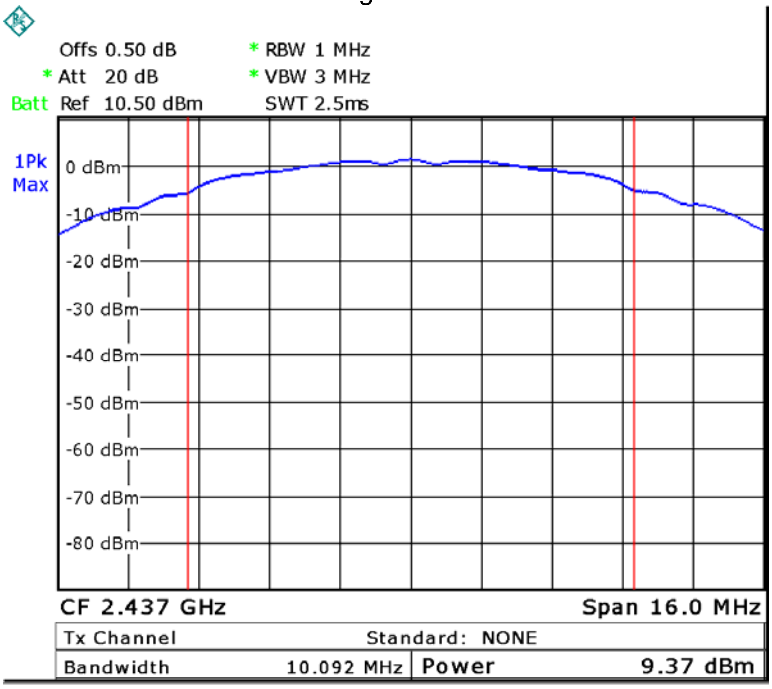
ANT1 TX 11b High channel



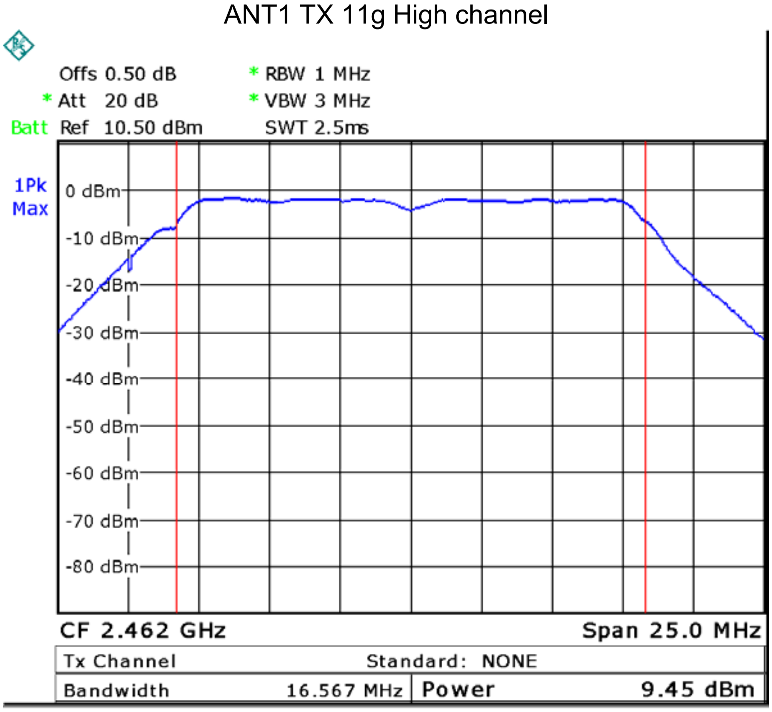
ANT1 TX 11g Low channel



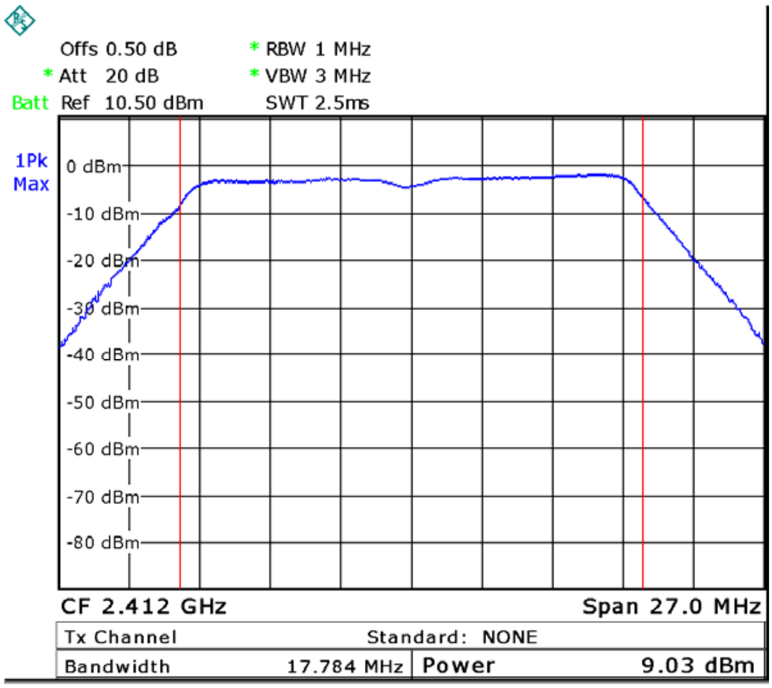
ANT1 TX 11g Middle channel



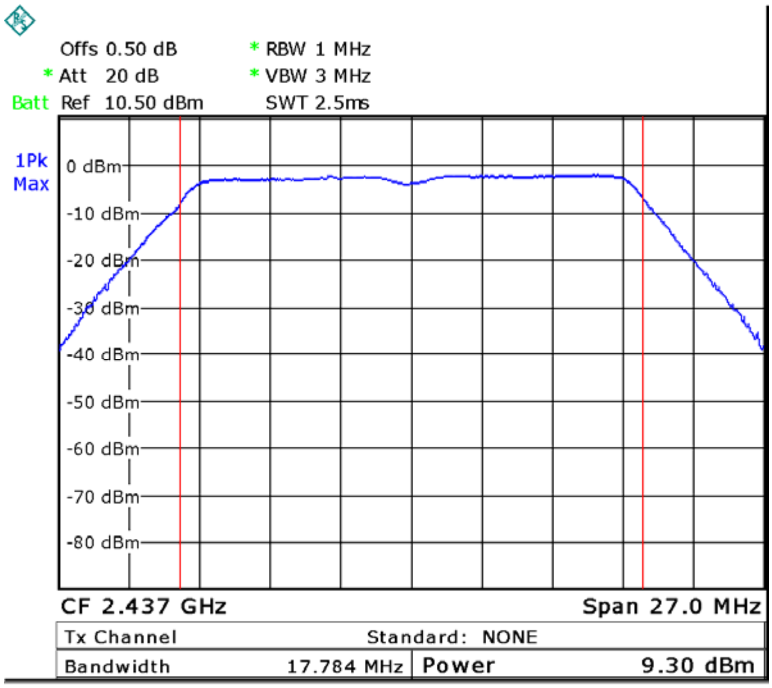
ANT1 TX 11g High channel



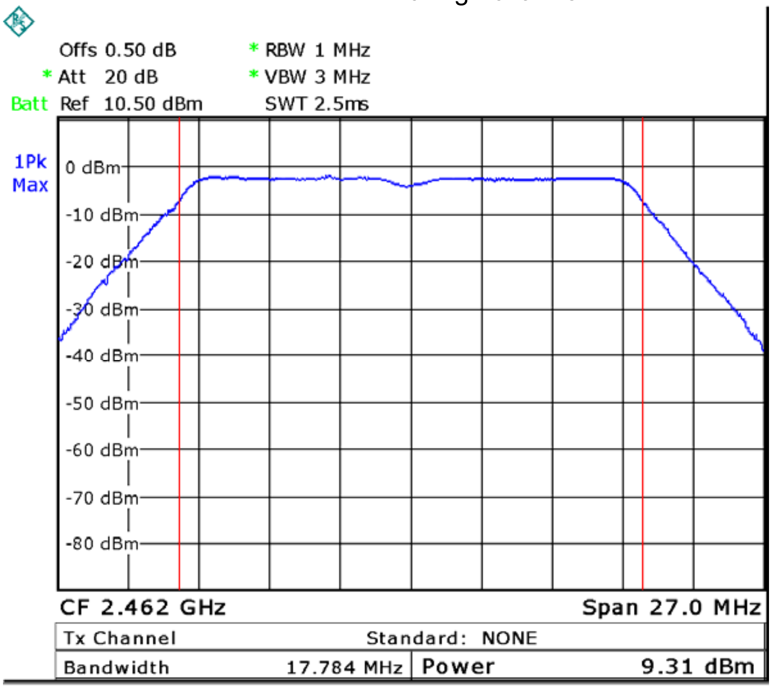
ANT1 TX 11n HT20 Low channel



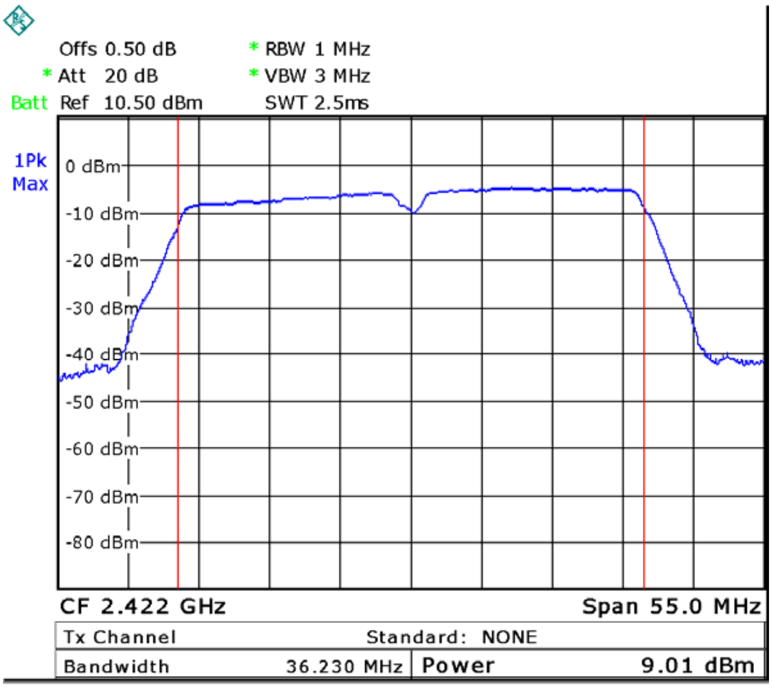
ANT1 TX 11n HT20 Middle channel



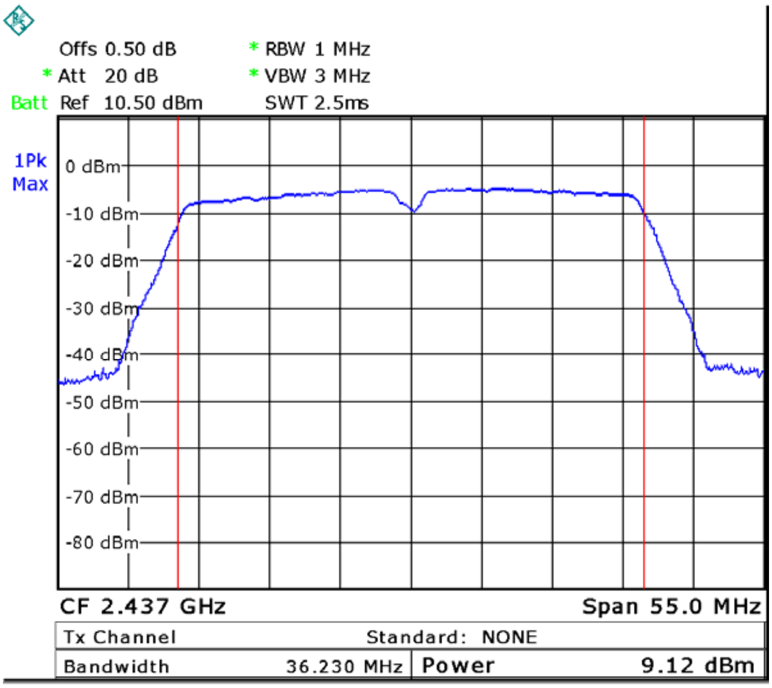
ANT1 TX 11n HT20 High channel



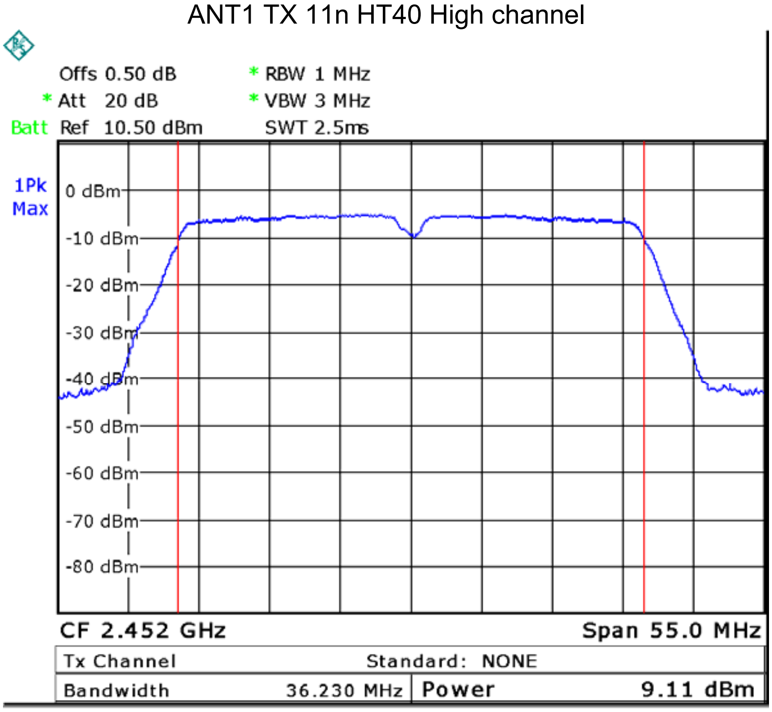
ANT1 TX 11n HT40 Low channel



ANT1 TX 11n HT40 Middle channel



ANT1 TX 11n HT40 High channel



11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 DTS Meas Guidance v03r05

11.1 Test Procedure:

KDB558074 D01 DTS Meas Guidance v03r05 section 10.2

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.

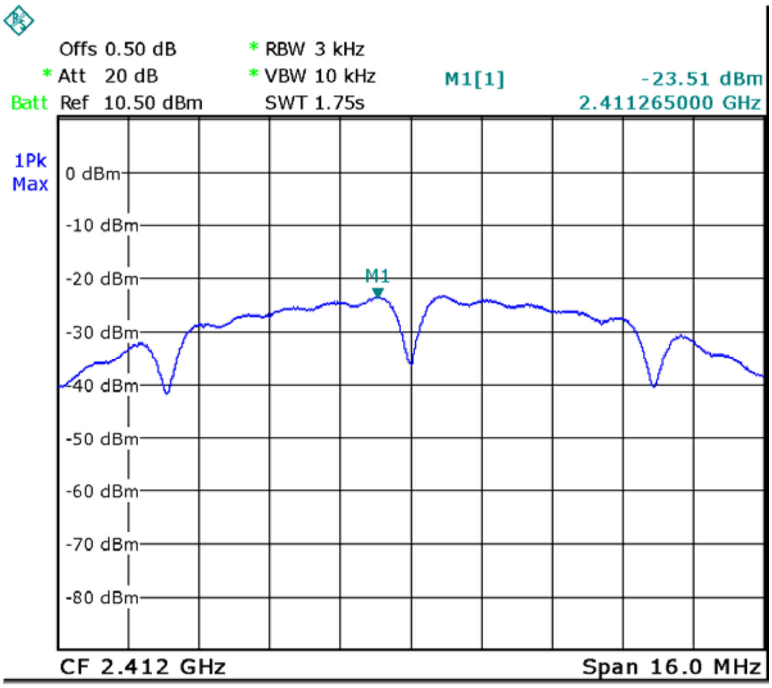
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

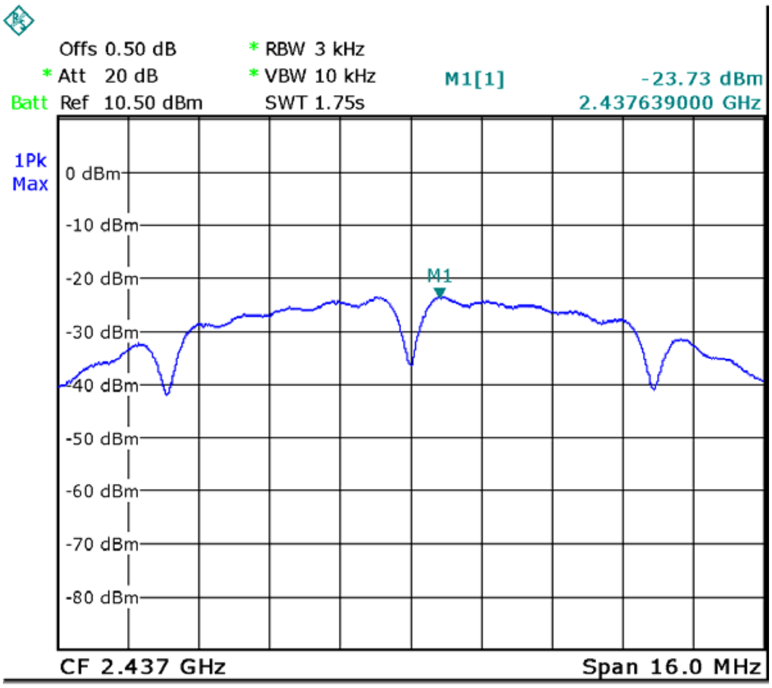
11.2 Test Result:

Operation mode	ANT	Maximum Peak Output Power (dBm per 3kHz)		
		Low	Middle	High
11b	ANT0	-23.31	-23.71	-23.59
	ANT1	-23.51	-23.73	-23.56
11g	ANT0	-26.91	-27.09	-27.03
	ANT1	26.97	-27.02	-26.69
11n HT20	ANT0	-27.48	-27.33	-27.54
	ANT1	-27.19	-27.44	-26.72
	ANT0+ANT1	-24.32	-24.37	-24.10
11n HT40	ANT0	-29.9	-29.51	-29.93
	ANT1	-29.56	-29.35	-28.98
	ANT0+ANT1	-26.72	-26.42	-26.42
Limit				
(8 dBm per 3kHz)				

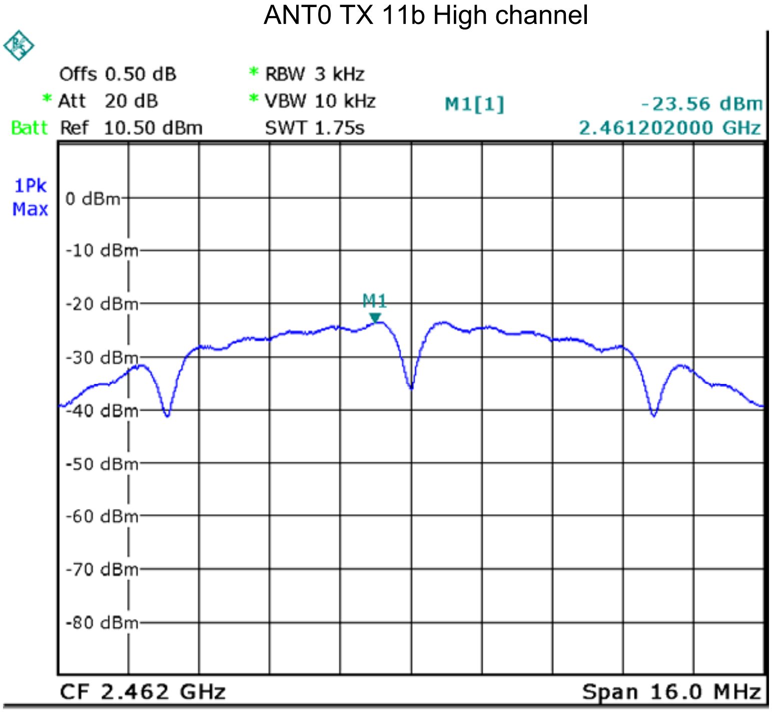
ANT0 TX 11b Low channel



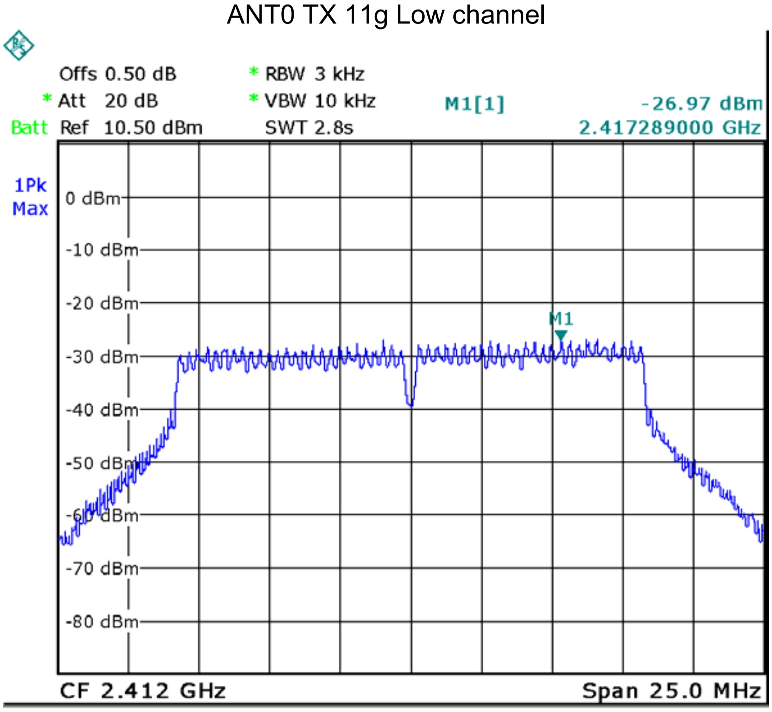
ANT0 TX 11b Middle channel



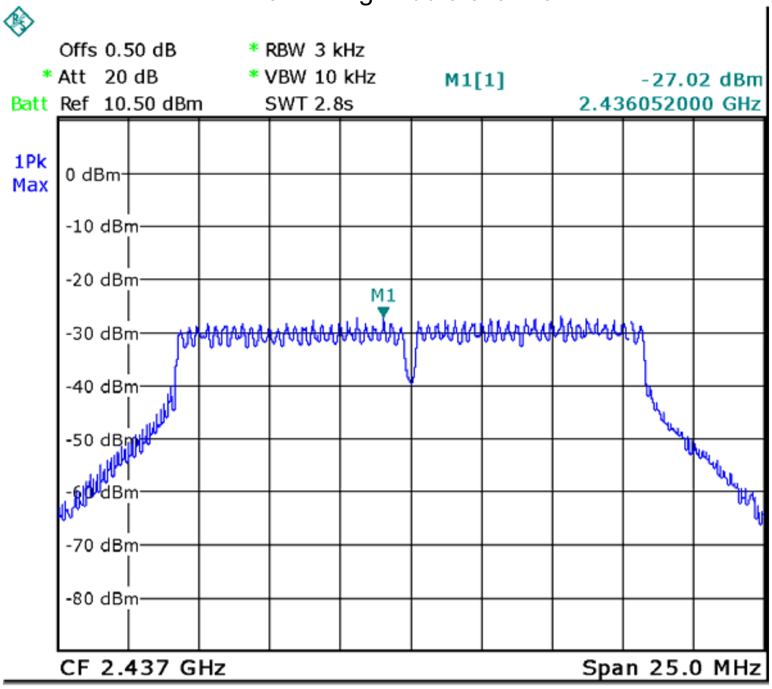
ANT0 TX 11b High channel



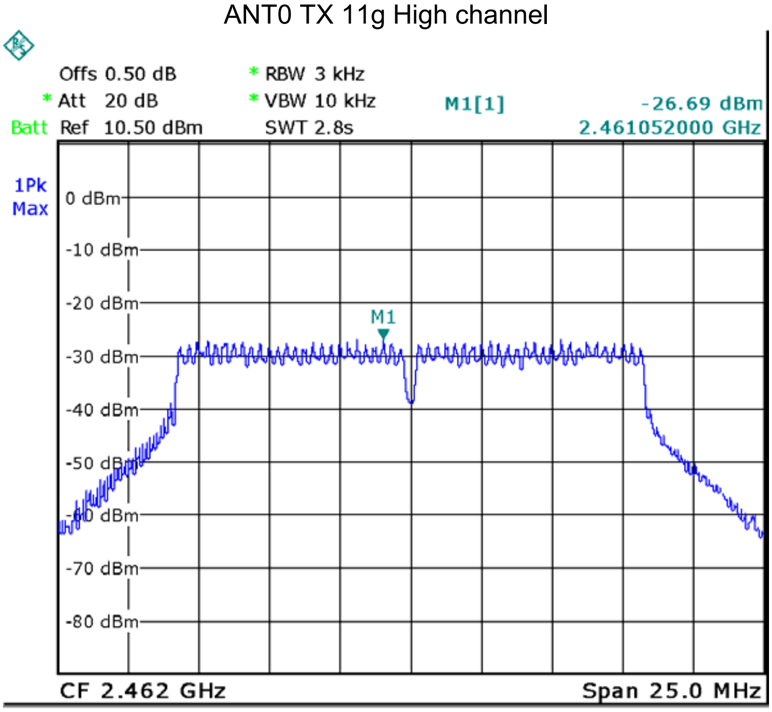
ANT0 TX 11g Low channel



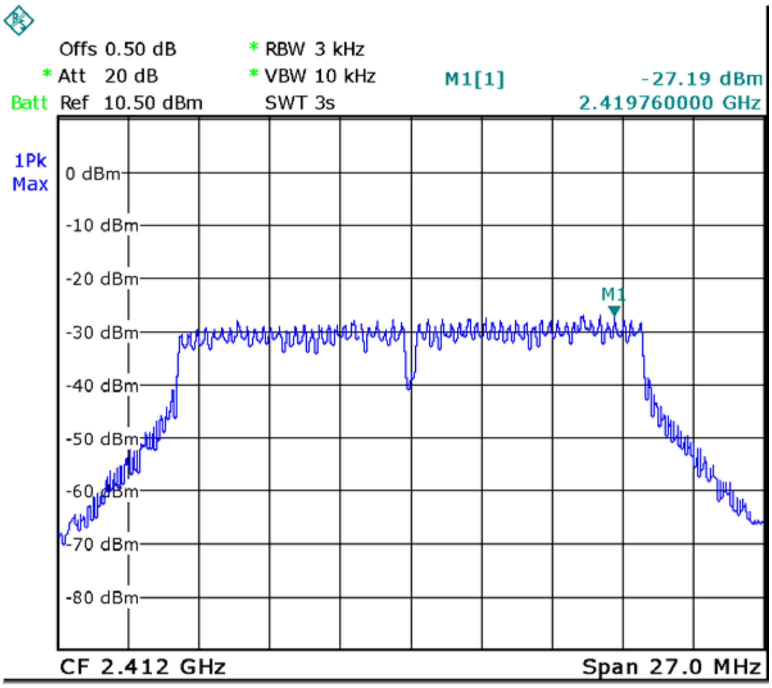
ANT0 TX 11g Middle channel



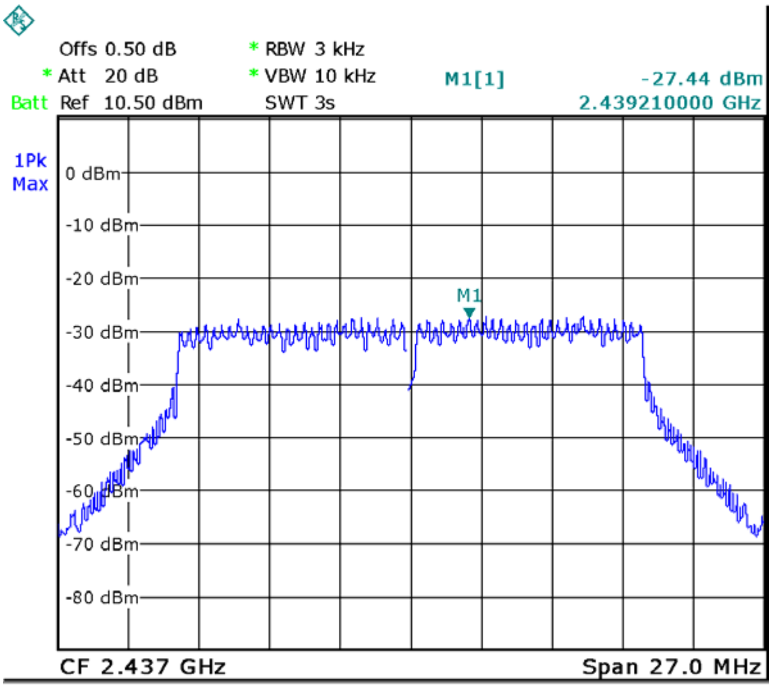
ANT0 TX 11g High channel



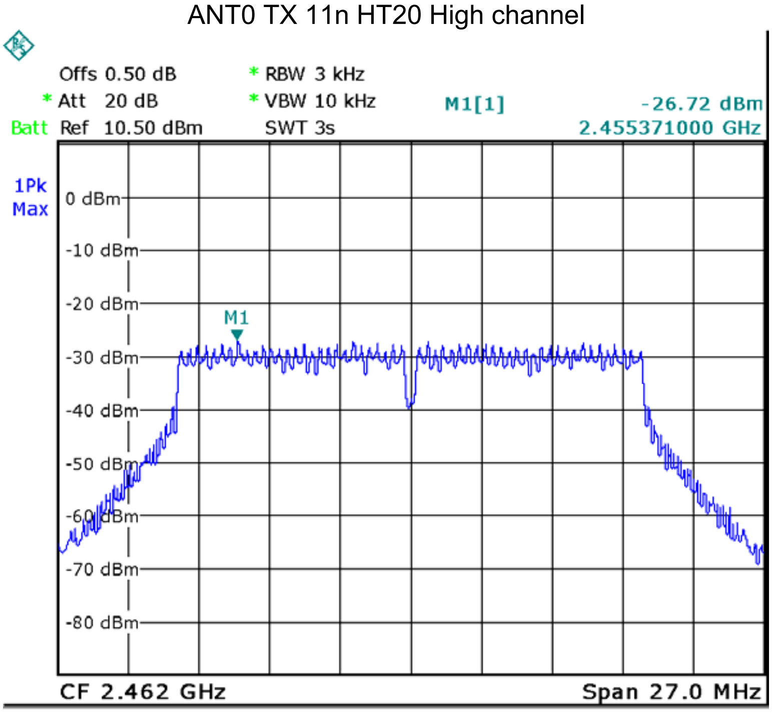
ANT0 TX 11n HT20 Low channel



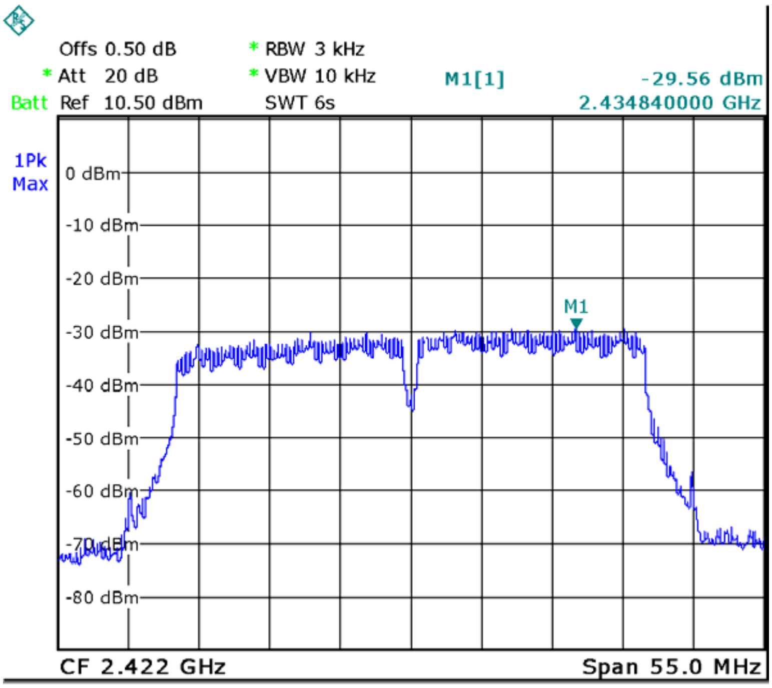
ANT0 TX 11n HT20 Middle channel



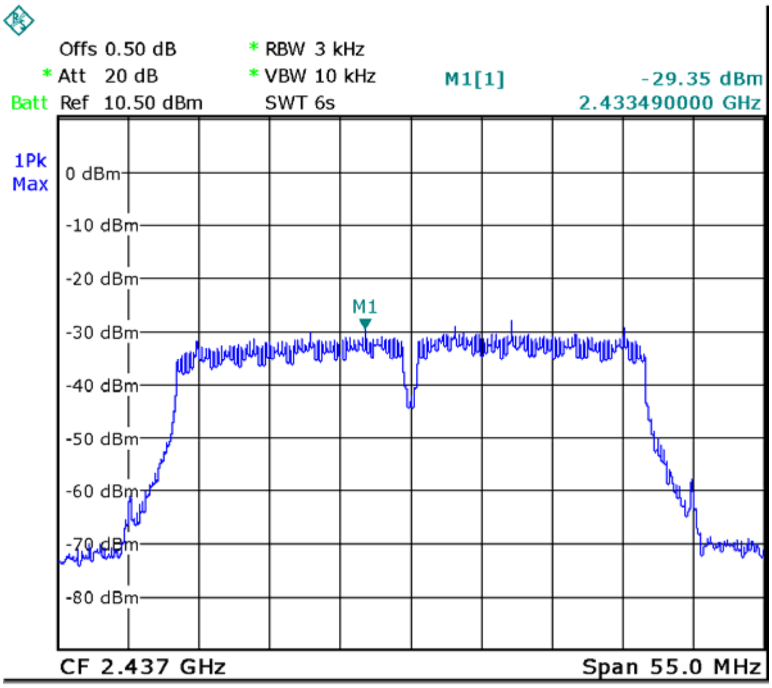
ANT0 TX 11n HT20 High channel



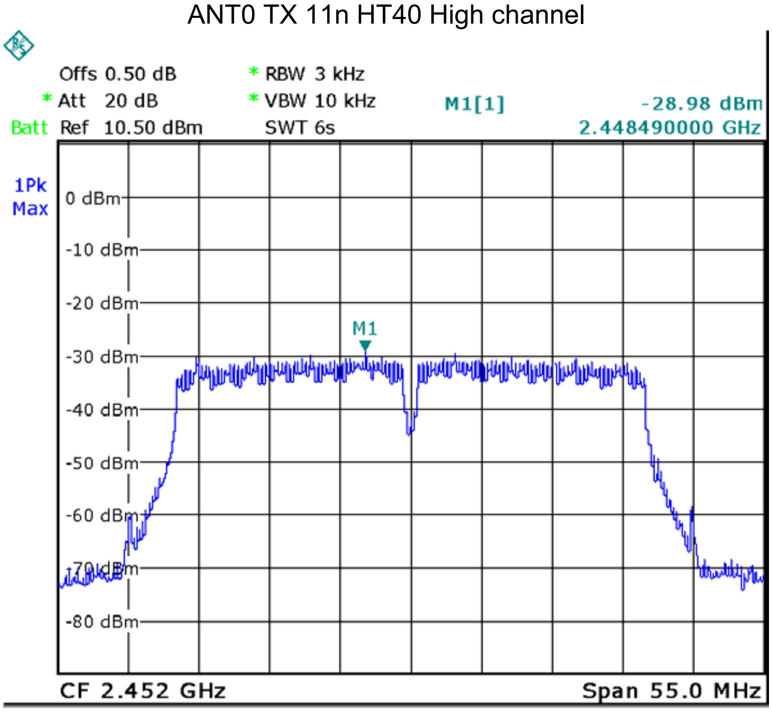
ANT0 TX 11n HT40 Low channel



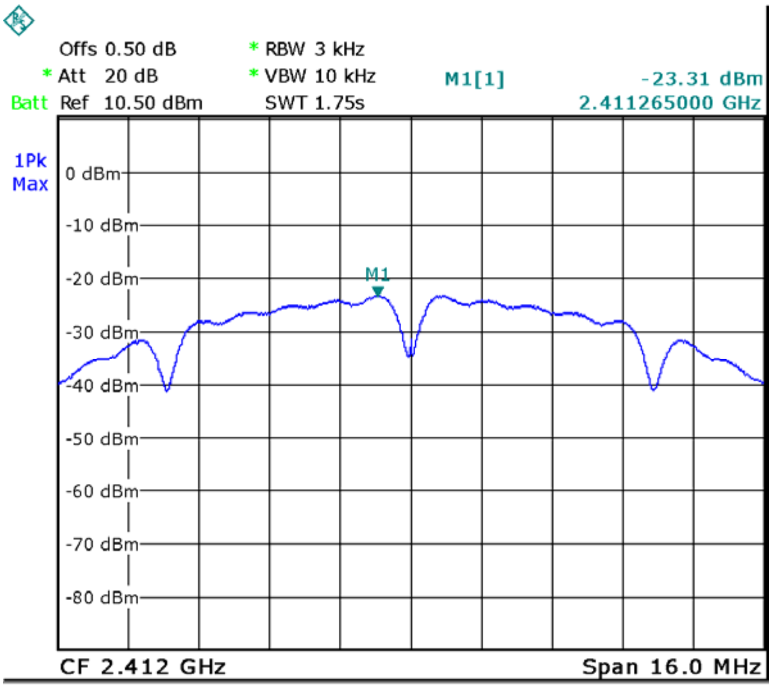
ANT0 TX 11n HT40 Middle channel



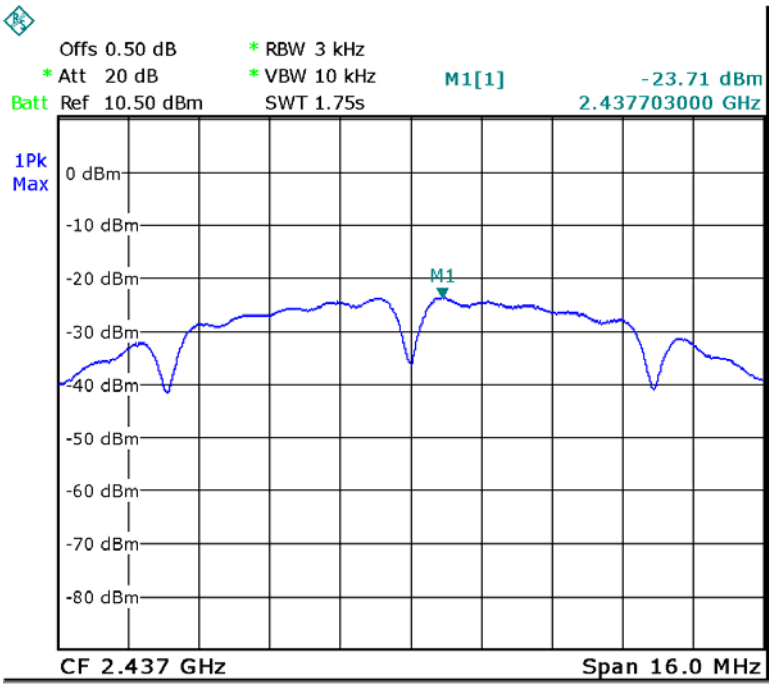
ANT0 TX 11n HT40 High channel



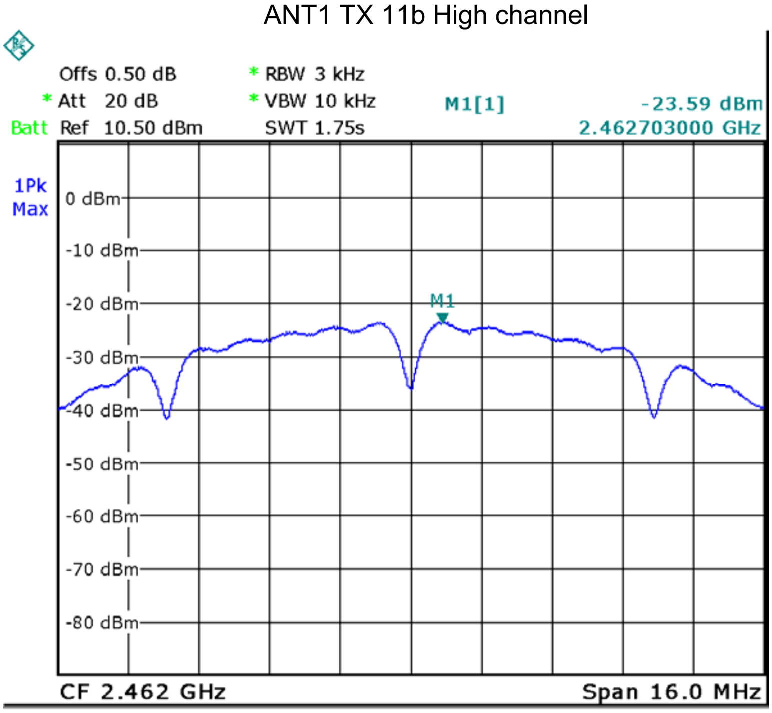
ANT1 TX 11b Low channel



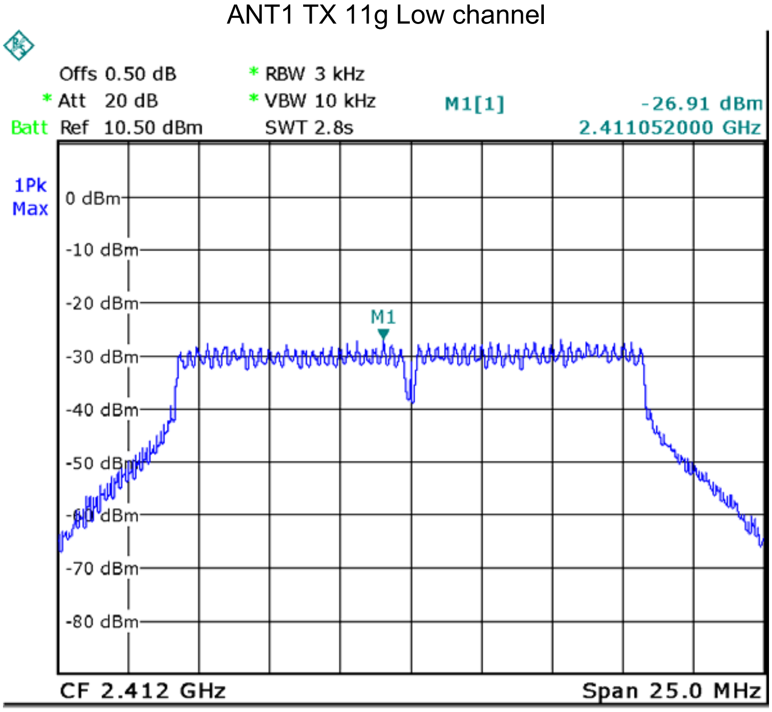
ANT1 TX 11b Middle channel



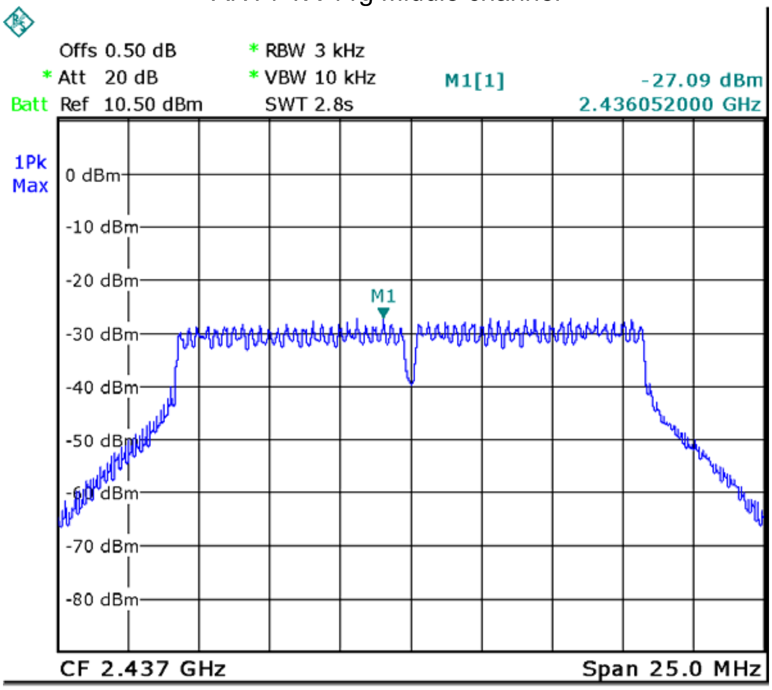
ANT1 TX 11b High channel



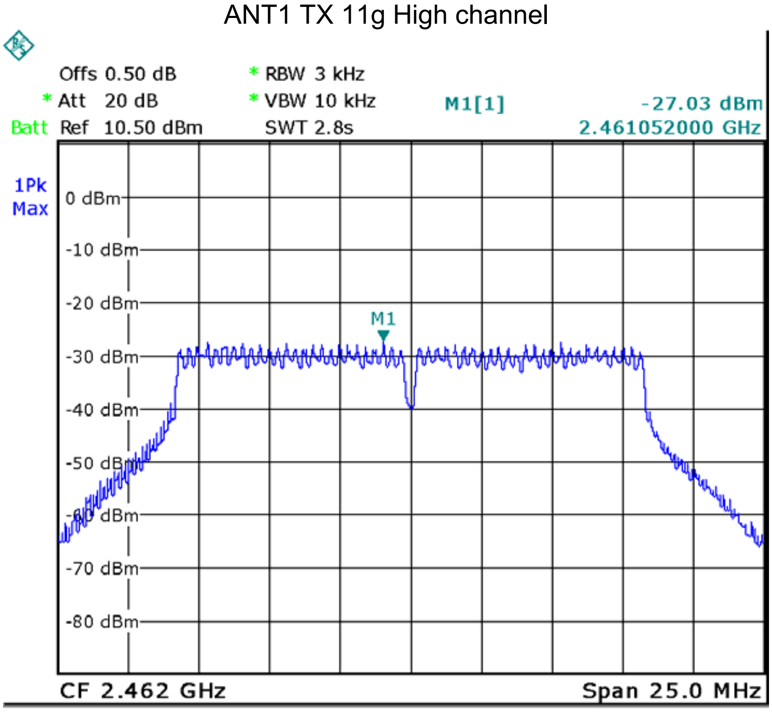
ANT1 TX 11g Low channel



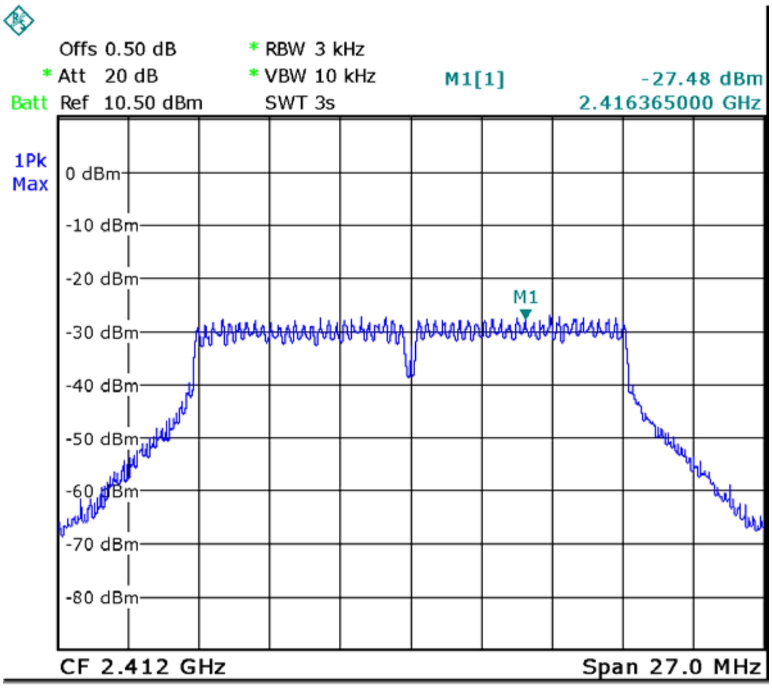
ANT1 TX 11g Middle channel



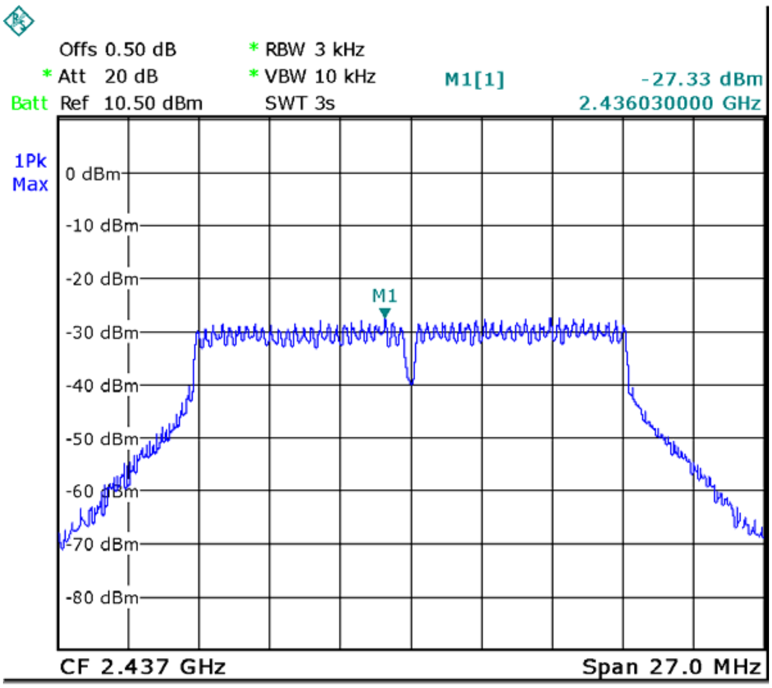
ANT1 TX 11g High channel



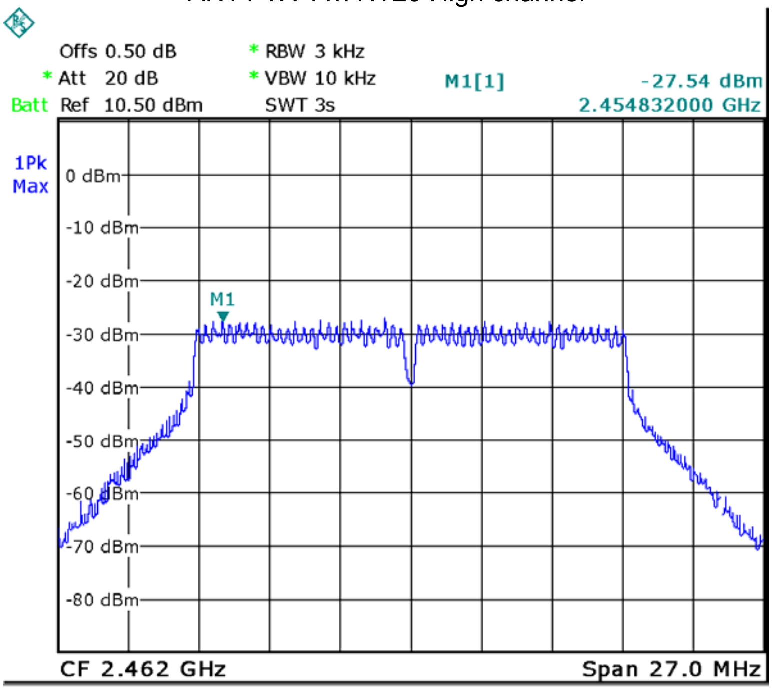
ANT1 TX 11n HT20 Low channel



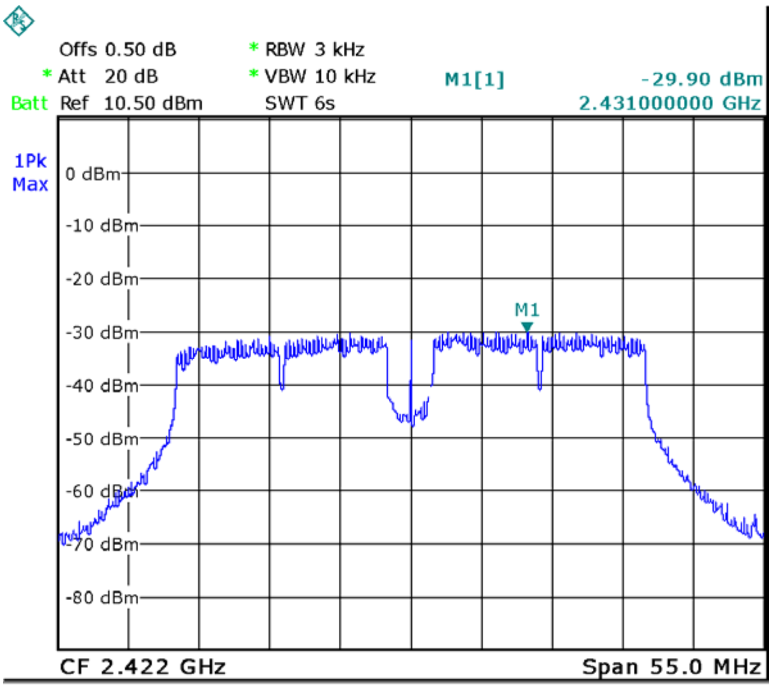
ANT1 TX 11n HT20 Middle channel



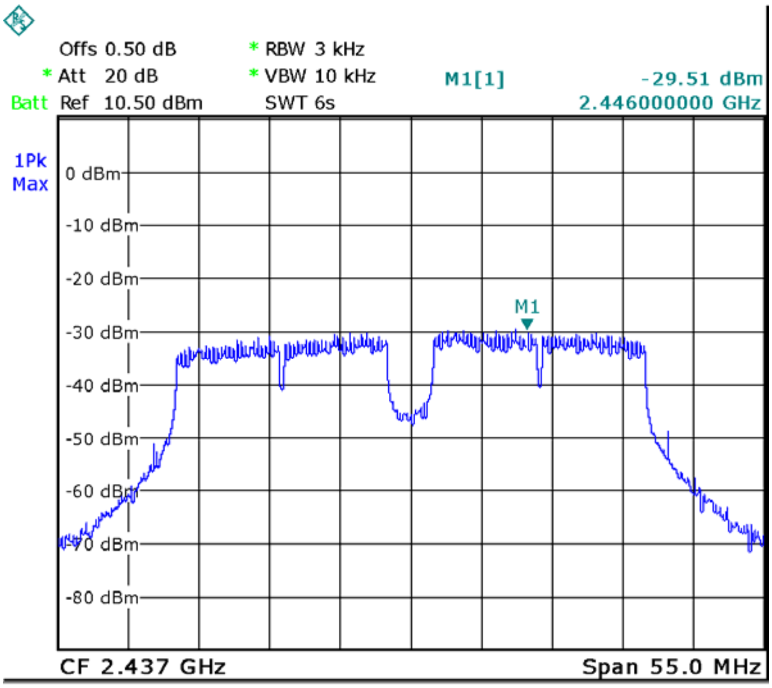
ANT1 TX 11n HT20 High channel



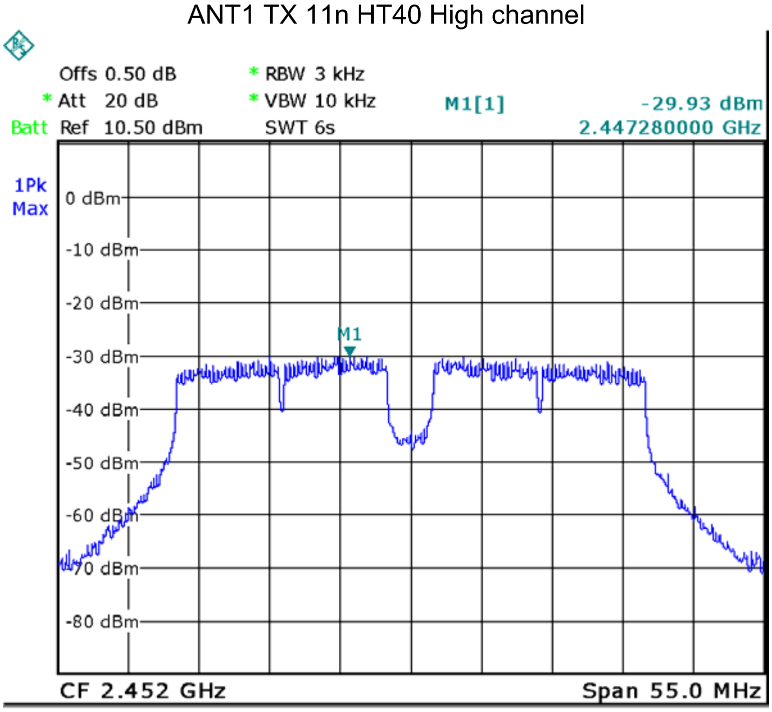
ANT1 TX 11n HT40 Low channel



ANT1 TX 11n HT40 Middle channel



ANT1 TX 11n HT40 High channel



12 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

This device uses of two antennas that uses a specified coupling to the intentional radiator. Antenna connectors complied with the requirement.

13 RF Exposure

Test Requirement: FCC Part 1.1307

Evaluation Method: FCC Part 2.1091

13.1 Requirements

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

13.2 The procedures / limit

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm^2)	Averaging Time $\|E\|^2$,$\|H\|^2$ or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

13.3 MPE Calculation Method

E (V/m) $= \frac{\sqrt{30 \times P \times G}}{d}$ Power Density: *Pd* (W/m²) $= \frac{E^2}{377}$

E = Electric field (V/m)
P = Peak RF output power (W)
G = EUT Antenna numeric gain (numeric)
d = Separation distance between radiator and human body (m)
The formula can be changed to

Pd $= \frac{30 \times P \times G}{377 \times d^2}$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained

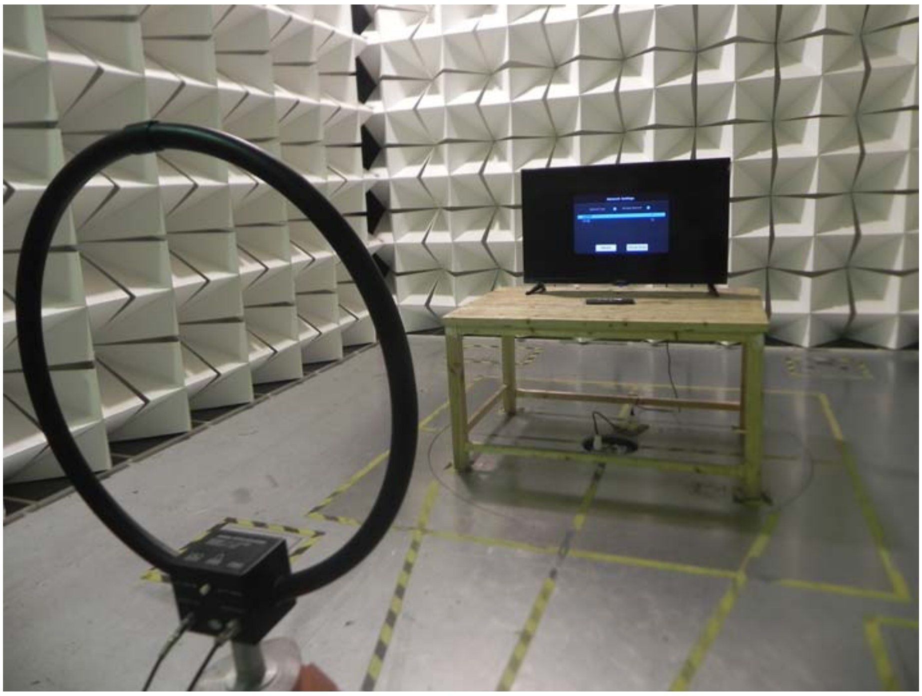
Directional gain (dBi)	Directional gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm2)	Limit of Power Density (mW/cm2)
3.20	2.089	9.48	8.87	0.003687	1

*Directional gain = Directional gain = 10 log[(10G1 /10 + 10G2 /10 + … + 10GN /10)/NANT] dBi = 3.2dBi

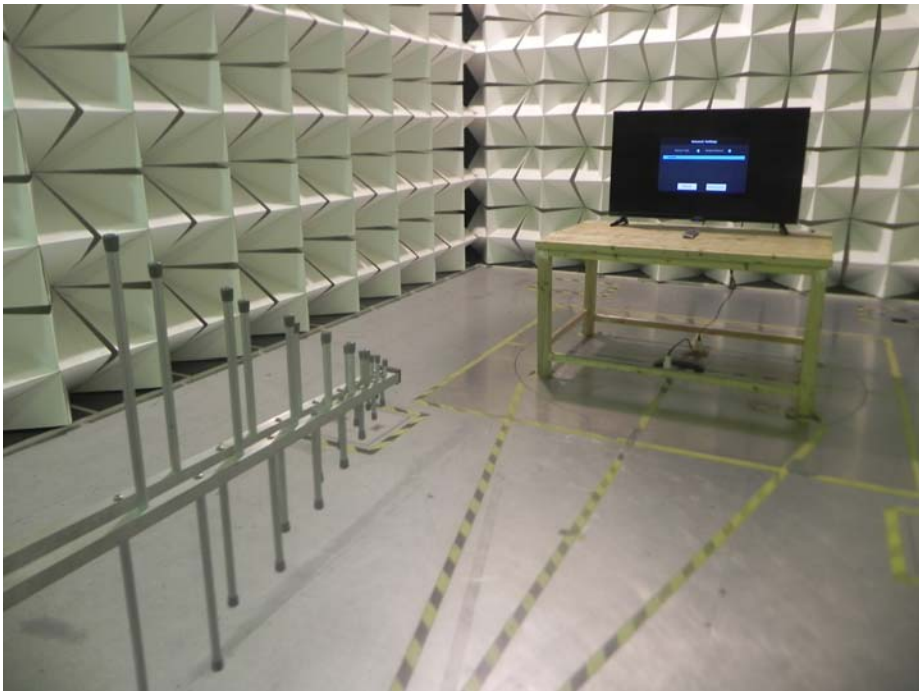
14 Photographs – Model WD50UK4550 Test Setup

14.1 Radiated Emission

Test frequency below 30MHz at Test Site 2#



Test frequency from 30MHz to 1GHz at Test Site 2#



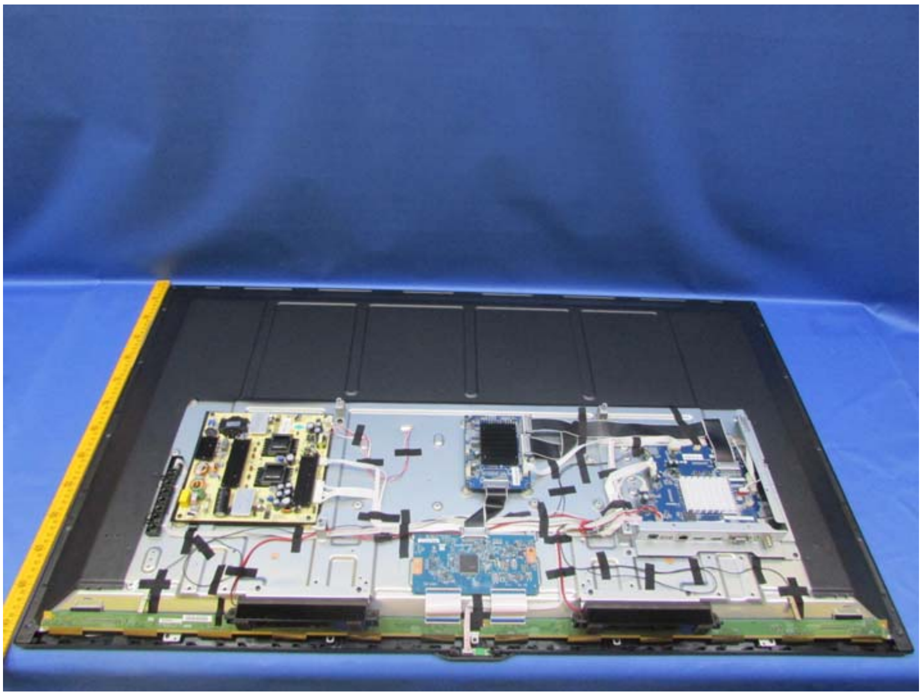
Test frequency above 1GHz at Test Site 1#

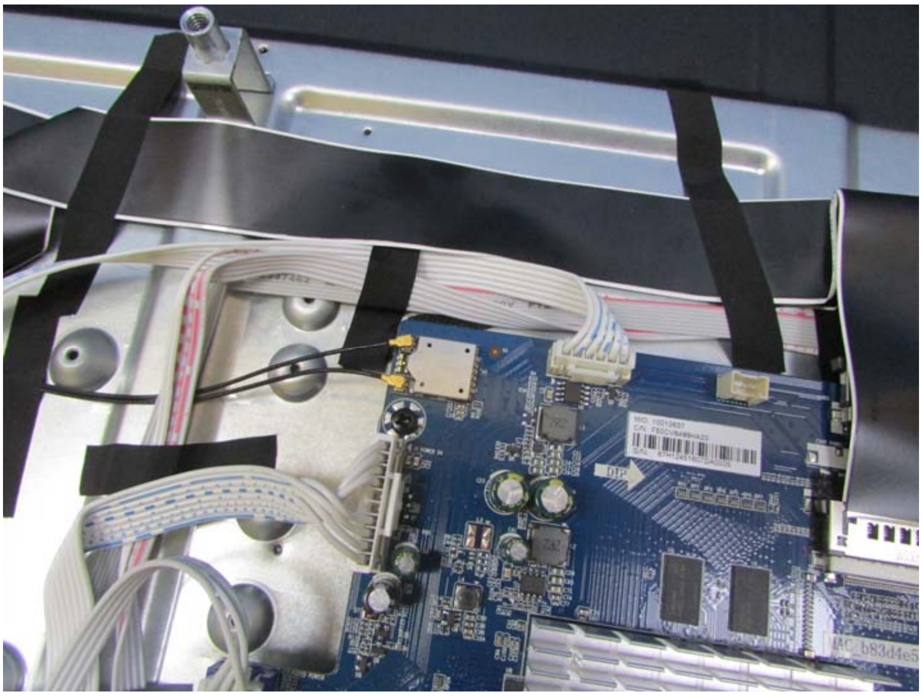
14.2 Conducted Emission at Test Site 1#

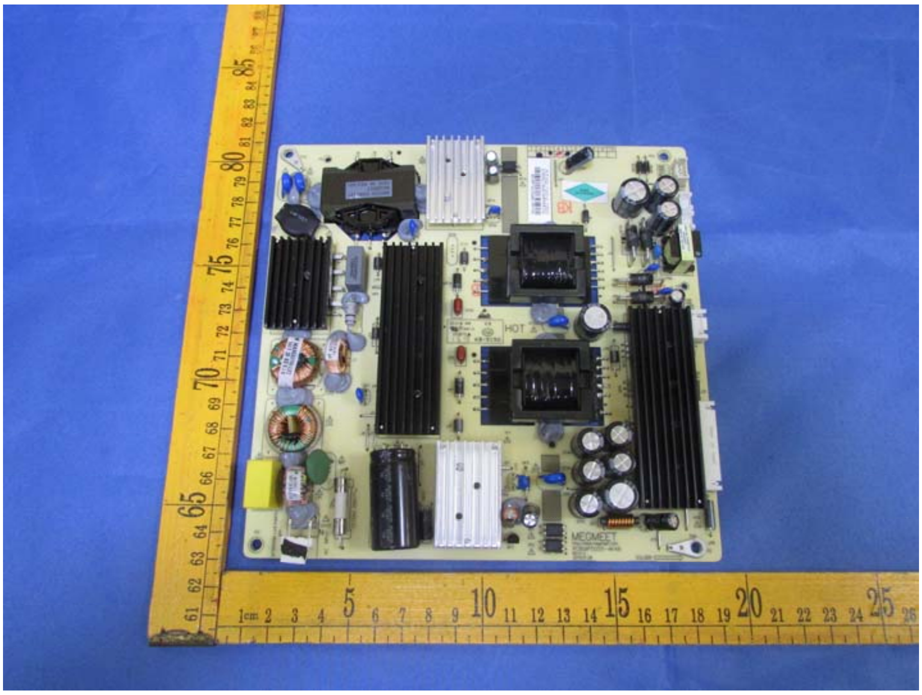
15 Photographs - Constructional Details

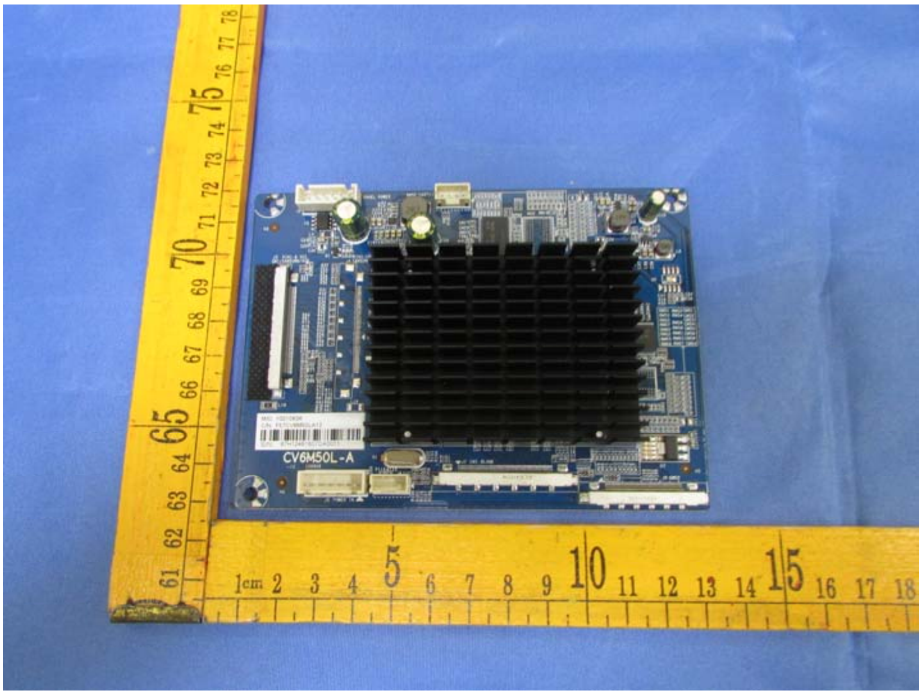
15.1 Model WD50UK4550–External Photos

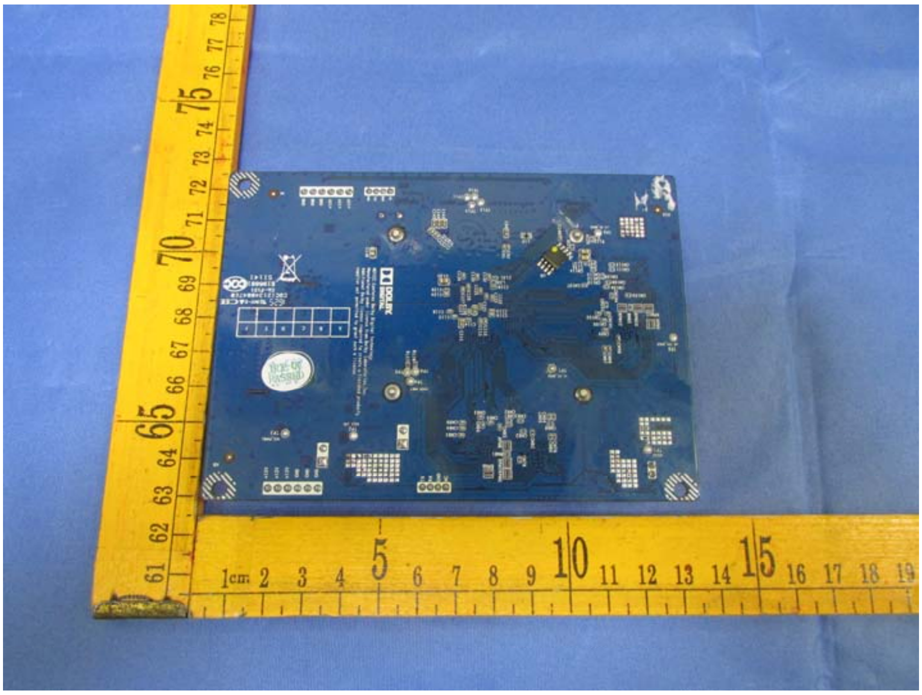
15.2 Model WD50UK4550– Internal Photos

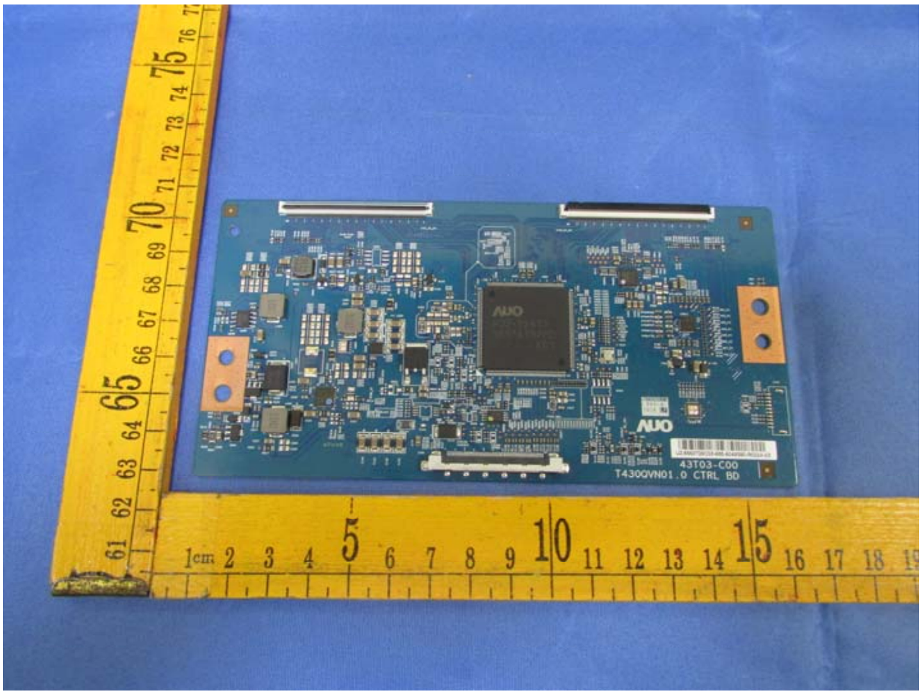


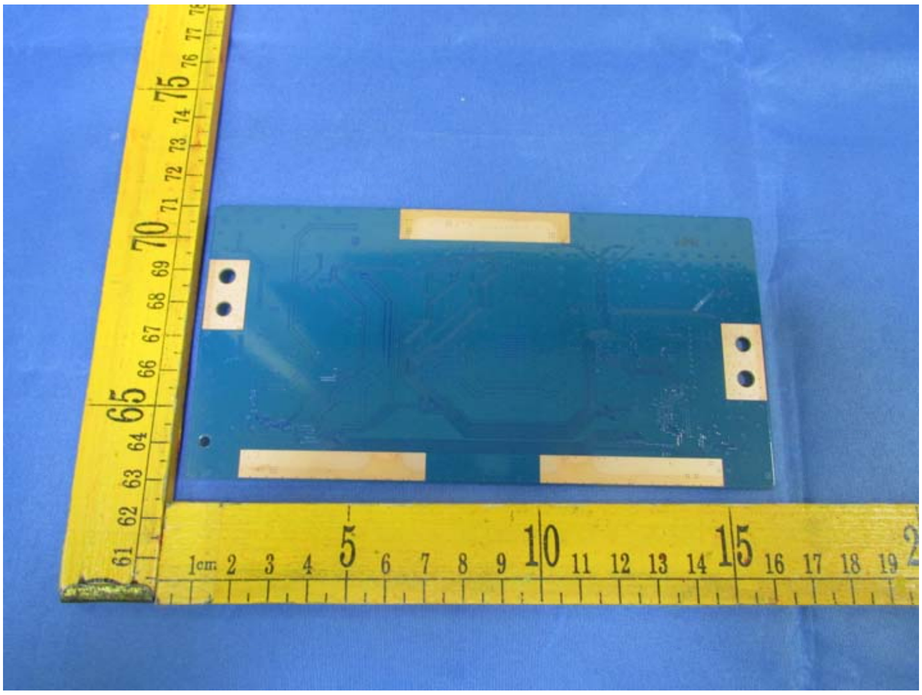


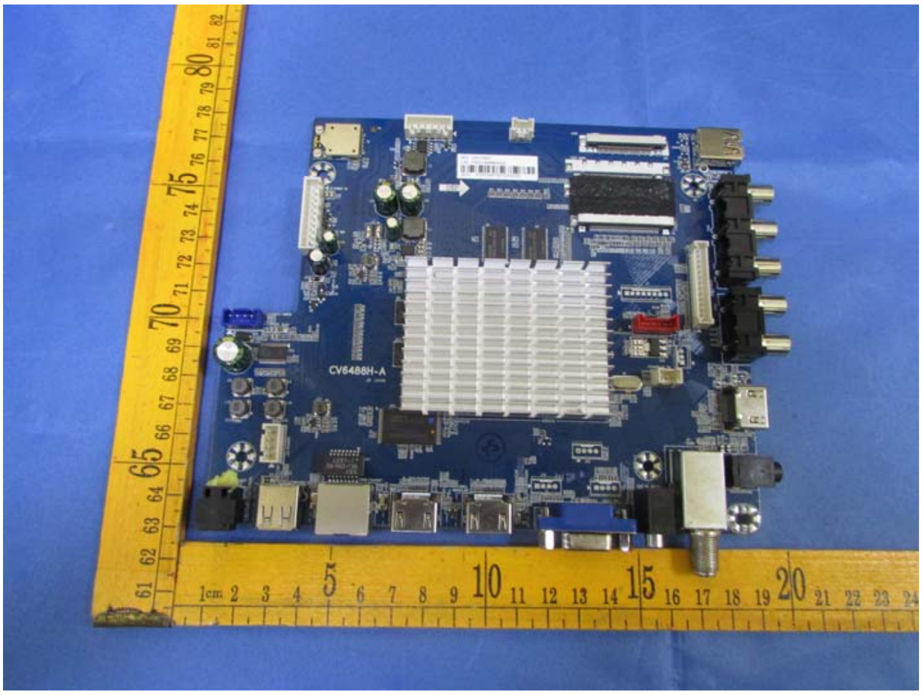



CV6M50L-A

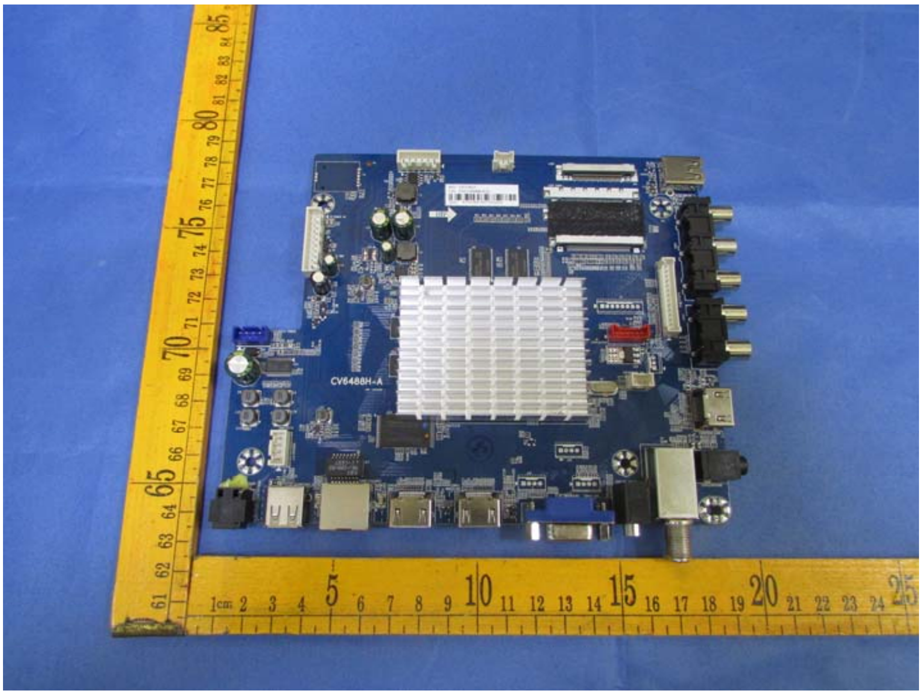


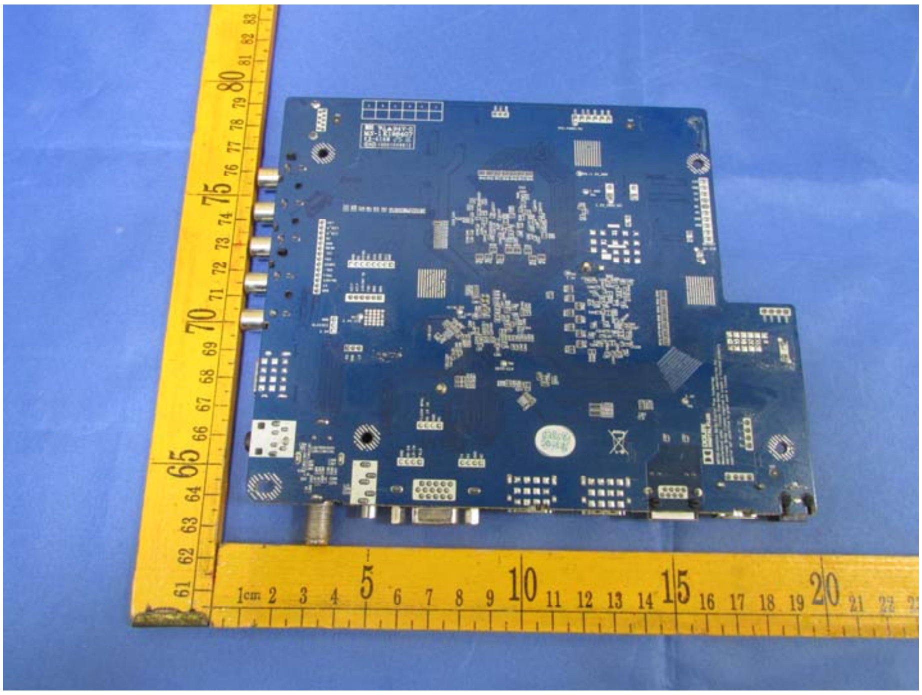

43T03-C00
T430QVN01.0 CTRL BD

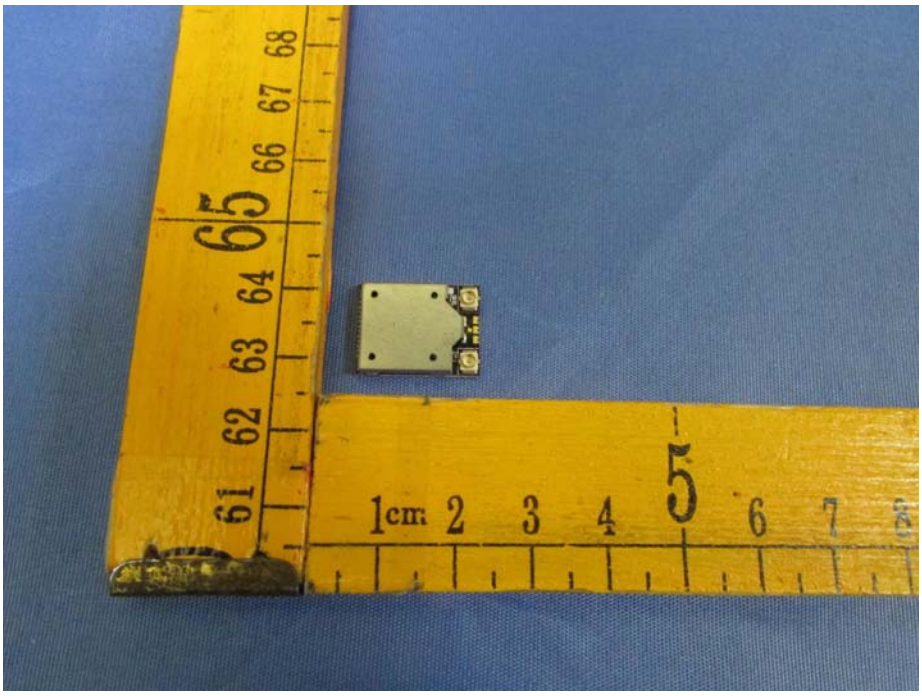


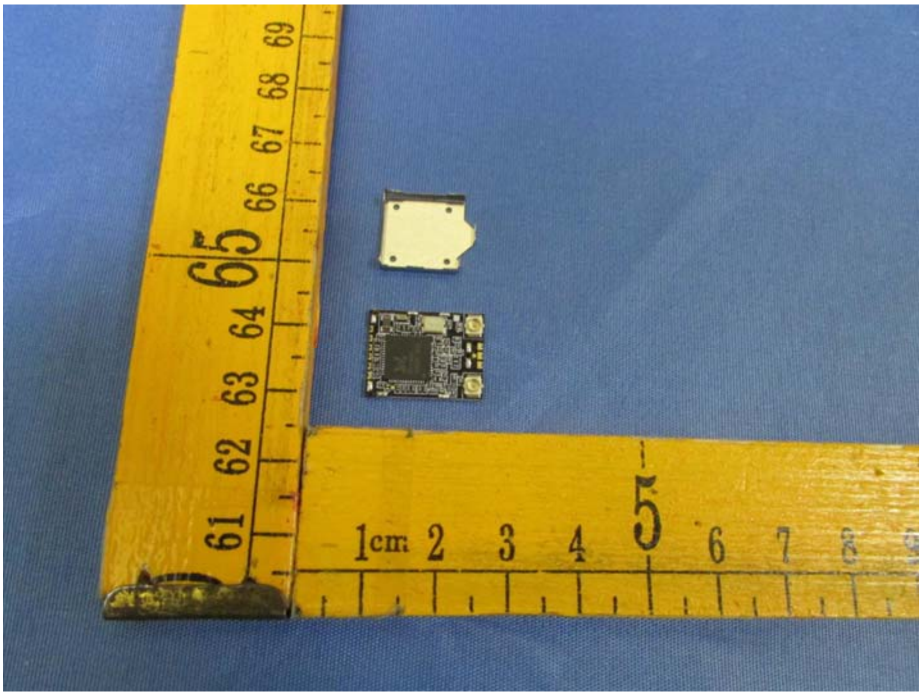


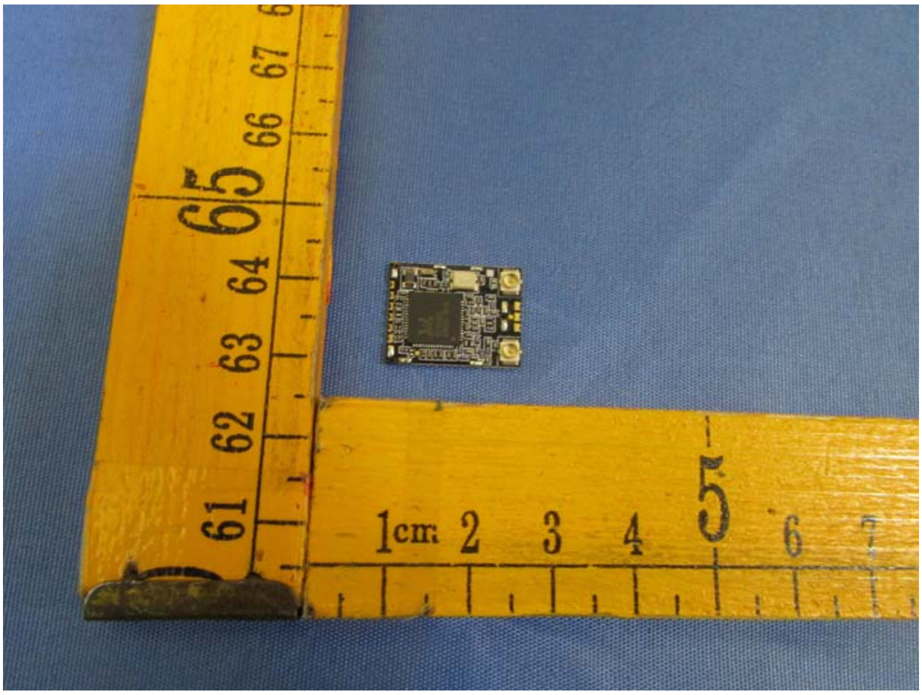

CV6488H-A

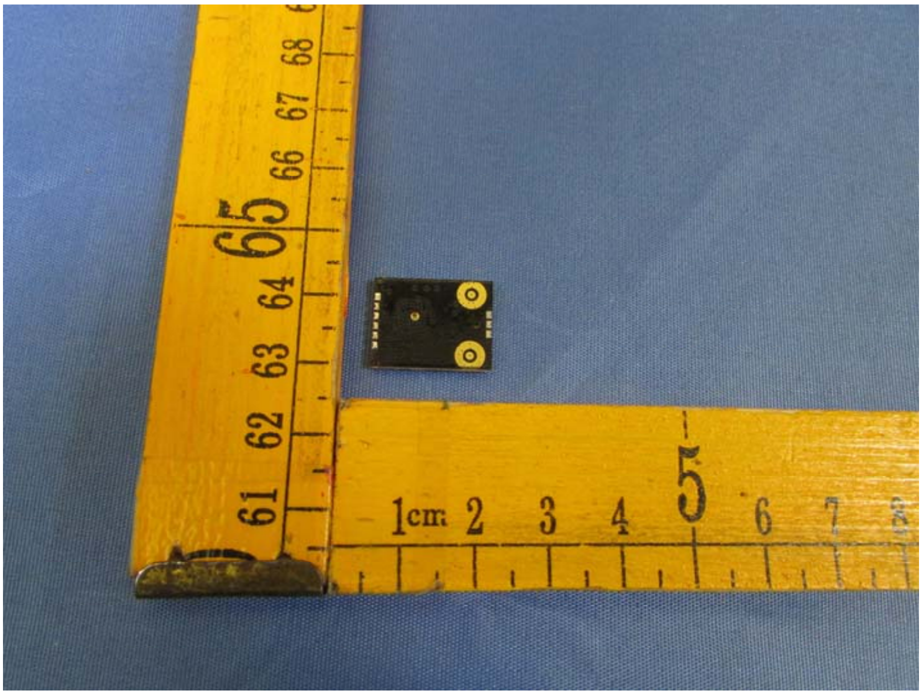

CV6488H-A











======End of Report======