TEST REPORT

Reference No.	:	WTS17S1092360E
FCC ID	:	VTA-ETBB301
Applicant	:	Yusan Industries Ltd.
Address	:	Unit 8-9, 8/F, Honour Ind'l Centre, 6 Sun Yip Street, Chai Wan, Hong Kong
Manufacturer	:	Yusan Technology(Shenzhen) Limited
Address	:	Haoyi Technology Park, Nan Huan Road, Shajing West, Baoan Shenzhen, Guang Dong P.R. China
Product	:	Blackout Buddy Charge Connected
Model(s)	:	ET-BB301
Standards	:	FCC CFR47 Part 15 C Section 15.247:2016
Date of Receipt sample	:	2017-10-13
Date of Test	:	2017-10-14 to 2017-11-22
Date of Issue	:	2017-11-23
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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2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.

Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. ElectroMagnetic Compatibility(EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

2.1 Test Facility

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	**A2LA (Certificate No.: 4243.01)**	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India	**International Services**	WPC	-
Thailand		NTC	-
Singapore		IDA	-

Note:

1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.
2. IC Canada Registration No.: 7760A

B.TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of …	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

3 Test Summary

Test Items	Test Requirement	Result
Conducted Emissions	15.207(a)	PASS
Conducted Spurious Emissions	15.247	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

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5 General Information

5.1 General Description of E.U.T

Product:	Blackout Buddy Charge Connected
Model(s)	ET-BB301
Model Description:	N/A
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40:2422-2452MHz
The Lowest Oscillator:	38.4MHz
Antenna type:	PCB Printed antenna
Antenna Gain:	2dBi
Type of modulation:	IEEE 802.11b (CCK/QPSK/BPSK,11Mbps max.) IEEE 802.11g (BPSK/QPSK/16QAM/64QAM,54Mbps max.) IEEE 802.11n (BPSK/QPSK/16QAM/64QAM,HT20:72Mbps max., HT40:150Mbps max.)

5.2 Details of E.U.T.

Ratings:	Input: AC 120-240V 50/60Hz, Output: 5V/1A*2 Battery: DC 3.7V 2000mAh

5.3 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	-

5.4 Test Mode

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
Frequency Range	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

Note :Parameters set by test software during channel & power tests, the software provided by the customer was used to set the operating channels as well as the output power level. The RF output power set is the power expected by the manufacturer and is going to be fixed on the firmware of the final product .

Table 2 Tests Carried Out Under FCC part 15.207 & FCC part 15.209

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

6 Equipment Used during Test

6.1 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	2017-09-14	2018-09-13
2.	LISN	R&S	ENV216	101215	2017-09-14	2018-09-13
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-14	2018-09-13
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	2017-09-14	2018-09-13
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-14	2018-09-13
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-14	2018-09-13
4.	Cable	LARGE	RF300	-	2017-09-14	2018-09-13
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	2017-09-14	2018-09-13
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2017-09-14	2018-09-13
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2017-04-07	2018-04-06
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2017-09-14	2018-09-13
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-09-14	2018-09-13
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2017-09-14	2018-09-13
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2017-09-14	2018-09-13
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	2017-09-14	2018-09-13
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-09-14	2018-09-13
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2017-09-14	2018-09-13
4	Cable	HUBER+SUHNER	CBL2	525178	2017-09-14	2018-09-13

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	2017-09-14	2018-09-13
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-14	2018-09-13
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-14	2018-09-13

6.2 Description of Support Units

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

6.3 Measurement Uncertainty

Parameter	Uncertainty
Radio Frequency	± 1 x 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)

6.4 Test Equipment Calibration

All the test equipments used are valid and calibrated by GUANG ZHOU GRG METROLOGY & TEST CO., LTD. address is No.163, Pingyun Rd. West of Huangpu Ave,Tianhe District, Guangzhou, Guangdong, China .

7 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)

7.1 E.U.T. Operation

Operating Environment :

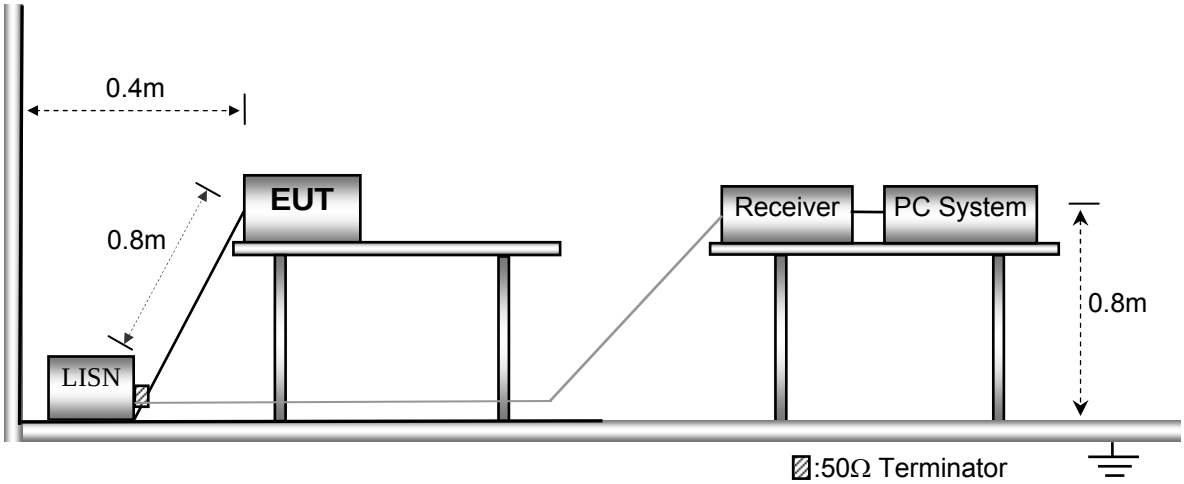
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation :

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

7.2 EUT Setup

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



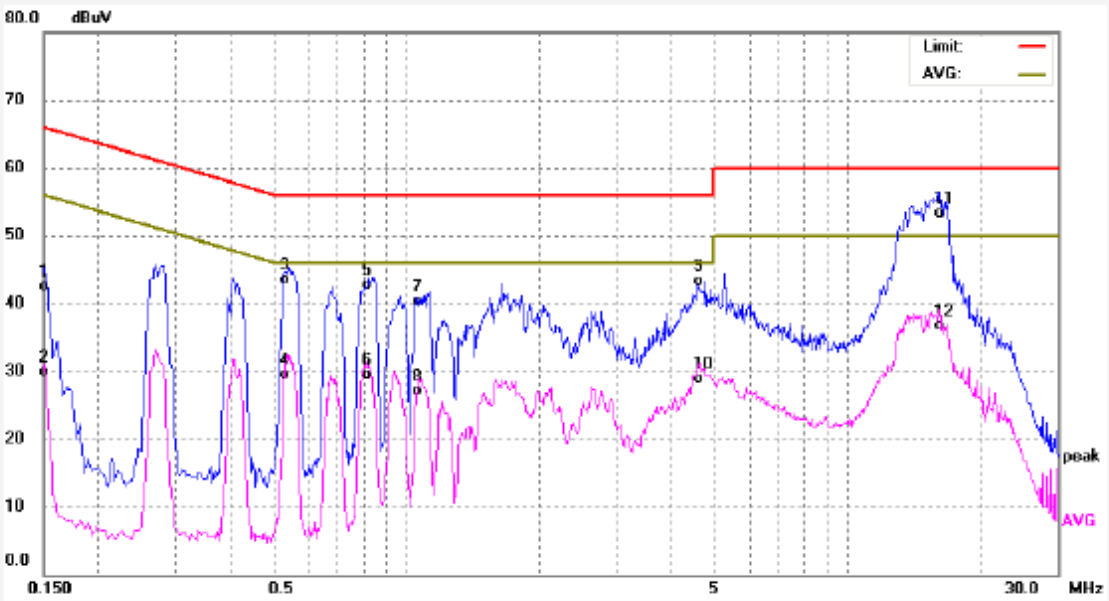
7.3 Measurement Description

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.

7.4 Conducted Emission Test Result

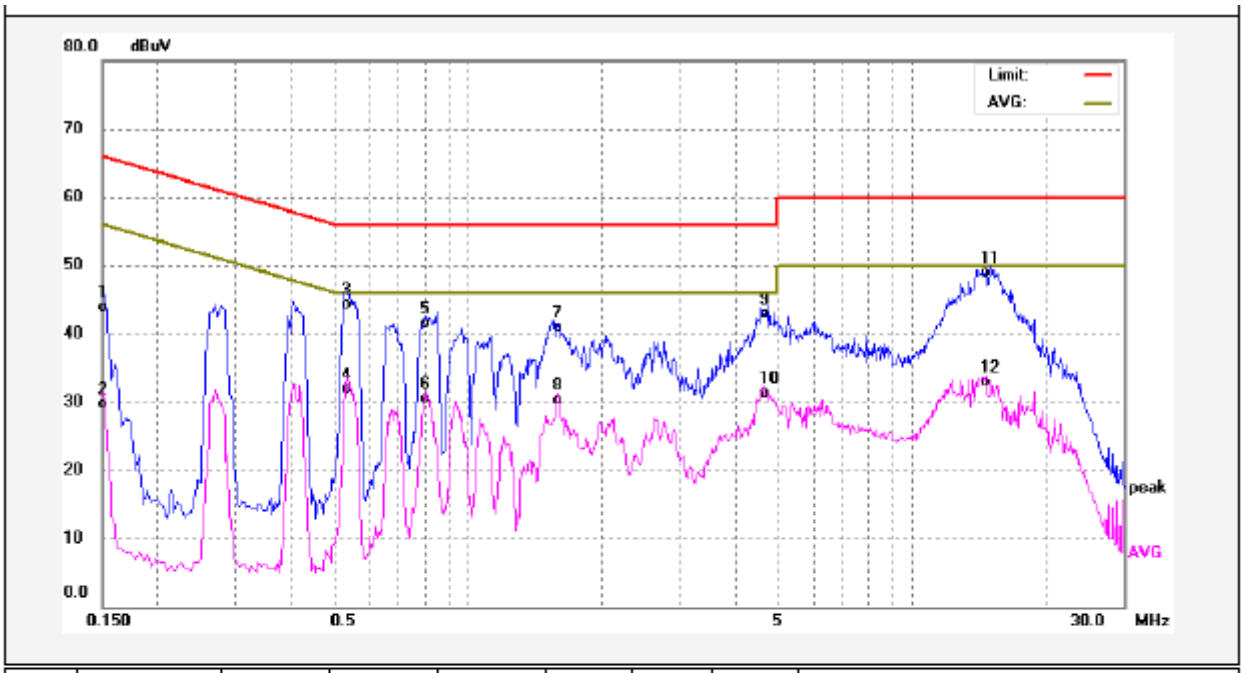
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	32.82	9.64	42.46	65.99	-23.53	QP	
2	0.1500	20.25	9.64	29.89	55.99	-26.10	AVG	
3	0.5340	33.92	9.67	43.59	56.00	-12.41	QP	
4	0.5340	19.79	9.67	29.46	46.00	-16.54	AVG	
5	0.8139	32.82	9.79	42.61	56.00	-13.39	QP	
6	0.8139	19.80	9.79	29.59	46.00	-16.41	AVG	
7	1.0700	30.39	9.84	40.23	56.00	-15.77	QP	
8	1.0700	17.26	9.84	27.10	46.00	-18.90	AVG	
9	4.6380	33.21	10.01	43.22	56.00	-12.78	QP	
10	4.6380	18.86	10.01	28.87	46.00	-17.13	AVG	
11	16.2099	43.13	10.26	53.39	60.00	-6.61	QP	
12	16.2099	26.39	10.26	36.65	50.00	-13.35	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	34.21	9.64	43.85	65.99	-22.14	QP	
2	0.1500	20.04	9.64	29.68	55.99	-26.31	AVG	
3	0.5321	34.58	9.67	44.25	56.00	-11.75	QP	
4	0.5321	22.25	9.67	31.92	46.00	-14.08	AVG	
5	0.8002	31.73	9.79	41.52	56.00	-14.48	QP	
6	0.8002	20.62	9.79	30.41	46.00	-15.59	AVG	
7	1.5933	31.08	9.91	40.99	56.00	-15.01	QP	
8	1.5933	20.32	9.91	30.23	46.00	-15.77	AVG	
9	4.6222	32.93	10.01	42.94	56.00	-13.06	QP	
10	4.6222	21.29	10.01	31.30	46.00	-14.70	AVG	
11	14.5942	38.61	10.23	48.84	60.00	-11.16	QP	
12	14.5942	22.65	10.23	32.88	50.00	-17.12	AVG	

8 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	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

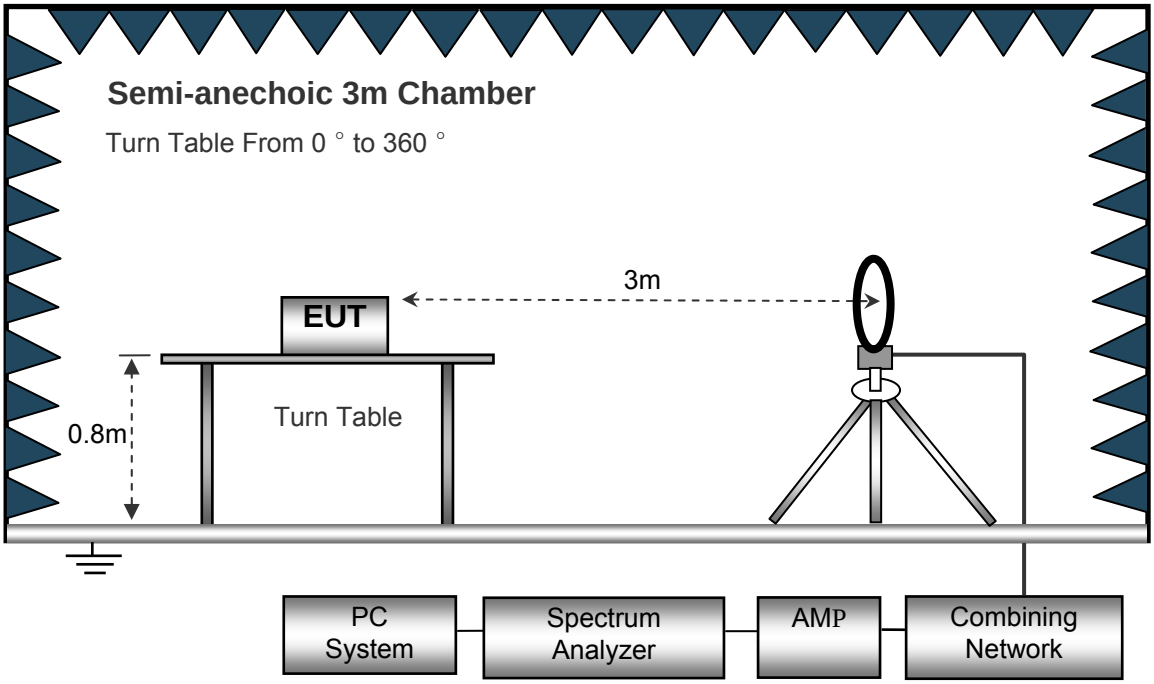
EUT Operation :

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

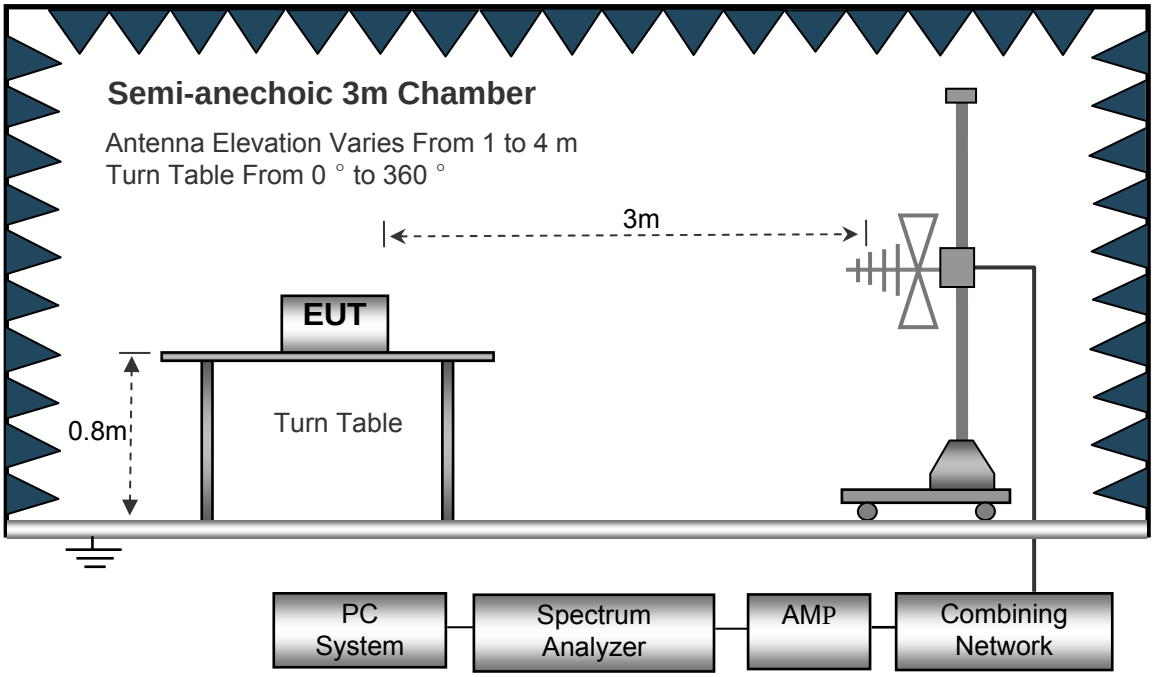
8.2 Test Setup

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

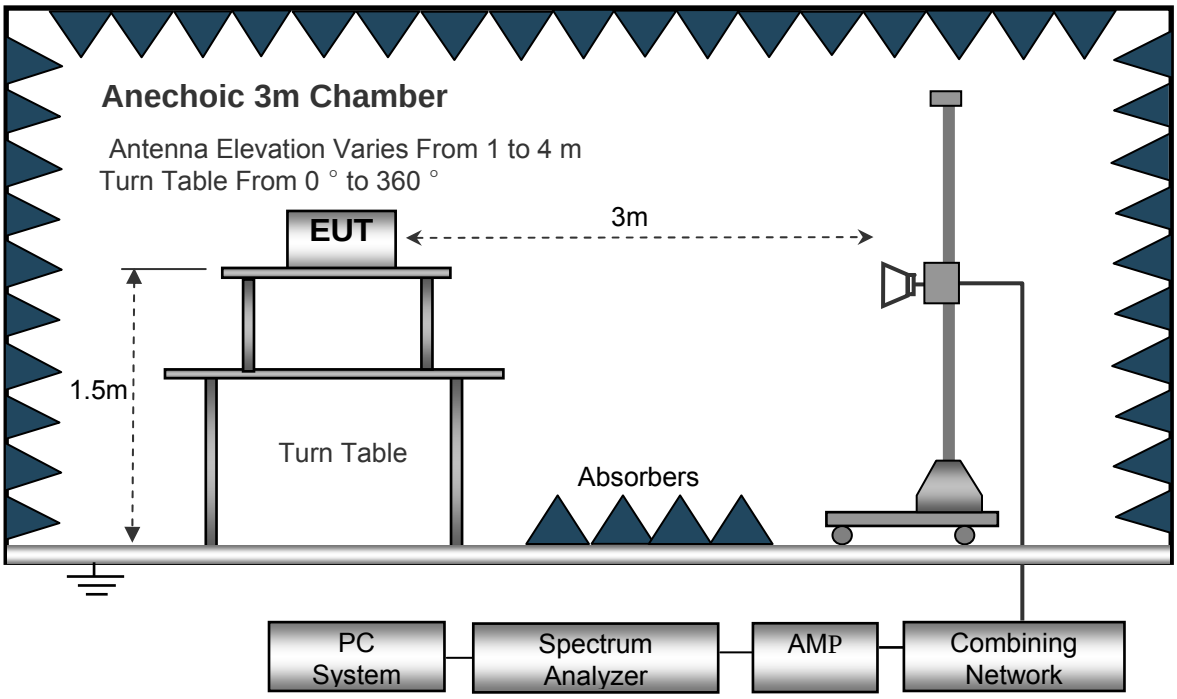
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



8.3 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

8.4 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.

8.5 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

8.6 Summary of Test Results

Test Frequency: 9kHz ~ 30MHz

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

Test Frequency : 30MHz ~ 18GHz

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)
ANT 11b: Low Channel 2412MHz									
260.02	42.56	QP	196.02	1.56	H	11.63	30.93	46.00	-15.07
260.02	36.19	QP	298.44	1.29	V	11.63	24.56	46.00	-21.44
4824.00	50.19	PK	93.12	1.03	V	1.23	48.96	74.00	-25.04
4824.00	46.85	Ave	93.12	1.03	V	1.23	45.62	54.00	-8.38
7236.00	40.22	PK	76.57	1.17	H	1.33	41.55	74.00	-32.45
7236.00	40.12	Ave	76.57	1.17	H	1.33	41.45	54.00	-12.55
2315.11	46.29	PK	237.97	1.64	V	13.02	33.27	74.00	-40.73
2315.11	39.96	Ave	237.97	1.64	V	13.02	26.94	54.00	-27.06
2381.89	44.13	PK	13.95	1.20	H	13.11	31.02	74.00	-42.98
2381.89	38.74	Ave	13.95	1.20	H	13.11	25.63	54.00	-28.37
2499.95	43.55	PK	271.38	1.15	V	13.05	30.50	74.00	-43.50
2499.95	38.20	Ave	271.38	1.15	V	13.05	25.15	54.00	-28.85

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)
ANT 11b: Middle Channel 2437MHz									
260.02	41.50	QP	96.53	1.96	H	11.55	29.95	46.00	-16.05
260.02	36.37	QP	274.01	1.69	V	11.55	24.82	46.00	-21.18
4874.00	48.78	PK	24.70	1.33	V	1.03	47.75	74.00	-26.25
4874.00	45.64	Ave	24.70	1.33	V	1.03	44.61	54.00	-9.39
7311.00	41.14	PK	95.03	1.69	H	2.21	43.35	74.00	-30.65
7311.00	38.65	Ave	95.03	1.69	H	2.21	40.86	54.00	-13.14
2312.42	45.63	PK	76.89	1.72	V	13.45	32.18	74.00	-41.82
2312.42	39.22	Ave	76.89	1.72	V	13.45	25.77	54.00	-28.23
2350.04	42.10	PK	243.66	1.81	H	13.56	28.54	74.00	-45.46
2350.04	36.59	Ave	243.66	1.81	H	13.56	23.03	54.00	-30.97
2491.65	44.65	PK	324.20	1.21	V	13.07	31.58	74.00	-42.42
2491.65	37.49	Ave	324.20	1.21	V	13.07	24.42	54.00	-29.58

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)
ANT 11b: High Channel 2462MHz									
260.02	42.92	QP	49.28	1.02	H	11.05	31.87	46.00	-14.13
260.02	37.47	QP	65.92	1.48	V	11.05	26.42	46.00	-19.58
4924.00	47.44	PK	346.07	1.72	V	1.20	46.24	74.00	-27.76
4924.00	44.79	Ave	346.07	1.72	V	1.20	43.59	54.00	-10.41
7386.00	42.38	PK	162.95	1.32	H	2.84	45.22	74.00	-28.78
7386.00	38.25	Ave	162.95	1.32	H	2.84	41.09	54.00	-12.91
2331.06	45.51	PK	73.49	1.32	V	13.44	32.07	74.00	-41.93
2331.06	39.68	Ave	73.49	1.32	V	13.44	26.24	54.00	-27.76
2381.05	42.40	PK	134.87	1.55	H	13.26	29.14	74.00	-44.86
2381.05	38.86	Ave	134.87	1.55	H	13.26	25.60	54.00	-28.40
2498.00	43.15	PK	219.81	1.68	V	13.03	30.12	74.00	-43.88
2498.00	36.75	Ave	219.81	1.68	V	13.03	23.72	54.00	-30.28

Frequency	Receiver Reading	Detector	Turn table	RX Antenna	Corrected Factor	Corrected	FCC Part 15.247/209/205

			Angle	Height	Polar		Amplitude	Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT 11g: Low Channel 2412MHz									
260.02	44.01	QP	108.36	1.54	H	11.63	32.38	46.00	-13.62
260.02	36.02	QP	125.61	1.61	V	11.63	24.39	46.00	-21.61
4824.00	48.75	PK	11.61	1.36	V	1.23	47.52	74.00	-26.48
4824.00	43.87	Ave	11.61	1.36	V	1.23	42.64	54.00	-11.36
7236.00	41.46	PK	160.50	1.74	H	1.33	42.79	74.00	-31.21
7236.00	39.56	Ave	160.50	1.74	H	1.33	40.89	54.00	-13.11
2318.72	45.65	PK	21.44	1.60	V	13.02	32.63	74.00	-41.37
2318.72	38.61	Ave	21.44	1.60	V	13.02	25.59	54.00	-28.41
2387.56	43.75	PK	276.96	1.83	H	13.11	30.64	74.00	-43.36
2387.56	36.33	Ave	276.96	1.83	H	13.11	23.22	54.00	-30.78
2494.92	42.27	PK	8.12	1.47	V	13.05	29.22	74.00	-44.78
2494.92	38.19	Ave	8.12	1.47	V	13.05	25.14	54.00	-28.86

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)
ANT 11g: Middle Channel 2437MHz									
260.02	44.04	QP	158.09	1.85	H	11.55	32.49	46.00	-13.51
260.02	34.66	QP	358.74	1.97	V	11.55	23.11	46.00	-22.89
4874.00	48.16	PK	176.78	1.34	V	1.03	47.13	74.00	-26.87
4874.00	44.38	Ave	176.78	1.34	V	1.03	43.35	54.00	-10.65
7311.00	41.29	PK	107.12	1.88	H	2.21	43.50	74.00	-30.50
7311.00	39.78	Ave	107.12	1.88	H	2.21	41.99	54.00	-12.01
2312.59	45.09	PK	312.13	1.52	V	13.45	31.64	74.00	-42.36
2312.59	39.90	Ave	312.13	1.52	V	13.45	26.45	54.00	-27.55
2370.02	44.03	PK	280.47	2.00	H	13.56	30.47	74.00	-43.53
2370.02	37.47	Ave	280.47	2.00	H	13.56	23.91	54.00	-30.09
2490.48	44.66	PK	171.58	1.18	V	13.07	31.59	74.00	-42.41
2490.48	38.40	Ave	171.58	1.18	V	13.07	25.33	54.00	-28.67

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)
ANT 11g: High Channel 2462MHz									
260.02	44.25	QP	312.46	1.01	H	11.05	33.20	46.00	-12.80
260.02	34.19	QP	129.11	1.56	V	11.05	23.14	46.00	-22.86
4924.00	49.63	PK	52.31	1.28	V	1.20	48.43	74.00	-25.57
4924.00	43.36	Ave	52.31	1.28	V	1.20	42.16	54.00	-11.84
7386.00	42.37	PK	136.79	1.84	H	2.84	45.21	74.00	-28.79
7386.00	40.68	Ave	136.79	1.84	H	2.84	43.52	54.00	-10.48
2313.69	46.61	PK	145.28	1.95	V	13.44	33.17	74.00	-40.83
2313.69	39.50	Ave	145.28	1.95	V	13.44	26.06	54.00	-27.94
2380.95	44.02	PK	288.68	1.11	H	13.26	30.76	74.00	-43.24
2380.95	36.89	Ave	288.68	1.11	H	13.26	23.63	54.00	-30.37
2485.68	43.16	PK	270.22	1.26	V	13.03	30.13	74.00	-43.87
2485.68	37.65	Ave	270.22	1.26	V	13.03	24.62	54.00	-29.38

Frequency	Receiver Reading	Detector	Turn table	RX Antenna	Corrected Factor	Corrected	FCC Part 15.247/209/205

			Angle	Height	Polar		Amplitude	Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
ANT n HT20: Low Channel 2412MHz									
260.02	45.02	QP	302.84	1.80	H	11.63	33.39	46.00	-12.61
260.02	33.96	QP	5.14	1.31	V	11.63	22.33	46.00	-23.67
4824.00	48.71	PK	301.16	1.09	V	1.23	47.48	74.00	-26.52
4824.00	42.02	Ave	301.16	1.09	V	1.23	40.79	54.00	-13.21
7236.00	43.45	PK	242.65	1.42	H	1.33	44.78	74.00	-29.22
7236.00	40.59	Ave	242.65	1.42	H	1.33	41.92	54.00	-12.08
2344.96	46.05	PK	171.74	1.70	V	13.02	33.03	74.00	-40.97
2344.96	37.36	Ave	171.74	1.70	V	13.02	24.34	54.00	-29.66
2351.80	42.92	PK	139.82	1.49	H	13.11	29.81	74.00	-44.19
2351.80	37.68	Ave	139.82	1.49	H	13.11	24.57	54.00	-29.43
2493.54	44.43	PK	275.56	1.48	V	13.05	31.38	74.00	-42.62
2493.54	37.48	Ave	275.56	1.48	V	13.05	24.43	54.00	-29.57

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)
ANT n HT20: Middle Channel 2437MHz									
260.02	44.57	QP	156.90	1.95	H	11.55	33.02	46.00	-12.98
260.02	33.25	QP	160.66	1.17	V	11.55	21.70	46.00	-24.30
4874.00	47.70	PK	291.24	1.12	V	1.03	46.67	74.00	-27.33
4874.00	43.21	Ave	291.24	1.12	V	1.03	42.18	54.00	-11.82
7311.00	43.43	PK	159.33	1.16	H	2.21	45.64	74.00	-28.36
7311.00	39.36	Ave	159.33	1.16	H	2.21	41.57	54.00	-12.43
2311.50	46.53	PK	314.19	1.78	V	13.45	33.08	74.00	-40.92
2311.50	38.97	Ave	314.19	1.78	V	13.45	25.52	54.00	-28.48
2357.32	43.85	PK	196.57	1.34	H	13.56	30.29	74.00	-43.71
2357.32	38.49	Ave	196.57	1.34	H	13.56	24.93	54.00	-29.07
2484.63	43.60	PK	189.66	1.89	V	13.07	30.53	74.00	-43.47
2484.63	37.53	Ave	189.66	1.89	V	13.07	24.46	54.00	-29.54

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)
ANT n HT20: High Channel 2462MHz									
260.02	43.49	QP	113.33	1.97	H	11.05	32.44	46.00	-13.56
260.02	34.05	QP	77.51	1.90	V	11.05	23.00	46.00	-23.00
4924.00	49.18	PK	327.18	1.67	V	1.20	47.98	74.00	-26.02
4924.00	42.90	Ave	327.18	1.67	V	1.20	41.70	54.00	-12.30
7386.00	41.99	PK	271.46	1.42	H	2.84	44.83	74.00	-29.17
7386.00	40.53	Ave	271.46	1.42	H	2.84	43.37	54.00	-10.63
2315.69	46.97	PK	286.03	1.05	V	13.44	33.53	74.00	-40.47
2315.69	39.27	Ave	286.03	1.05	V	13.44	25.83	54.00	-28.17
2365.23	43.49	PK	174.54	1.99	H	13.26	30.23	74.00	-43.77
2365.23	38.31	Ave	174.54	1.99	H	13.26	25.05	54.00	-28.95
2485.45	44.93	PK	45.13	1.65	V	13.03	31.90	74.00	-42.10
2485.45	37.14	Ave	45.13	1.65	V	13.03	24.11	54.00	-29.89

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)
802.11n(HT40) low channel 2422MHz									
260.02	42.88	QP	316.42	1.01	H	11.63	31.25	46.00	-14.75
260.02	32.60	QP	206.74	1.99	V	11.63	20.97	46.00	-25.03
4844.00	47.72	PK	150.40	1.77	V	1.23	46.49	74.00	-27.51
4844.00	40.00	Ave	150.40	1.77	V	1.23	38.77	54.00	-15.23
7266.00	39.89	PK	198.25	1.40	H	1.33	41.22	74.00	-32.78
7266.00	38.25	Ave	198.25	1.40	H	1.33	39.58	54.00	-14.42
2343.79	45.15	PK	317.25	1.37	V	13.02	32.13	74.00	-41.87
2343.79	39.06	Ave	317.25	1.37	V	13.02	26.04	54.00	-27.96
2362.60	42.57	PK	17.33	1.15	H	13.11	29.46	74.00	-44.54
2362.60	36.54	Ave	17.33	1.15	H	13.11	23.43	54.00	-30.57
2485.58	44.01	PK	275.86	1.70	V	13.05	30.96	74.00	-43.04
2485.58	38.75	Ave	275.86	1.70	V	13.05	25.70	54.00	-28.30

Frequency	Receiver Reading	Detector	Turn table	RX Antenna	Corrected Factor	Corrected	FCC Part 15.247/209/205

			Angle	Height	Polar		Amplitude	Limit	Margin
(MHz)	(dBμV)	(PK/QP/Ave)	Degree	(m)	(H/V)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
802.11n(HT40) middle channel 2437MHz									
260.02	43.76	QP	28.21	1.66	H	11.55	32.21	46.00	-13.79
260.02	32.56	QP	34.53	1.08	V	11.55	21.01	46.00	-24.99
4874.00	47.25	PK	207.53	1.85	V	1.03	46.22	74.00	-27.78
4874.00	40.45	Ave	207.53	1.85	V	1.03	39.42	54.00	-14.58
7311.00	40.26	PK	72.76	1.35	H	2.21	42.47	74.00	-31.53
7311.00	37.92	Ave	72.76	1.35	H	2.21	40.13	54.00	-13.87
2317.88	46.87	PK	300.20	1.27	V	13.45	33.42	74.00	-40.58
2317.88	37.87	Ave	300.20	1.27	V	13.45	24.42	54.00	-29.58
2379.90	44.48	PK	304.68	1.96	H	13.56	30.92	74.00	-43.08
2379.90	36.59	Ave	304.68	1.96	H	13.56	23.03	54.00	-30.97
2497.40	44.12	PK	125.98	1.22	V	13.07	31.05	74.00	-42.95
2497.40	36.98	Ave	125.98	1.22	V	13.07	23.91	54.00	-30.09

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)
802.11n(HT40) High channel 2452MHz									
260.02	43.19	QP	317.46	1.11	H	11.05	32.14	46.00	-13.86
260.02	32.94	QP	184.60	1.49	V	11.05	21.89	46.00	-24.11
4904.00	47.39	PK	195.42	1.64	V	1.20	46.19	74.00	-27.81
4904.00	41.32	Ave	195.42	1.64	V	1.20	40.12	54.00	-13.88
7356.00	40.67	PK	278.17	1.71	H	2.84	43.51	74.00	-30.49
7356.00	37.71	Ave	278.17	1.71	H	2.84	40.55	54.00	-13.45
2313.94	45.39	PK	12.70	1.61	V	13.44	31.95	74.00	-42.05
2313.94	38.79	Ave	12.70	1.61	V	13.44	25.35	54.00	-28.65
2389.38	43.17	PK	330.33	1.54	H	13.26	29.91	74.00	-44.09
2389.38	36.81	Ave	330.33	1.54	H	13.26	23.55	54.00	-30.45
2496.46	43.34	PK	175.20	1.43	V	13.03	30.31	74.00	-43.69
2496.46	38.82	Ave	175.20	1.43	V	13.03	25.79	54.00	-28.21

Test Frequency: 18GHz~25GHz

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

9 Conducted Spurious Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v03r05 April 8, 2016

Test Result: PASS

Limit:

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

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:

Blow 30MHz:

RBW = 100kHz, VBW = 300kHz, Sweep = auto

Detector function = peak, Trace = max hold

Above 30MHz:

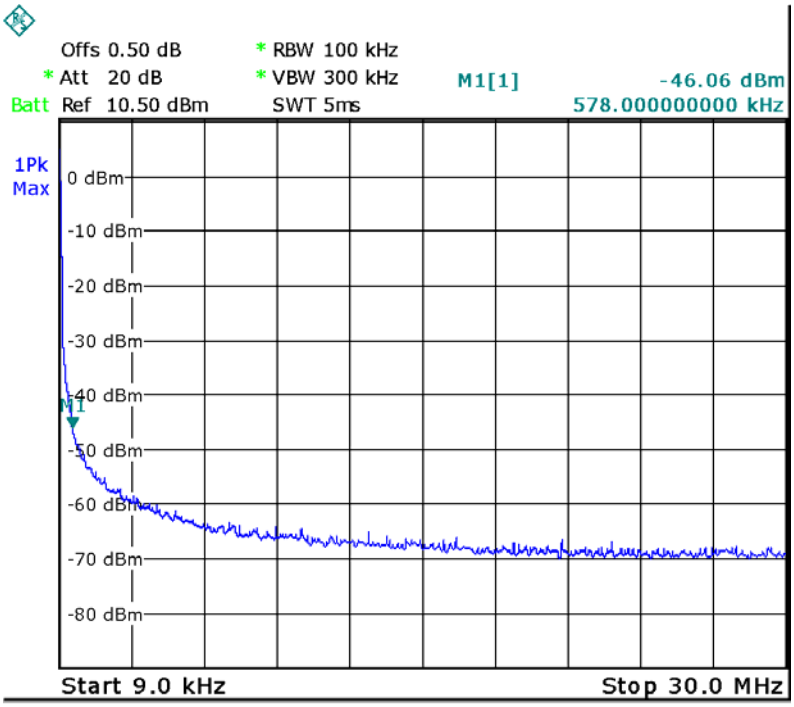
RBW = 1MHz, VBW = 3MHz, Sweep = auto

Detector function = peak, Trace = max hold

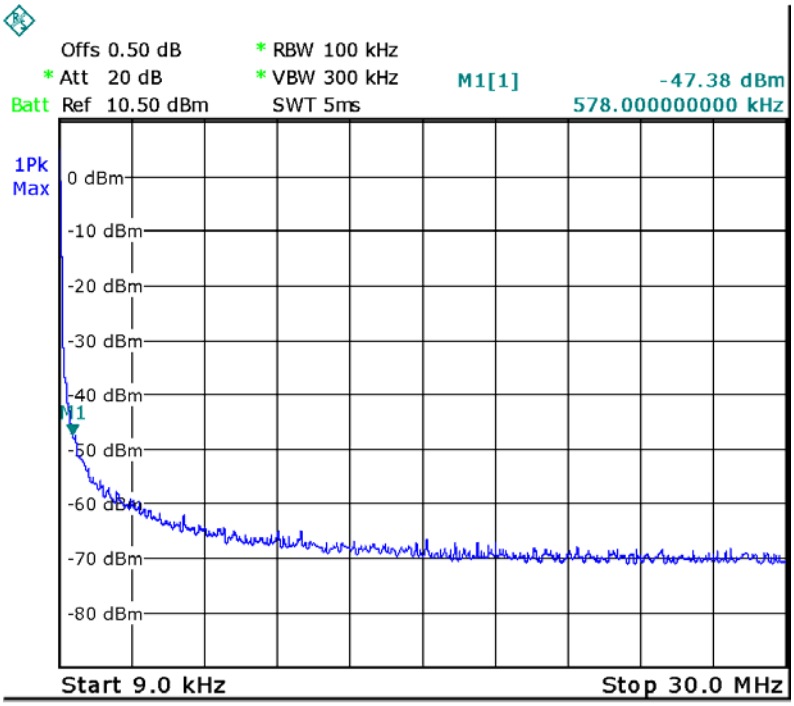
9.2 Test Result

802.11B

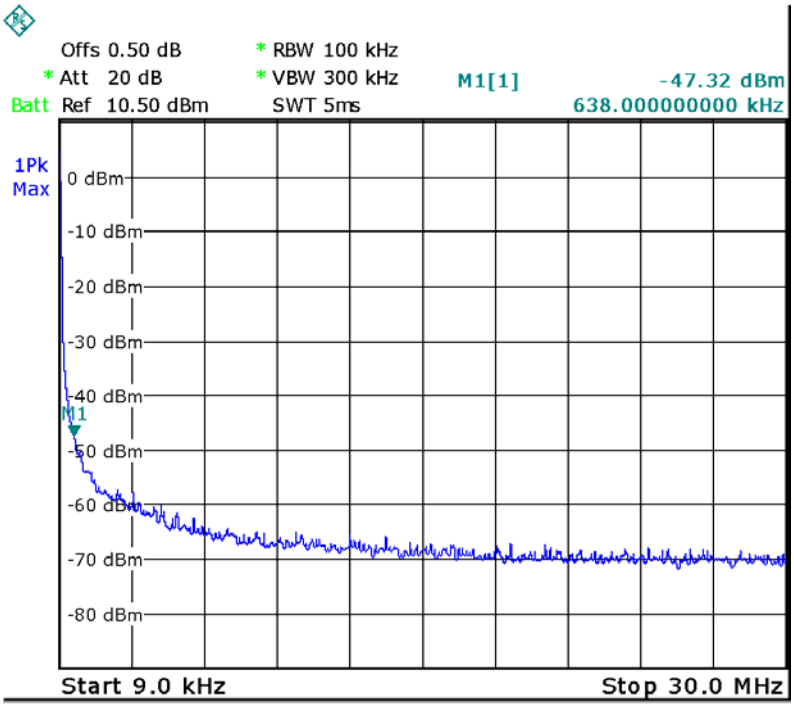
Low Channel



Middle Channel

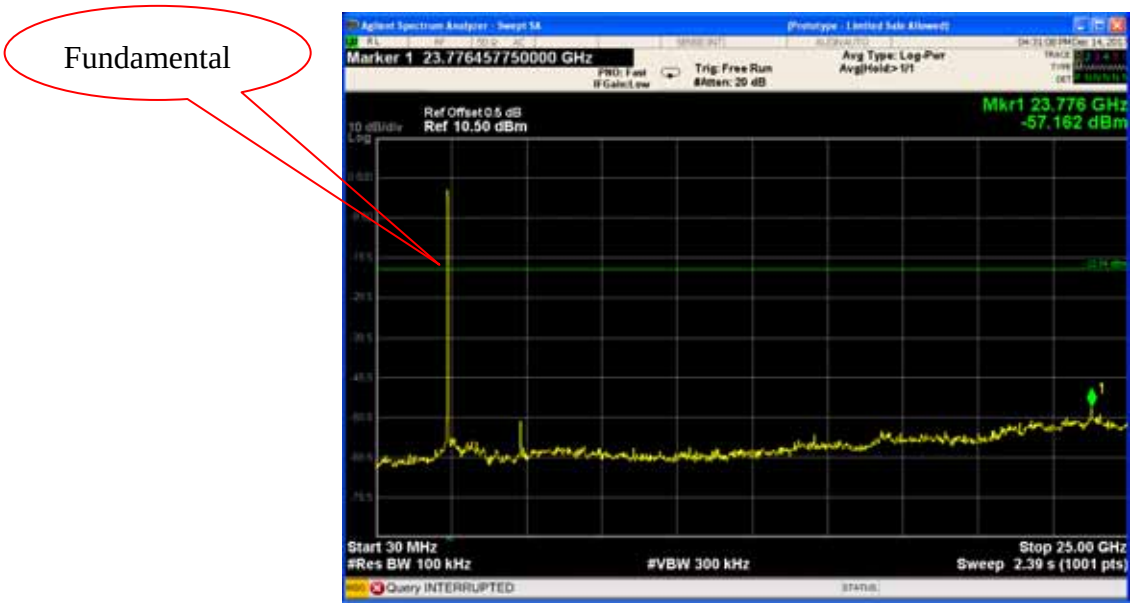


High Channel

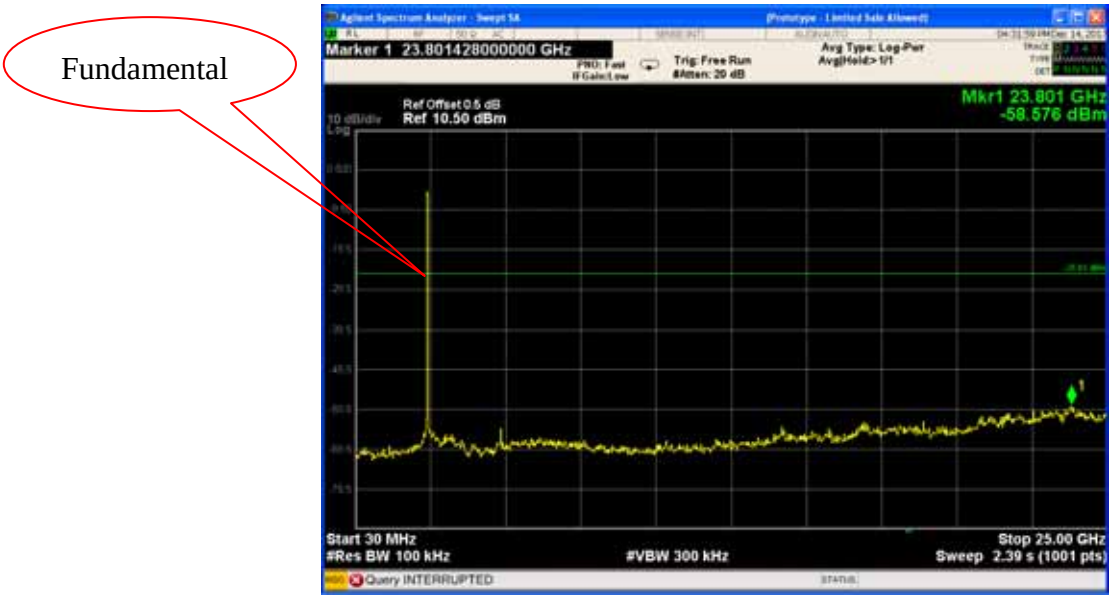


802.11B

Low Channel



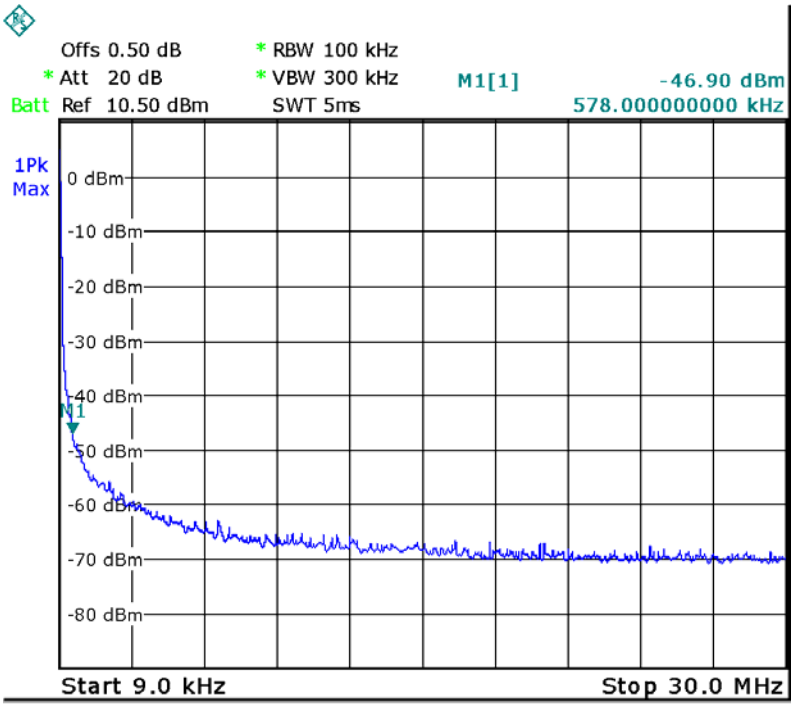
Middle Channel



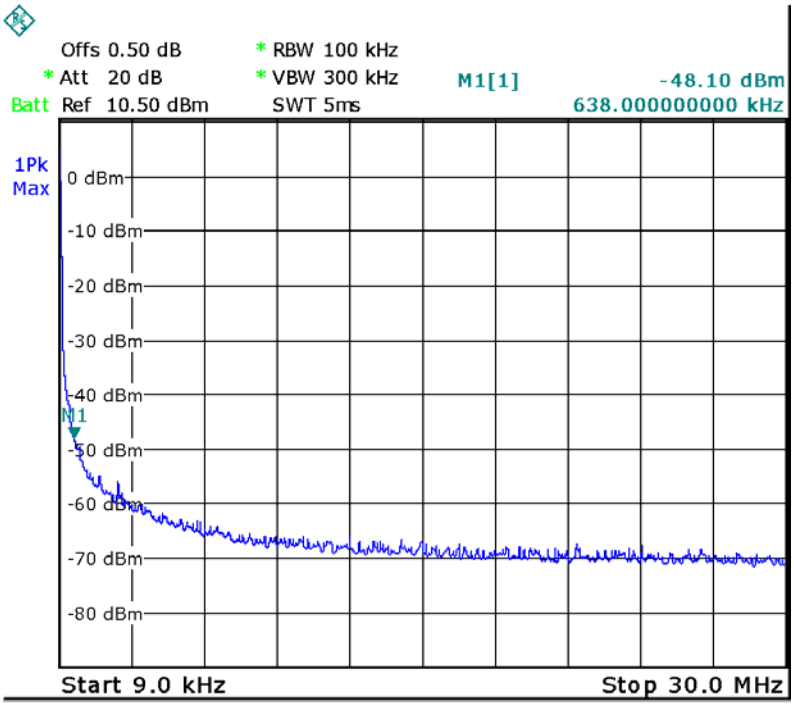
High Channel

802.11G

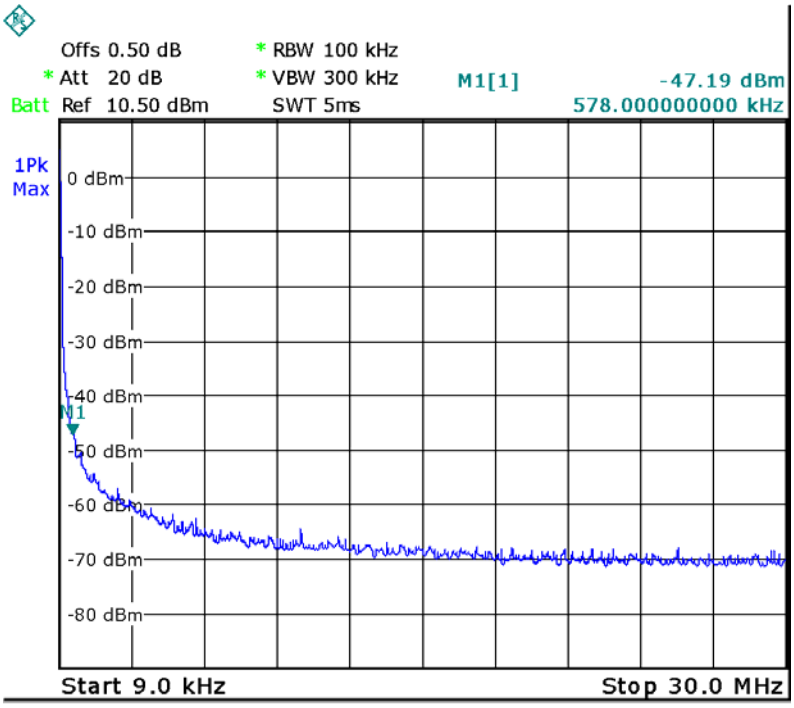
Low Channel



Middle Channel

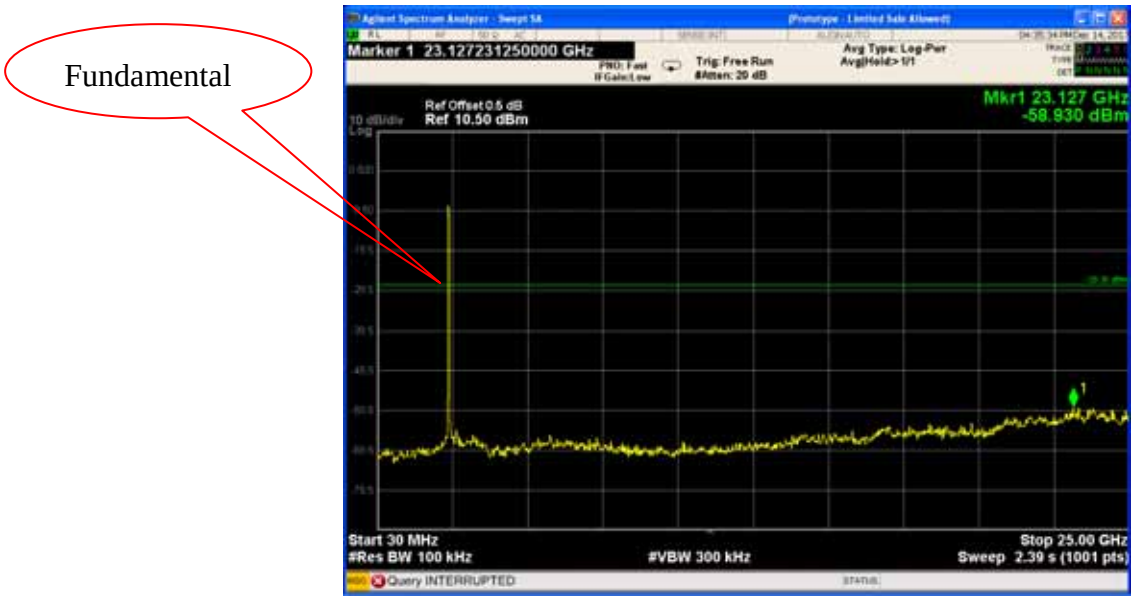


High Channel

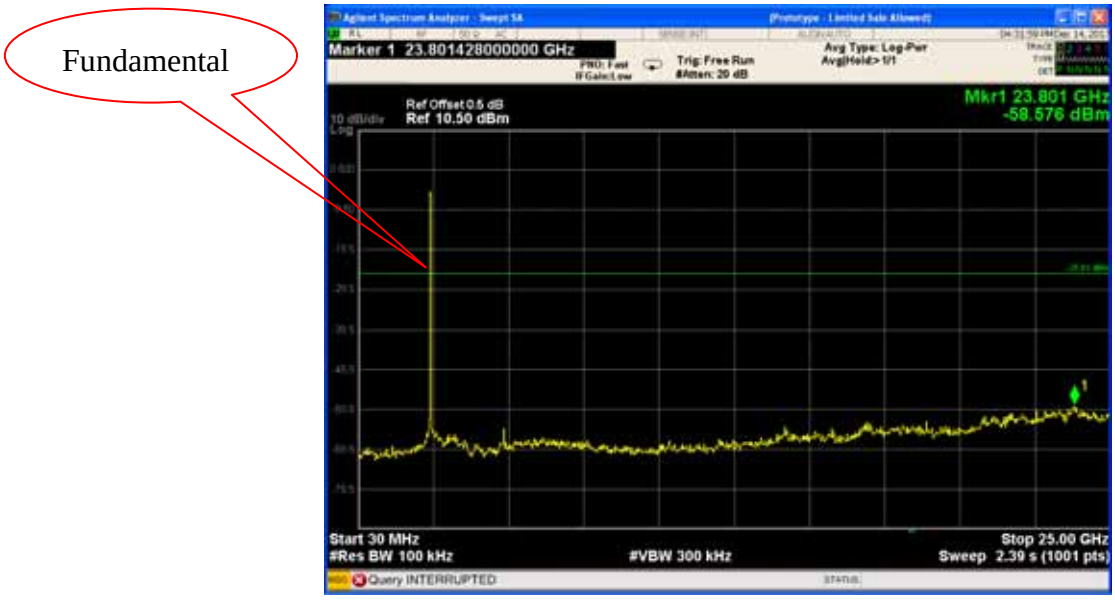


802.11G

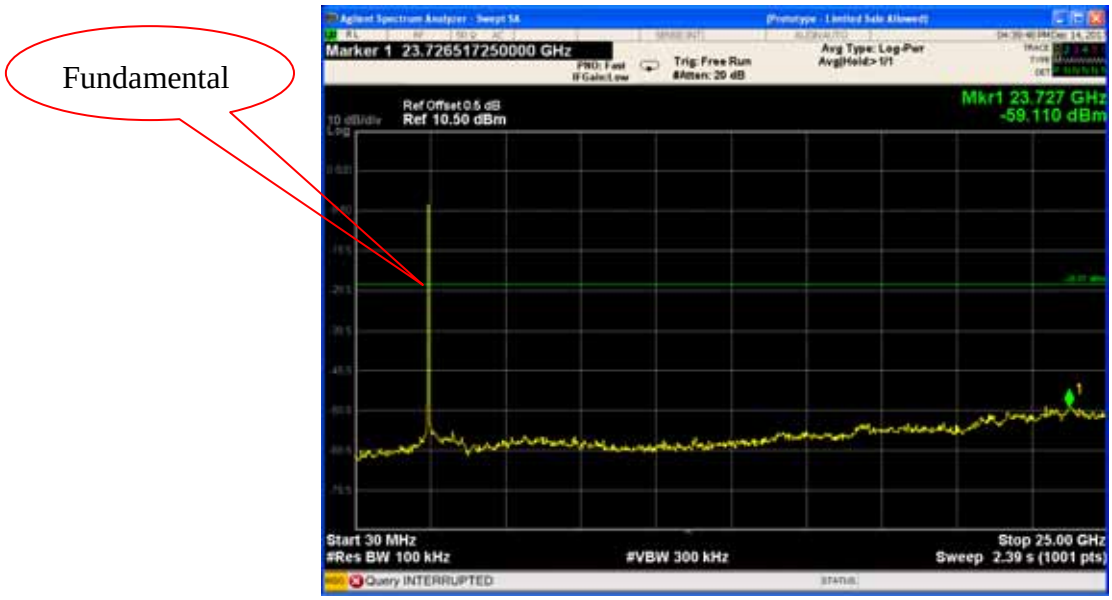
Low Channel



Middle Channel

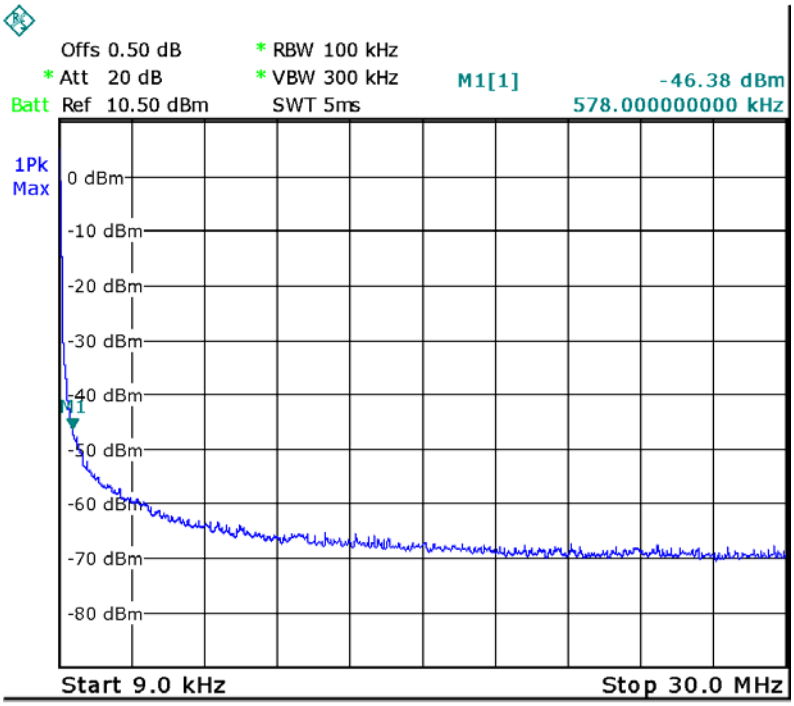


High Channel

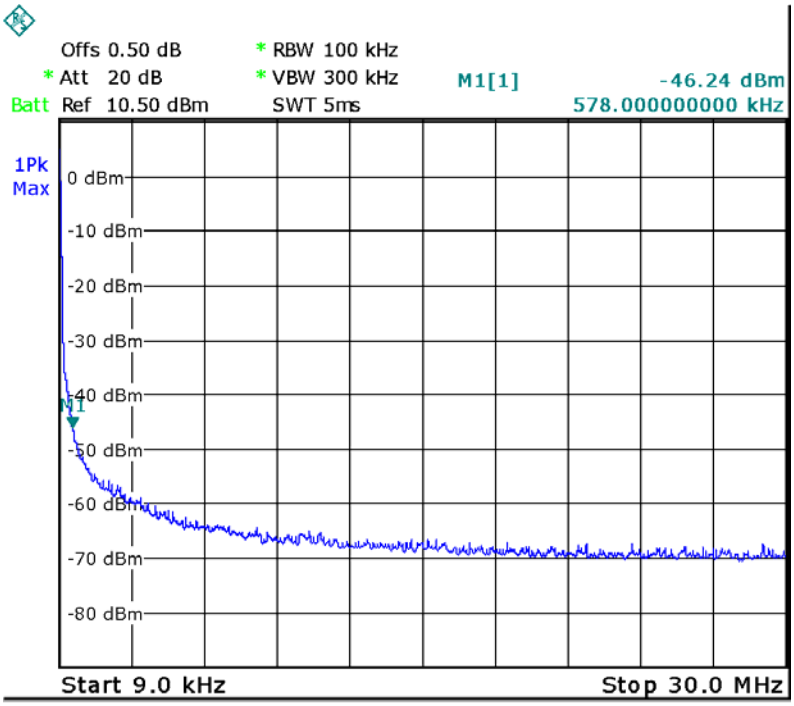


802.11 HT n20

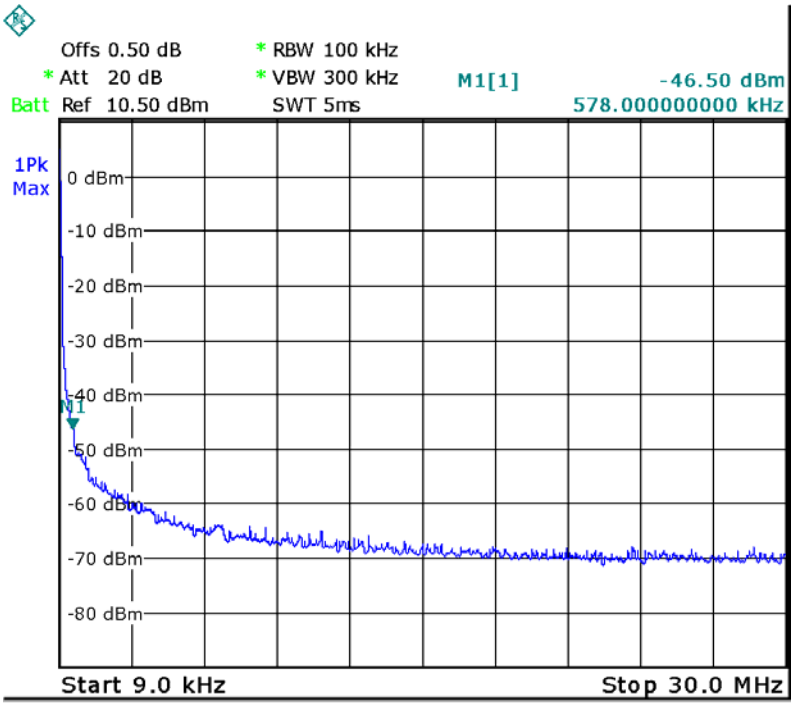
Low Channel



Middle Channel

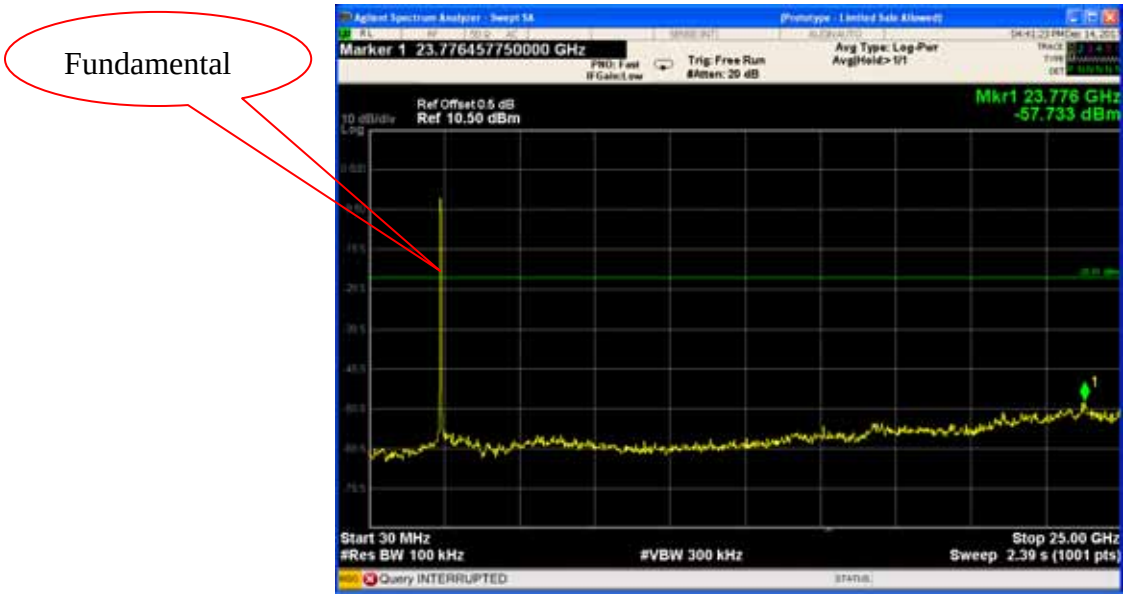


High Channel

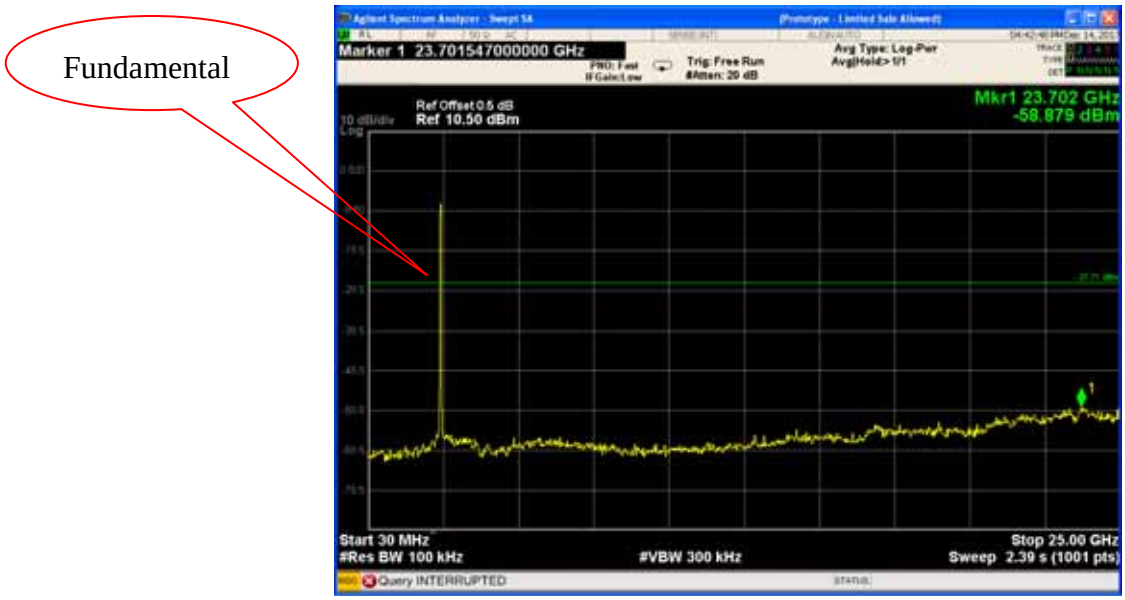


802.11 HT n20

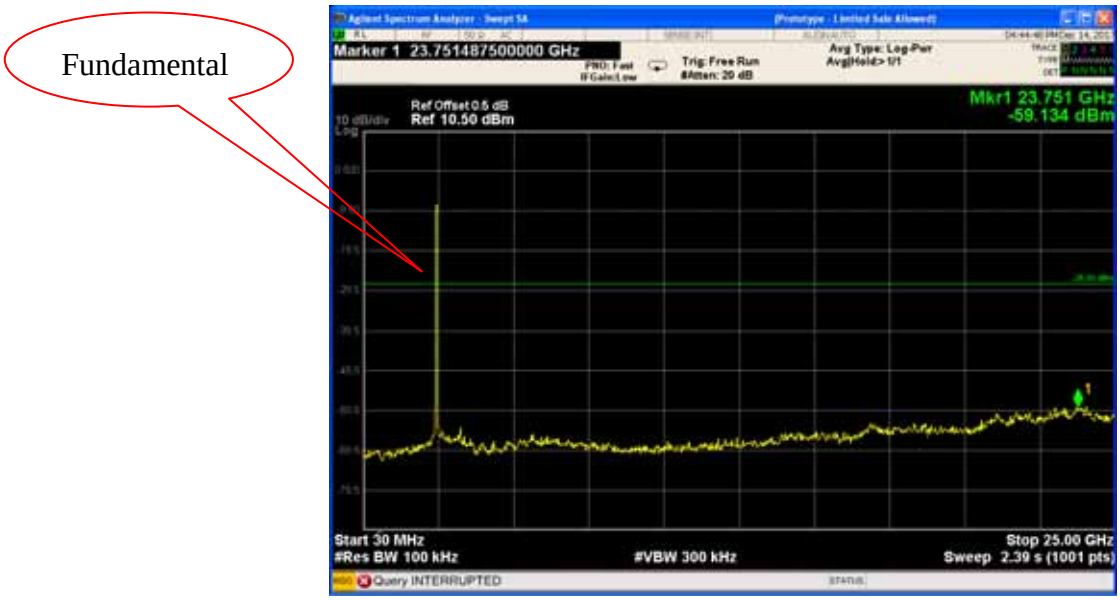
Low Channel



Middle Channel

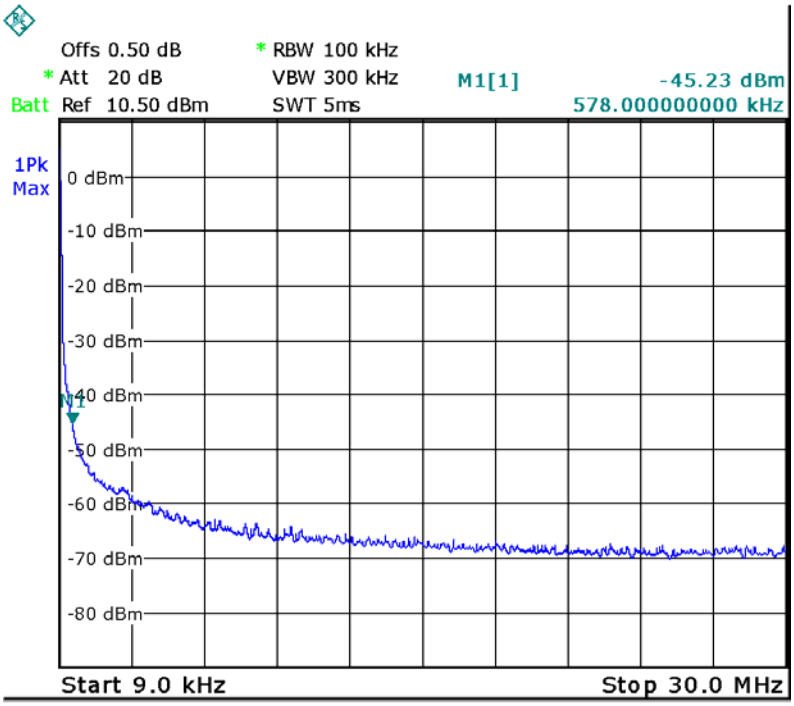


High Channel

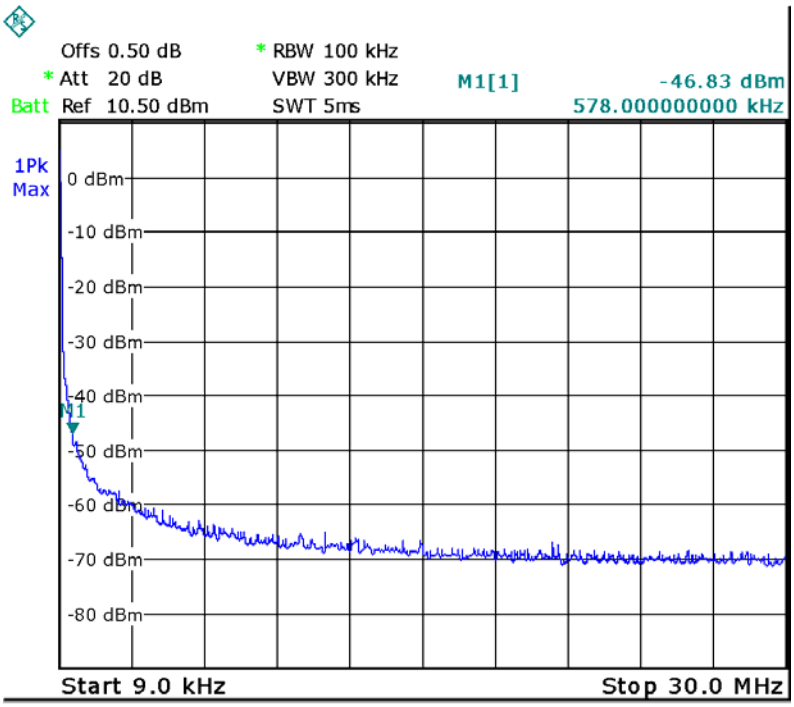


802.11 HT n40

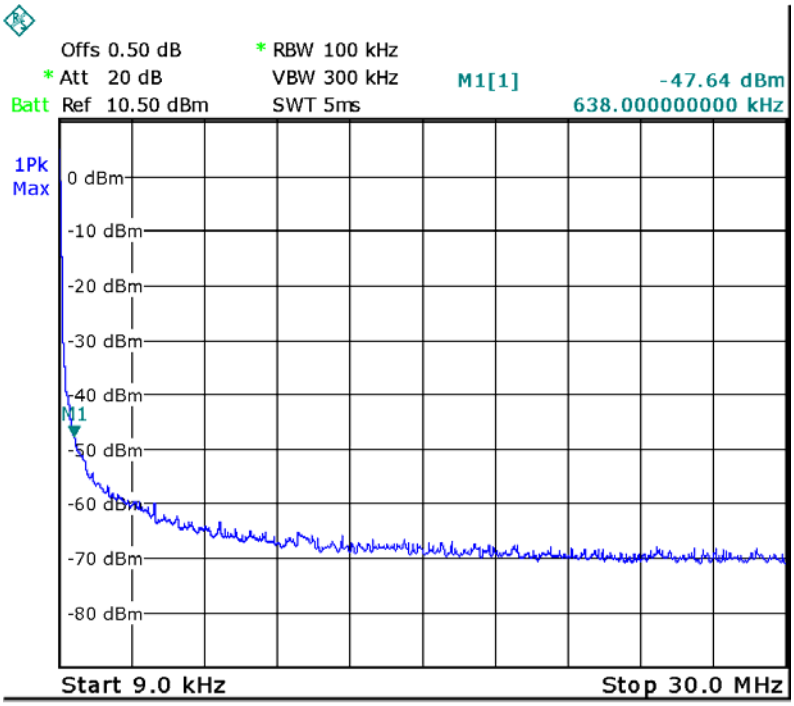
Low Channel



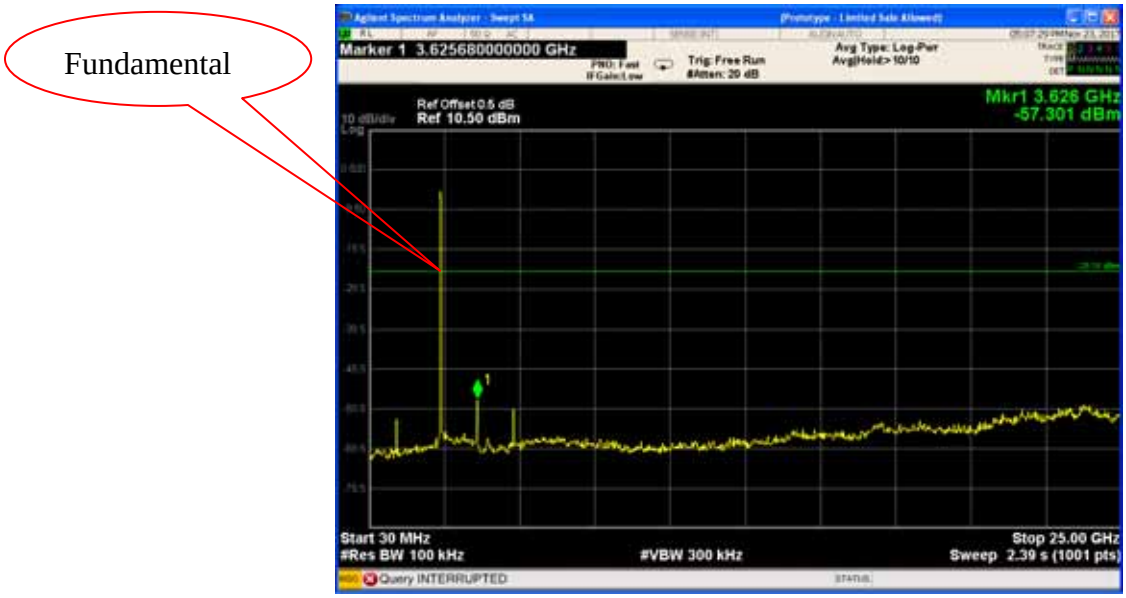
Middle Channel



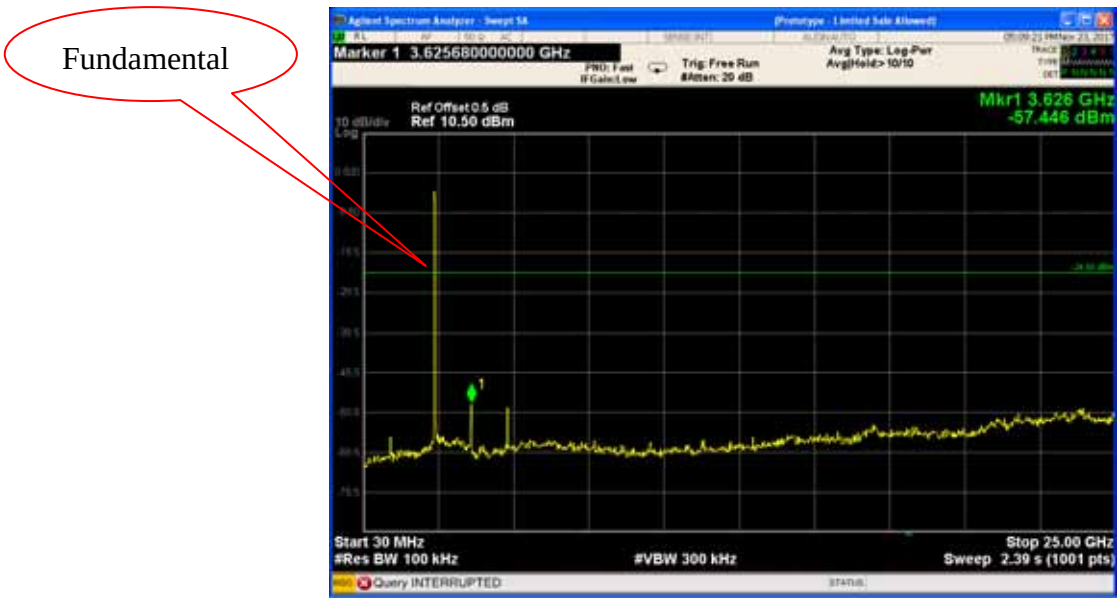
High Channel



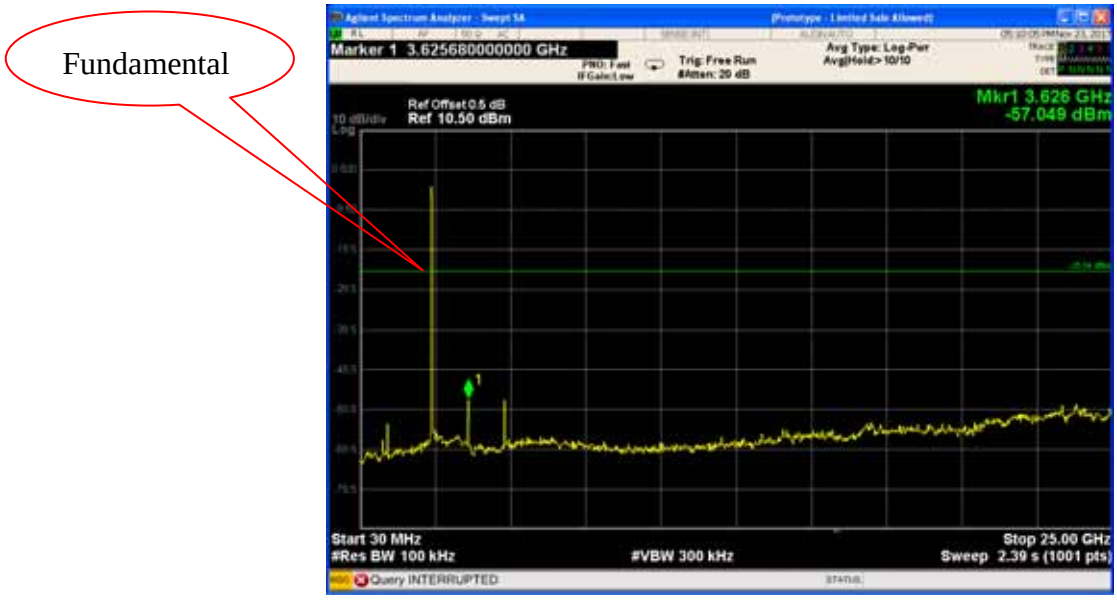
Low Channel



Middle Channel



High Channel



10 Band Edge Measurement

Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB 558074 D01 DTS Meas Guidance v04
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

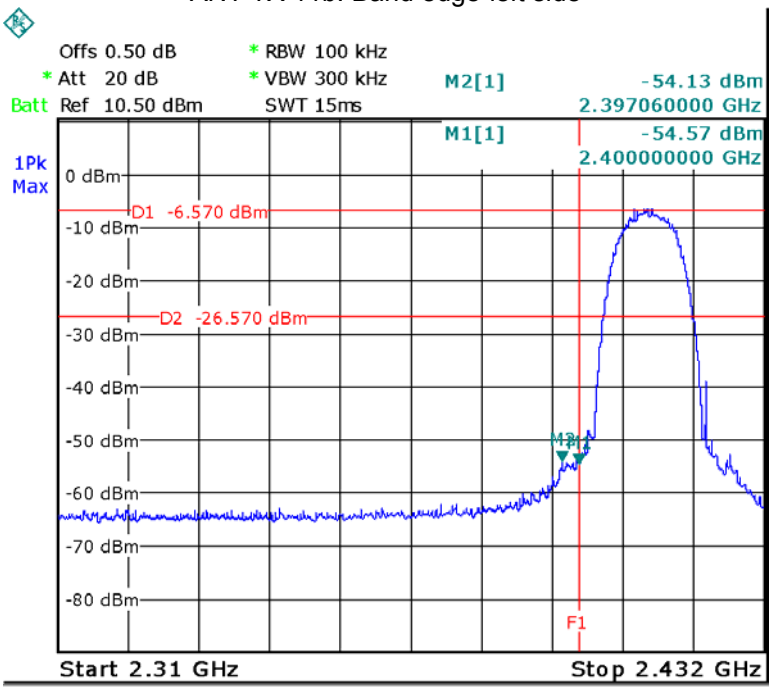
10.1 Test Produce

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.

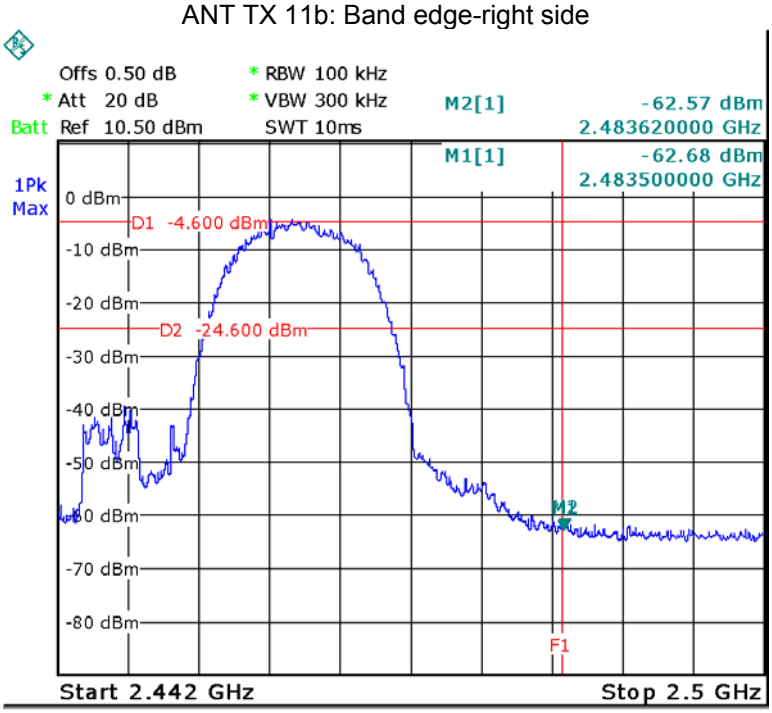
10.2 Test Result

Test result plots shown as follows:

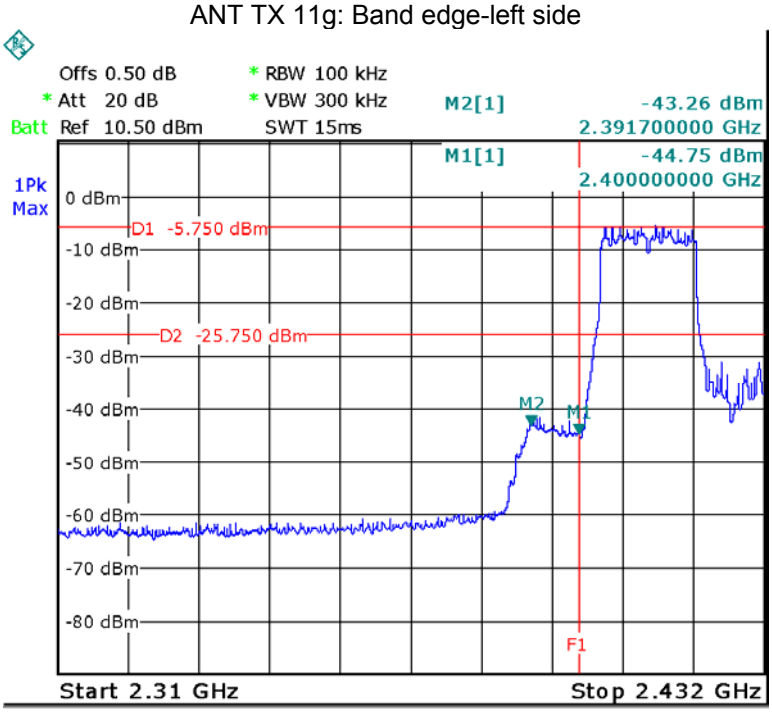
ANT TX 11b: Band edge-left side



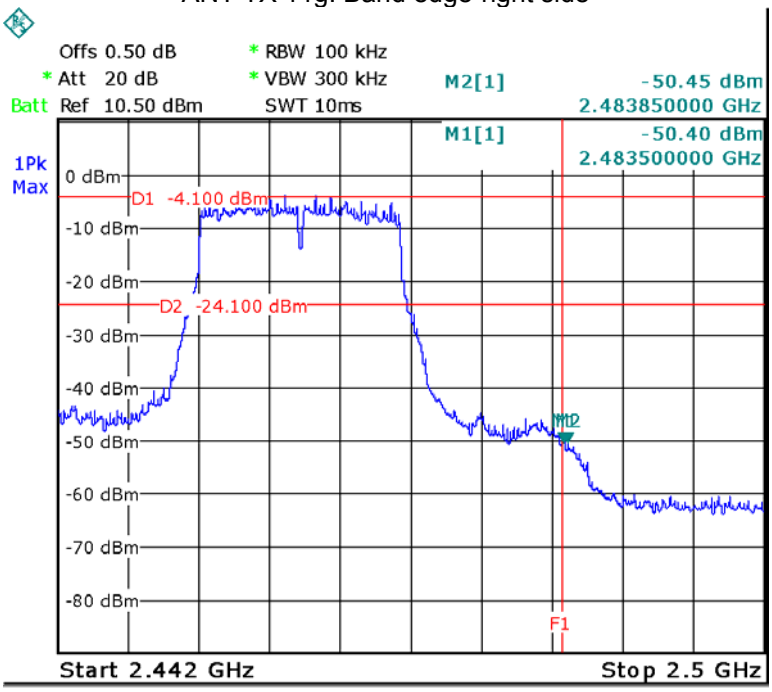
ANT TX 11b: Band edge-right side



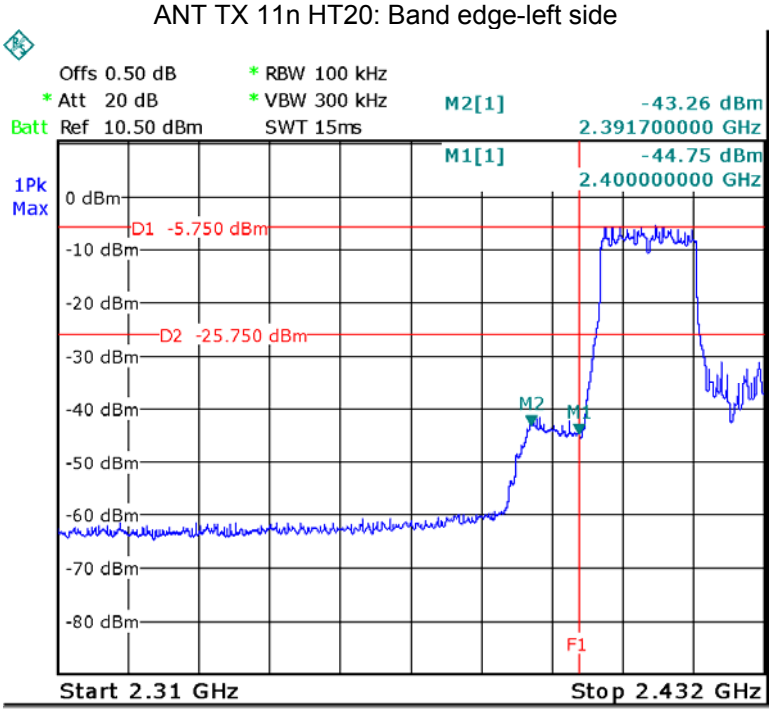
ANT TX 11g: Band edge-left side



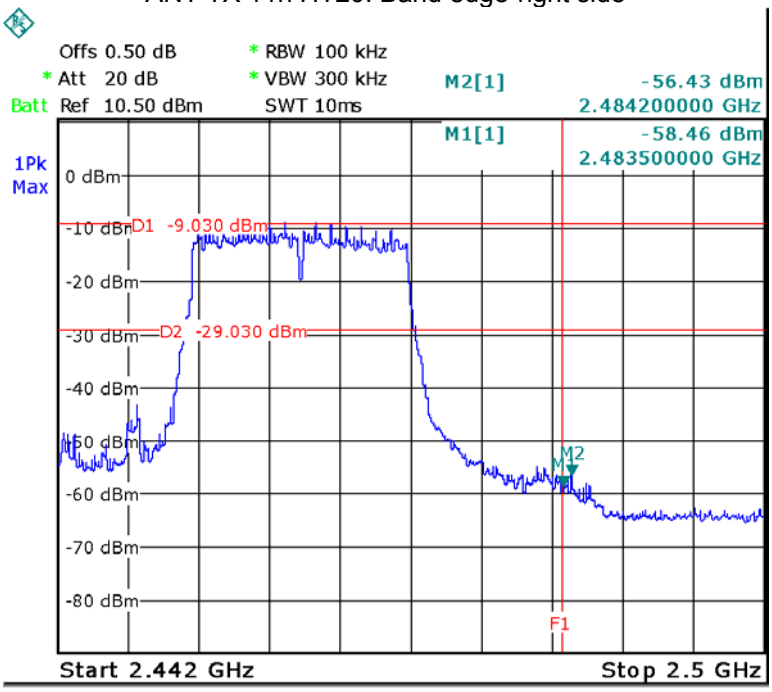
ANT TX 11g: Band edge-right side



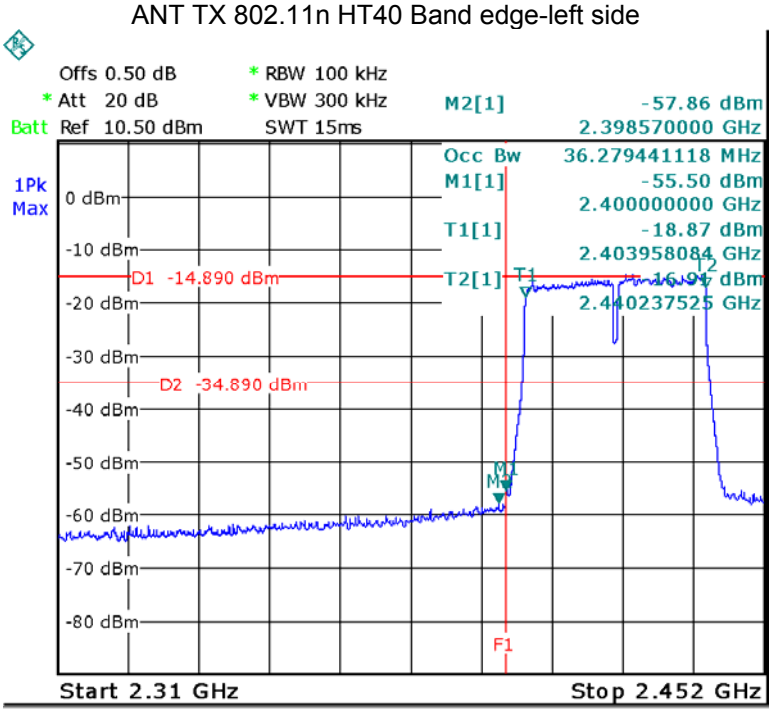
ANT TX 11n HT20: Band edge-left side



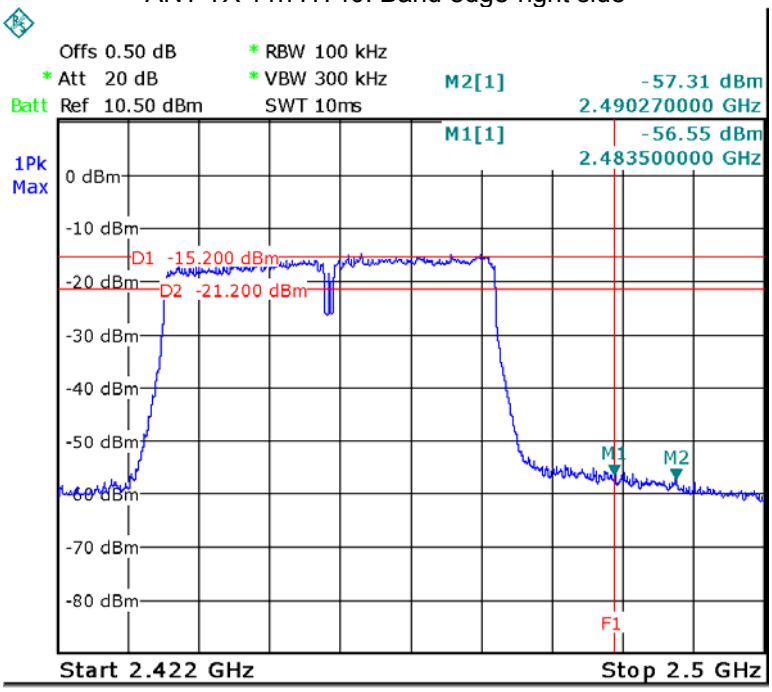
ANT TX 11n HT20: Band edge-right side



ANT TX 802.11n HT40 Band edge-left side



ANT TX 11n HT40: Band edge-right side



11 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04

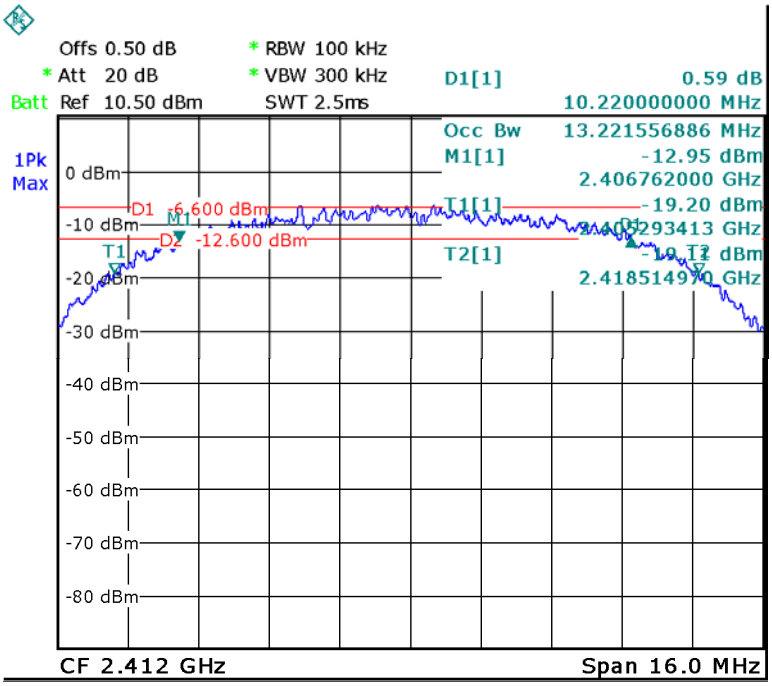
11.1 Test Procedure:

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

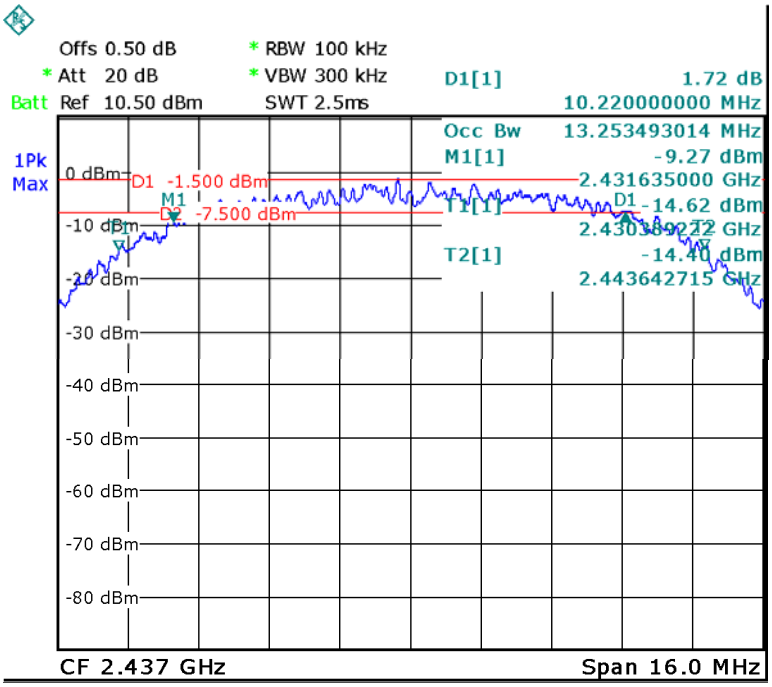
11.2 Test Result:

ANT	**Operation mode**	**Bandwidth (MHz)**		
		Low	Middle	High
ANT	11b	10.220	10.220	10.028
	11g	16.517	16.517	16.517
	11n HT20	17.677	17.677	17.677
	11n HT40	36.560	36.560	36.560

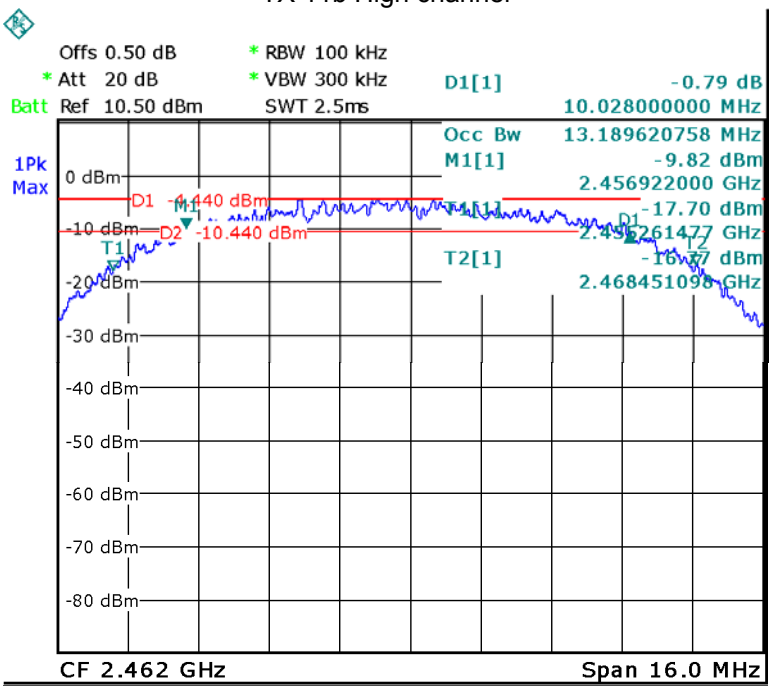
TX 11b Low channel



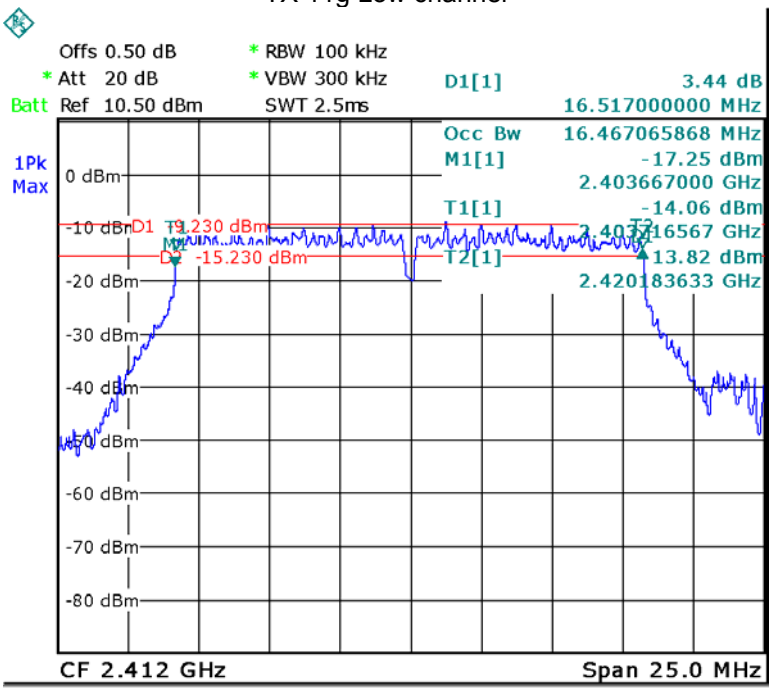
TX 11b Middle channel



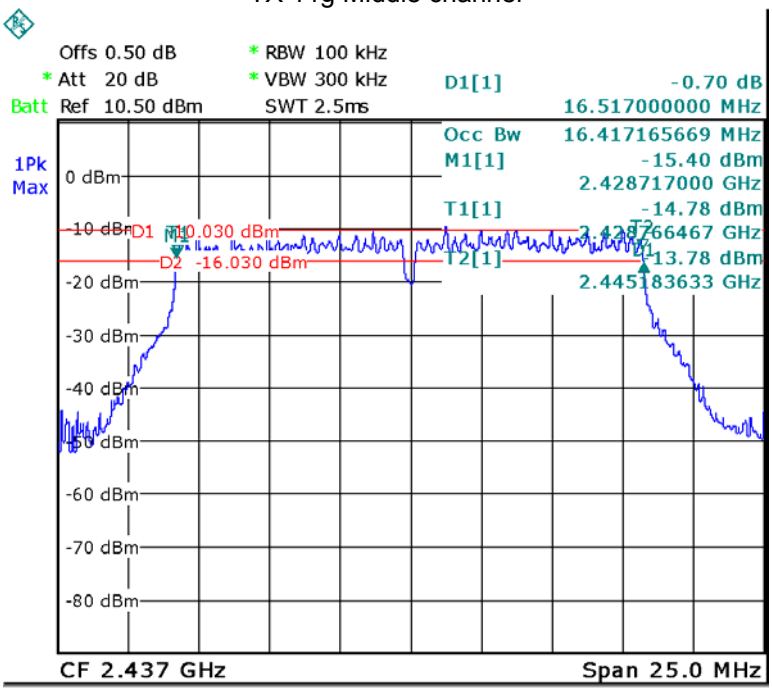
TX 11b High channel



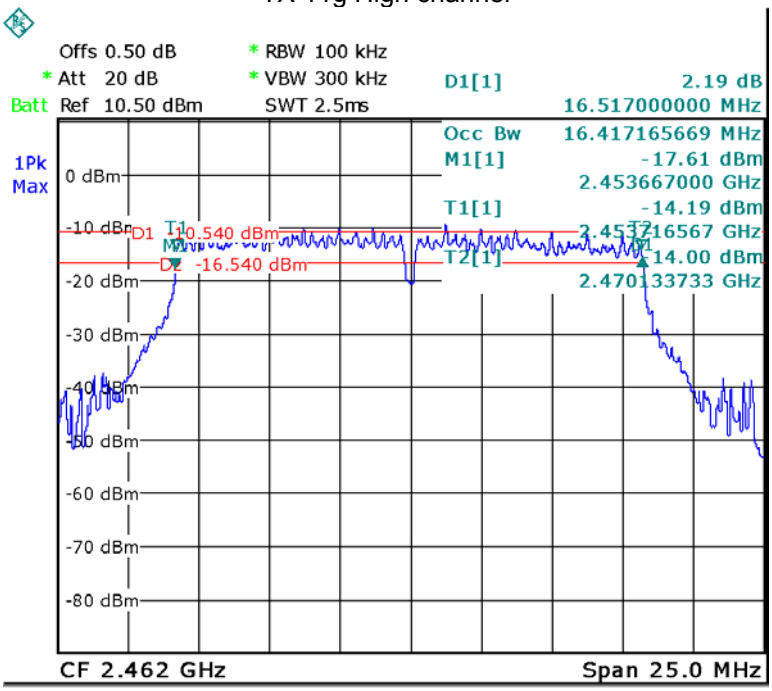
TX 11g Low channel



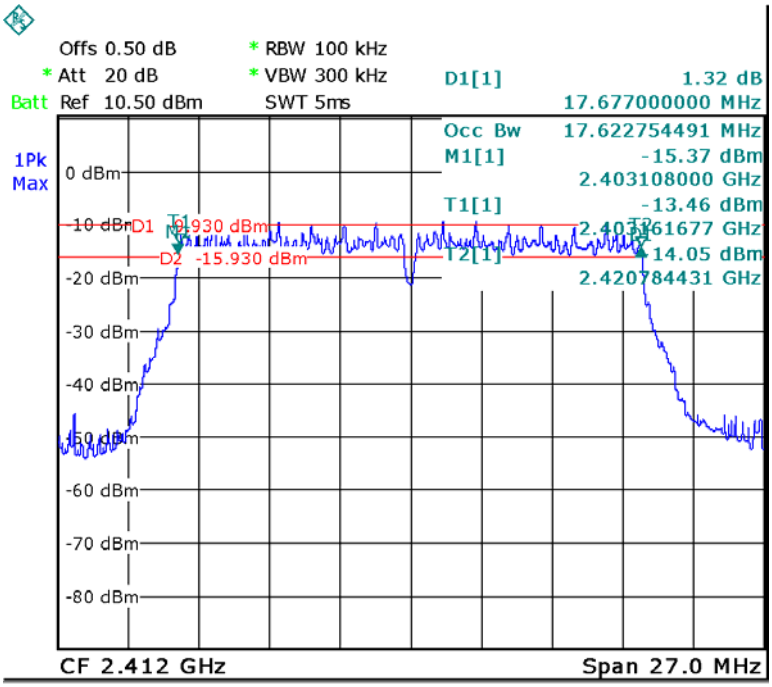
TX 11g Middle channel



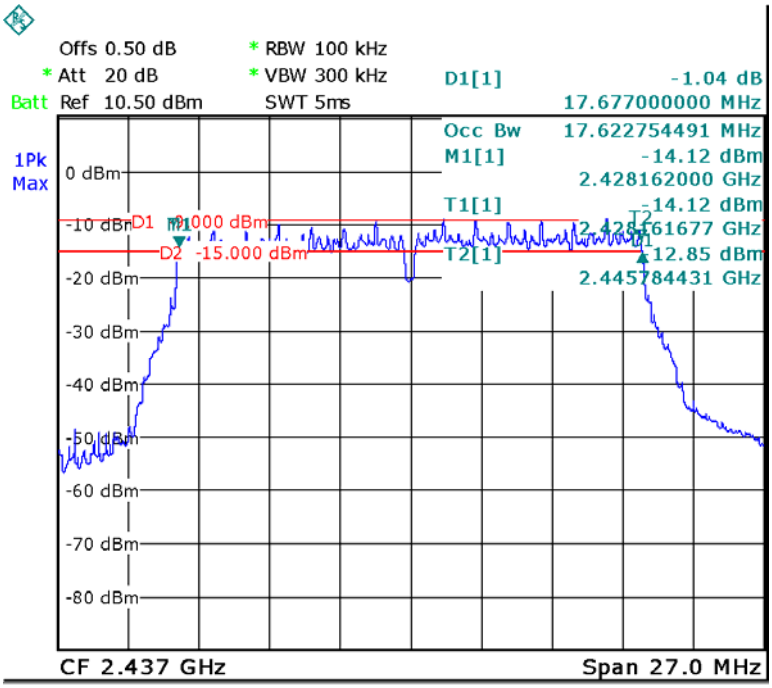
TX 11g High channel



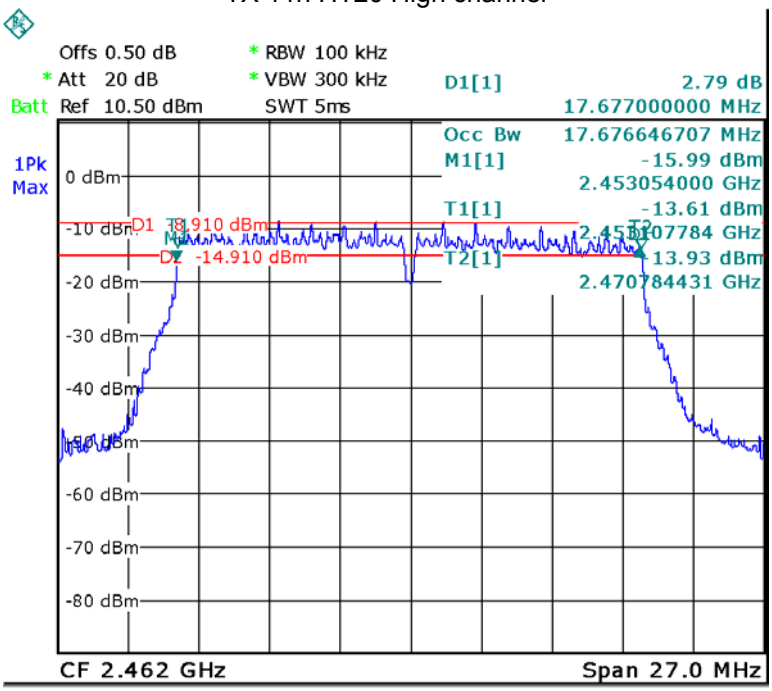
TX 11n HT20 Low channel



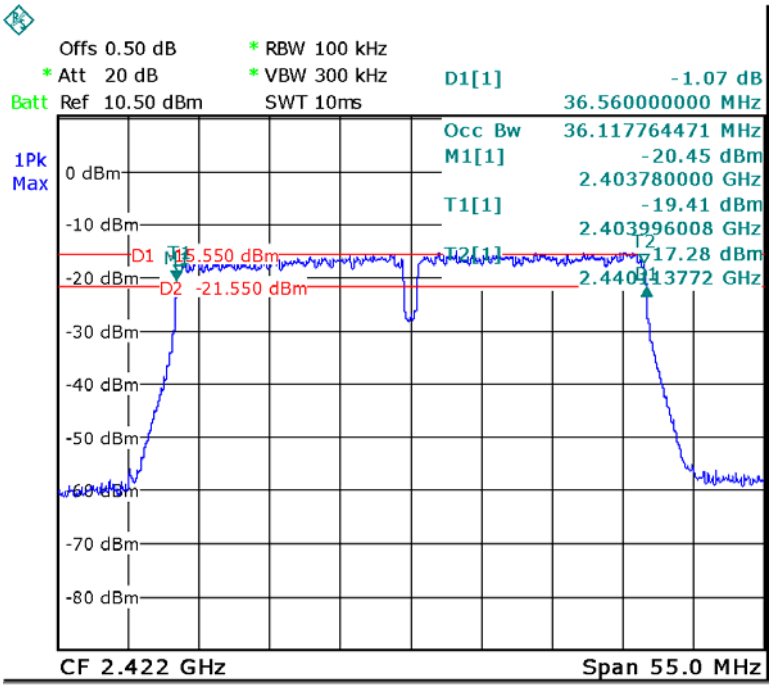
TX 11n HT20 Middle channel



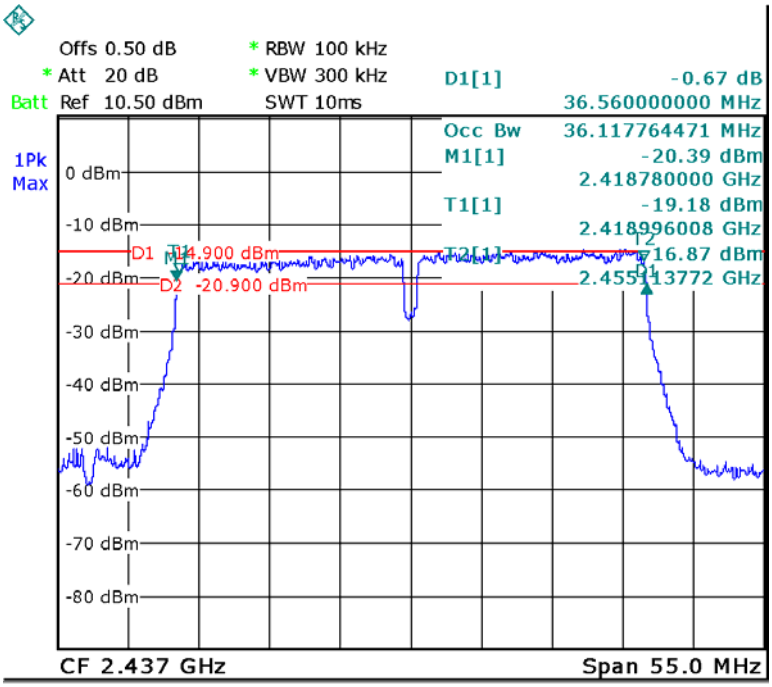
TX 11n HT20 High channel



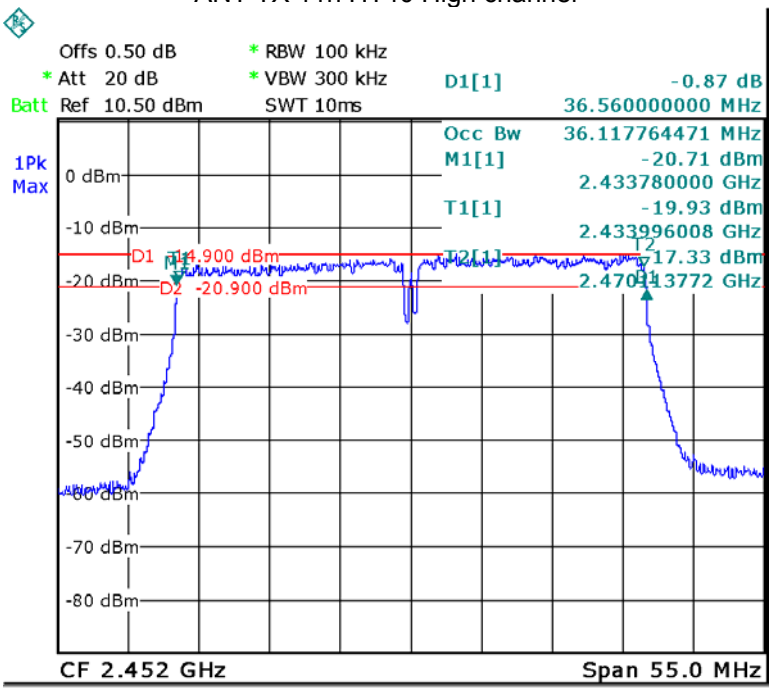
ANT TX 11n HT40 Low channel



ANT TX 11n HT40 Middle channel



ANT TX 11n HT40 High channel



12 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04

12.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v03r04 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.

12.2 Test Result:

Operation mode	ANT	Maximum Peak Output Power (dBm)		
		Low	Middle	High
11b	ANT	9.02	9.18	9.28
11g	ANT	9.22	9.29	9.36
11n HT20	ANT	9.15	9.28	9.40
11n HT40	ANT	9.09	**9.46**	9.38
Limit				
1W/30dBm				

13 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04

13.1 Test Procedure:

KDB 558074 D01 DTS Meas Guidance v03r04 section 10.2

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

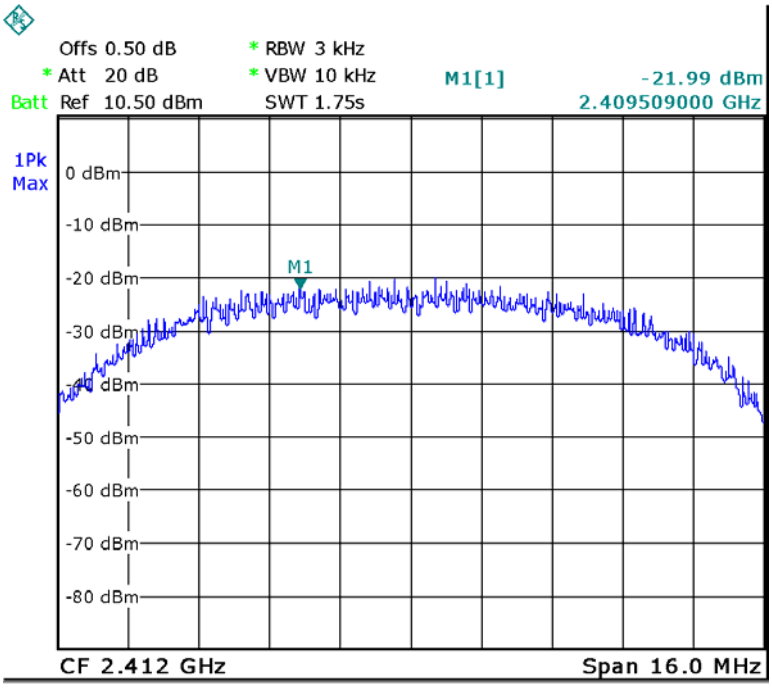
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.

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.

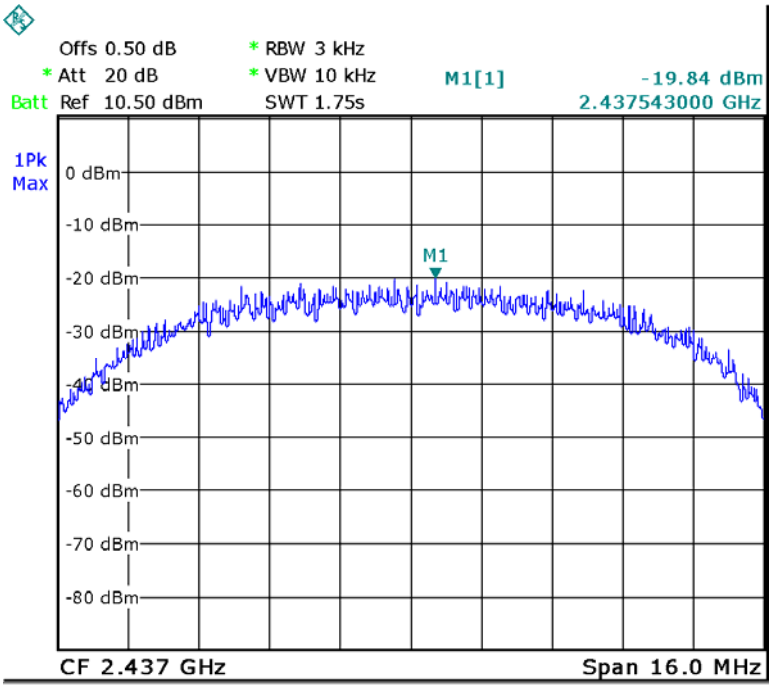
13.2 Test Result:

Operation mode	ANT	Maximum Peak Output Power (dBm per 3kHz)		
		Low	Middle	High
11b	ANT	-21.99	-19.84	-21.61
11g	ANT	-21.27	-19.60	-21.76
11n HT20	ANT	-20.41	-18.71	-23.54
11n HT40	ANT	-27.45	-28.00	-20.66
Limit				
8dBm per 3kHz				

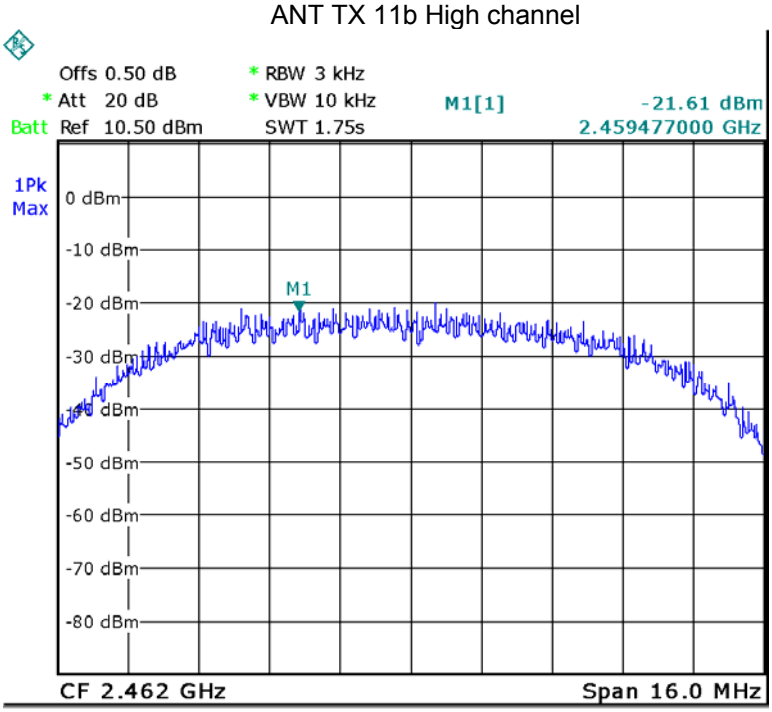
ANT TX 11b Low channel



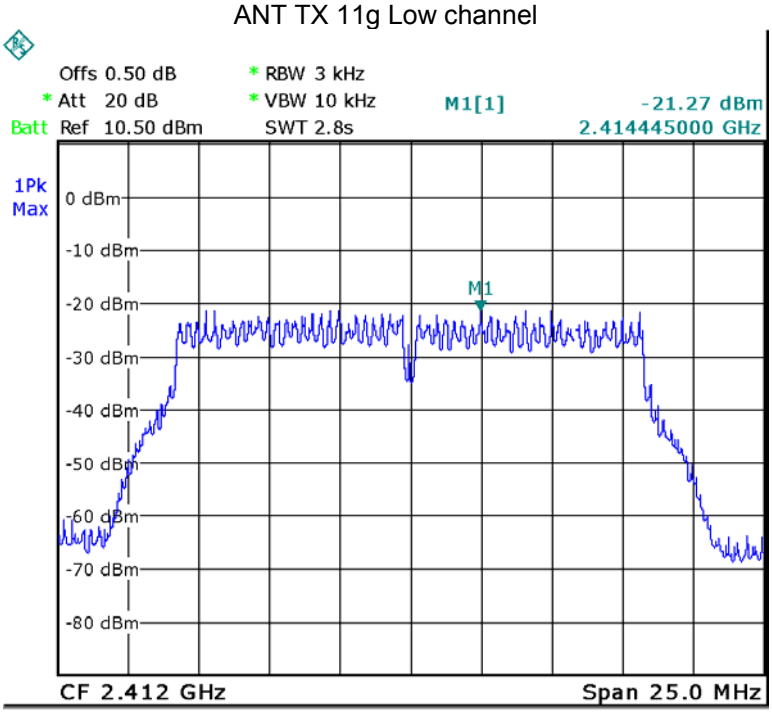
ANT TX 11b Middle channel



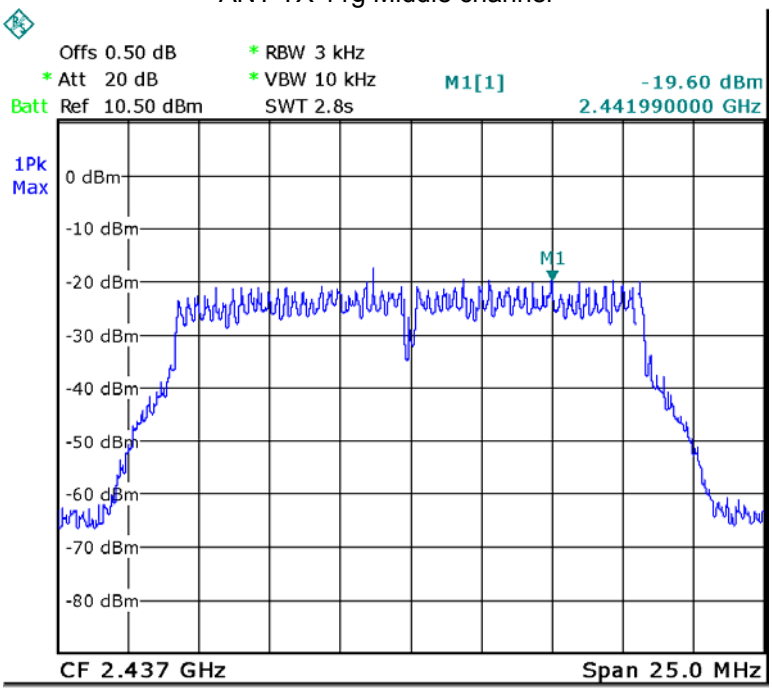
ANT TX 11b High channel



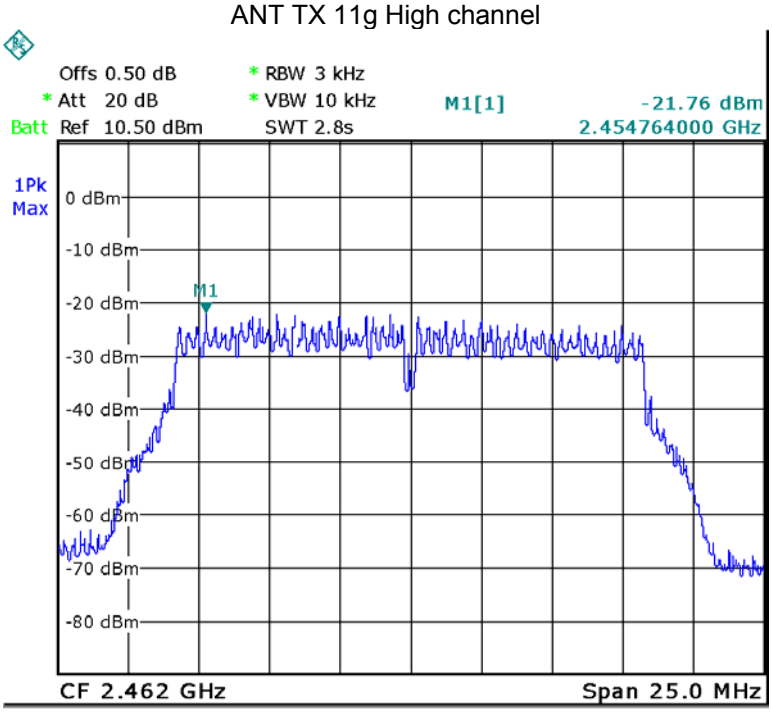
ANT TX 11g Low channel



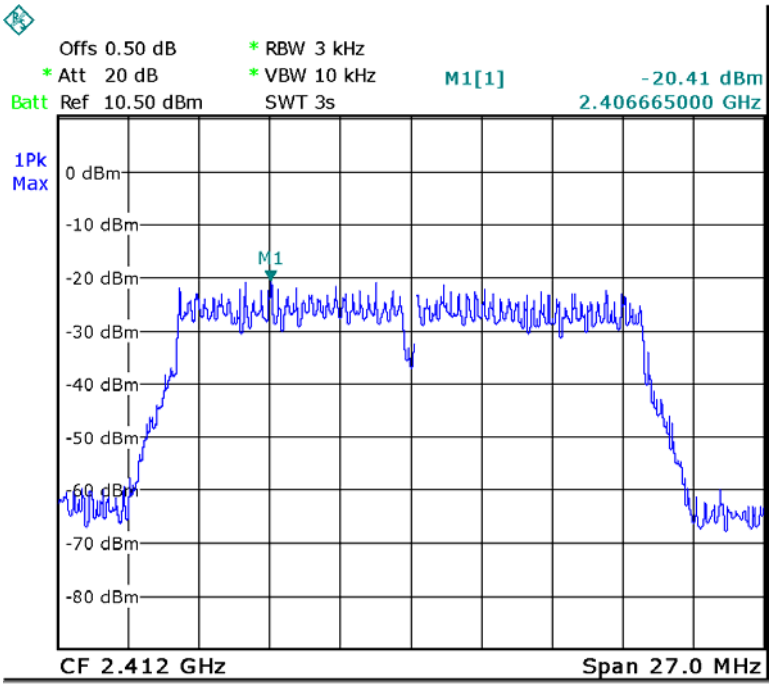
ANT TX 11g Middle channel



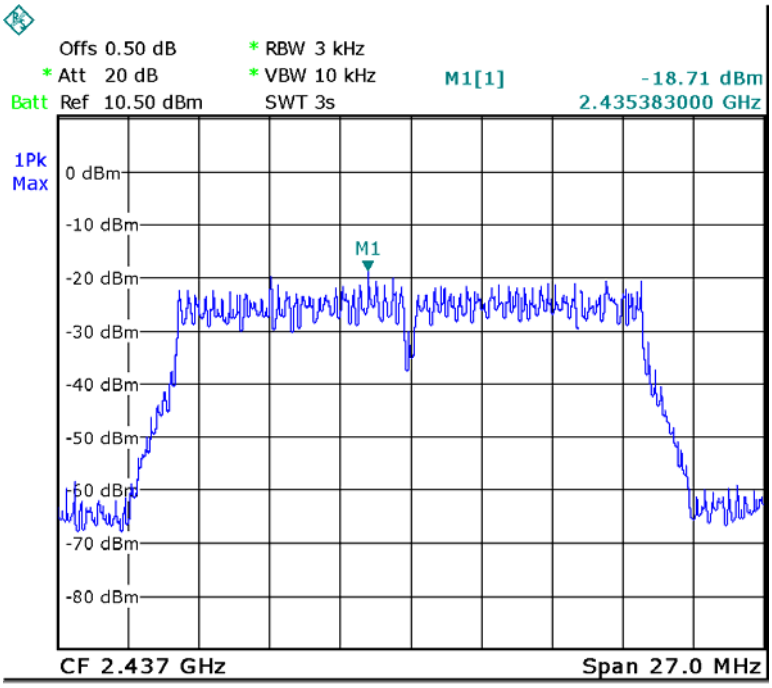
ANT TX 11g High channel



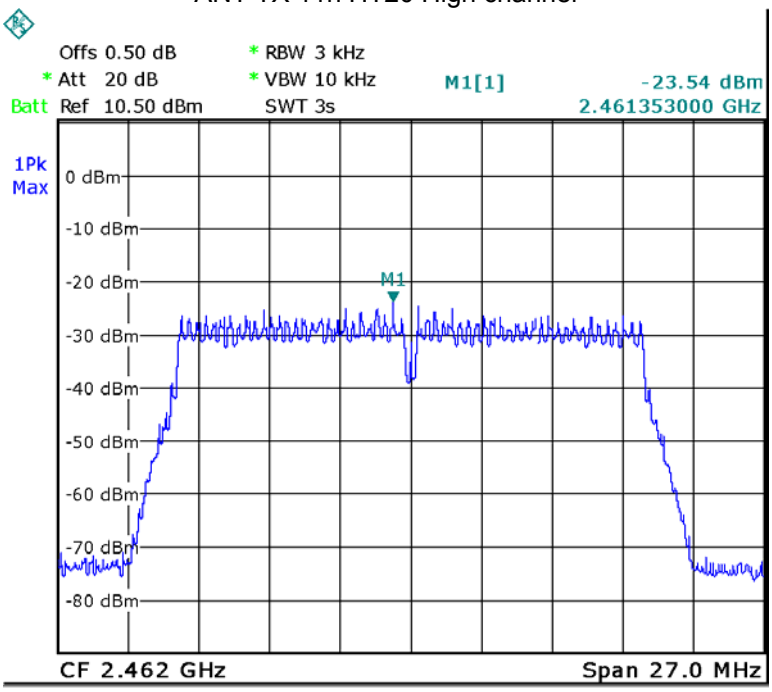
ANT TX 11n HT20 Low channel



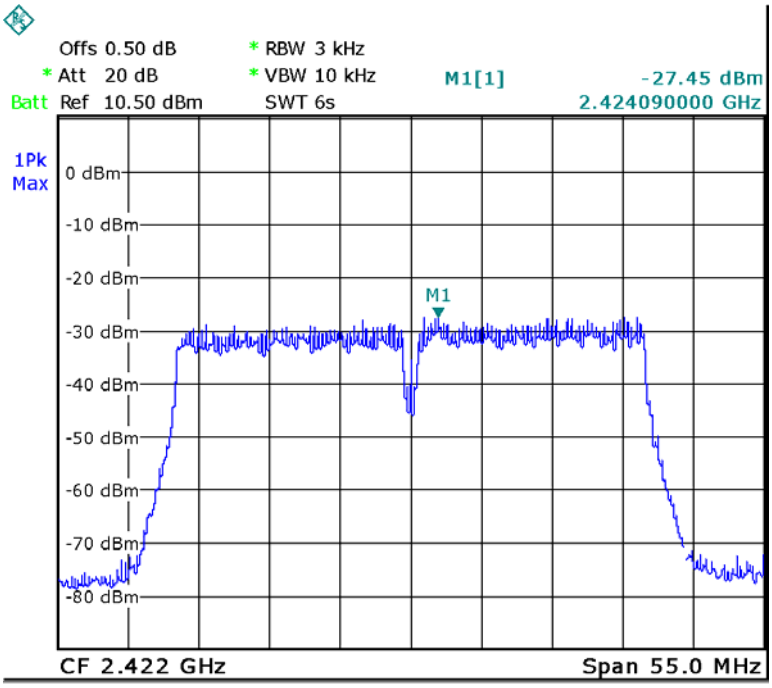
ANT TX 11n HT20 Middle channel



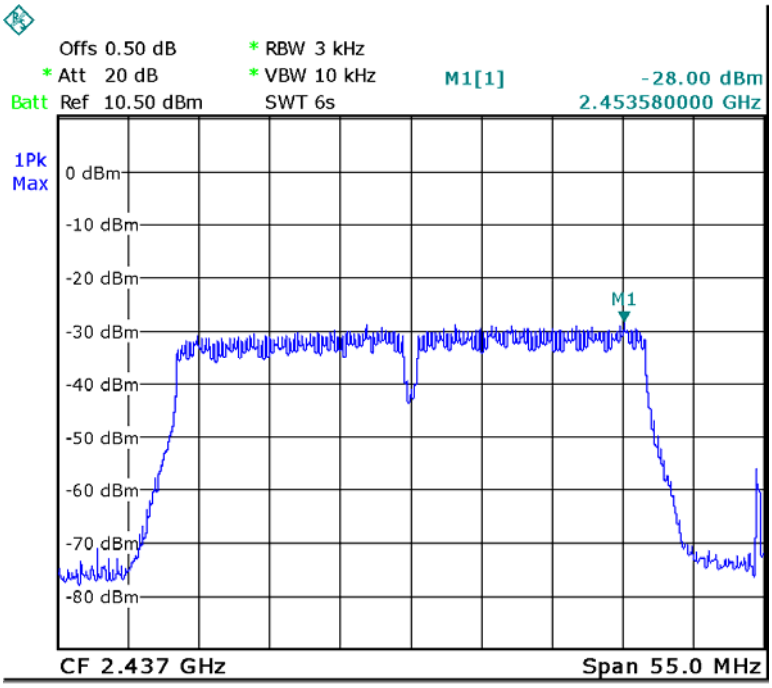
ANT TX 11n HT20 High channel



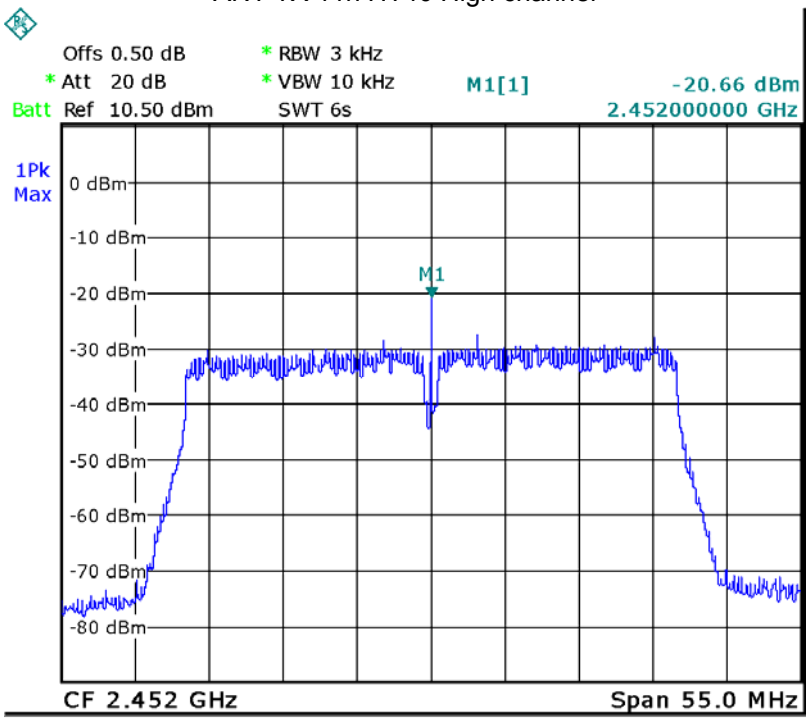
ANT TX 11n HT40 Low channel



ANT TX 11n HT40 Middle channel

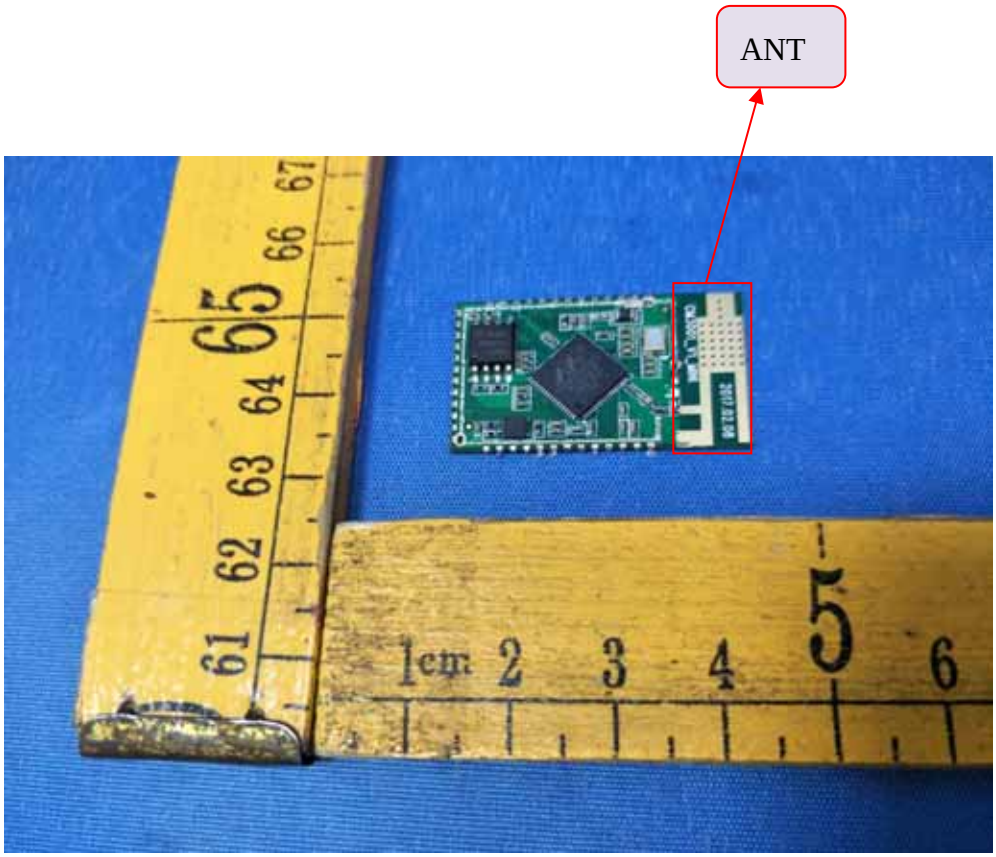


ANT TX 11n HT40 High channel



14 Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, 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. This product has PCB Printed antenna fulfill the requirement of this section.



15 RF Exposure

Please refer to the SAR report.

16 Photographs – Model ET-BB301 Test Setup

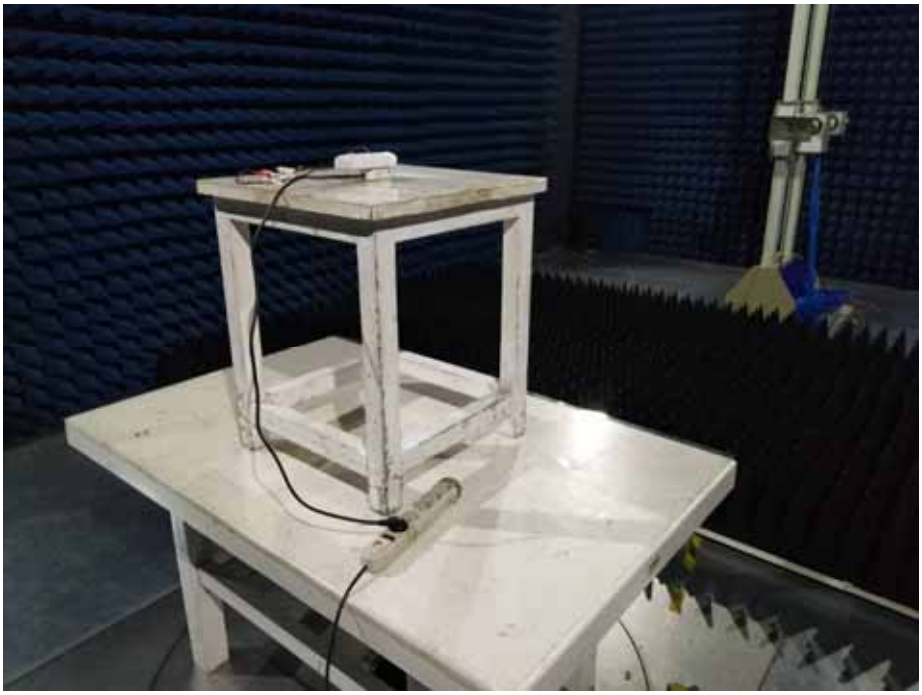
16.1 Conducted Emission

16.2 Radiated Emission

Below 30MHz

Test frequency from 30MHz to 1GHz

Test frequency above 1GHz



17 Photographs - Constructional Details

17.1 EUT – External View

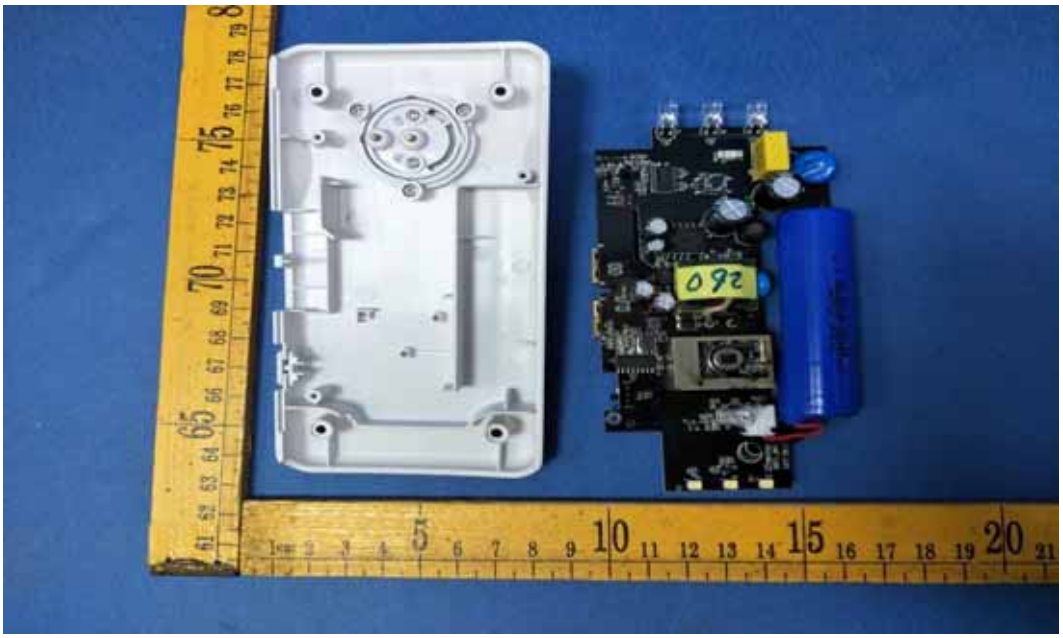
iPhone/iPod
iPhone/iPod
SW
AUTO

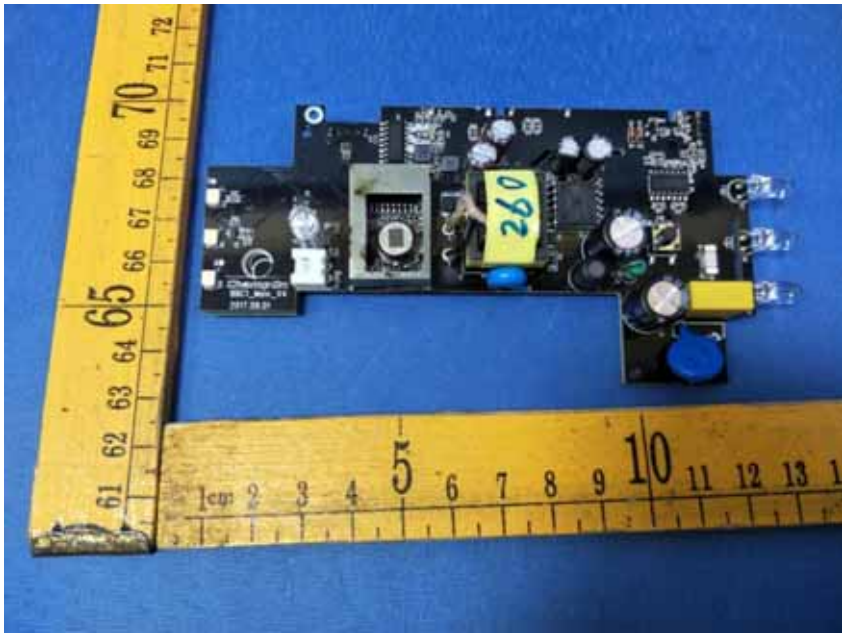
American
Red Cross
BUDDY CONNECT

American
Red Cross

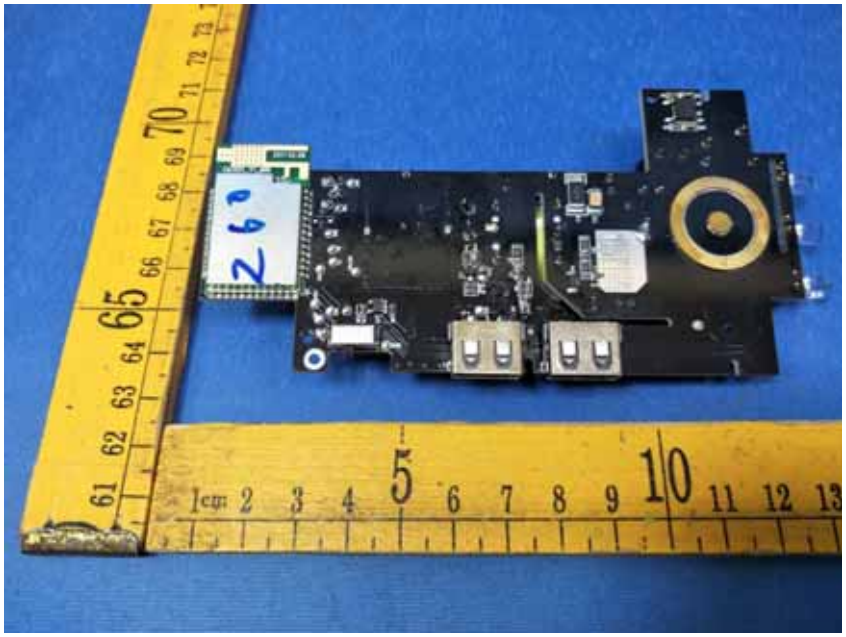
American
Red Cross
BLACKTOUT BUDDY CONNECT

17.2 EUT – Internal View

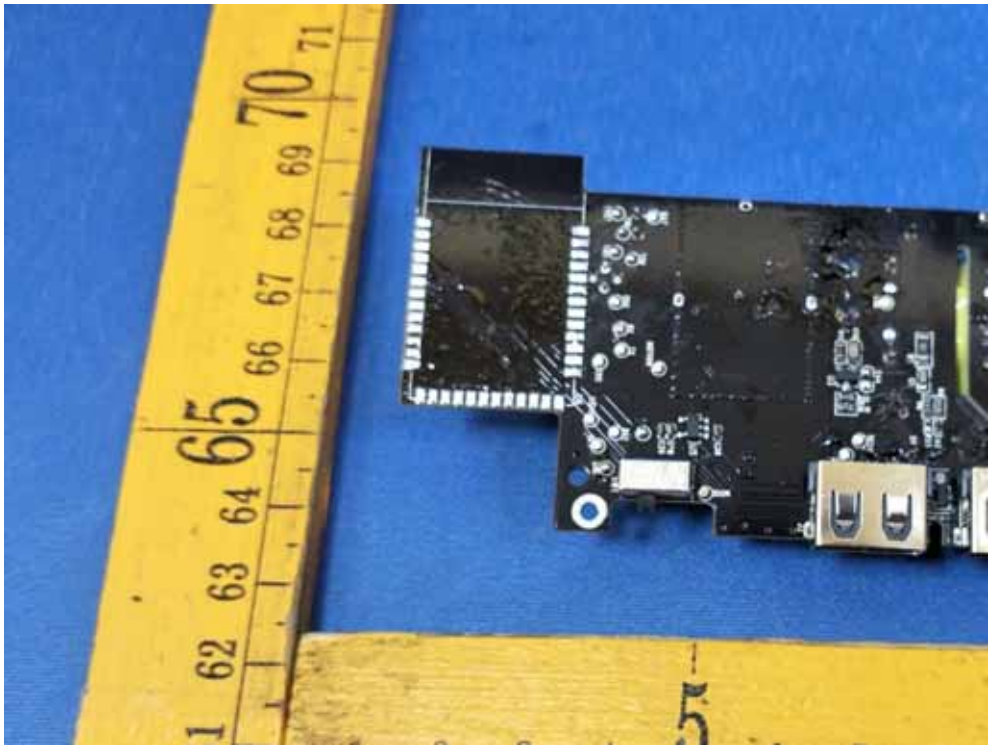


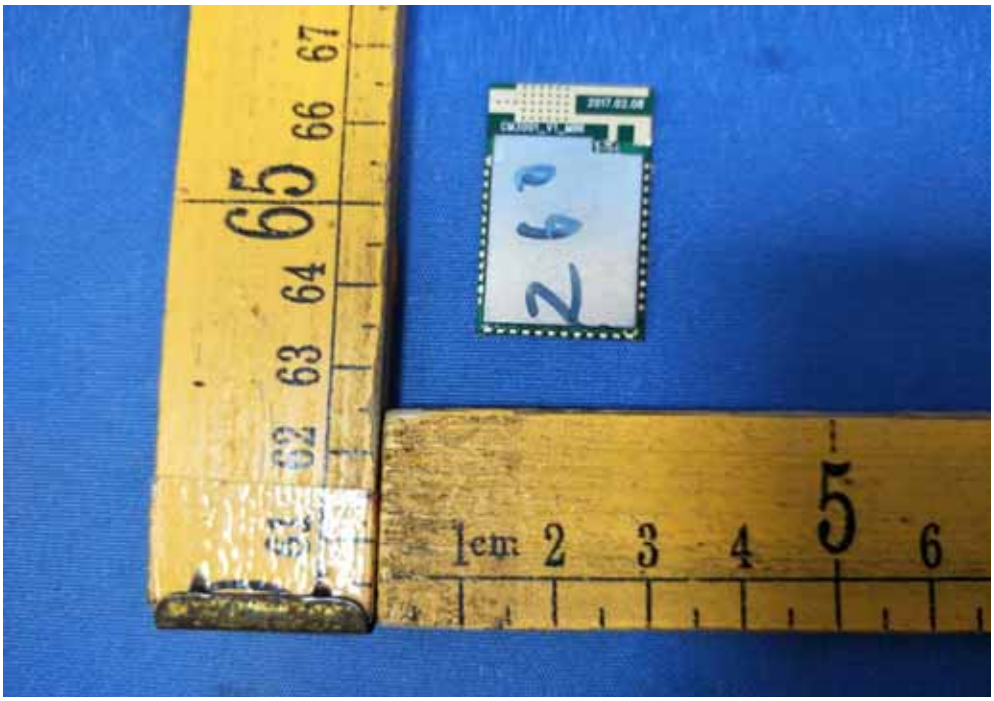

260

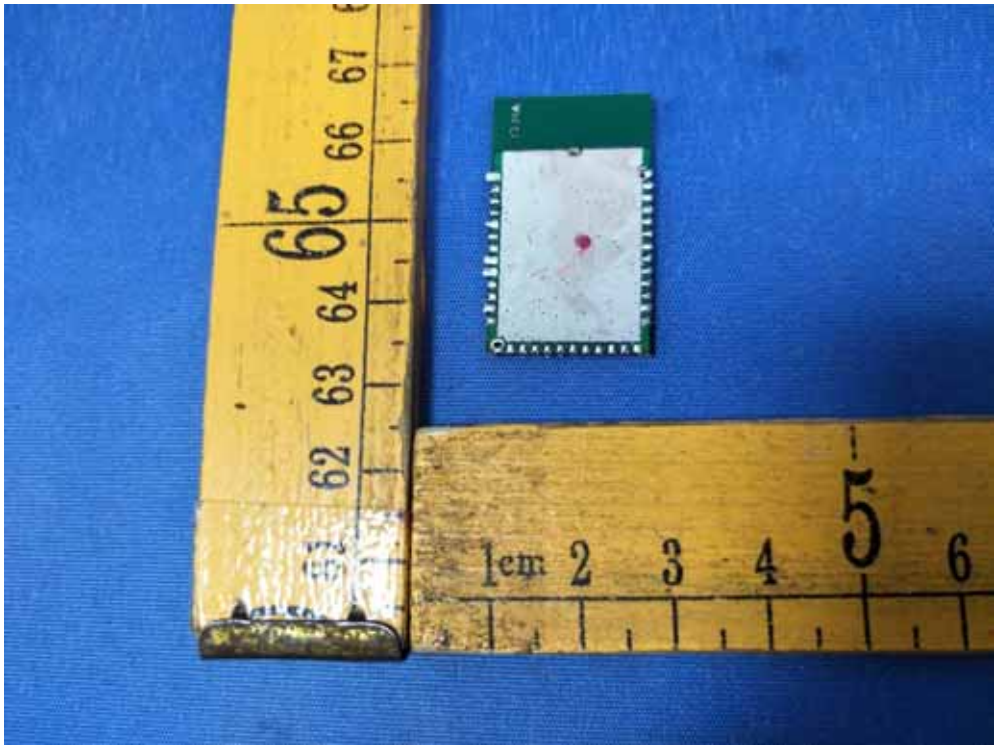
260

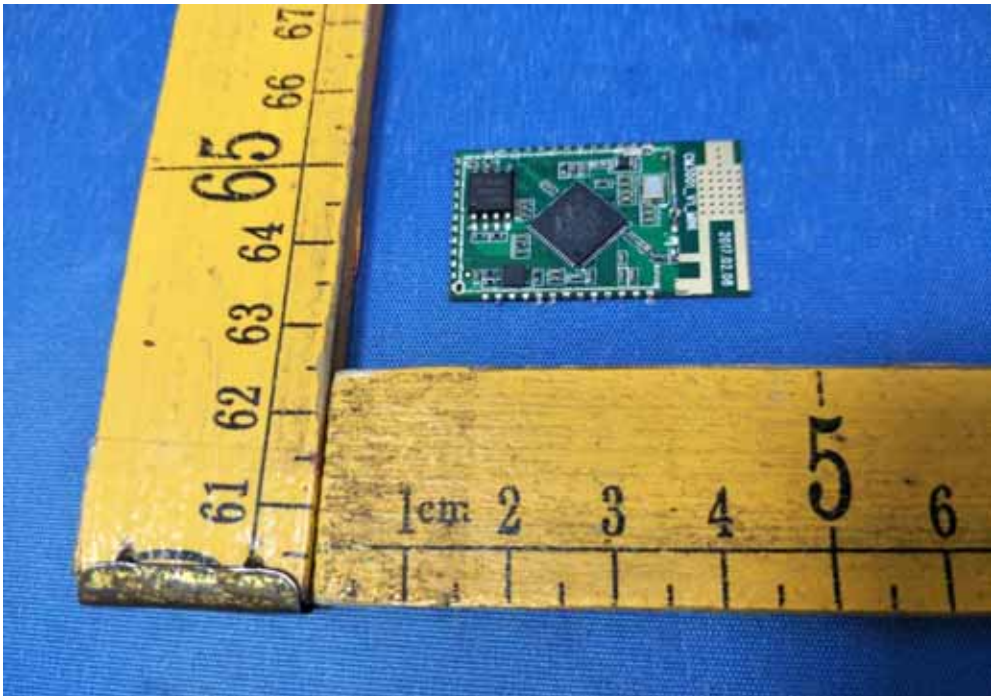

269

280






62
63
64
65
66
67
1cm
2
3
4
5
6


61
62
63
64
65
66
67
1cm
2
3
4
5
6

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