

TEST REPORT

Reference No. : WTS17S0683494-2E
FCC ID : 2AIPV-BH70900
Applicant : Hoover, Inc.
Address : 7005 Cochran Road, Glenwillow Ohio 44139, United States
Manufacturer : Shenzhen Silver Star Intelligent Technology Co., Ltd.
Address : Building D, Huiqing Science-park, Dafu Industrial Areas, Guanguang Road, Guanlan Town, Longhua District, Shenzhen, China
Product Name : Vacuum Cleaner
Model No. . : BH70950, BH70950CA, BH70970, BH709XX
Standards : FCC CFR47 Part 15 C Section 15.247:2016
Date of Receipt sample : Jun. 29, 2017
Date of Test : Jun.30, 2017 ~ Jul. 10, 2017
Date of Issue : Jul. 12, 2017
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.

Prepared By:

Waltek Services (Shenzhen) Co., Ltd.

Address: 1/F., Fukangtai Building, West Baima Road, Songgang Street, Baoan District, Shenzhen, Guangdong, China

Tel :+86-755-83551033

Fax:+86-755-83552400

Compiled by:

Jack Wen

Jack Wen / Test Engineer

Approved by:



Philo Zhong

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

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4 General Information

4.1 General Description of E.U.T

Product Name:	Vacuum Cleaner
Model No.:	BH70950, BH70950CA, BH70970, BH709XX
Model Description:	Only the Colors and model names are different.
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz 802.11n HT40:2422-2452MHz
The Lowest Oscillator:	32.768kHz
Antenna type:	ceramic 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.)

4.2 Details of E.U.T.

Technical Data:	Adapter:Input:100-240V,50/60Hz 0.6 Max Output:18.0V === 1.0A Battery:14.52V 2550mAh 37.03Wh
Adapter	Model: NLD100180W1A4
Manufacturer	SHENZHEN NALIN ELEC. TECH. CO., LTD

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

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

4.5 Test Facility

Waltek Services (Shenzhen) Co., Ltd.

Accreditations for Conformity Assessment

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 \ PSE	-
Europe		EMCD\LVD\RED	-
Taiwan		BSMI\NCC	-
Hong Kong	CNAS (Registration No. : L3110)	OFCA	-
Australia		RCM	-
South Korea		KC	-
Thailand		NTC	-
Singapore		IDA	-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476, test Firm Registration No.: 328995.			
2. IC Canada Registration No.: 7760A			

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.14,2016	Sep.13,2017
2.	LISN	R&S	ENV216	101215	Sep.14,2016	Sep.13,2017
3.	Cable	Top	TYPE16(3.5M)	-	Sep.14,2016	Sep.13,2017
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.14,2016	Sep.13,2017
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.14,2016	Sep.13,2017
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.14,2016	Sep.13,2017
4.	Cable	LARGE	RF300	-	Sep.14,2016	Sep.13,2017
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.14,2016	Sep.13,2017
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.14,2016	Sep.13,2017
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.07, 2017	Apr.06, 2018
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.12, 2016	Sep.11, 2017
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Sep.14,2016	Sep.13,2017
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Sep.14,2016	Sep.13,2017
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Sep.14,2016	Sep.13,2017
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Sep.14,2016	Sep.13,2017
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.14,2016	Sep.13,2017
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.14,2016	Sep.13,2017
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.14,2016	Sep.13,2017
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.14,2016	Sep.13,2017

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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.14,2016	Sep.13,2017
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.14,2016	Sep.13,2017
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.14,2016	Sep.13,2017

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 GUANG ZHOU GRG METROLOGY & TEST CO., L TD. address is No.163, Pingyun Rd. West of Huangpu Ave,Tianhe District, Guangzhou, Guangdong, 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 dB μ V between 0.15MHz & 0.5MHz 56 dB μ V between 0.5MHz & 5MHz 60 dB μ V between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

6.1 E.U.T. Operation

Operating Environment :

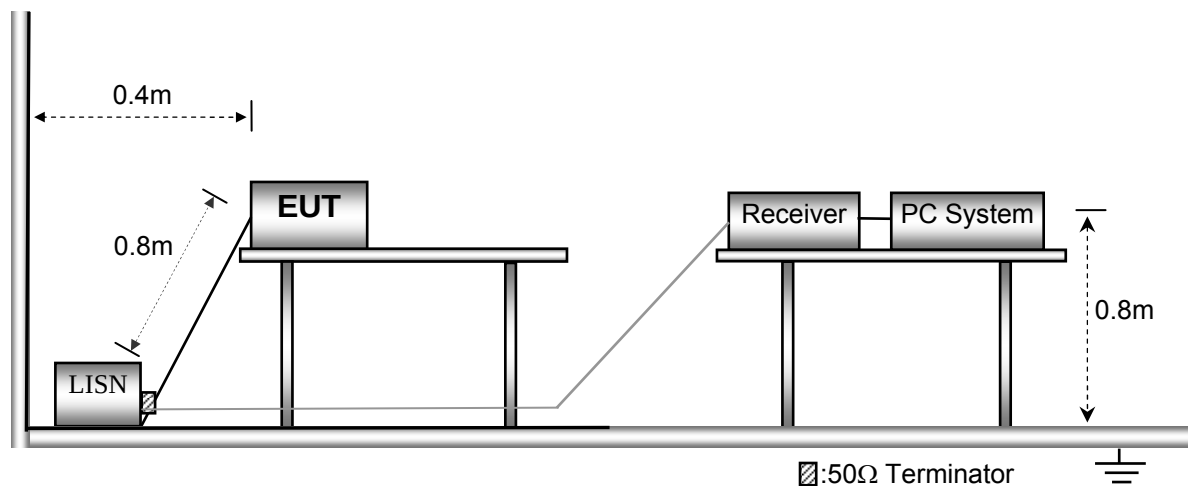
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

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.



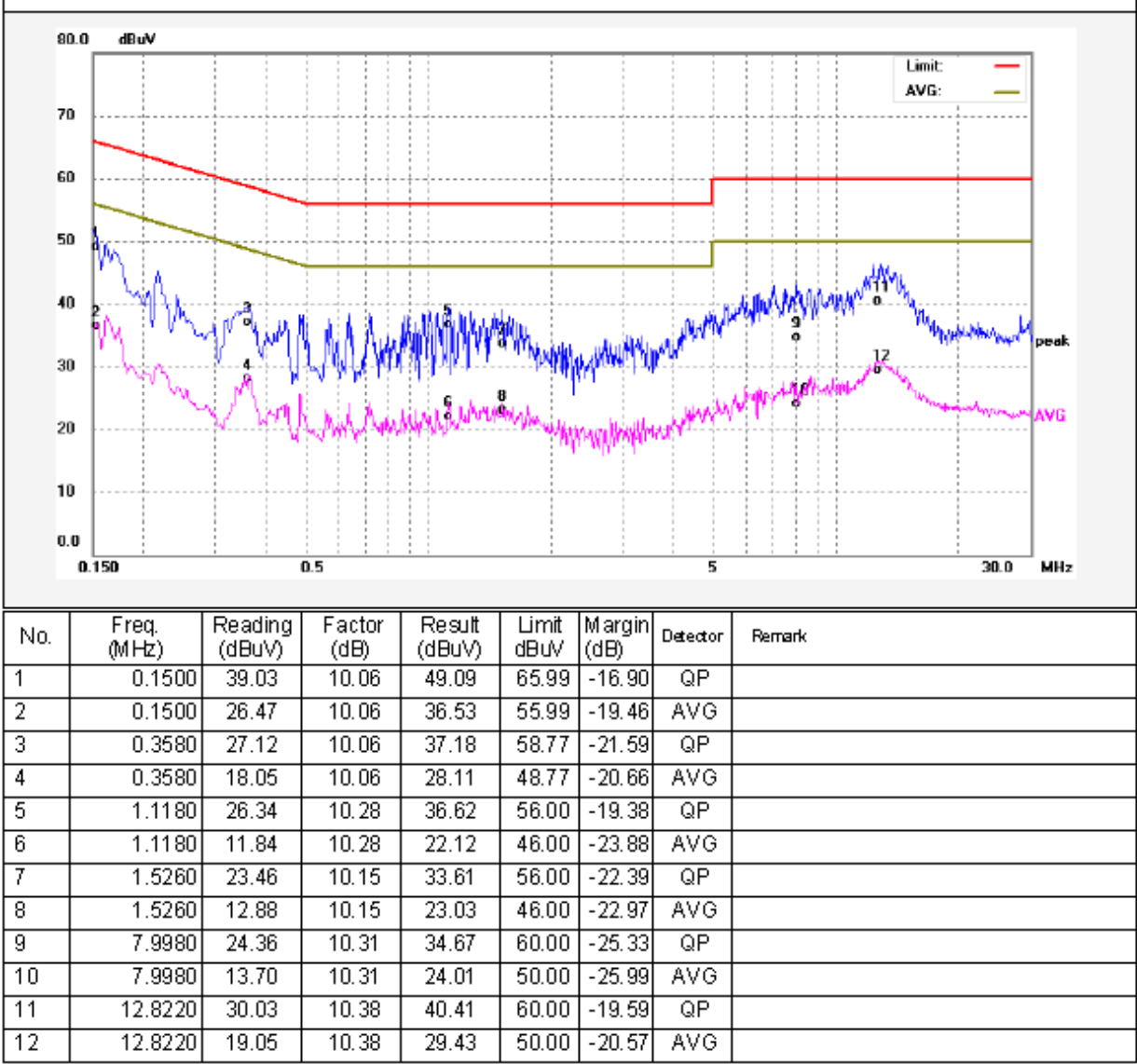
6.3 Measurement Description

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.

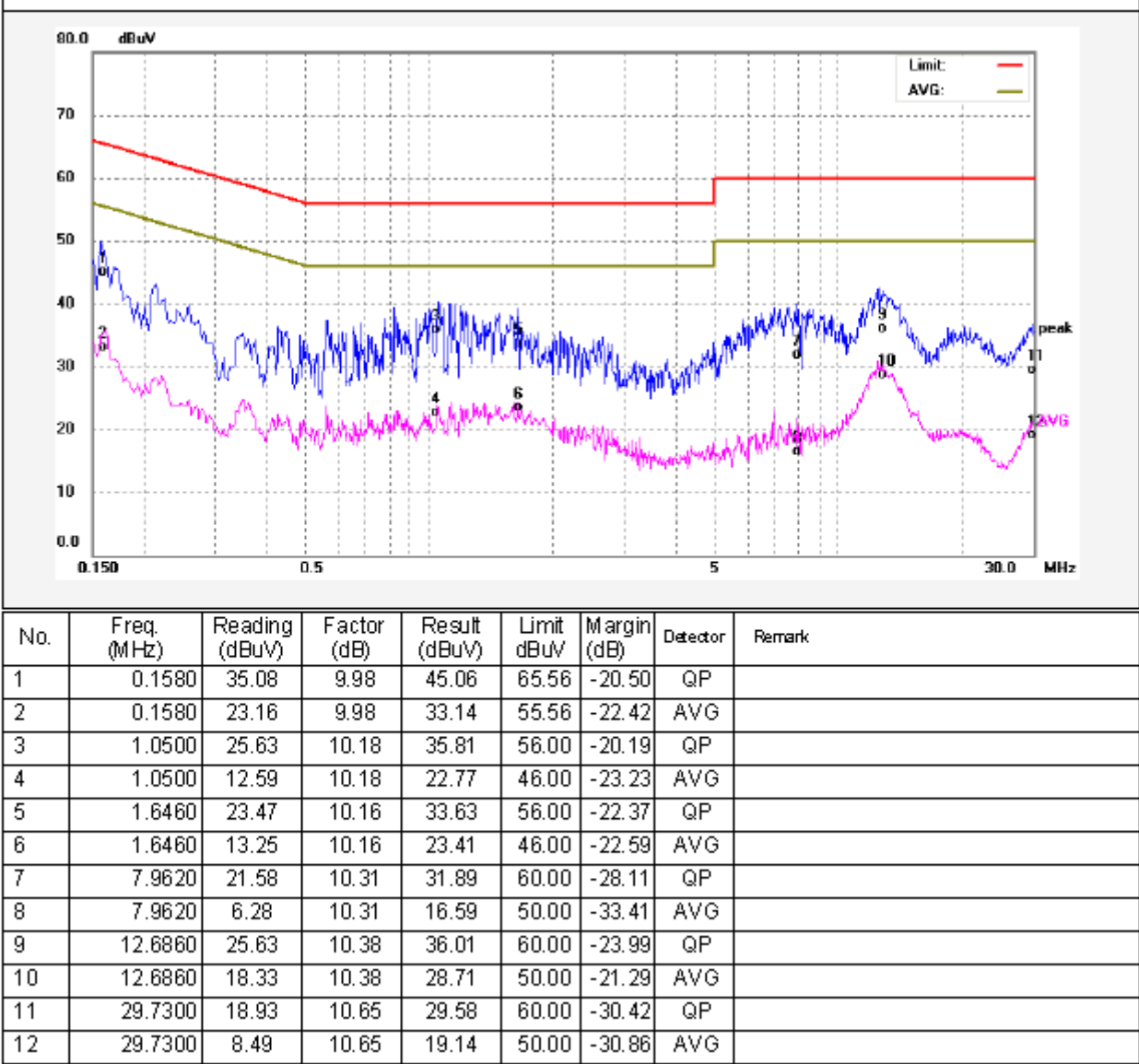
6.4 Conducted Emission Test Result

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

Live line:



Neutral line:



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	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
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

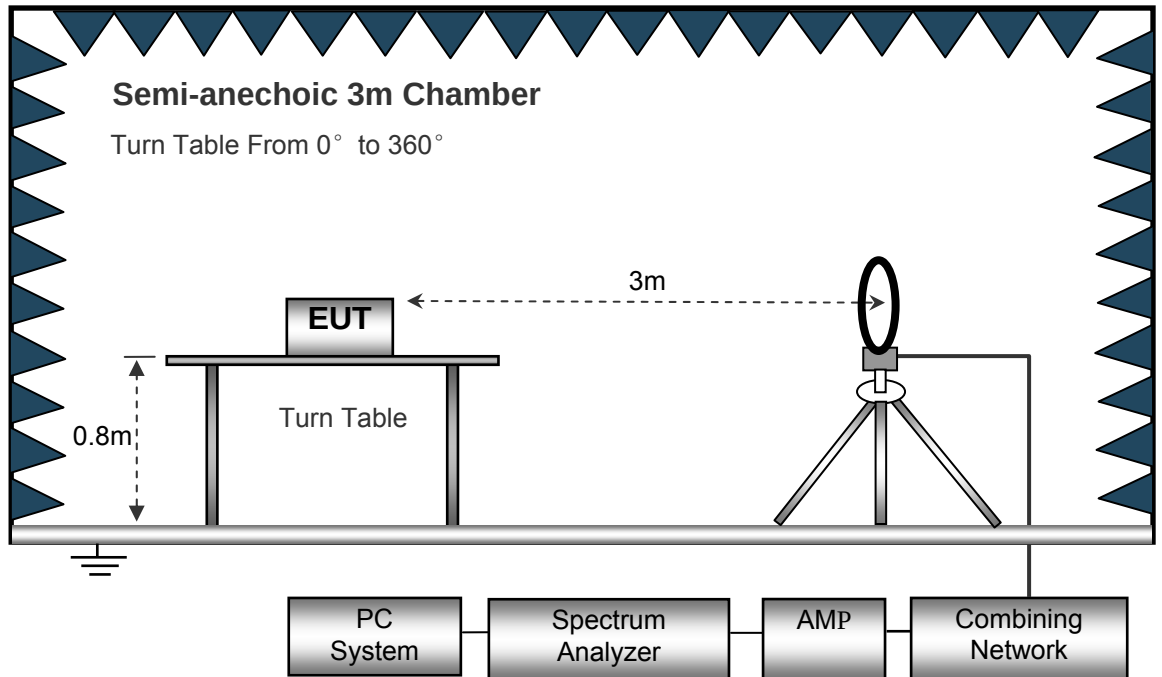
EUT Operation :

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

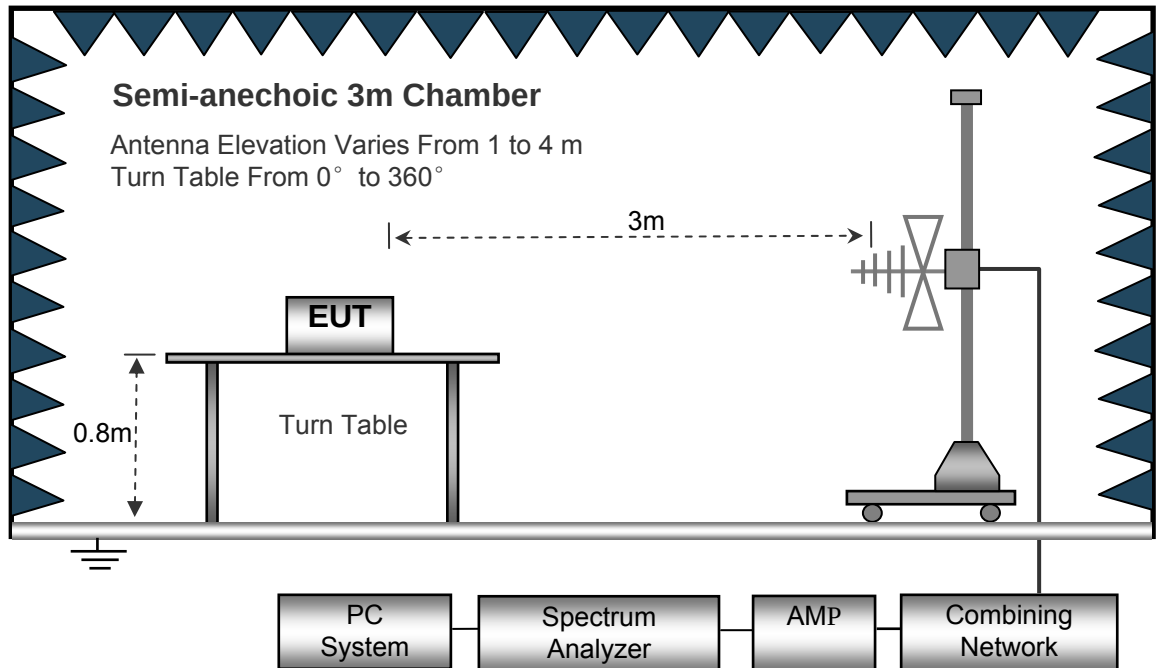
7.2 Test Setup

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

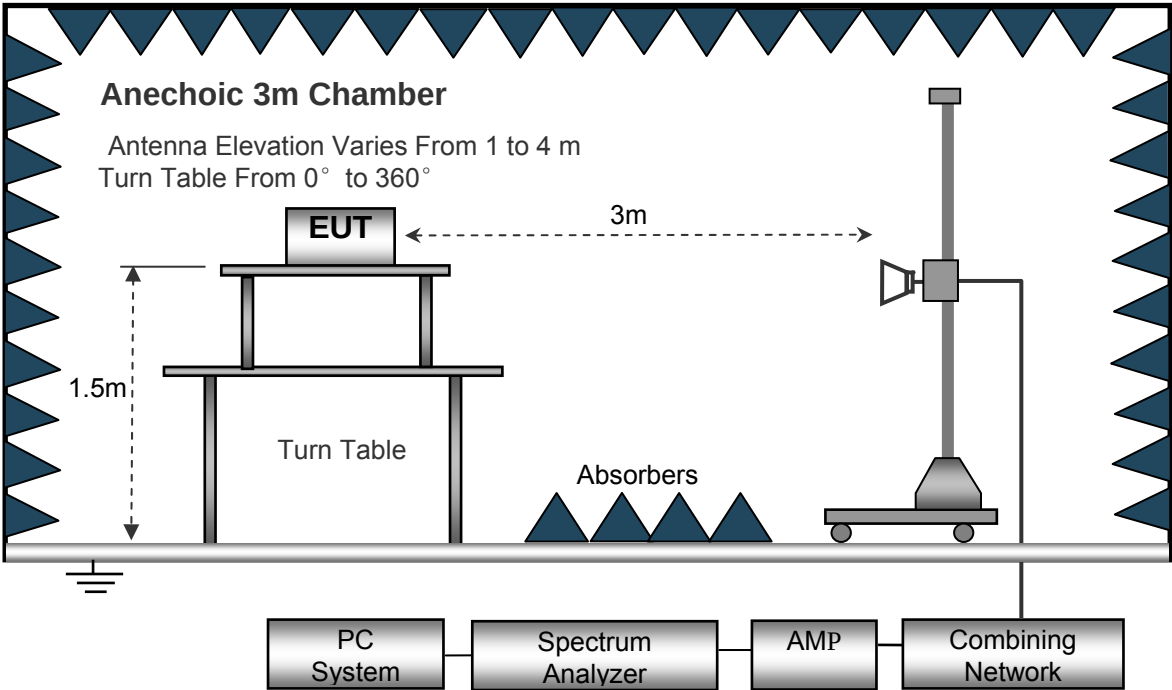
The test setup for emission measurement below 30MHz.



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
DetectorPK
Resolution Bandwidth.....100kHz
Video Bandwidth.....300kHz

Above 1GHz

Sweep Speed Auto
DetectorPK
Resolution Bandwidth.....1MHz
Video Bandwidth.....3MHz
DetectorAve.
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 during 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:

$$\text{Corr. Ampl.} = \text{Indicated Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Amplifier Gain}$$

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:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

7.6 Summary of Test Results

Test Frequency: 32.768kHz ~ 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									
263.88	42.15	QP	304.62	1.66	H	11.20	30.95	46.00	-15.05
263.88	36.25	QP	138.49	1.95	V	11.20	25.05	46.00	-20.95
4824.00	50.12	PK	233.47	1.04	V	1.28	48.84	74.00	-25.16
4824.00	45.20	Ave	233.47	1.04	V	1.28	43.92	54.00	-10.08
7236.00	40.18	PK	83.37	1.06	H	1.33	41.51	74.00	-32.49
7236.00	42.12	Ave	83.37	1.06	H	1.33	43.45	54.00	-10.55
2330.16	45.89	PK	93.05	1.02	V	13.25	32.64	74.00	-41.36
2330.16	37.22	Ave	93.05	1.02	V	13.25	23.97	54.00	-30.03
2371.53	42.54	PK	185.08	1.19	H	13.03	29.51	74.00	-44.49
2371.53	37.65	Ave	185.08	1.19	H	13.04	24.61	54.00	-29.39
2491.63	44.26	PK	156.53	1.19	V	13.49	30.77	74.00	-43.23
2491.63	38.55	Ave	156.53	1.19	V	13.49	25.06	54.00	-28.94

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									
263.88	41.96	QP	8.66	1.04	H	11.08	30.88	46.00	-15.12
263.88	35.17	QP	28.56	1.84	V	11.08	24.09	46.00	-21.91
4874.00	50.76	PK	72.34	1.44	V	1.07	49.69	74.00	-24.31
4874.00	44.82	Ave	72.34	1.44	V	1.07	43.75	54.00	-10.25
7311.00	40.95	PK	97.82	1.32	H	2.21	43.16	74.00	-30.84
7311.00	41.67	Ave	97.82	1.32	H	2.21	43.88	54.00	-10.12
2325.95	45.51	PK	25.85	1.68	V	13.15	32.36	74.00	-41.64
2325.95	37.19	Ave	25.85	1.68	V	13.15	24.04	54.00	-29.96
2387.61	43.70	PK	225.56	1.38	H	13.27	30.43	74.00	-43.57
2387.61	38.10	Ave	225.56	1.38	H	13.27	24.83	54.00	-29.17
2484.86	42.22	PK	7.87	1.82	V	13.20	29.02	74.00	-44.98
2484.86	36.67	Ave	7.87	1.82	V	13.20	23.47	54.00	-30.53

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									
263.88	42.32	QP	207.22	1.17	H	11.00	31.32	46.00	-14.68
263.88	34.51	QP	344.47	1.03	V	11.00	23.51	46.00	-22.49
4924.00	51.43	PK	307.07	1.56	V	1.03	50.40	74.00	-23.60
4924.00	45.52	Ave	307.07	1.56	V	1.03	44.49	54.00	-9.51
7386.00	40.11	PK	56.54	1.18	H	2.84	42.95	74.00	-31.05
7386.00	42.99	Ave	56.54	1.18	H	2.84	45.83	54.00	-8.17
2322.62	46.96	PK	174.63	1.36	V	13.08	33.88	74.00	-40.12
2322.62	39.91	Ave	174.63	1.36	V	13.08	26.83	54.00	-27.17
2366.87	42.88	PK	205.91	1.68	H	13.33	29.55	74.00	-44.45
2366.87	36.63	Ave	205.91	1.68	H	13.33	23.30	54.00	-30.70
2492.98	44.70	PK	212.00	1.88	V	13.05	31.65	74.00	-42.35
2492.98	38.06	Ave	212.00	1.88	V	13.05	25.01	54.00	-28.99

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: Low Channel 2412MHz									
263.88	41.84	QP	20.55	1.98	H	11.20	30.64	46.00	-15.36
263.88	34.23	QP	317.25	1.51	V	11.20	23.03	46.00	-22.97
4824.00	50.26	PK	50.88	1.27	V	1.28	48.98	74.00	-25.02
4824.00	44.24	Ave	50.88	1.27	V	1.28	42.96	54.00	-11.04
7236.00	39.07	PK	105.22	1.01	H	1.33	40.40	74.00	-33.60
7236.00	43.79	Ave	105.22	1.01	H	1.33	45.12	54.00	-8.88
2311.81	46.04	PK	52.69	1.21	V	13.25	32.79	74.00	-41.21
2311.81	39.02	Ave	52.69	1.21	V	13.25	25.77	54.00	-28.23
2364.54	44.53	PK	37.67	1.65	H	13.03	31.50	74.00	-42.50
2364.54	38.55	Ave	37.67	1.65	H	13.04	25.51	54.00	-28.49
2494.01	42.52	PK	99.73	1.31	V	13.49	29.03	74.00	-44.97
2494.01	37.29	Ave	99.73	1.31	V	13.49	23.80	54.00	-30.20

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									
263.88	41.27	QP	43.67	1.56	H	11.08	30.19	46.00	-15.81
263.88	35.45	QP	38.31	1.30	V	11.08	24.37	46.00	-21.63
4874.00	51.37	PK	304.24	1.39	V	1.07	50.30	74.00	-23.70
4874.00	44.84	Ave	304.24	1.39	V	1.07	43.77	54.00	-10.23
7311.00	39.44	PK	282.55	1.51	H	2.21	41.65	74.00	-32.35
7311.00	43.23	Ave	282.55	1.51	H	2.21	45.44	54.00	-8.56
2330.14	45.93	PK	231.71	1.74	V	13.15	32.78	74.00	-41.22
2330.14	39.26	Ave	231.71	1.74	V	13.15	26.11	54.00	-27.89
2374.92	44.96	PK	340.99	1.11	H	13.27	31.69	74.00	-42.31
2374.92	36.58	Ave	340.99	1.11	H	13.27	23.31	54.00	-30.69
2499.16	43.60	PK	3.90	1.76	V	13.20	30.40	74.00	-43.60
2499.16	37.70	Ave	3.90	1.76	V	13.20	24.50	54.00	-29.50

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									
263.88	42.05	QP	352.50	1.02	H	11.00	31.05	46.00	-14.95
263.88	36.17	QP	197.58	1.29	V	11.00	25.17	46.00	-20.83
4924.00	51.66	PK	263.31	1.22	V	1.03	50.63	74.00	-23.37
4924.00	45.27	Ave	263.31	1.22	V	1.03	44.24	54.00	-9.76
7386.00	39.91	PK	272.80	1.91	H	2.84	42.75	74.00	-31.25
7386.00	41.86	Ave	272.80	1.91	H	2.84	44.70	54.00	-9.30
2343.64	46.91	PK	174.25	1.54	V	13.08	33.83	74.00	-40.17
2343.64	37.69	Ave	174.25	1.54	V	13.08	24.61	54.00	-29.39
2361.79	43.47	PK	193.59	1.20	H	13.33	30.14	74.00	-43.86
2361.79	37.89	Ave	193.59	1.20	H	13.33	24.56	54.00	-29.44
2483.80	42.86	PK	157.79	1.85	V	13.05	29.81	74.00	-44.19
2483.80	37.78	Ave	157.79	1.85	V	13.05	24.73	54.00	-29.27

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: Low Channel 2412MHz									
263.88	41.11	QP	348.03	1.82	H	11.20	29.91	46.00	-16.09
263.88	35.79	QP	92.18	1.22	V	11.20	24.59	46.00	-21.41
4824.00	52.10	PK	77.68	1.63	V	1.28	50.82	74.00	-23.18
4824.00	44.97	Ave	77.68	1.63	V	1.28	43.69	54.00	-10.31
7236.00	40.60	PK	278.25	1.42	H	1.33	41.93	74.00	-32.07
7236.00	41.69	Ave	278.25	1.42	H	1.33	43.02	54.00	-10.98
2319.22	45.90	PK	116.30	1.18	V	13.25	32.65	74.00	-41.35
2319.22	38.29	Ave	116.30	1.18	V	13.25	25.04	54.00	-28.96
2366.99	44.92	PK	286.52	1.35	H	13.03	31.89	74.00	-42.11
2366.99	38.64	Ave	286.52	1.35	H	13.04	25.60	54.00	-28.40
2487.42	43.97	PK	36.64	1.98	V	13.49	30.48	74.00	-43.52
2487.42	38.42	Ave	36.64	1.98	V	13.49	24.93	54.00	-29.07

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)
ANT n HT20: Middle Channel 2437MHz									
263.88	40.65	QP	232.45	1.63	H	11.08	29.57	46.00	-16.43
263.88	37.23	QP	232.12	1.36	V	11.08	26.15	46.00	-19.85
4874.00	53.32	PK	150.02	1.52	V	1.07	52.25	74.00	-21.75
4874.00	44.54	Ave	150.02	1.52	V	1.07	43.47	54.00	-10.53
7311.00	41.01	PK	78.51	1.15	H	2.21	43.22	74.00	-30.78
7311.00	41.30	Ave	78.51	1.15	H	2.21	43.51	54.00	-10.49
2313.61	45.81	PK	300.61	1.70	V	13.15	32.66	74.00	-41.34
2313.61	37.49	Ave	300.61	1.70	V	13.15	24.34	54.00	-29.66
2379.94	43.60	PK	53.86	1.35	H	13.27	30.33	74.00	-43.67
2379.94	38.28	Ave	53.86	1.35	H	13.27	25.01	54.00	-28.99
2499.04	43.72	PK	318.51	1.63	V	13.20	30.52	74.00	-43.48
2499.04	36.27	Ave	318.51	1.63	V	13.20	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)
ANT n HT20: High Channel 2462MHz									
263.88	41.16	QP	83.52	1.12	H	11.00	30.16	46.00	-15.84
263.88	36.70	QP	218.83	1.27	V	11.00	25.70	46.00	-20.30
4924.00	52.67	PK	244.42	1.49	V	1.03	51.64	74.00	-22.36
4924.00	45.67	Ave	244.42	1.49	V	1.03	44.64	54.00	-9.36
7386.00	40.65	PK	326.76	1.23	H	2.84	43.49	74.00	-30.51
7386.00	40.86	Ave	326.76	1.23	H	2.84	43.70	54.00	-10.30
2347.85	46.89	PK	203.08	1.72	V	13.08	33.81	74.00	-40.19
2347.85	39.91	Ave	203.08	1.72	V	13.08	26.83	54.00	-27.17
2386.68	44.53	PK	16.07	1.40	H	13.33	31.20	74.00	-42.80
2386.68	38.19	Ave	16.07	1.40	H	13.33	24.86	54.00	-29.14
2498.63	42.63	PK	17.11	1.40	V	13.05	29.58	74.00	-44.42
2498.63	36.82	Ave	17.11	1.40	V	13.05	23.77	54.00	-30.23

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									
263.88	39.72	QP	237.95	1.96	H	11.02	28.70	46.00	-17.30
263.88	33.74	QP	10.95	1.90	V	11.02	22.72	46.00	-23.28
4844.00	43.95	PK	54.46	1.52	V	1.08	42.87	74.00	-31.13
4844.00	44.06	Ave	54.46	1.52	V	1.08	42.98	54.00	-11.02
7266.00	35.77	PK	307.13	1.93	H	1.33	37.10	74.00	-36.90
7266.00	40.87	Ave	307.13	1.93	H	1.33	42.20	54.00	-11.80
2316.24	46.69	PK	8.03	1.79	V	13.11	33.58	74.00	-40.42
2316.24	38.82	Ave	8.03	1.79	V	13.11	25.71	54.00	-28.29
2367.36	43.26	PK	329.09	1.49	H	13.06	30.20	74.00	-43.80
2367.36	38.18	Ave	329.09	1.49	H	13.04	25.14	54.00	-28.86
2485.17	42.04	PK	108.43	1.24	V	13.00	29.04	74.00	-44.96
2485.17	38.73	Ave	108.43	1.24	V	13.00	25.73	54.00	-28.27

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) middle channel 2437MHz									
263.88	43.55	QP	151.86	1.96	H	11.02	32.53	46.00	-13.47
263.88	39.37	QP	45.30	1.18	V	11.02	28.35	46.00	-17.65
4874.00	48.92	PK	28.69	1.67	V	1.08	47.84	74.00	-26.16
4874.00	46.04	Ave	28.69	1.67	V	1.08	44.96	54.00	-9.04
7311.00	39.24	PK	113.44	1.62	H	2.21	41.45	74.00	-32.55
7311.00	40.93	Ave	113.44	1.62	H	2.21	43.14	54.00	-10.86
2341.41	45.79	PK	118.21	1.80	V	13.11	32.68	74.00	-41.32
2341.41	39.90	Ave	118.21	1.80	V	13.11	26.79	54.00	-27.21
2362.61	42.90	PK	190.48	1.06	H	13.06	29.84	74.00	-44.16
2362.61	37.37	Ave	190.48	1.06	H	13.04	24.33	54.00	-29.67
2485.53	44.66	PK	339.54	1.89	V	13.00	31.66	74.00	-42.34
2485.53	36.04	Ave	339.54	1.89	V	13.00	23.04	54.00	-30.96

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									
263.88	42.94	QP	247.83	1.04	H	11.00	31.94	46.00	-14.06
263.88	38.92	QP	307.29	1.05	V	11.00	27.92	46.00	-18.08
4904.00	48.93	PK	252.25	1.04	V	1.03	47.90	74.00	-26.10
4904.00	46.94	Ave	252.25	1.04	V	1.03	45.91	54.00	-8.09
7356.00	39.14	PK	65.51	1.20	H	2.84	41.98	74.00	-32.02
7356.00	40.74	Ave	65.51	1.20	H	2.84	43.58	54.00	-10.42
2315.55	45.06	PK	238.71	1.67	V	13.08	31.98	74.00	-42.02
2315.55	37.68	Ave	238.71	1.67	V	13.08	24.60	54.00	-29.40
2388.32	43.82	PK	206.86	1.10	H	13.33	30.49	74.00	-43.51
2388.32	37.36	Ave	206.86	1.10	H	13.33	24.03	54.00	-29.97
2497.93	43.99	PK	318.17	1.25	V	13.05	30.94	74.00	-43.06
2497.93	36.54	Ave	318.17	1.25	V	13.05	23.49	54.00	-30.51

Test Frequency: 18GHz~25GHz

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

8 Band Edge Measurement

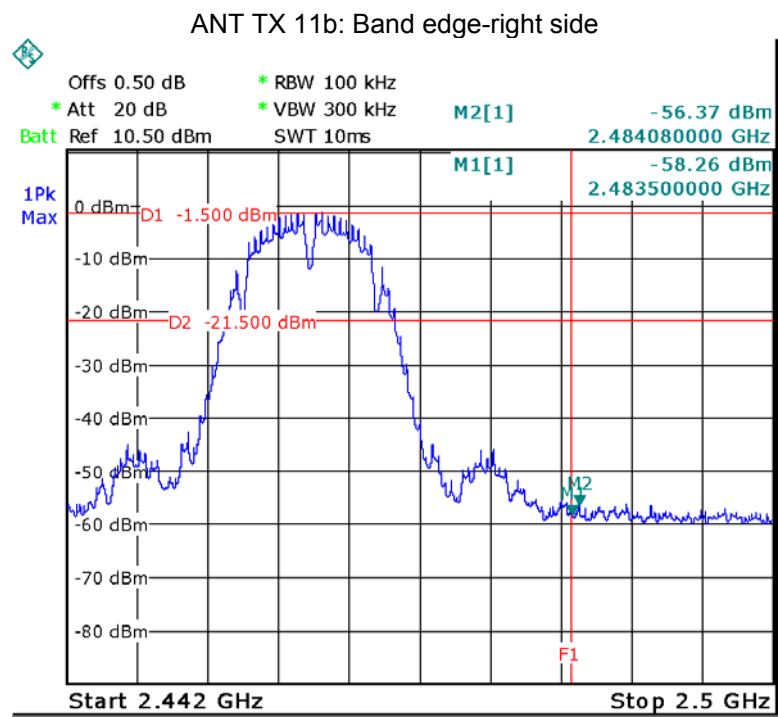
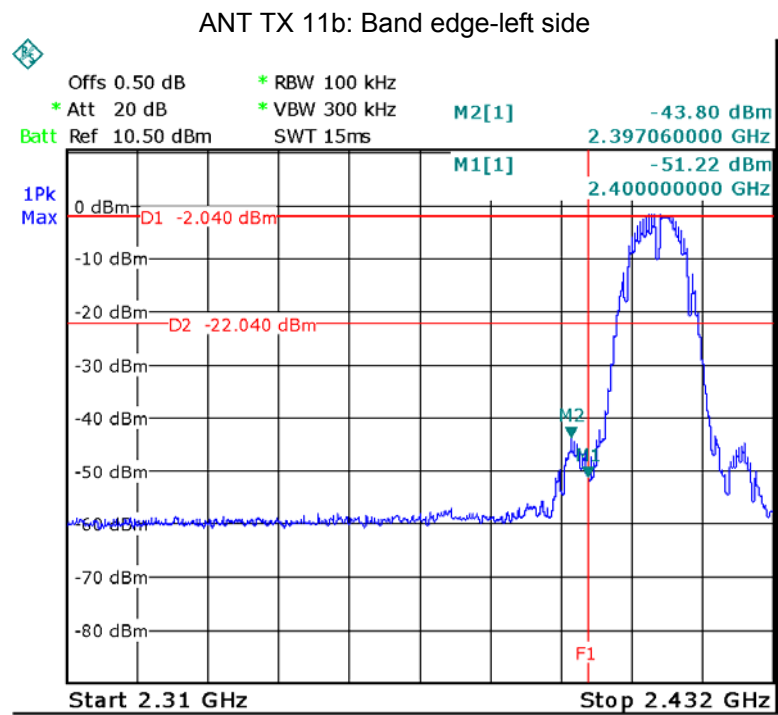
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	KDB 558074 D01 DTS Meas Guidance v04
Test Limit:	Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power 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

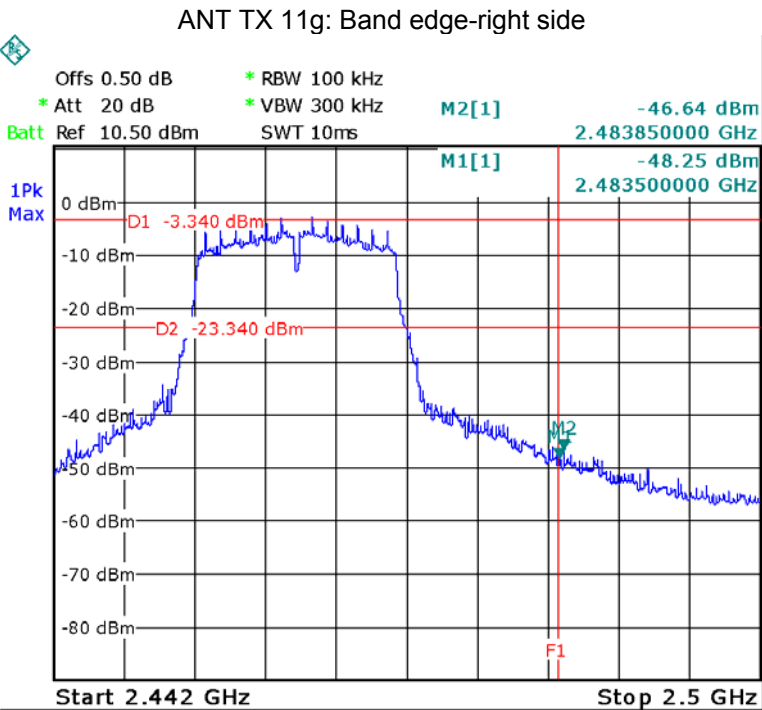
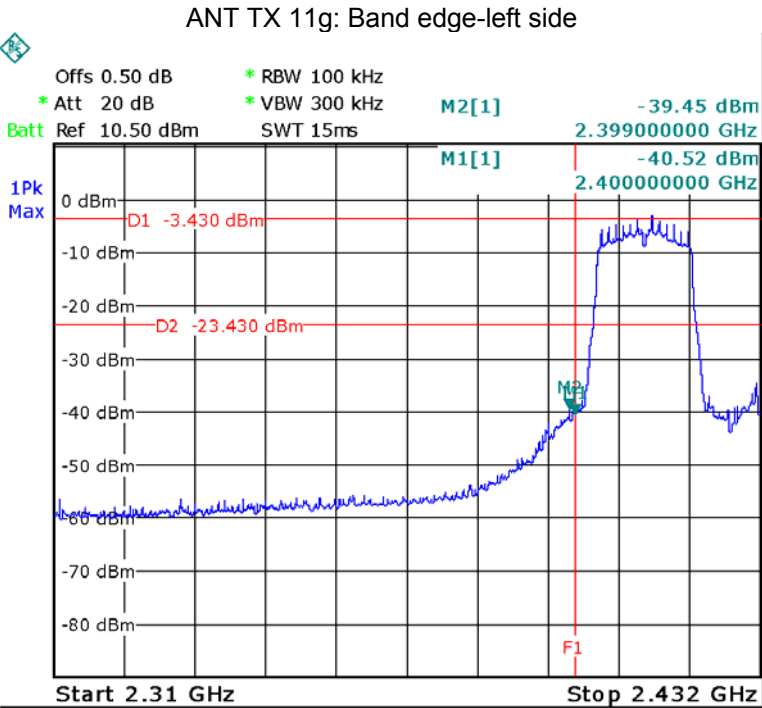
8.1 Test Produce

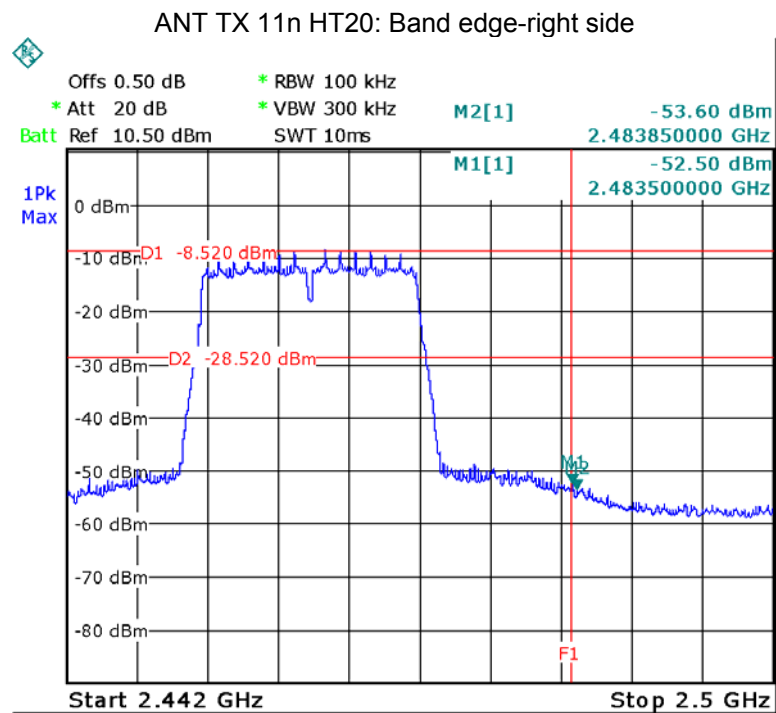
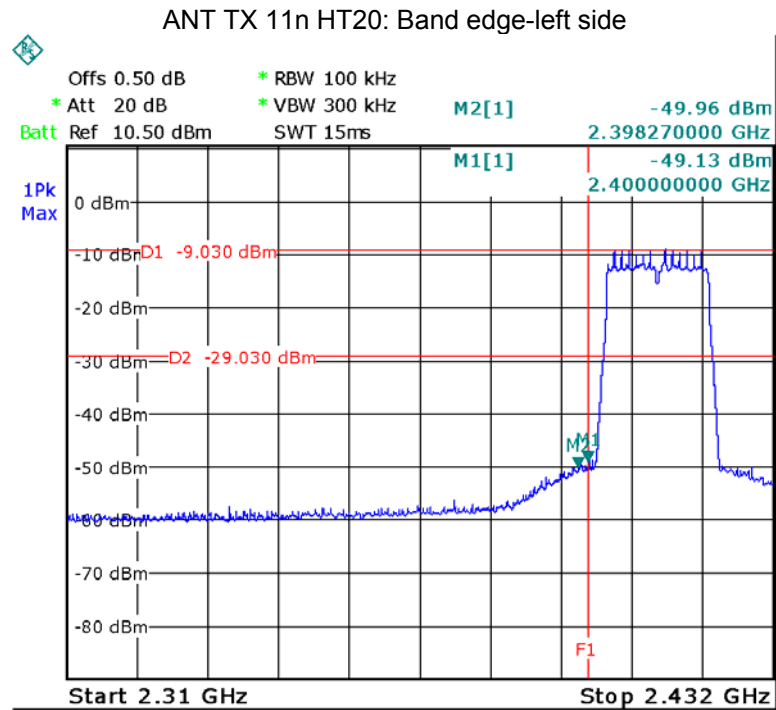
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then 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.

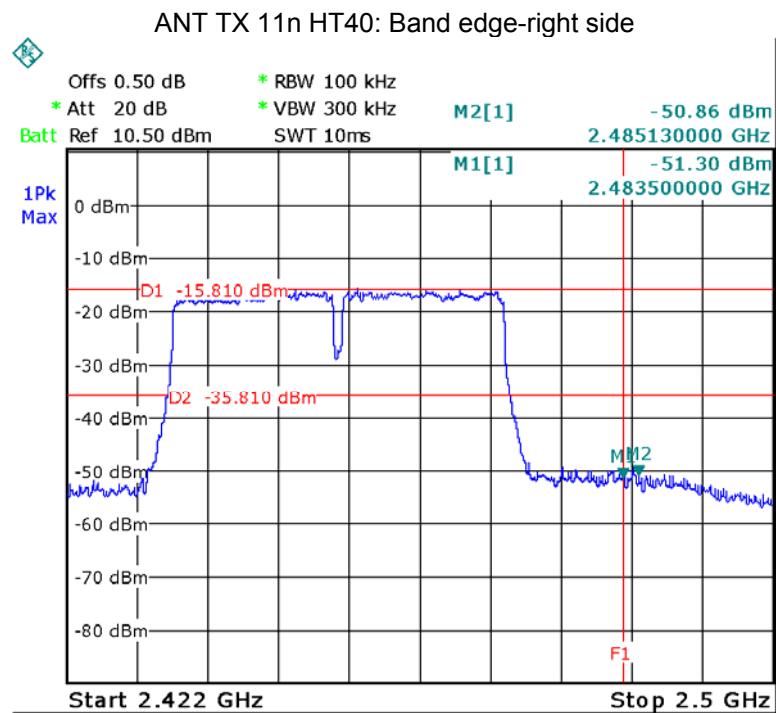
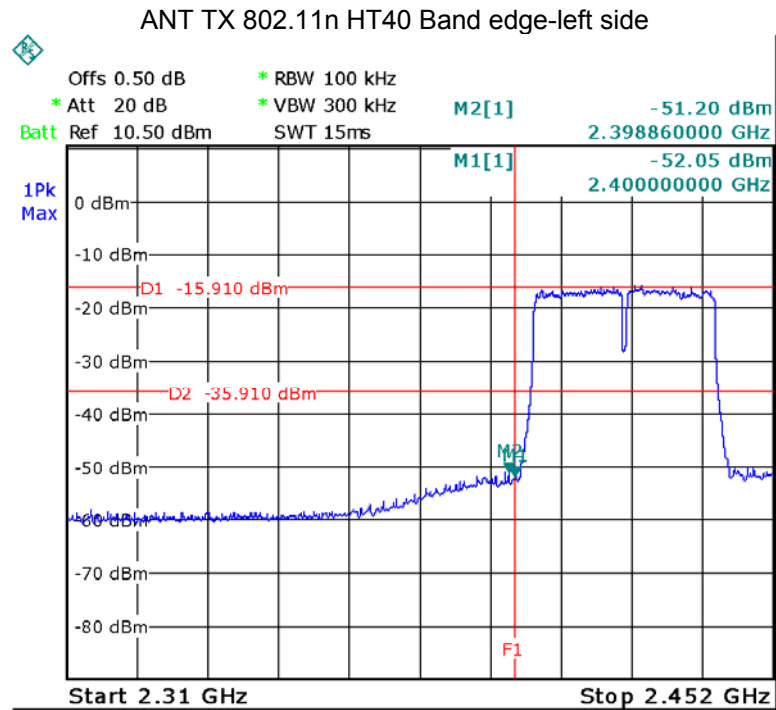
8.2 Test Result

Test result plots shown as follows:









9 6 dB Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

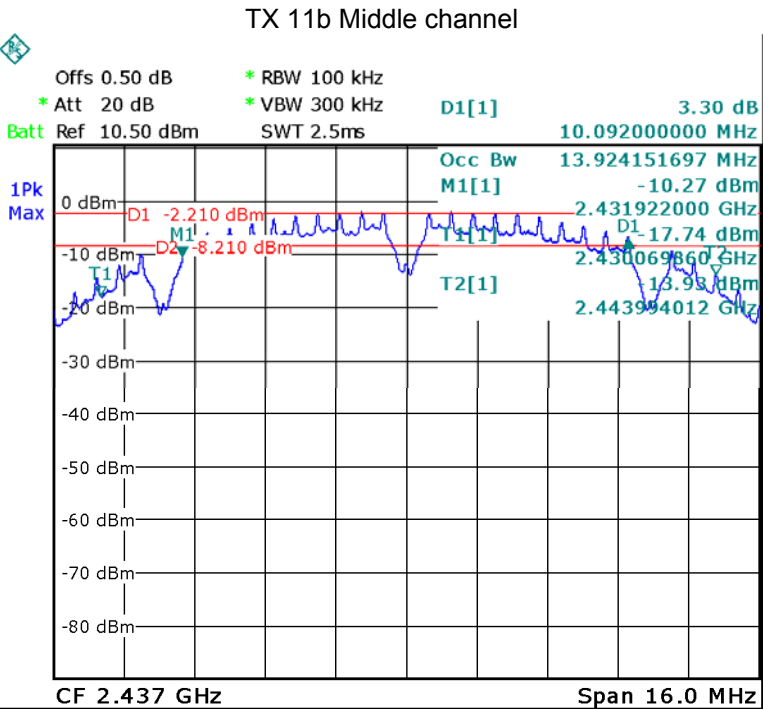
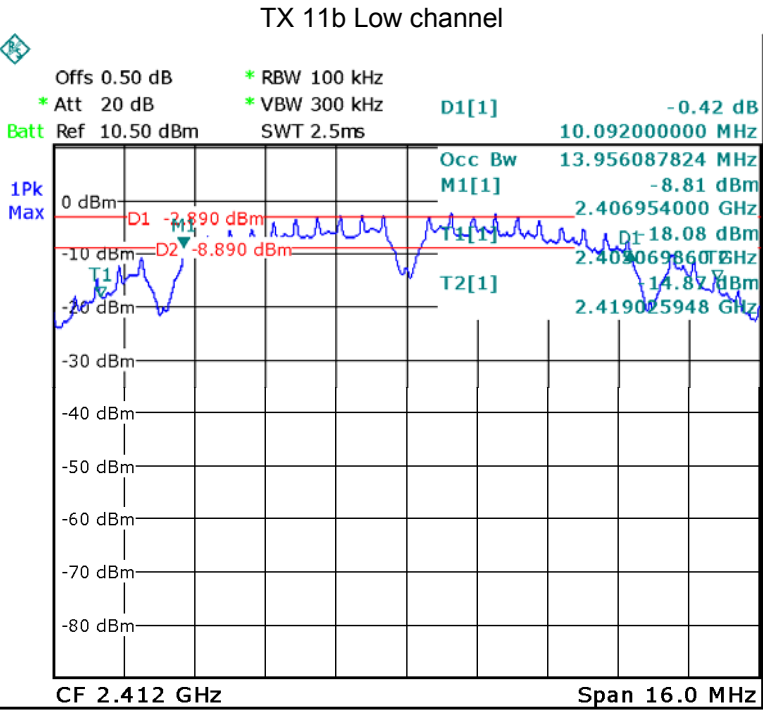
KDB 558074 D01 DTS Meas Guidance v04

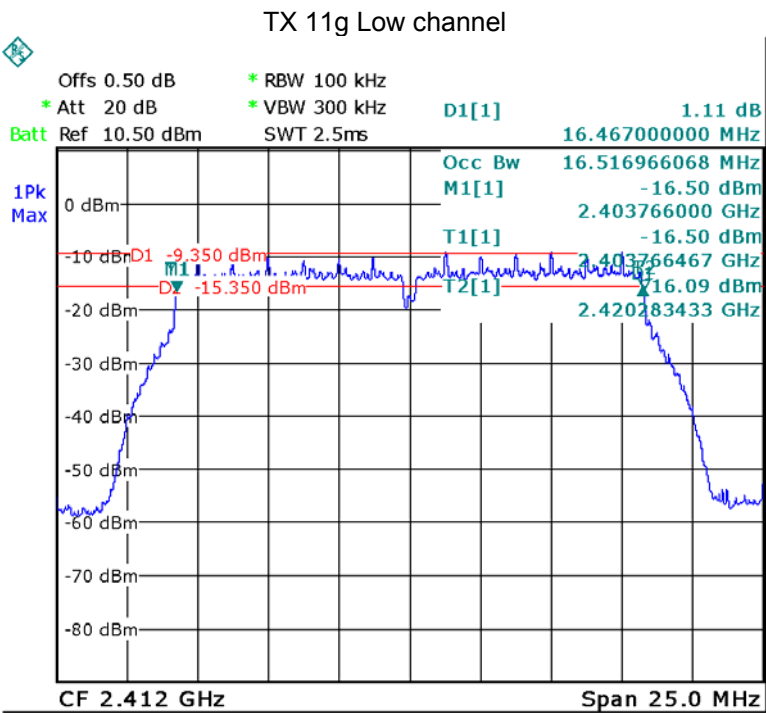
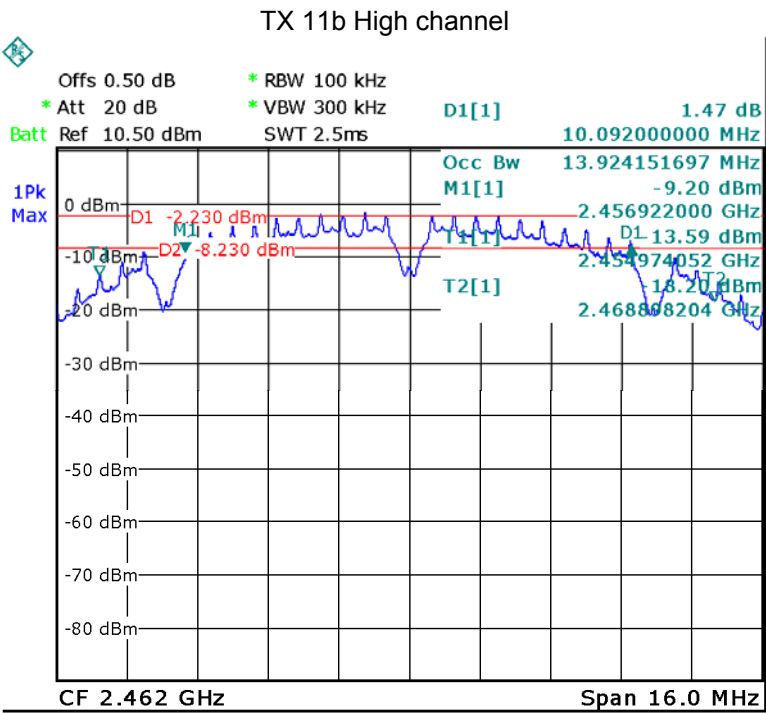
9.1 Test Procedure:

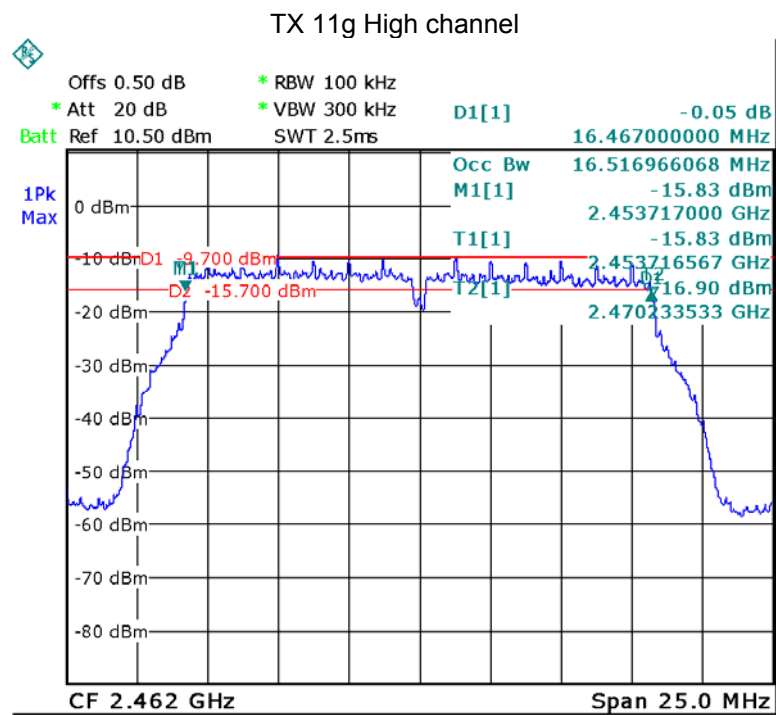
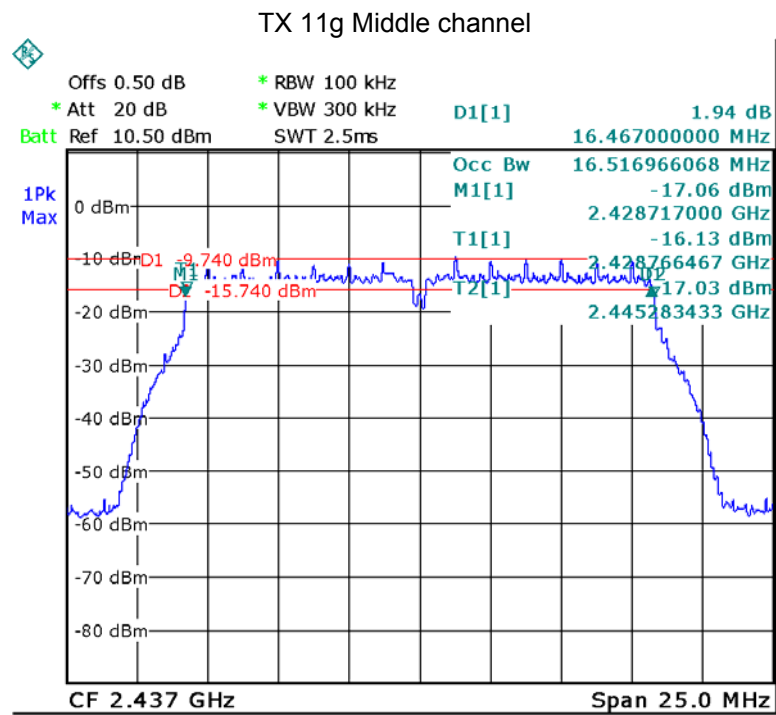
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

9.2 Test Result:

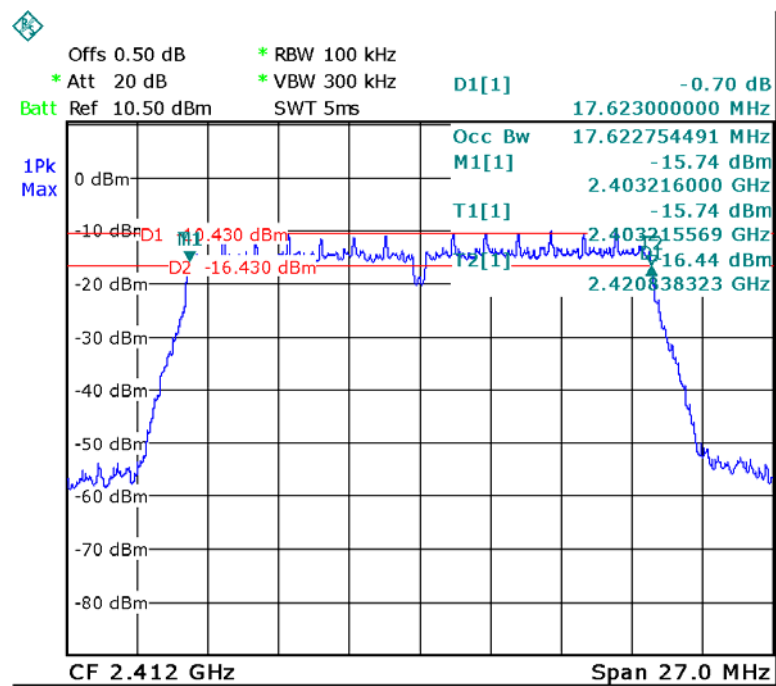
ANT	Operation mode	Bandwidth (MHz)		
		Low	Middle	High
ANT	11b	10.092	10.092	10.092
	11g	16.467	16.467	16.467
	11n HT20	17.623	17.623	17.623
	11n HT40	17.623	36.010	36.010



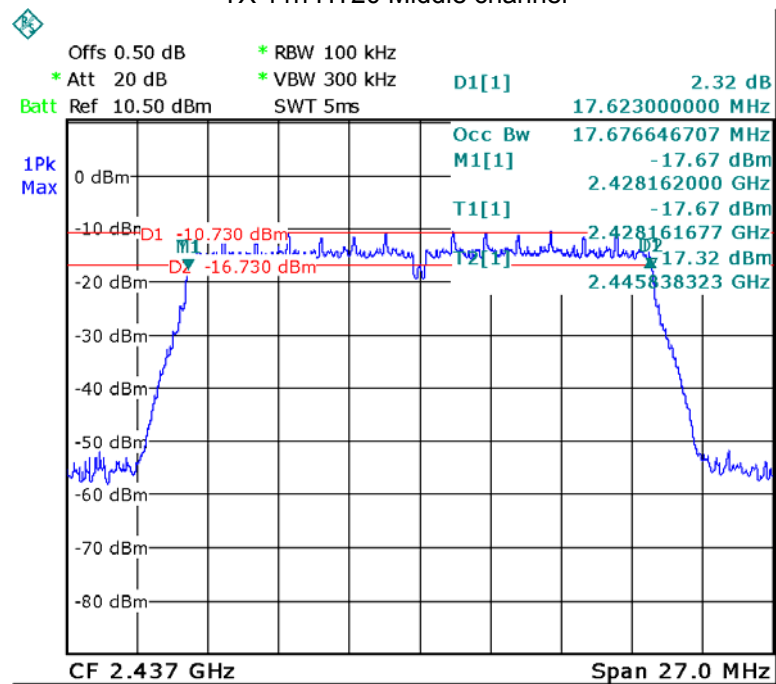




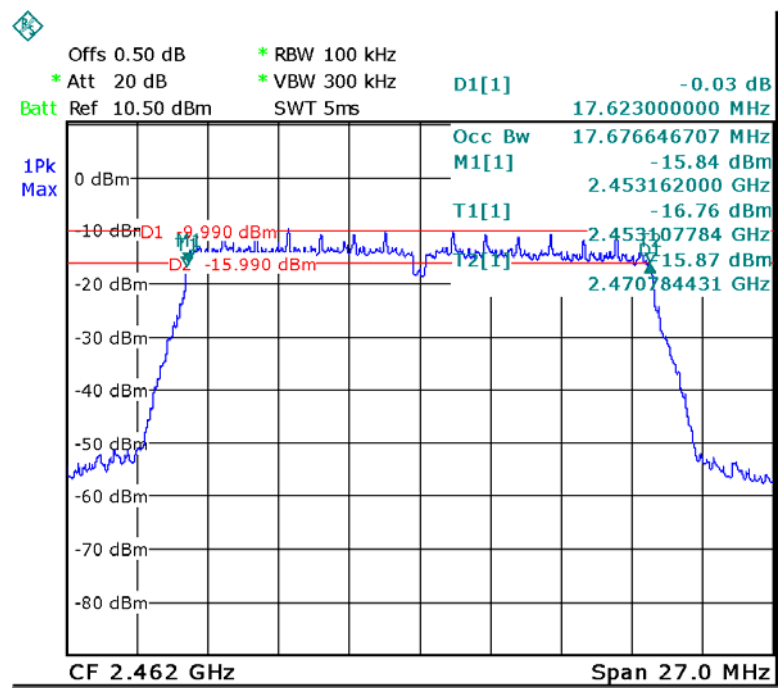
TX 11n HT20 Low channel



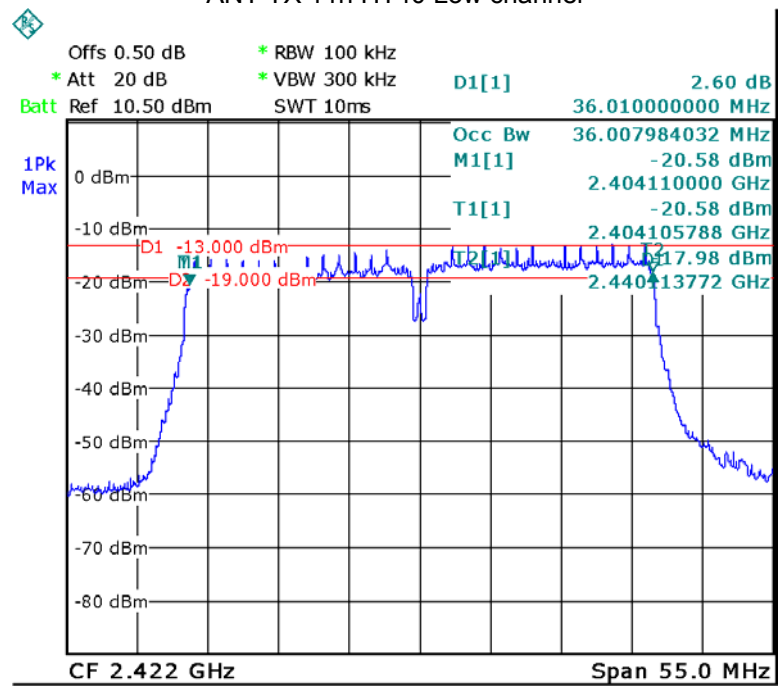
TX 11n HT20 Middle channel



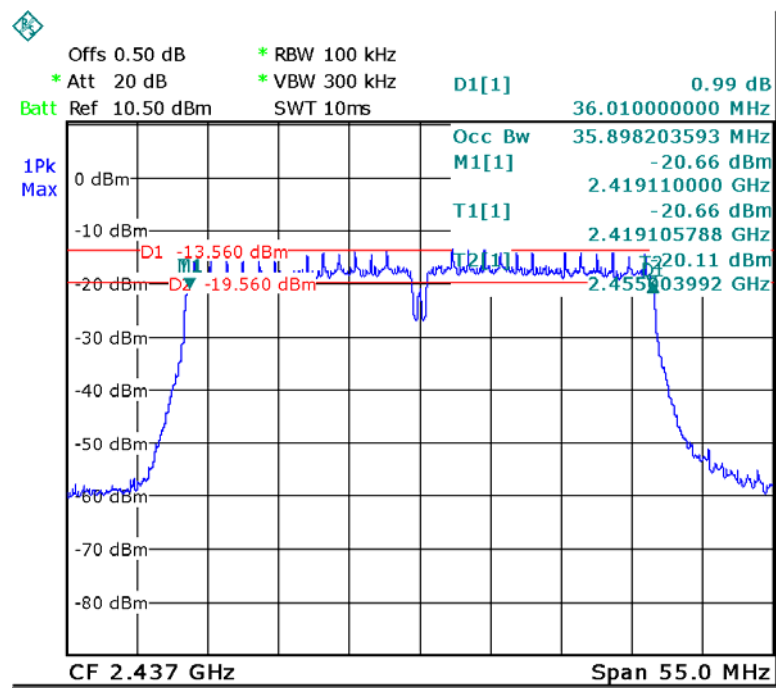
TX 11n HT20 Middle channel



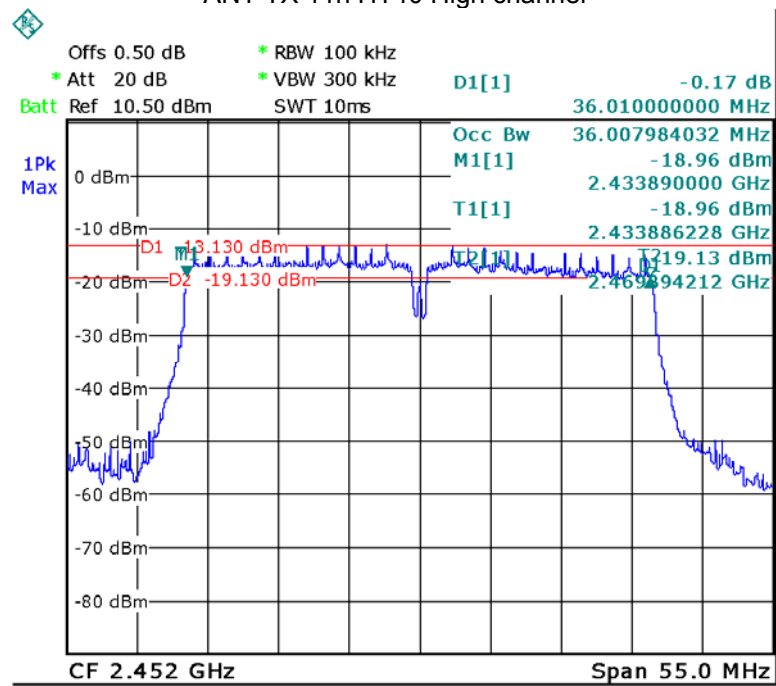
ANT TX 11n HT40 Low channel



ANT TX 11n HT40 Middle channel



ANT TX 11n HT40 High channel



10 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB 558074 D01 DTS Meas Guidance v04

10.1 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.

10.2 Test Result:

Operation mode	ANT	Maximum Peak Output Power (dBm)		
		Low	Middle	High
11b	ANT	9.46	9.54	9.49
11g	ANT	9.53	9.54	9.81
11n HT20	ANT	9.42	9.65	9.89
11n HT40	ANT	9.90	9.53	9.53
Limit				
1W/30dBm				

11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB 558074 D01 DTS Meas Guidance v04

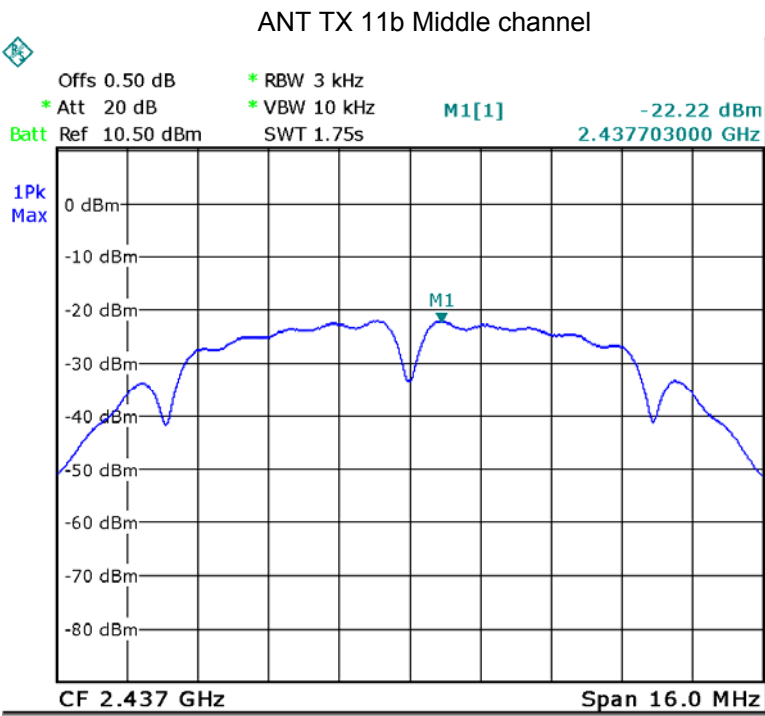
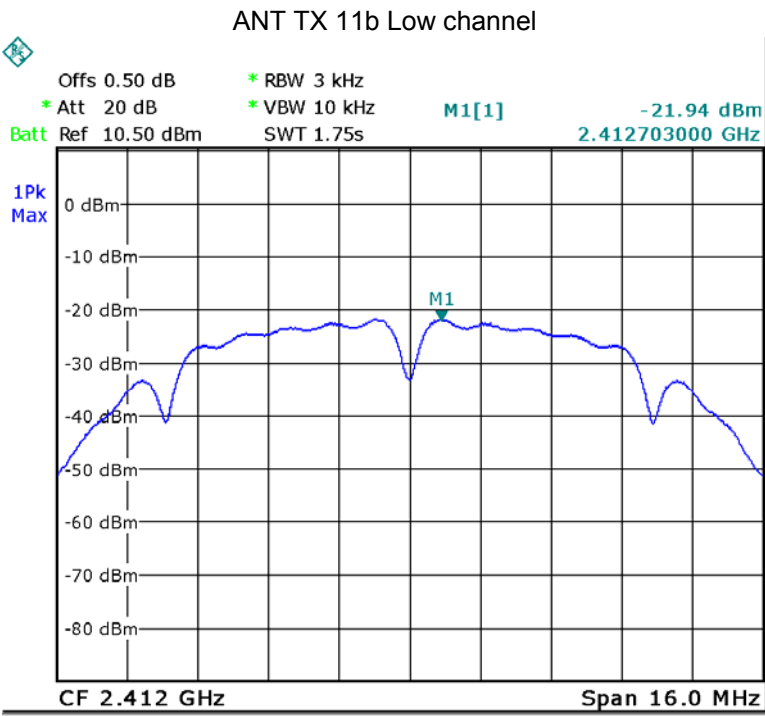
11.1 Test Procedure:

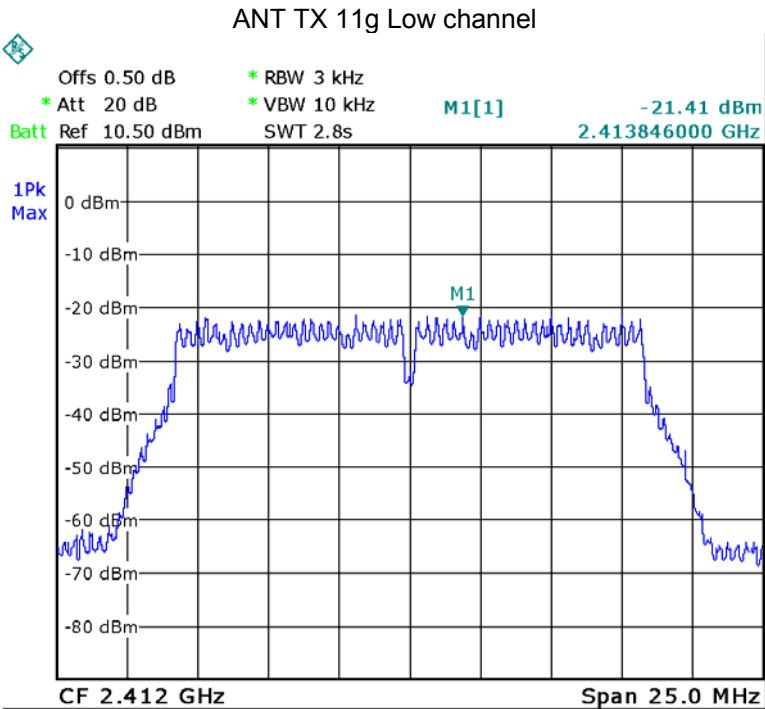
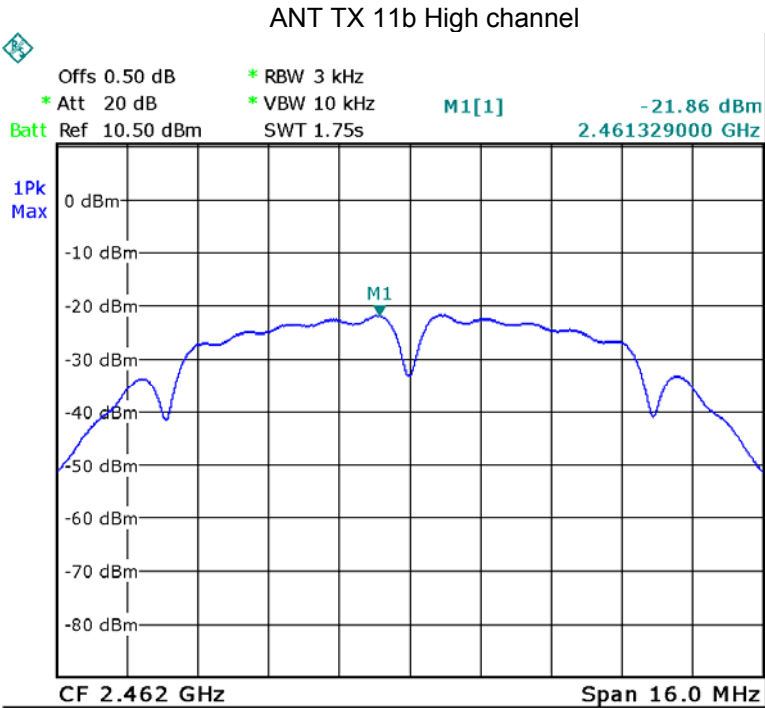
KDB 558074 D01 DTS Meas Guidance v03r04 section 10.2

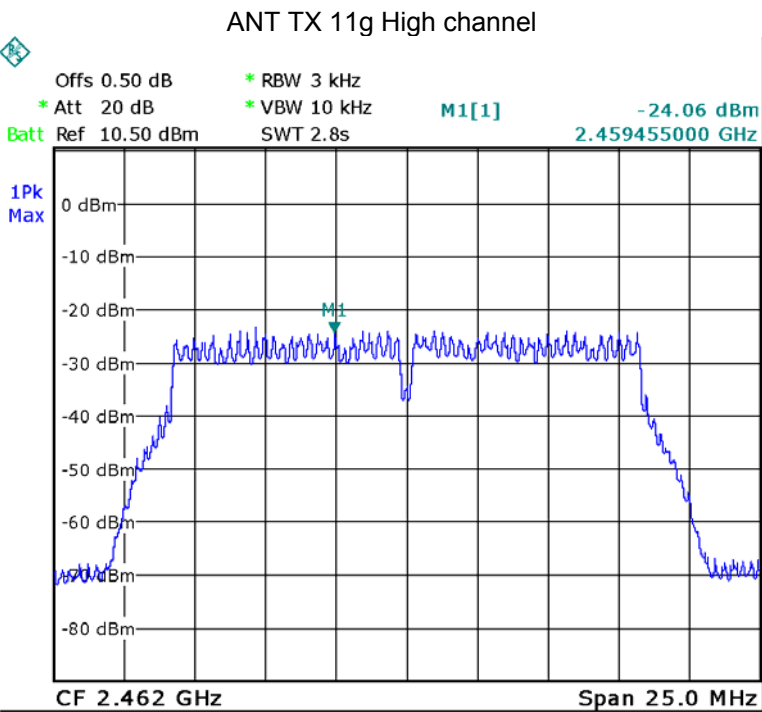
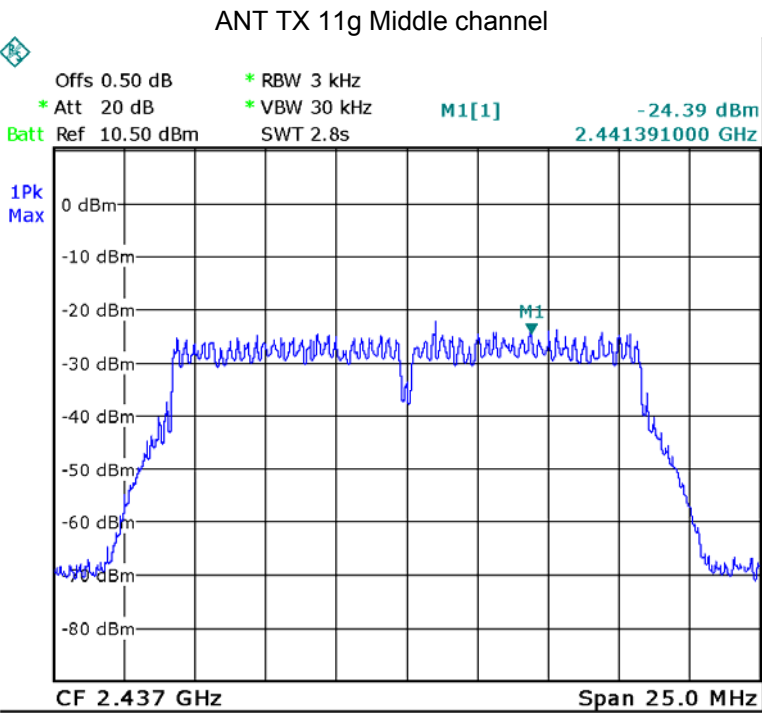
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 3kHz. VBW = 10kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to 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.

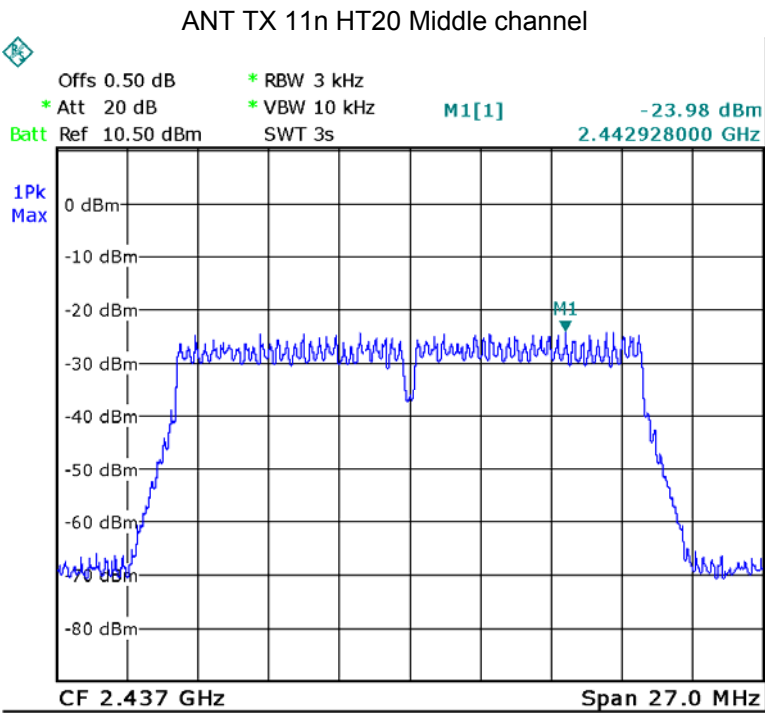
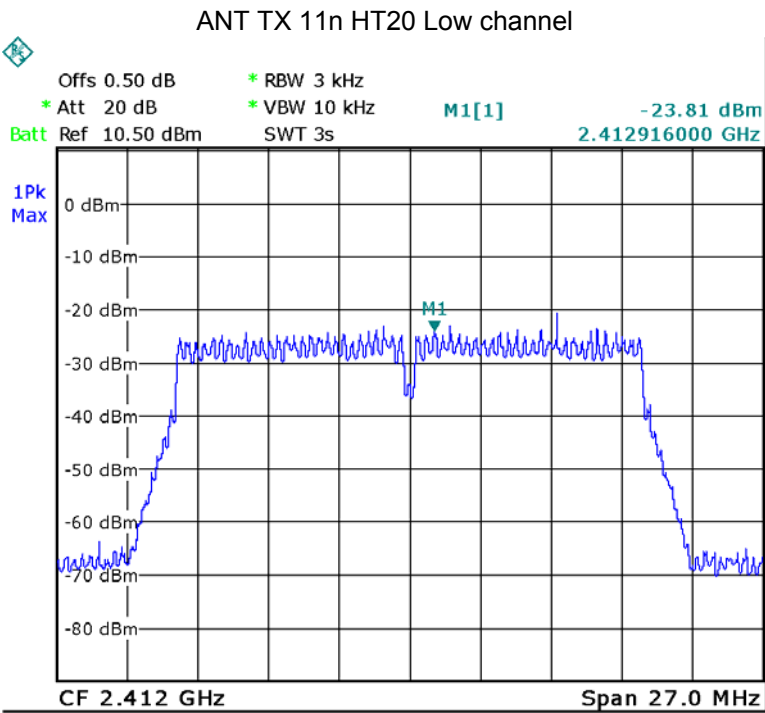
11.2 Test Result:

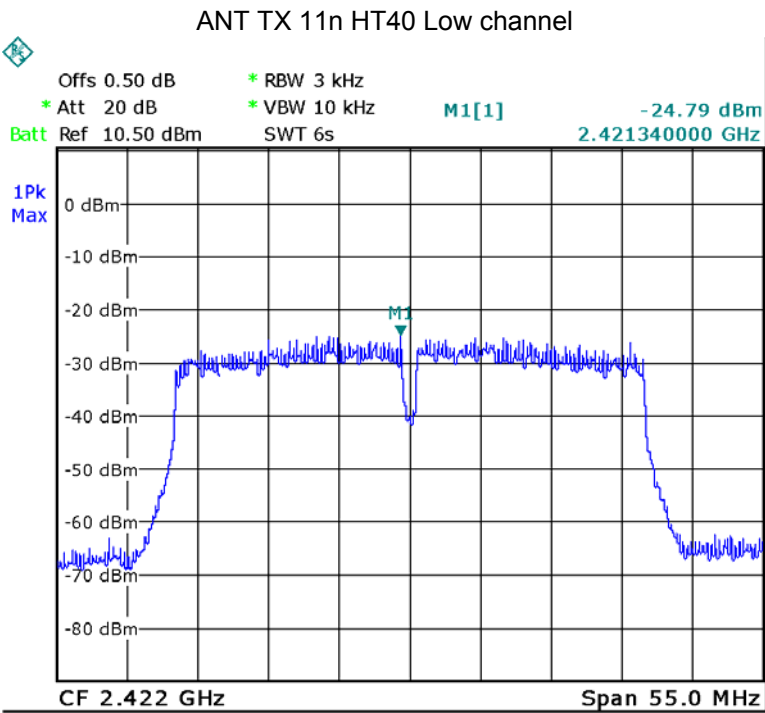
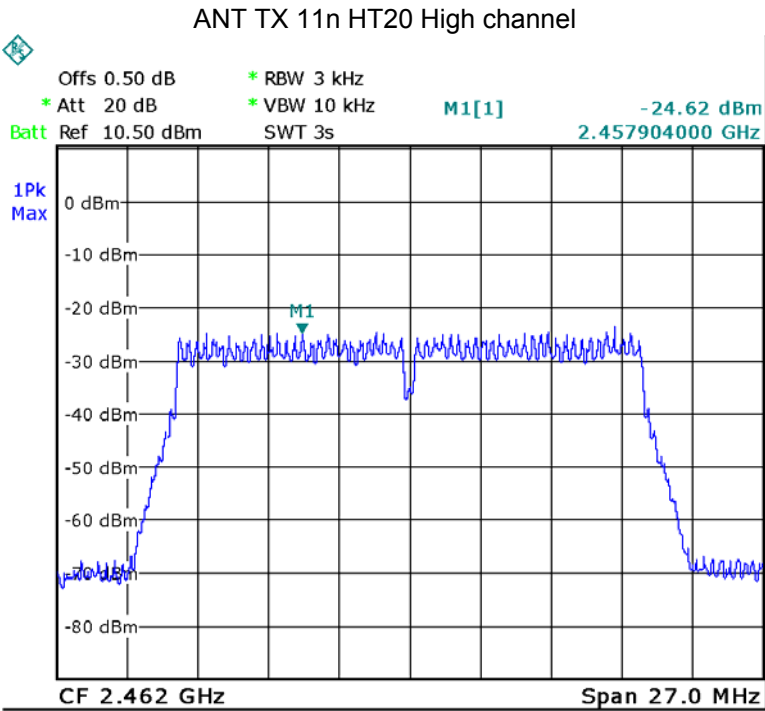
Operation mode	ANT	Maximum Peak Output Power (dBm per 3kHz)		
		Low	Middle	High
11b	ANT	-21.94	-22.22	-21.86
11g	ANT	-21.41	-24.39	-24.06
11n HT20	ANT	-23.81	-23.98	-24.62
11n HT40	ANT	-24.79	-26.40	-27.59
Limit				
8dBm per 3kHz				

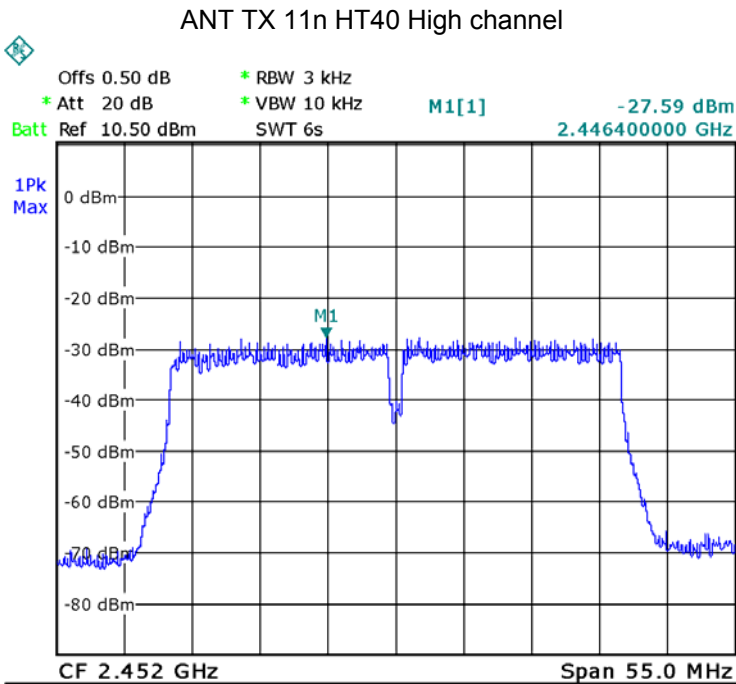
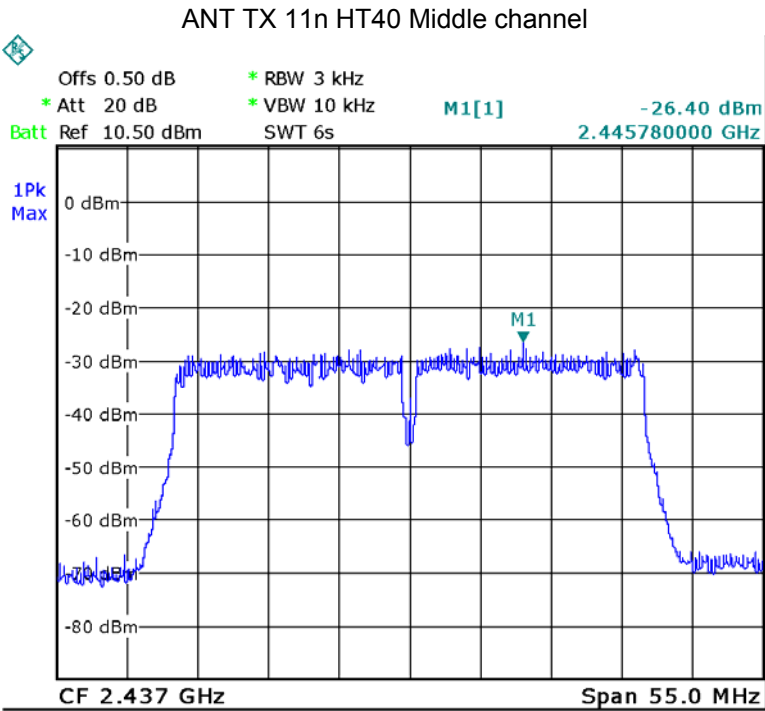






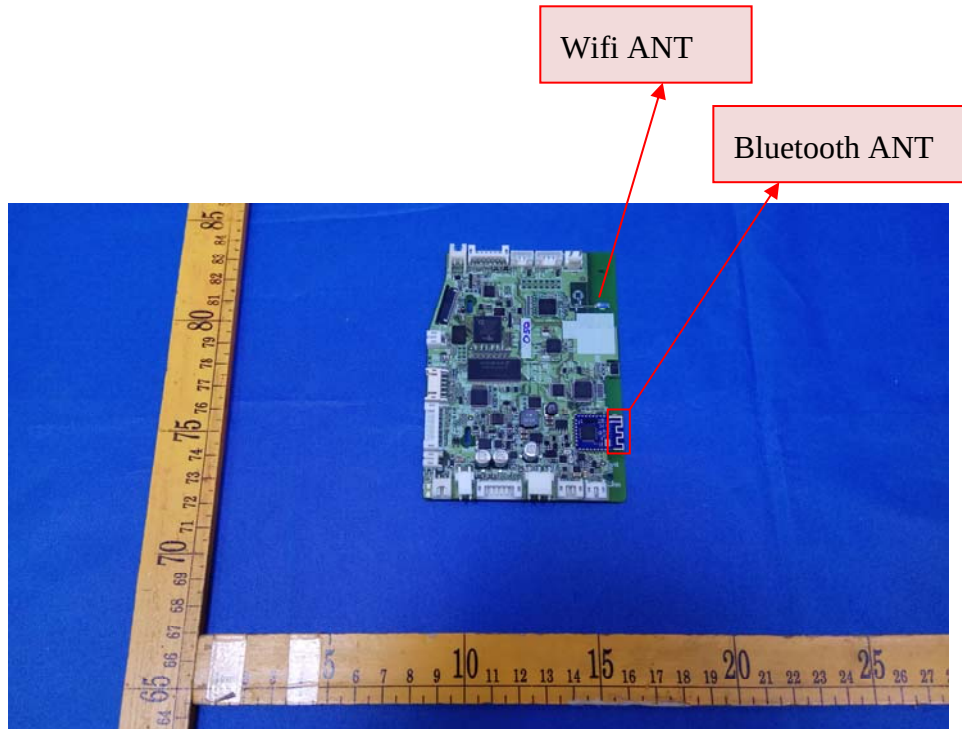






12 Antenna Requirement

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 ceramic antenna fulfill the requirement of this section.



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

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

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.

Antenna Gain (dBi)	Antenna Gain (numeric)	Max. Peak Output Power (dBm)	Peak Output Power (mW)	Power Density (mW/cm ²)	Limit of Power Density (mW/cm ²)
2.00	1.585	9.90	9.77	0.003081	1

14 Photographs – Model BH70970 Test Setup

14.1 Conducted Emission

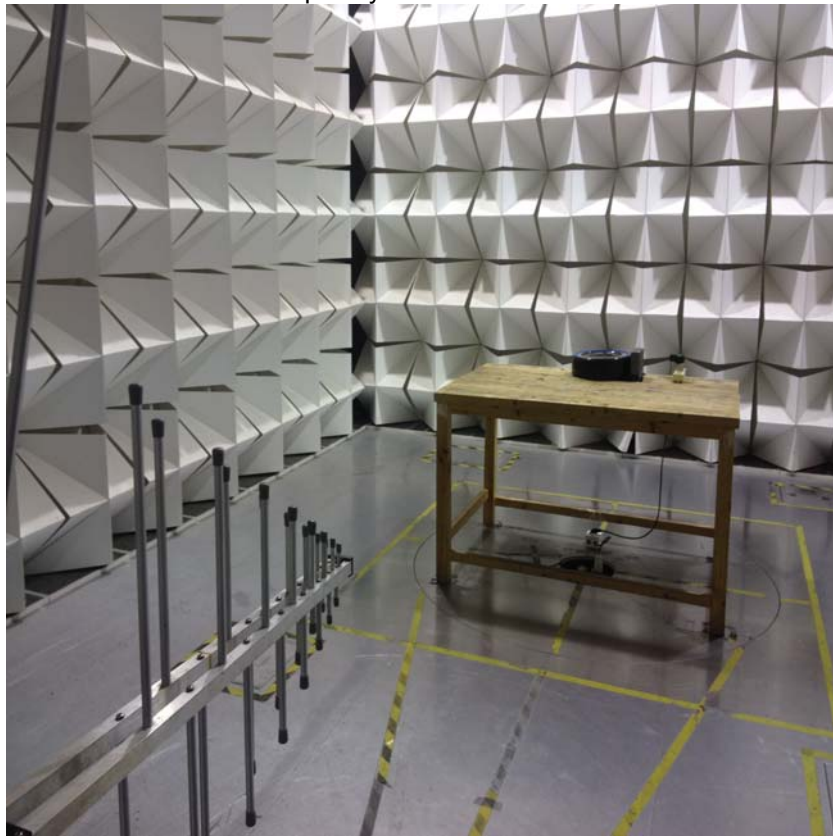


14.2 Radiated Emission

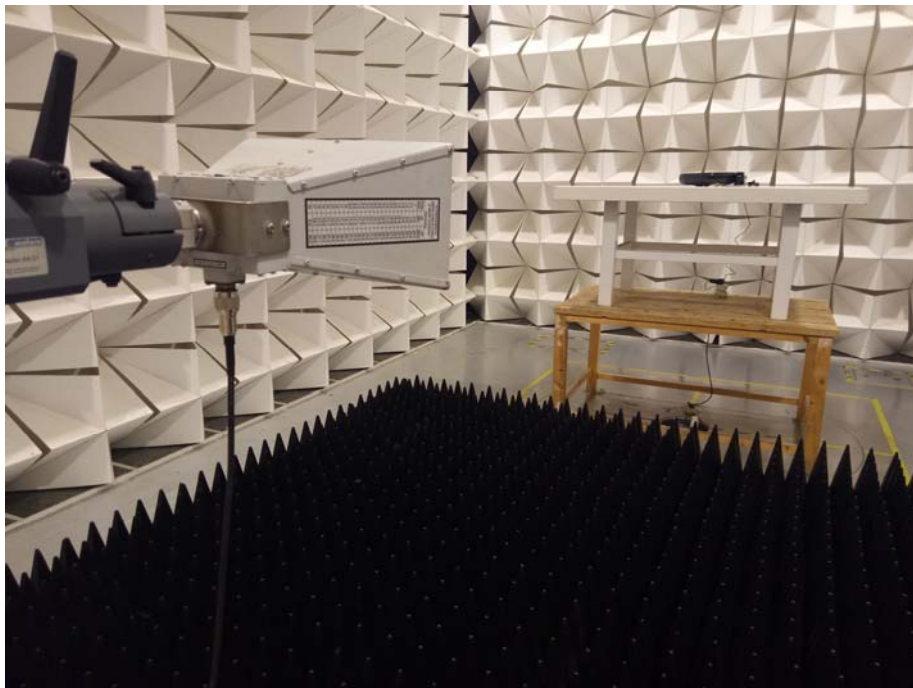
Below 30MHz



Test frequency from 30MHz to 1GHz



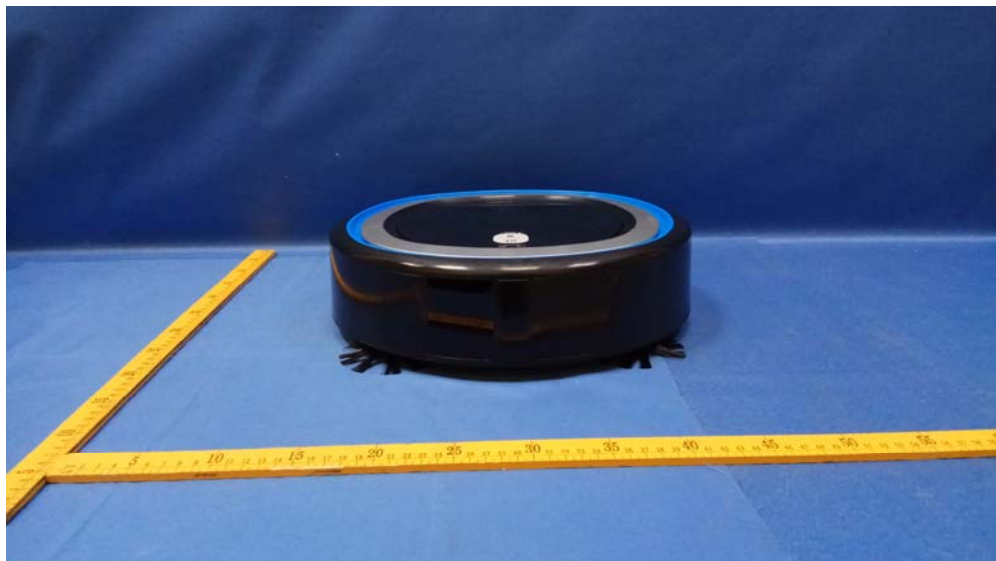
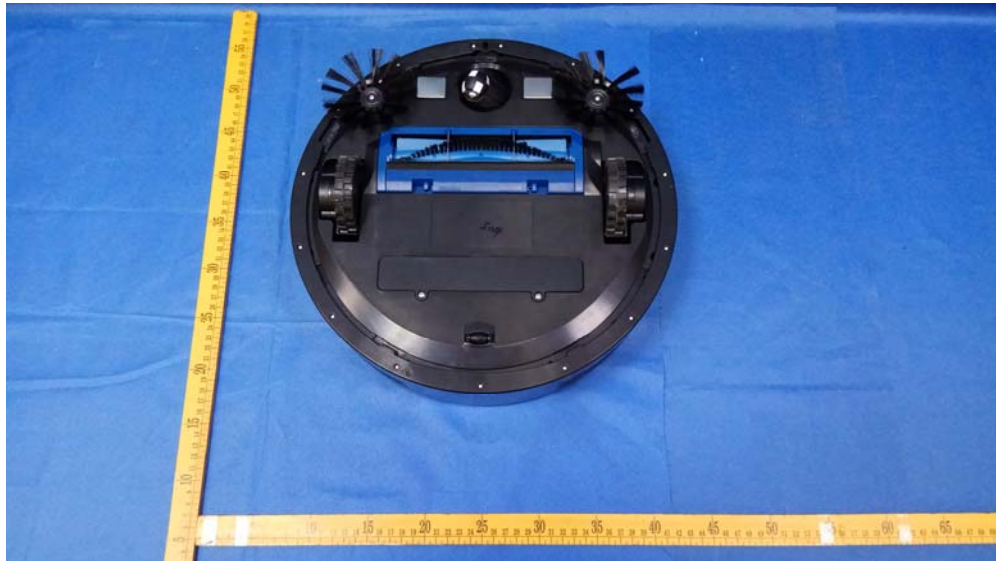
Test frequency above 1GHz

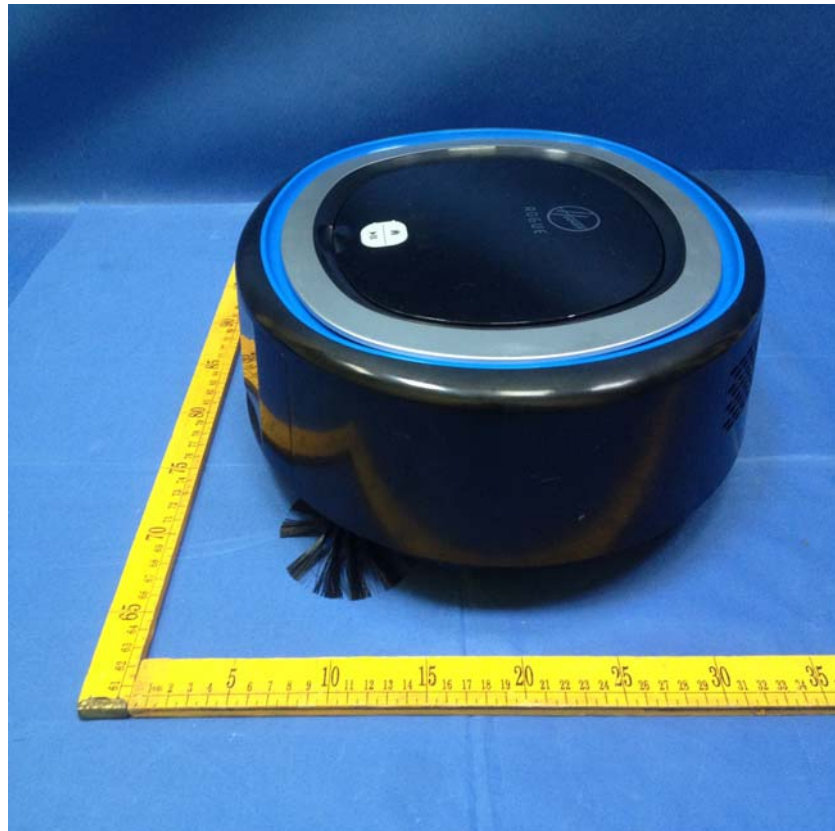


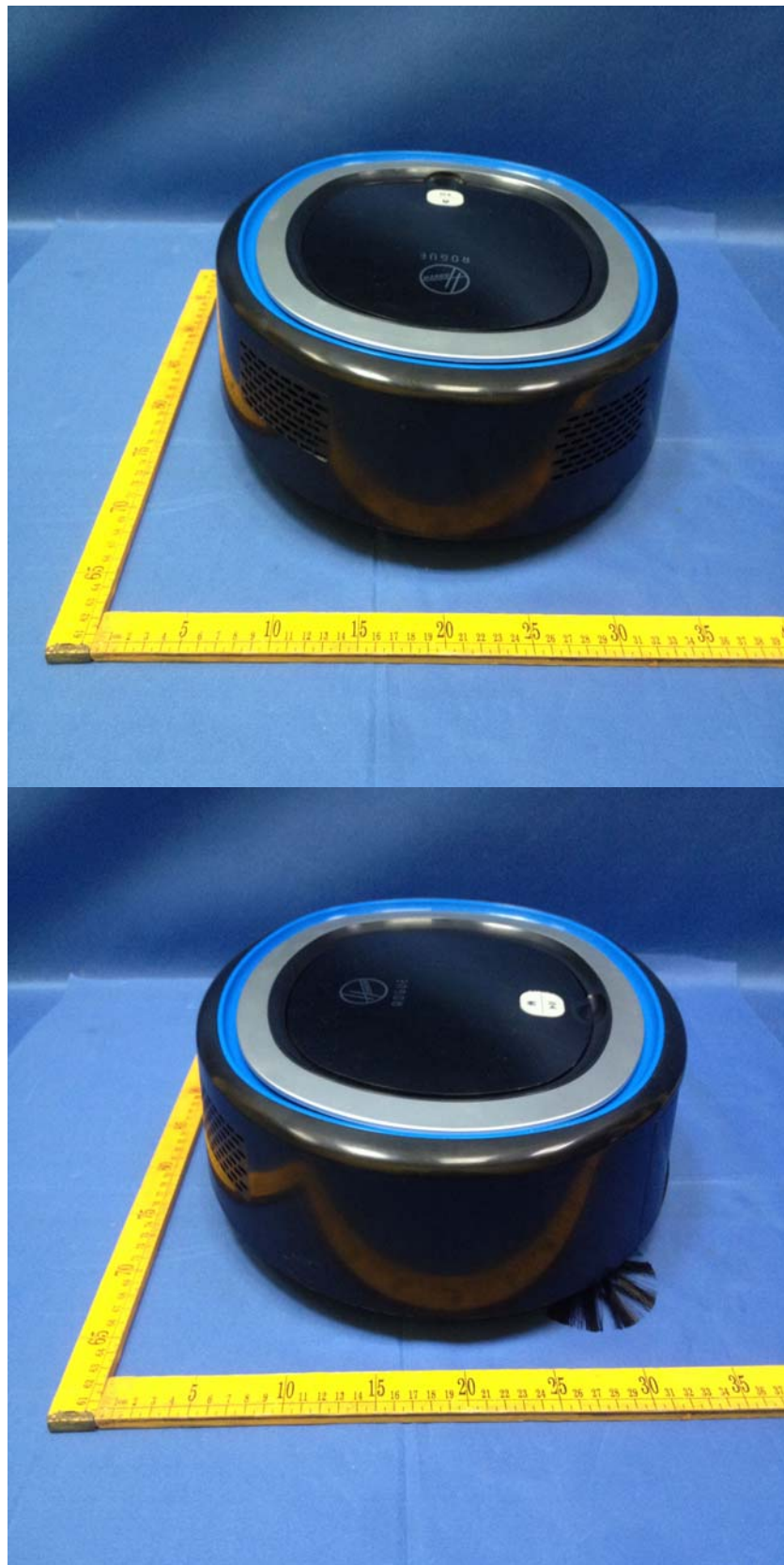
15 Photographs - Constructional Details

15.1 Model BH70970 External View



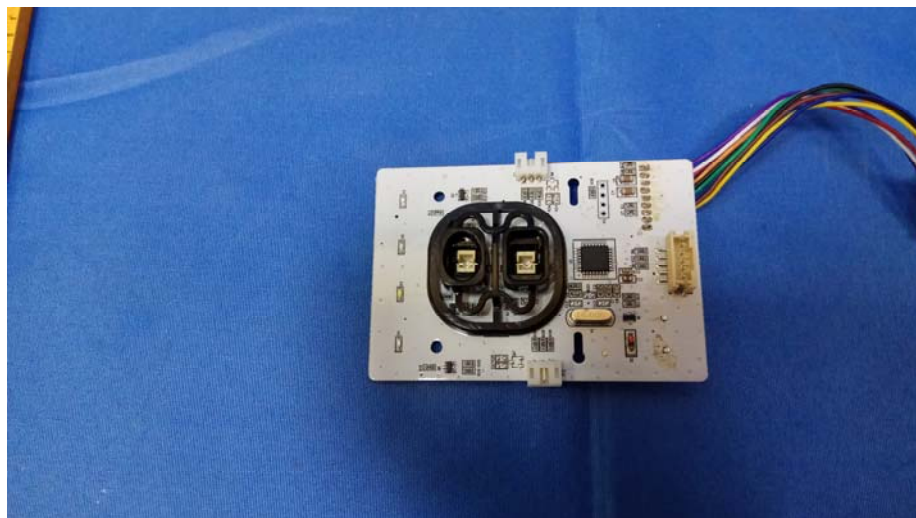


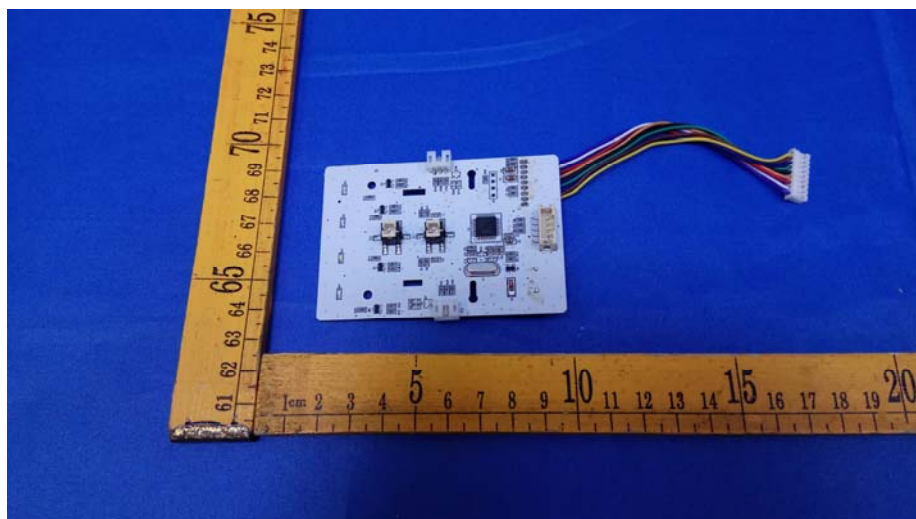


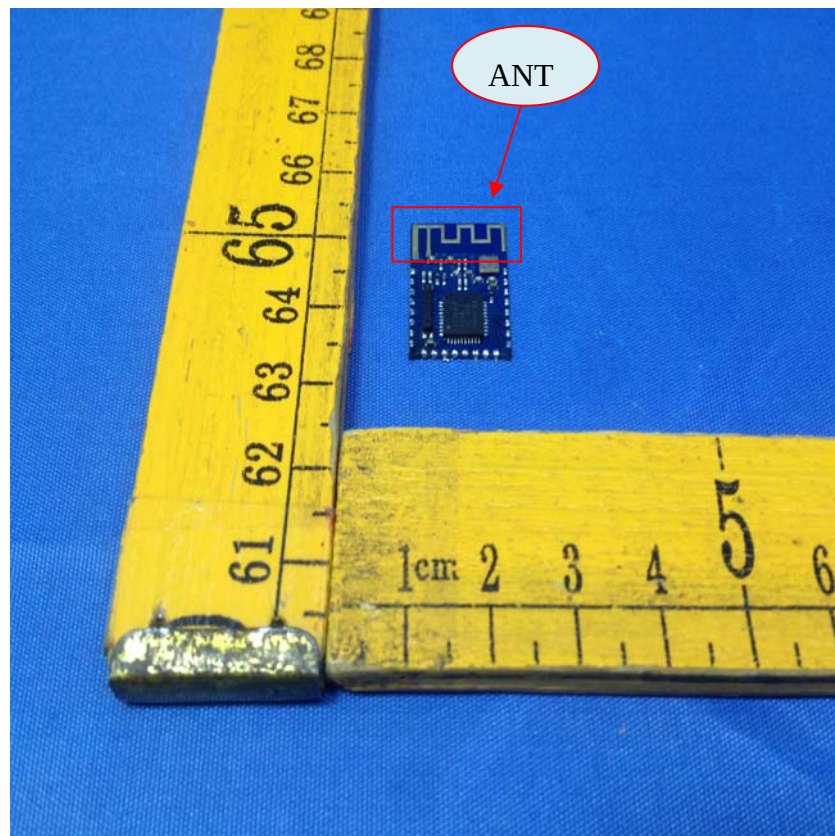
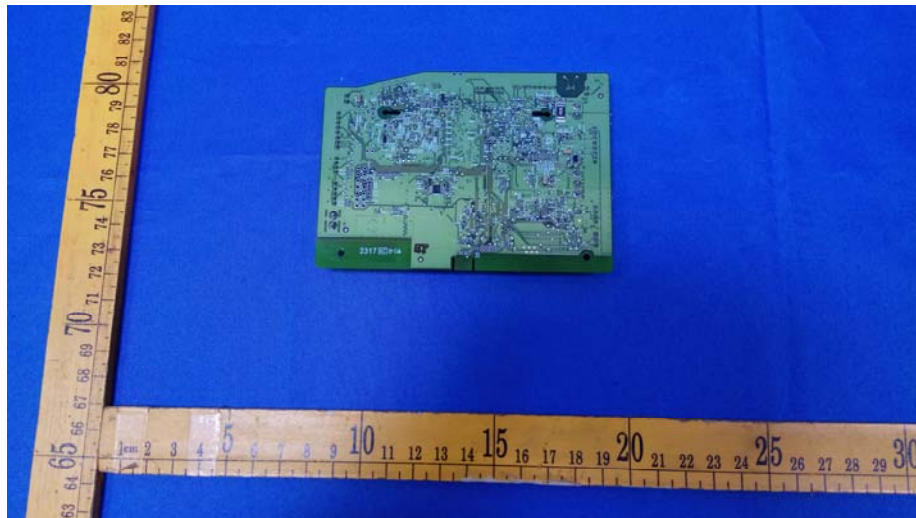


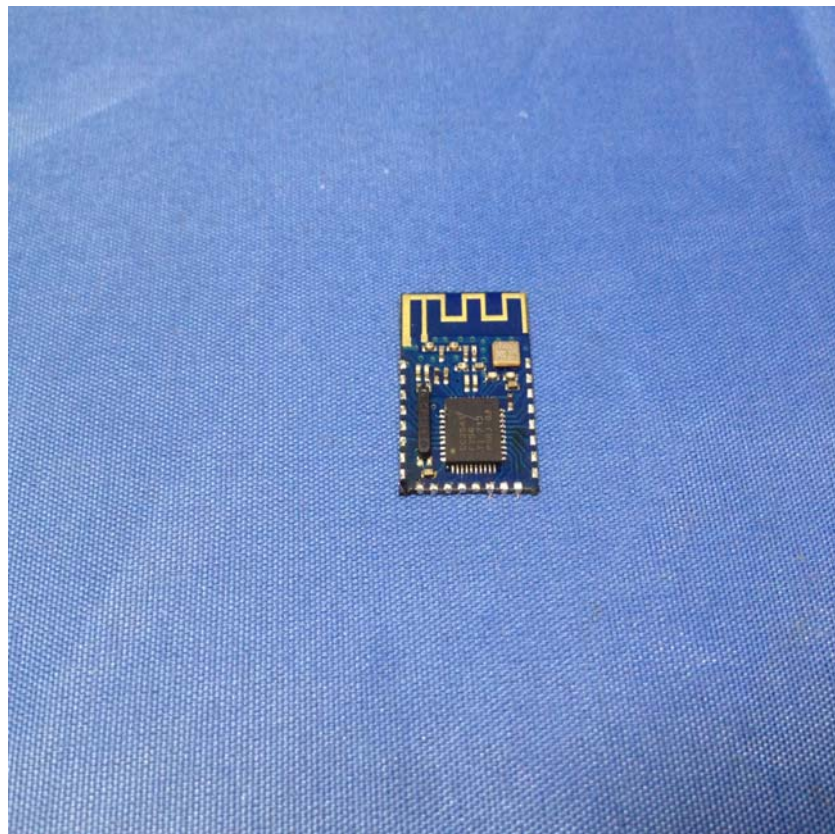
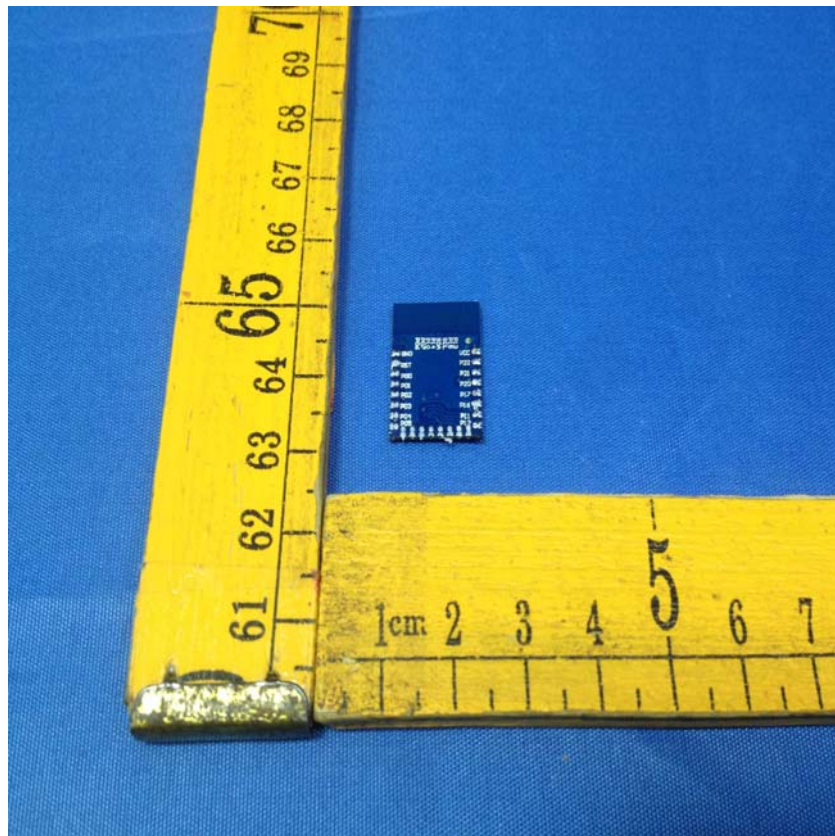


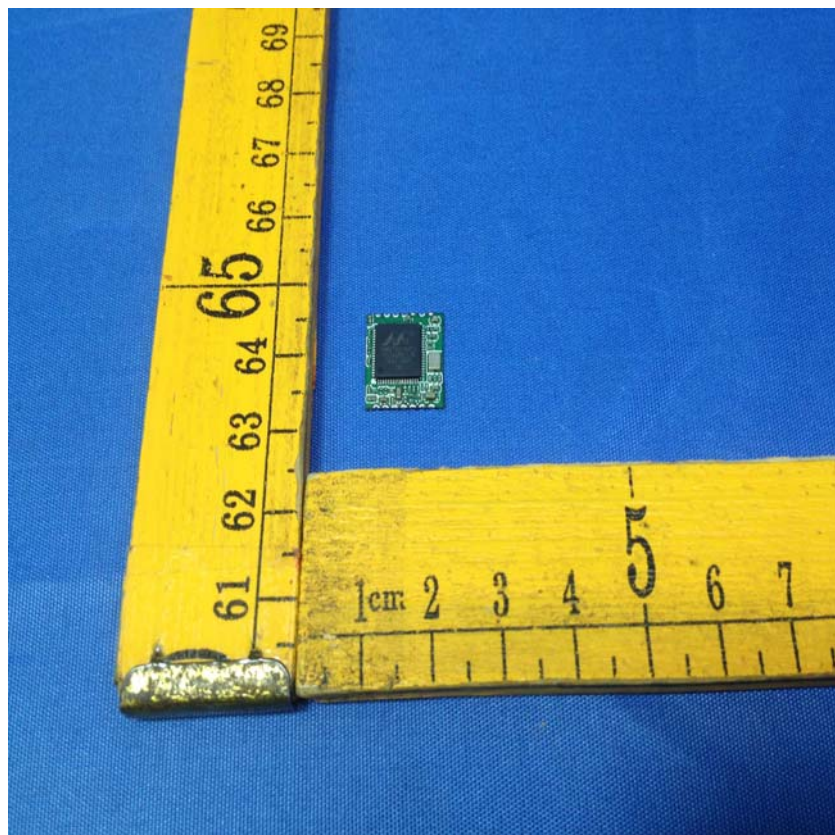
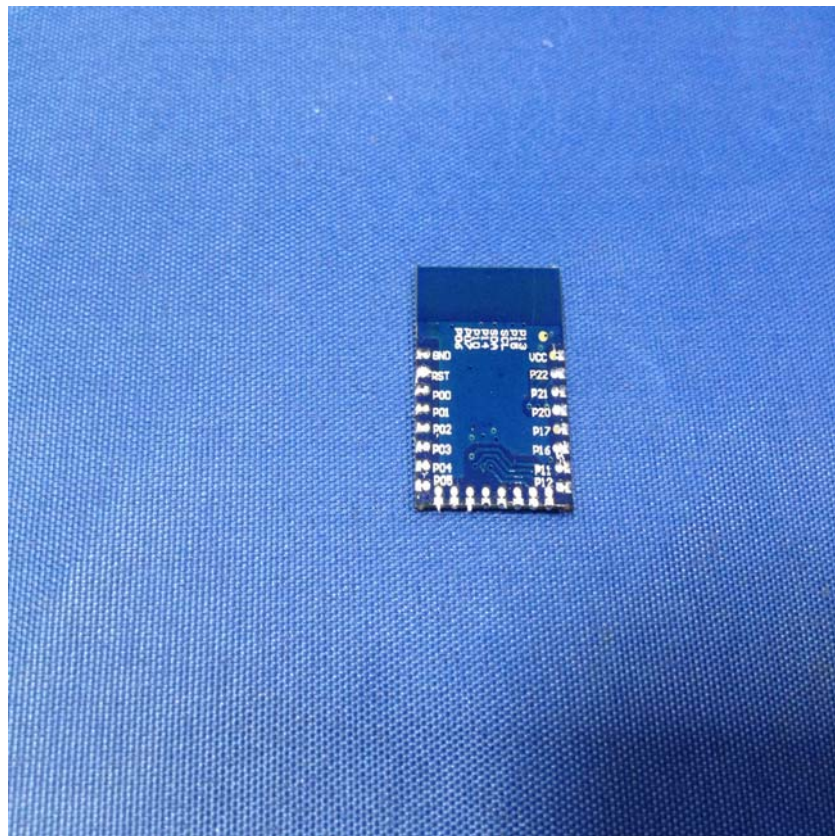
15.2 Model BH70970 Internal View

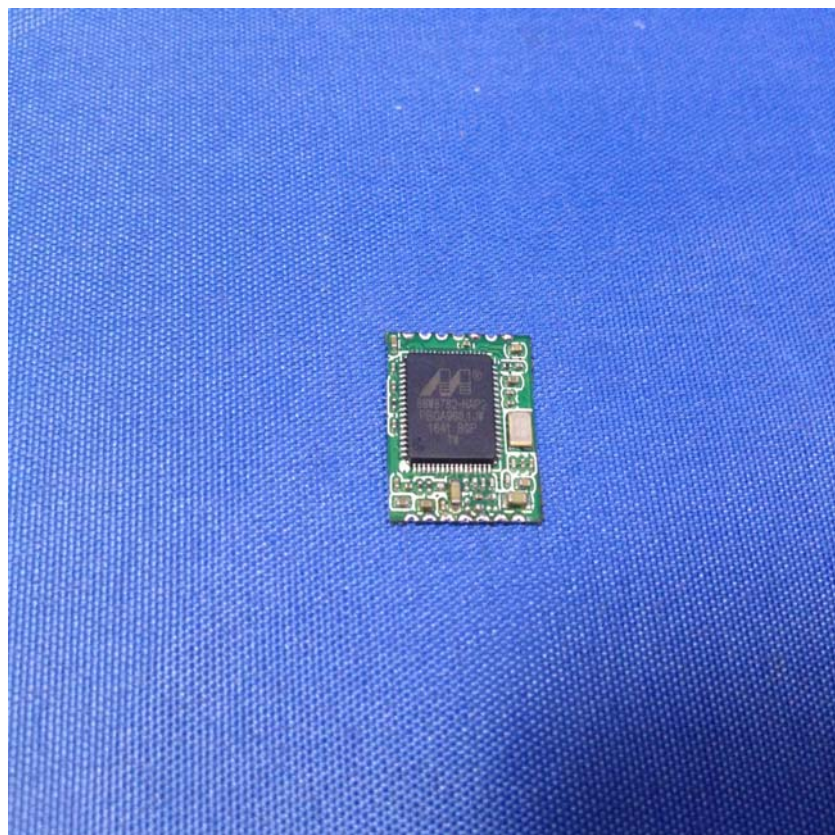
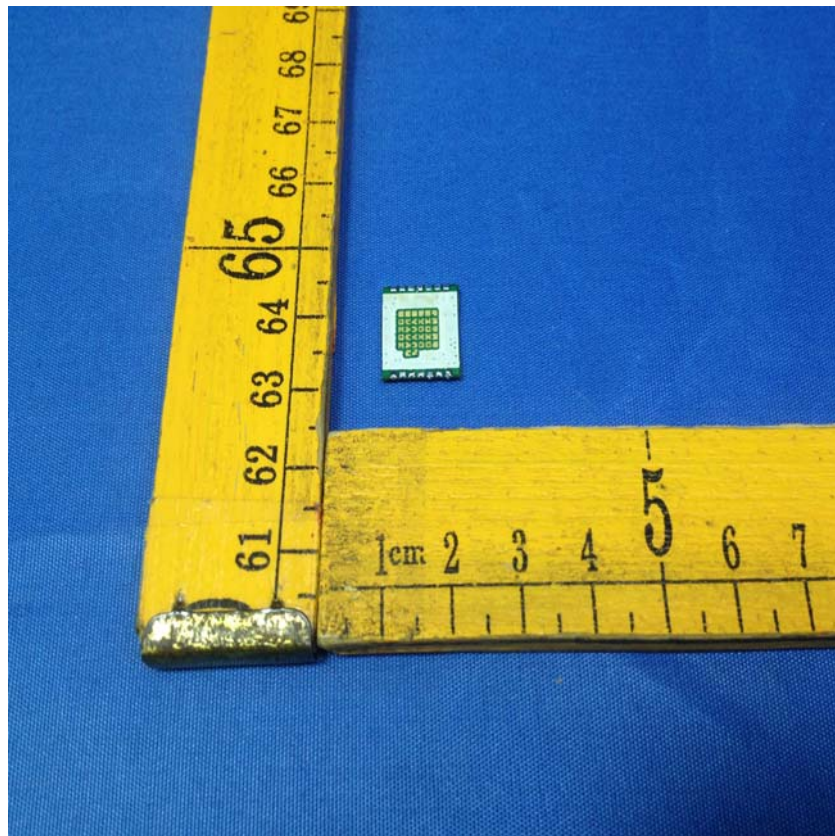


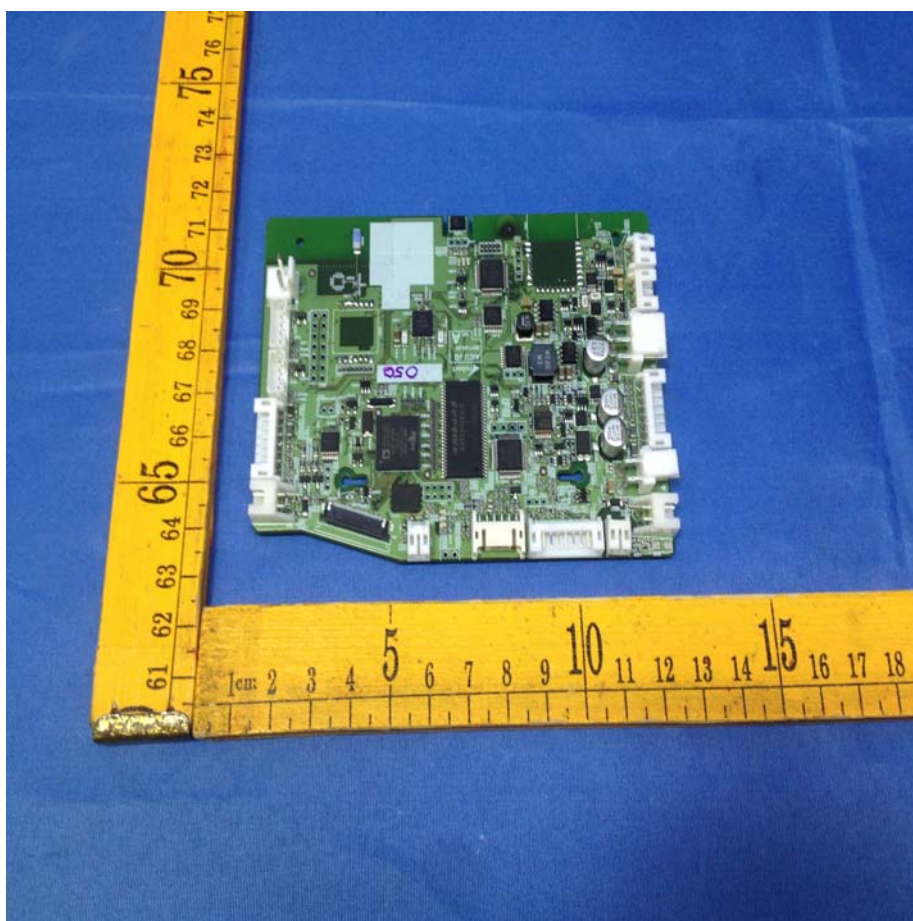
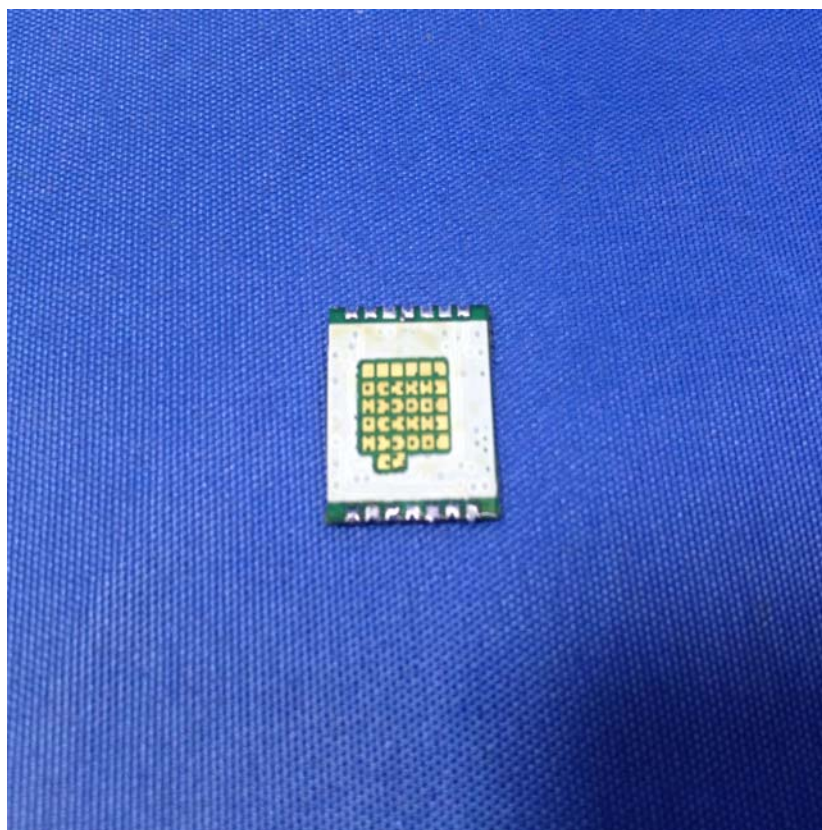














=====End of Report=====