

TEST REPORT

Reference No. : WTN17S0989813-2E
FCC ID..... : 2AE2WT0702R
Applicant : Chunghsin Technology Group CO.,LTD
Address : NO.618-2 GONGREN WEST ROAD, JIAOJIANG AREA, TAIZHOU,
ZHEJIANG, China
Manufacturer : The same as above
Address : The same as above
Product..... : 7" tablet
Model(s)..... : T0702R, HT0703W08
Standards..... : FCC CFR47 Part 15 C Section 15.247:2016
Date of Receipt sample..... : 2017-09-11
Date of Test..... : 2017-09-12 to 2017-10-31
Date of Issue : 2017-11-02
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:

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2 Laboratories Introduction

Waltek Services Test Group Ltd. is one of the largest and the most comprehensive third party testing organizations in China, our headquarter located in Shenzhen (CNAS Registration No. L3110, A2LA Certificate Number: 4243.01) and have branches in Foshan (CNAS Registration No. L6478), Dongguan (CNAS Registration No. L9950), Zhongshan, Suzhou (CNAS Registration No. L7754), Ningbo and Hong Kong, Our test capability covered four large fields: safety test. Electronic Magnetic Compatibility(EMC), reliability and energy performance, Chemical test. 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), CPSC(Consumer Product Safety Commission), CEC(California energy efficiency), IC(Industry Canada) and ELI(Efficient Lighting Initiative). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as UL, Intertek(ETL-SEMKO), CSA, TÜV Rheinland, TÜV SÜD, etc. 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.

Waltek Services (Shenzhen) Co., Ltd.

A. Accreditations for Conformity Assessment (International)

Country/Region	Accreditation Body	Scope	Note
USA	CNAS (Registration No.: L3110) 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

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3 Revision History


Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTN17S0989813-2E	2017-09-11	2017-09-12 to 2017-10-31	2017-11-02	Original	-	Valid

4 General Information

4.1 General Description of E.U.T

Product:	7" tablet
Model(s):	T0702R, HT0703W08
Model Difference:	Only the model names and colors are different.
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz, 802.11n HT40: 2422MHz~2452MHz
The Lowest Oscillator:	32.768kHz
Antenna Gain:	2.5dBi
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.

	DC 3.7V, 2500mAh, power by battery
Ratings	(Adapter: Input:100-240V~50/60 Hz, 0.2A Output:5.0V  1.5A)
Adapter	Model: BSY01J3050150U U1

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.

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	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
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	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
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	-	2017-10-17	2018-10-16
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2017-04-09	2018-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2017-04-09	2018-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2017-09-14	2018-09-13
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2017-04-13	2018-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2017-04-13	2018-04-12
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	2017-04-13	2018-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2017-04-09	2018-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2017-04-13	2018-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2017-04-13	2018-04-12

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	2017-09-12	2018-09-11
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-12	2018-09-11
RF Conducted Spurious Emissions Testing (Shenzhen Balun Technology Co.,Ltd.)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	R&S	FSV-40	101544	2017-02-17	2018-02-16
10m Semi-anechoic Chamber for Radiation Emissions (Above18GHz) (Shenzhen Balun Technology Co.,Ltd.)						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	Spectrum Analyzer	R&S	FSV-40	101544	2017-02-17	2018-02-16
2.	Antenna-Horn (18-40 GHz)	A-INFO	LB-180400KF	J211060273	2017-01-07	2018-01-06
3.	Amplifier	COM-MV	ZLNA-18-40G-021	1608001	2017-02-17	2018-02-16
4.	Cable	Top	18-40GHz	-	2017-02-17	2018-02-16

5.2 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)
Radiated Spurious Emissions (Shenzhen Balun Technology Co.,Ltd.)	± 7.5 dB
Conducted Spurious Emissions (Shenzhen Balun Technology Co.,Ltd.)	± 2.2 dB

5.3 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☒ Yes ☐ No

If Yes, list the related test items and lab information:

Test Lab: Shenzhen Balun Technology Co.,Ltd.

FCC Designation No.: CN1196, Test Firm Registration No.: 935607.

Lab address: Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, ShenZhen, GuangDong Province, P. R. China

Test items: Radiated Spurious Emission(18GHz to 25GHz),

Conducted Spurious Emission(18GHz to 25GHz).

5.4 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.

6 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.247 15.205(a) 15.209(a)	C
Conducted Emissions	15.207(a)	C
Bandwidth	15.247(a)(2)	C
Maximum Peak Output Power	15.247(b)(3),(4)	C
Power Spectral Density	15.247(e)	C
Band Edge	15.247(d)	C
Antenna Requirement	15.203	C
Maximum Permissible Exposure (Exposure of Humans to RF Fields)	1.1307(b)(1)	C
Note: C=Compliance; NC=Not Compliance; NT=Not Tested; N/A=Not Applicable.		

7 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.10:2013,ANSI C63.4:2014
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)

7.1 E.U.T. Operation

Operating Environment :

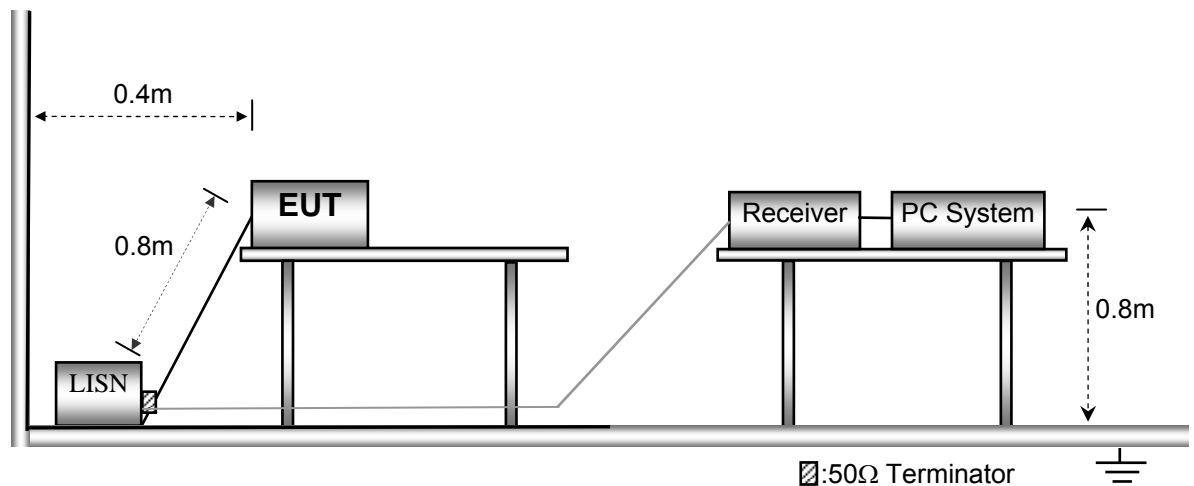
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

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.



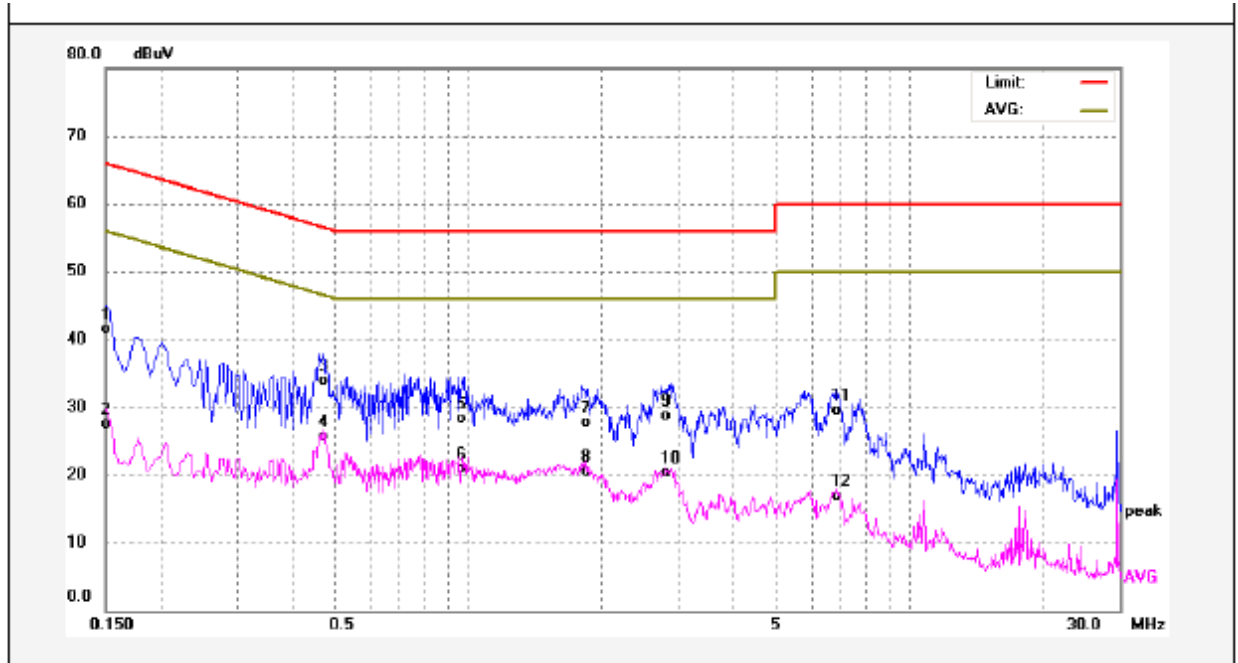
7.3 Measurement Description

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

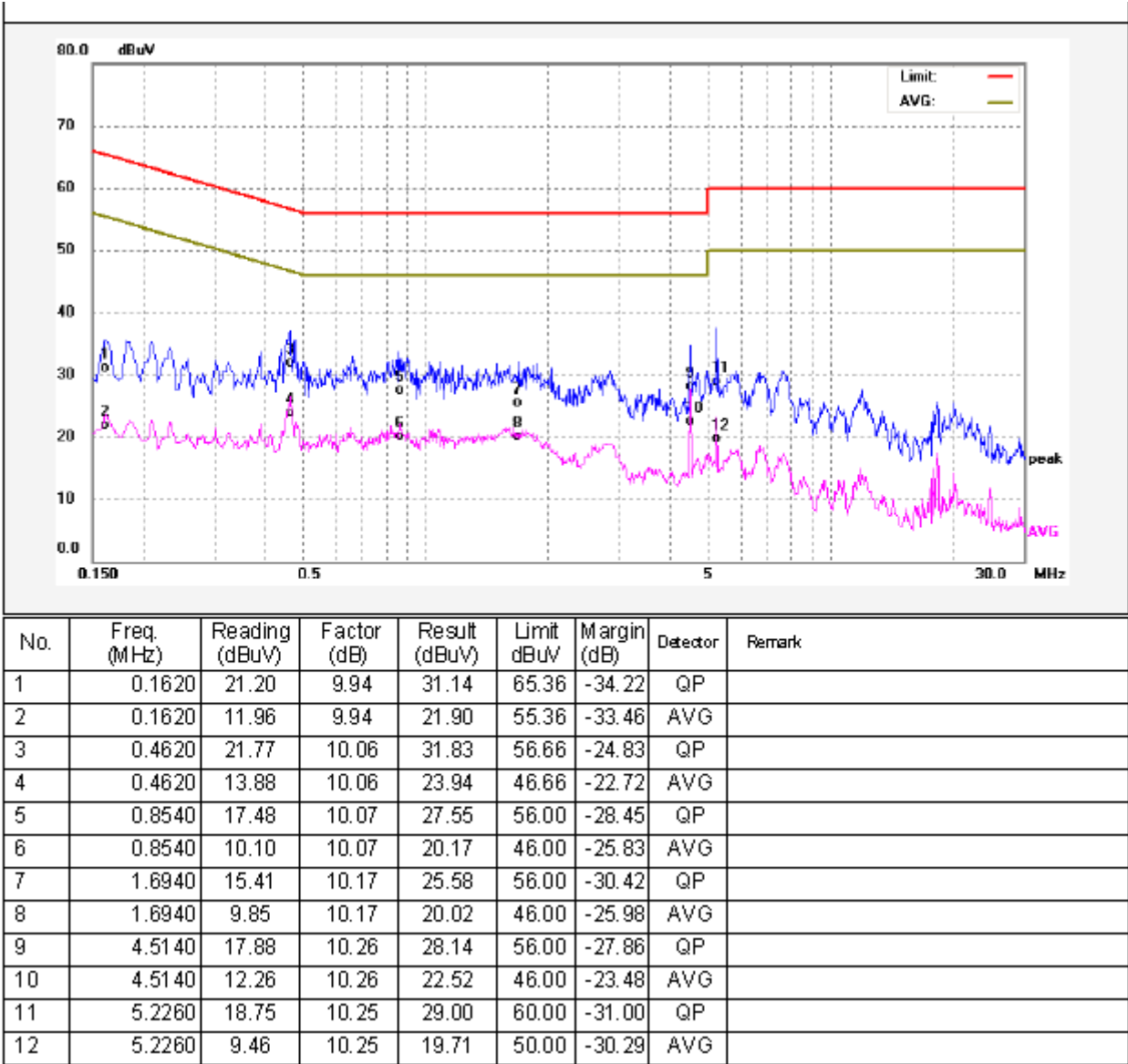
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	31.47	10.06	41.53	65.99	-24.46	QP	
2	0.1500	17.35	10.06	27.41	55.99	-28.58	AVG	
3	0.4700	23.87	10.06	33.93	56.51	-22.58	QP	
4	0.4700	15.71	10.06	25.77	46.51	-20.74	AVG	
5	0.9660	18.21	10.08	28.29	56.00	-27.71	QP	
6	0.9660	10.73	10.08	20.81	46.00	-25.19	AVG	
7	1.8500	17.46	10.18	27.64	56.00	-28.36	QP	
8	1.8500	10.24	10.18	20.42	46.00	-25.58	AVG	
9	2.8100	18.46	10.24	28.70	56.00	-27.30	QP	
10	2.8100	9.99	10.24	20.23	46.00	-25.77	AVG	
11	6.8620	19.16	10.28	29.44	60.00	-30.56	QP	
12	6.8620	6.59	10.28	16.87	50.00	-33.13	AVG	

Neutral line:



8 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.10:2013, ANSI C63.4:2014

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	$20\log^{(500)}$

8.1 EUT Operation

Operating Environment :

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

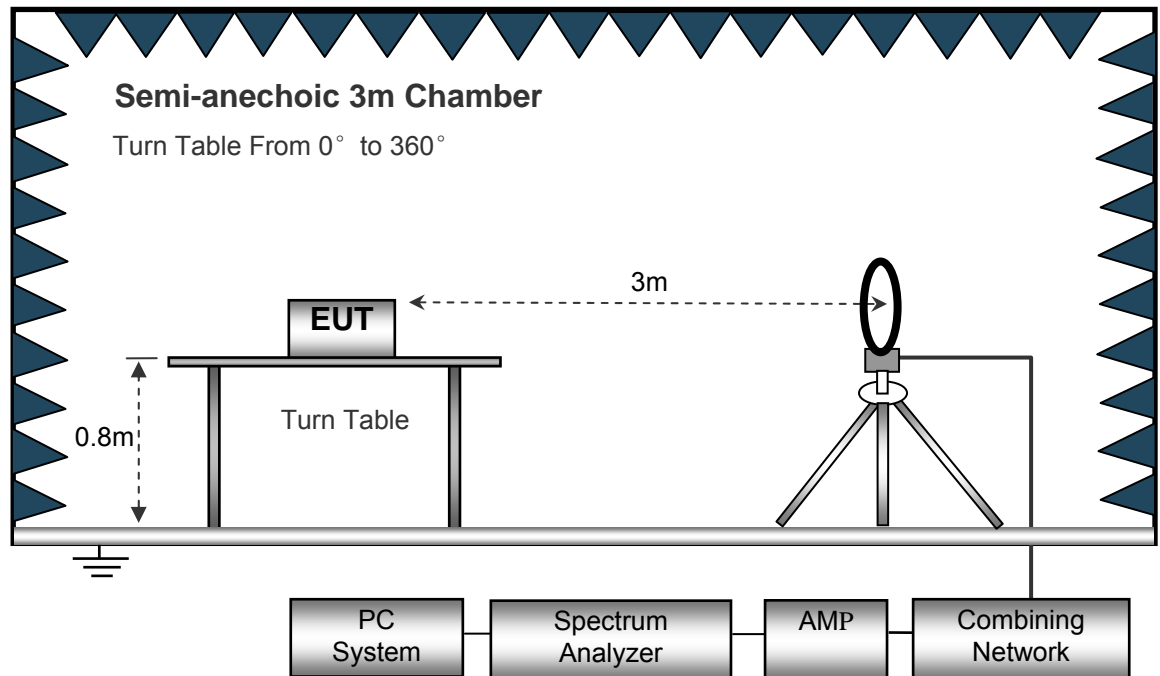
EUT Operation :

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

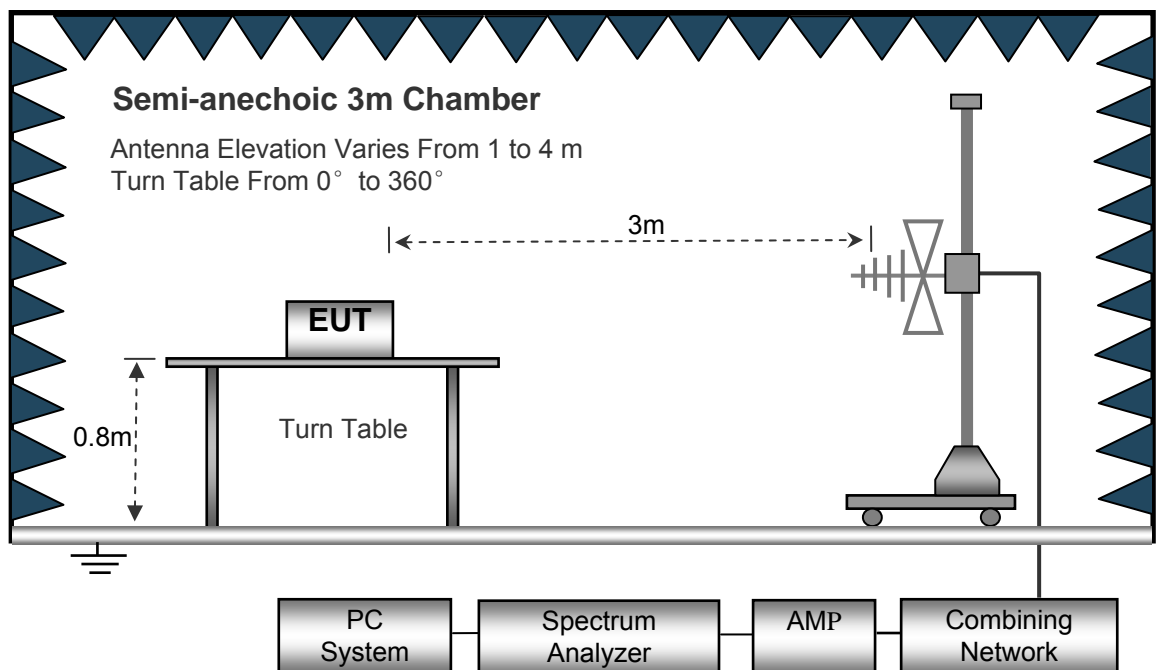
8.2 Test Setup

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

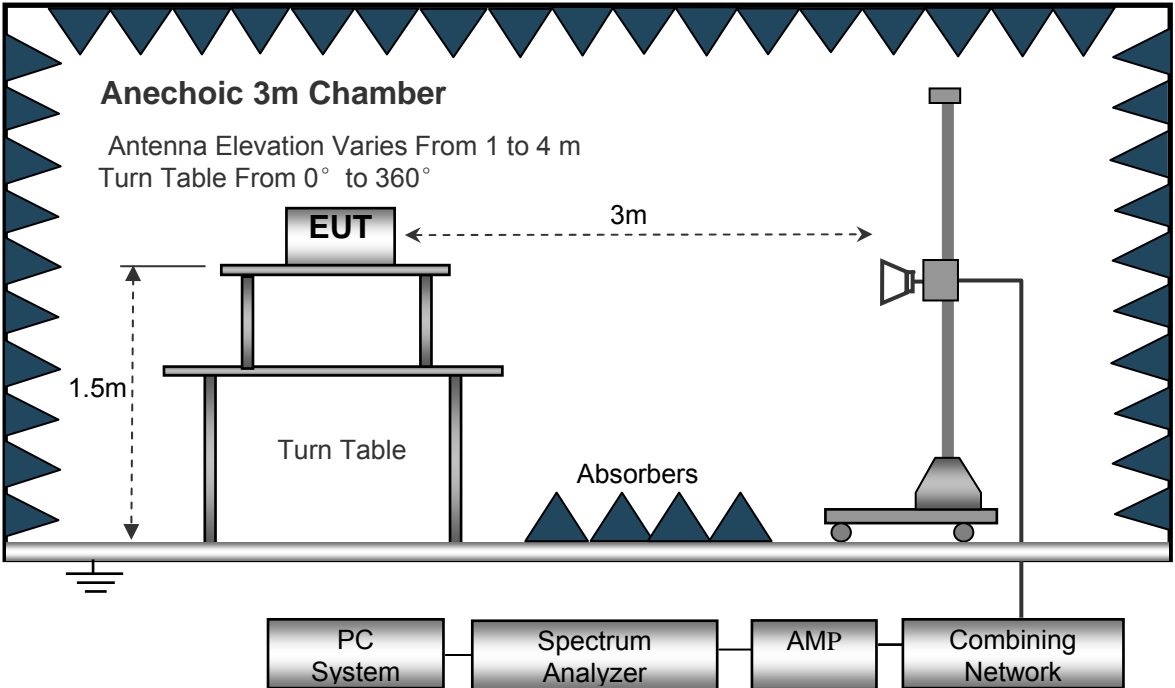
The test setup for emission measurement below 30MHz.



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
- 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

8.4 Test Procedure

1. The EUT is placed on a turntable. For below 1GHz, the EUT is 0.8m above ground plane;
For above 1GHz, the EUT is 1.5m above ground plane.
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.

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:

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

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:

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

8.6 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)
11b: Low Channel 2412MHz									
223.69	40.29	QP	101	1.0	H	-11.62	28.67	46.00	-17.33
223.69	36.45	QP	261	1.5	V	-11.62	24.83	46.00	-21.17
4824.00	50.16	PK	71	1.4	V	-1.06	49.10	74.00	-24.90
4824.00	45.20	Ave	71	1.4	V	-1.06	44.14	54.00	-9.86
7236.00	41.03	PK	10	1.1	H	1.33	42.36	74.00	-31.64
7236.00	41.22	Ave	10	1.1	H	1.33	42.55	54.00	-11.45
2349.00	46.06	PK	197	2.0	V	-13.19	32.87	74.00	-41.13
2349.00	39.89	Ave	197	2.0	V	-13.19	26.70	54.00	-27.30
2359.23	42.60	PK	93	1.8	H	-13.14	29.46	74.00	-44.54
2359.23	36.09	Ave	93	1.8	H	-13.14	22.95	54.00	-31.05
2494.64	44.64	PK	193	1.2	V	-13.08	31.56	74.00	-42.44
2494.64	38.60	Ave	193	1.2	V	-13.08	25.52	54.00	-28.48

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)
11b: Middle Channel 2437MHz									
223.69	40.63	QP	69	1.4	H	-11.62	29.01	46.00	-16.99
223.69	35.55	QP	346	2.0	V	-11.62	23.93	46.00	-22.07
4874.00	49.49	PK	1	1.7	V	-0.62	48.87	74.00	-25.13
4874.00	46.58	Ave	1	1.7	V	-0.62	45.96	54.00	-8.04
7311.00	40.17	PK	66	1.8	H	2.21	42.38	74.00	-31.62
7311.00	40.72	Ave	66	1.8	H	2.21	42.93	54.00	-11.07
2327.28	45.93	PK	308	1.7	V	-13.19	32.74	74.00	-41.26
2327.28	39.21	Ave	308	1.7	V	-13.19	26.02	54.00	-27.98
2370.85	44.49	PK	35	1.3	H	-13.14	31.35	74.00	-42.65
2370.85	38.04	Ave	35	1.3	H	-13.14	24.90	54.00	-29.10
2493.90	44.99	PK	194	1.0	V	-13.08	31.91	74.00	-42.09
2493.90	36.96	Ave	194	1.0	V	-13.08	23.88	54.00	-30.12

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)
11b: High Channel 2462MHz									
223.69	39.16	QP	240	1.1	H	-11.62	27.54	46.00	-18.46
223.69	36.56	QP	320	1.9	V	-11.62	24.94	46.00	-21.06
4924.00	50.79	PK	4	1.5	V	-0.24	50.55	74.00	-23.45
4924.00	46.69	Ave	4	1.5	V	-0.24	46.45	54.00	-7.55
7386.00	40.79	PK	295	1.9	H	2.84	43.63	74.00	-30.37
7386.00	41.74	Ave	295	1.9	H	2.84	44.58	54.00	-9.42
2315.88	45.04	PK	287	1.6	V	-13.19	31.85	74.00	-42.15
2315.88	37.95	Ave	287	1.6	V	-13.19	24.76	54.00	-29.24
2367.08	44.93	PK	62	1.2	H	-13.14	31.79	74.00	-42.21
2367.08	38.37	Ave	62	1.2	H	-13.14	25.23	54.00	-28.77
2483.53	44.65	PK	299	1.1	V	-13.08	31.57	74.00	-42.43
2483.53	37.98	Ave	299	1.1	V	-13.08	24.90	54.00	-29.10

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)
11g: Low Channel 2412MHz									
223.69	40.13	QP	131	2.0	H	-11.62	28.51	46.00	-17.49
223.69	35.93	QP	183	1.7	V	-11.62	24.31	46.00	-21.69
4824.00	51.08	PK	324	1.6	V	-1.06	50.02	74.00	-23.98
4824.00	46.95	Ave	324	1.6	V	-1.06	45.89	54.00	-8.11
7236.00	39.73	PK	112	1.4	H	1.33	41.06	74.00	-32.94
7236.00	40.67	Ave	112	1.4	H	1.33	42.00	54.00	-12.00
2313.13	45.47	PK	177	1.6	V	-13.19	32.28	74.00	-41.72
2313.13	39.23	Ave	177	1.6	V	-13.19	26.04	54.00	-27.96
2382.32	42.97	PK	246	1.8	H	-13.14	29.83	74.00	-44.17
2382.32	38.16	Ave	246	1.8	H	-13.14	25.02	54.00	-28.98
2486.65	44.95	PK	116	1.5	V	-13.08	31.87	74.00	-42.13
2486.65	37.04	Ave	116	1.5	V	-13.08	23.96	54.00	-30.04

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)
11g: Middle Channel 2437MHz									
223.69	40.13	QP	271	1.5	H	-11.62	28.51	46.00	-17.49
223.69	37.40	QP	200	1.8	V	-11.62	25.78	46.00	-20.22
4874.00	49.86	PK	243	1.7	V	-0.62	49.24	74.00	-24.76
4874.00	47.04	Ave	243	1.7	V	-0.62	46.42	54.00	-7.58
7311.00	38.66	PK	113	1.9	H	2.21	40.87	74.00	-33.13
7311.00	41.91	Ave	113	1.9	H	2.21	44.12	54.00	-9.88
2344.14	46.75	PK	283	1.2	V	-13.19	33.56	74.00	-40.44
2344.14	38.04	Ave	283	1.2	V	-13.19	24.85	54.00	-29.15
2373.18	43.50	PK	171	1.9	H	-13.14	30.36	74.00	-43.64
2373.18	36.42	Ave	171	1.9	H	-13.14	23.28	54.00	-30.72
2489.94	43.47	PK	221	1.9	V	-13.08	30.39	74.00	-43.61
2489.94	37.84	Ave	221	1.9	V	-13.08	24.76	54.00	-29.24

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)
11g: High Channel 2462MHz									
223.69	41.55	QP	105	1.7	H	-11.62	29.93	46.00	-16.07
223.69	37.75	QP	233	1.9	V	-11.62	26.13	46.00	-19.87
4924.00	50.21	PK	20	1.5	V	-0.24	49.97	74.00	-24.03
4924.00	47.86	Ave	20	1.5	V	-0.24	47.62	54.00	-6.38
7386.00	39.07	PK	289	1.5	H	2.84	41.91	74.00	-32.09
7386.00	42.62	Ave	289	1.5	H	2.84	45.46	54.00	-8.54
2321.27	45.45	PK	53	1.5	V	-13.19	32.26	74.00	-41.74
2321.27	38.22	Ave	53	1.5	V	-13.19	25.03	54.00	-28.97
2360.06	43.40	PK	156	1.8	H	-13.14	30.26	74.00	-43.74
2360.06	38.03	Ave	156	1.8	H	-13.14	24.89	54.00	-29.11
2499.08	42.07	PK	7	2.0	V	-13.08	28.99	74.00	-45.01
2499.08	36.74	Ave	7	2.0	V	-13.08	23.66	54.00	-30.34

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)
n20: Low Channel 2412MHz									
223.69	41.93	QP	323	1.3	H	-11.62	30.31	46.00	-15.69
223.69	39.04	QP	216	1.8	V	-11.62	27.42	46.00	-18.58
4824.00	48.81	PK	136	1.5	V	-1.06	47.75	74.00	-26.25
4824.00	46.47	Ave	136	1.5	V	-1.06	45.41	54.00	-8.59
7236.00	38.24	PK	289	1.7	H	1.33	39.57	74.00	-34.43
7236.00	42.71	Ave	289	1.7	H	1.33	44.04	54.00	-9.96
2320.03	45.26	PK	8	1.6	V	-13.19	32.07	74.00	-41.93
2320.03	37.13	Ave	8	1.6	V	-13.19	23.94	54.00	-30.06
2376.79	44.59	PK	84	1.3	H	-13.14	31.45	74.00	-42.55
2376.79	38.97	Ave	84	1.3	H	-13.14	25.83	54.00	-28.17
2485.24	44.61	PK	317	1.2	V	-13.08	31.53	74.00	-42.47
2485.24	38.67	Ave	317	1.2	V	-13.08	25.59	54.00	-28.41

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)
n20: Middle Channel 2437MHz									
223.69	41.23	QP	119	1.9	H	-11.62	29.61	46.00	-16.39
223.69	40.23	QP	60	1.7	V	-11.62	28.61	46.00	-17.39
4874.00	49.42	PK	184	1.1	V	-0.62	48.80	74.00	-25.20
4874.00	45.66	Ave	184	1.1	V	-0.62	45.04	54.00	-8.96
7311.00	38.06	PK	163	1.0	H	2.21	40.27	74.00	-33.73
7311.00	43.68	Ave	163	1.0	H	2.21	45.89	54.00	-8.11
2322.67	46.71	PK	11	1.2	V	-13.19	33.52	74.00	-40.48
2322.67	38.71	Ave	11	1.2	V	-13.19	25.52	54.00	-28.48
2352.15	44.47	PK	92	1.5	H	-13.14	31.33	74.00	-42.67
2352.15	38.42	Ave	92	1.5	H	-13.14	25.28	54.00	-28.72
2491.00	43.72	PK	39	1.9	V	-13.08	30.64	74.00	-43.36
2491.00	38.83	Ave	39	1.9	V	-13.08	25.75	54.00	-28.25

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)
n20: High Channel 2462MHz									
223.69	41.56	QP	77	1.4	H	-11.62	29.94	46.00	-16.06
223.69	39.36	QP	85	1.9	V	-11.62	27.74	46.00	-18.26
4924.00	48.43	PK	184	1.9	V	-0.24	48.19	74.00	-25.81
4924.00	45.13	Ave	184	1.9	V	-0.24	44.89	54.00	-9.11
7386.00	38.97	PK	57	1.2	H	2.84	41.81	74.00	-32.19
7386.00	42.81	Ave	57	1.2	H	2.84	45.65	54.00	-8.35
2349.54	45.54	PK	150	1.4	V	-13.19	32.35	74.00	-41.65
2349.54	39.36	Ave	150	1.4	V	-13.19	26.17	54.00	-27.83
2381.86	44.90	PK	95	1.3	H	-13.14	31.76	74.00	-42.24
2381.86	38.27	Ave	95	1.3	H	-13.14	25.13	54.00	-28.87
2496.36	43.31	PK	243	1.2	V	-13.08	30.23	74.00	-43.77
2496.36	38.14	Ave	243	1.2	V	-13.08	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)
n40: Low Channel 2422MHz									
223.69	41.77	QP	176	1.4	H	-11.62	30.15	46.00	-15.85
223.69	39.79	QP	333	1.9	V	-11.62	28.17	46.00	-17.83
4844.00	46.53	PK	38	2.0	V	-1.06	45.47	74.00	-28.53
4844.00	42.59	Ave	38	2.0	V	-1.06	41.53	54.00	-12.47
7266.00	35.98	PK	327	1.7	H	1.33	37.31	74.00	-36.69
7266.00	40.70	Ave	327	1.7	H	1.33	42.03	54.00	-11.97
2314.61	46.03	PK	333	1.3	V	-13.19	32.84	74.00	-41.16
2314.61	37.11	Ave	333	1.3	V	-13.19	23.92	54.00	-30.08
2378.18	42.53	PK	89	2.0	H	-13.14	29.39	74.00	-44.61
2378.18	38.04	Ave	89	2.0	H	-13.14	24.90	54.00	-29.10
2494.38	43.09	PK	285	1.4	V	-13.08	30.01	74.00	-43.99
2494.38	37.26	Ave	285	1.4	V	-13.08	24.18	54.00	-29.82

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)
n40: Middle Channel 2437MHz									
223.69	42.18	QP	216	1.1	H	-11.62	30.56	46.00	-15.44
223.69	40.44	QP	25	1.9	V	-11.62	28.82	46.00	-17.18
4874.00	47.33	PK	250	1.6	V	-0.62	46.71	74.00	-27.29
4874.00	42.60	Ave	250	1.6	V	-0.62	41.98	54.00	-12.02
7311.00	36.10	PK	30	1.6	H	2.21	38.31	74.00	-35.69
7311.00	40.45	Ave	30	1.6	H	2.21	42.66	54.00	-11.34
2333.04	46.24	PK	163	1.9	V	-13.19	33.05	74.00	-40.95
2333.04	37.92	Ave	163	1.9	V	-13.19	24.73	54.00	-29.27
2357.17	43.90	PK	110	1.2	H	-13.14	30.76	74.00	-43.24
2357.17	36.78	Ave	110	1.2	H	-13.14	23.64	54.00	-30.36
2483.61	44.66	PK	150	1.9	V	-13.08	31.58	74.00	-42.42
2483.61	38.46	Ave	150	1.9	V	-13.08	25.38	54.00	-28.62

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)
n40: High Channel 2452MHz									
223.69	43.14	QP	19	1.4	H	-11.62	31.52	46.00	-14.48
223.69	40.78	QP	295	1.8	V	-11.62	29.16	46.00	-16.84
4904.00	47.87	PK	322	1.0	V	-0.24	47.63	74.00	-26.37
4904.00	43.34	Ave	322	1.0	V	-0.24	43.10	54.00	-10.90
7356.00	35.98	PK	83	1.0	H	2.84	38.82	74.00	-35.18
7356.00	39.65	Ave	83	1.0	H	2.84	42.49	54.00	-11.51
2312.25	46.58	PK	152	1.8	V	-13.19	33.39	74.00	-40.61
2312.25	37.08	Ave	152	1.8	V	-13.19	23.89	54.00	-30.11
2354.84	44.70	PK	194	1.8	H	-13.14	31.56	74.00	-42.44
2354.84	37.63	Ave	194	1.8	H	-13.14	24.49	54.00	-29.51
2499.91	42.56	PK	254	1.4	V	-13.08	29.48	74.00	-44.52
2499.91	36.89	Ave	254	1.4	V	-13.08	23.81	54.00	-30.19

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:

Below 30MHz:

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

Detector function = peak, Trace = max hold

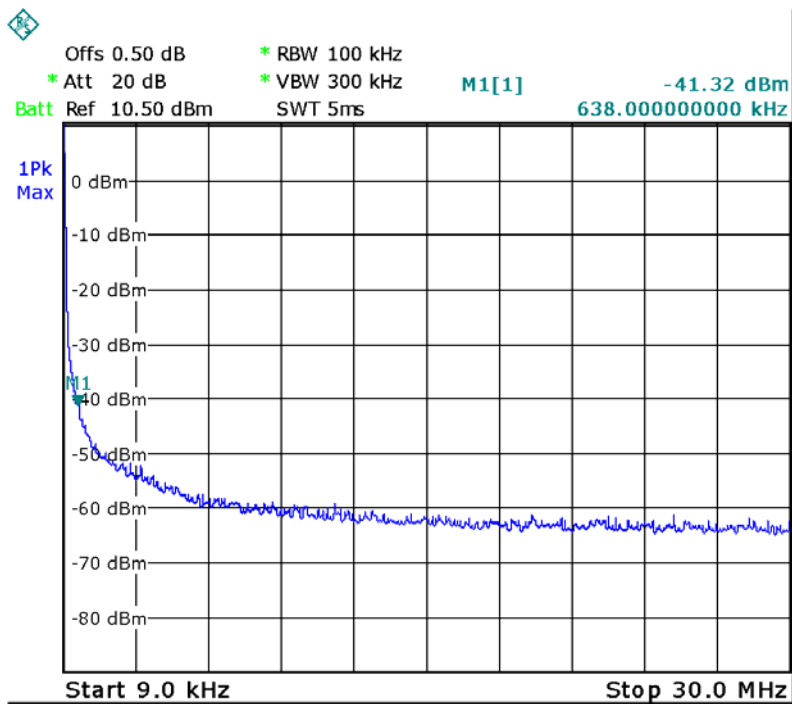
Above 30MHz:

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

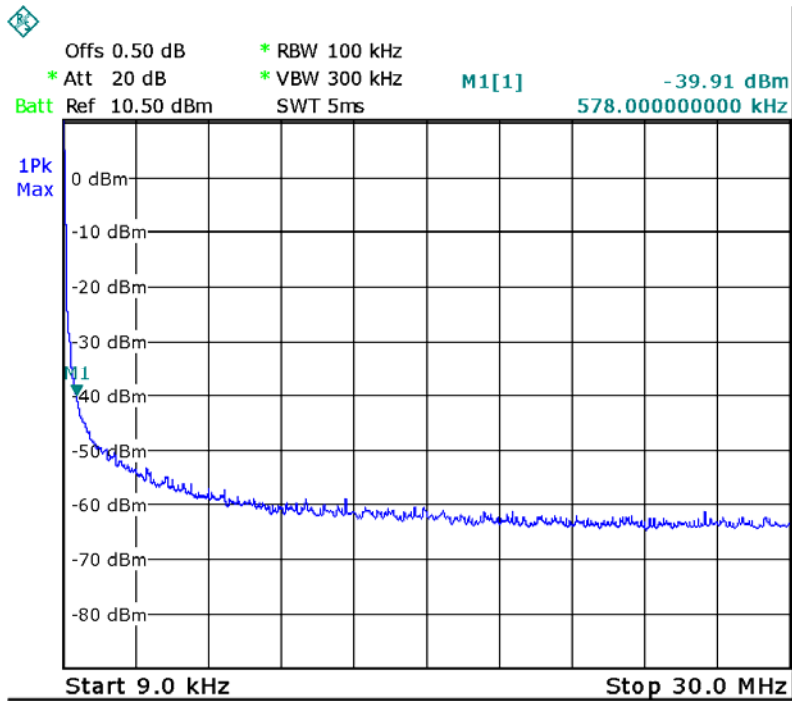
Detector function = peak, Trace = max hold

9.2 Test Result

11b: Low Channel 2412MHz

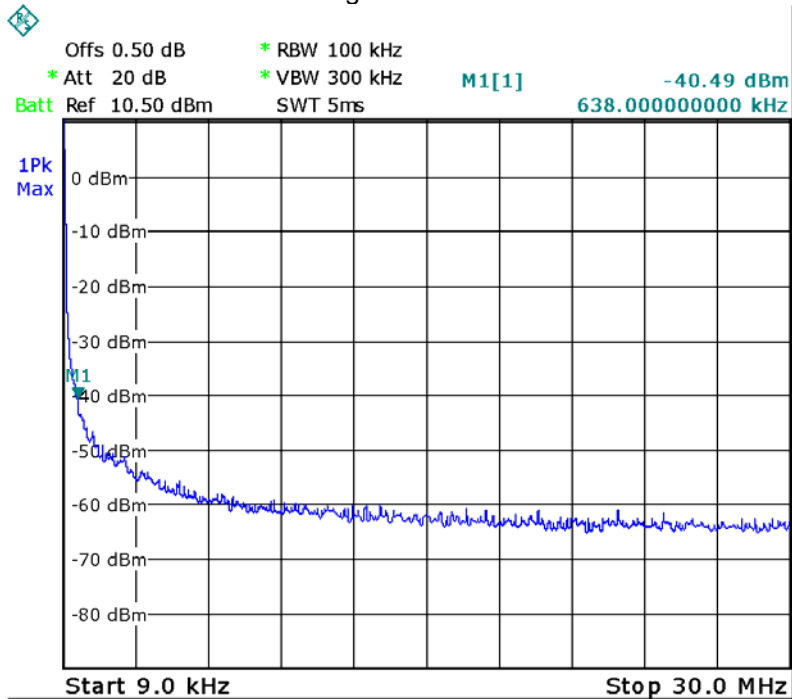


11b: Middle Channel 2437MHz



11b: High Channel 2462MHz

High Channel



Low Channel

Fundamental



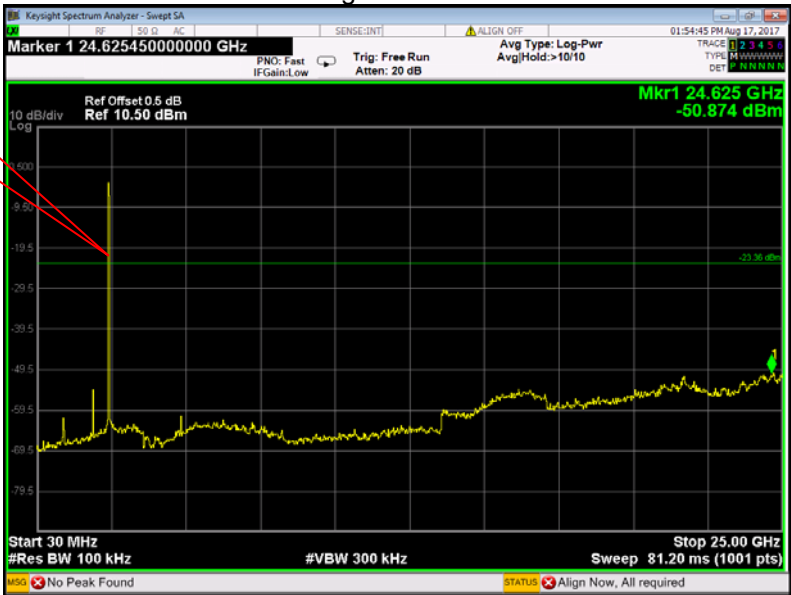
Middle Channel

Fundamental

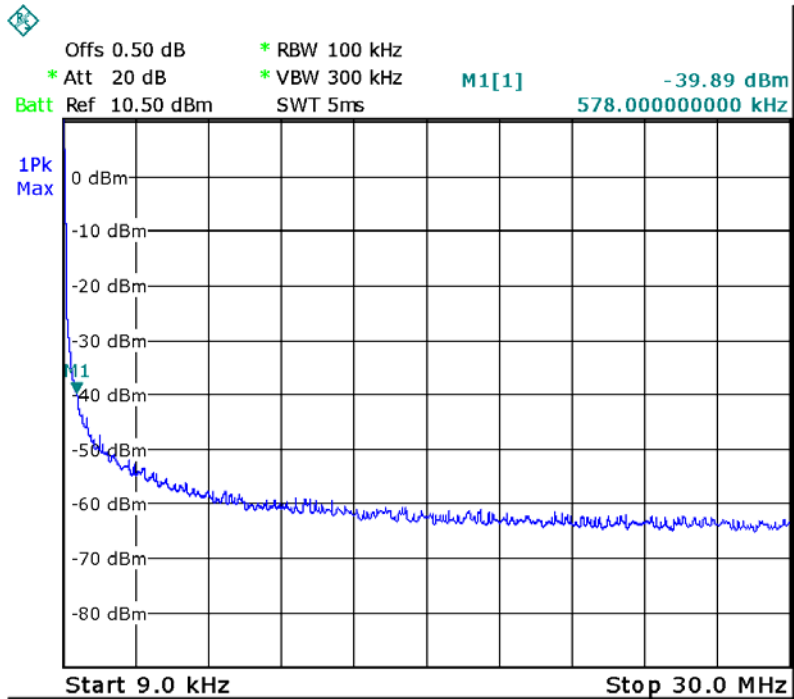


High Channel

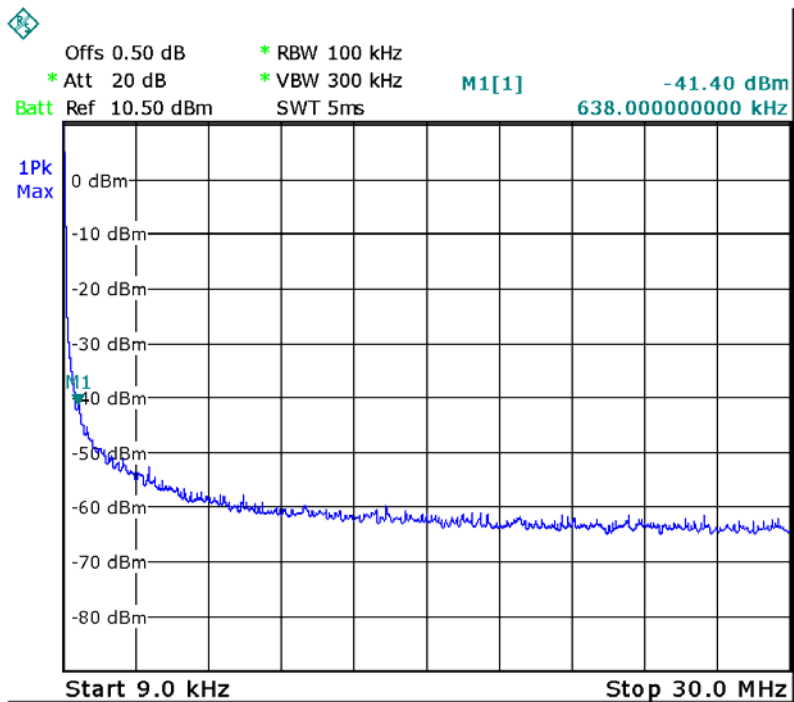
Fundamental



11g: Low Channel 2412MHz

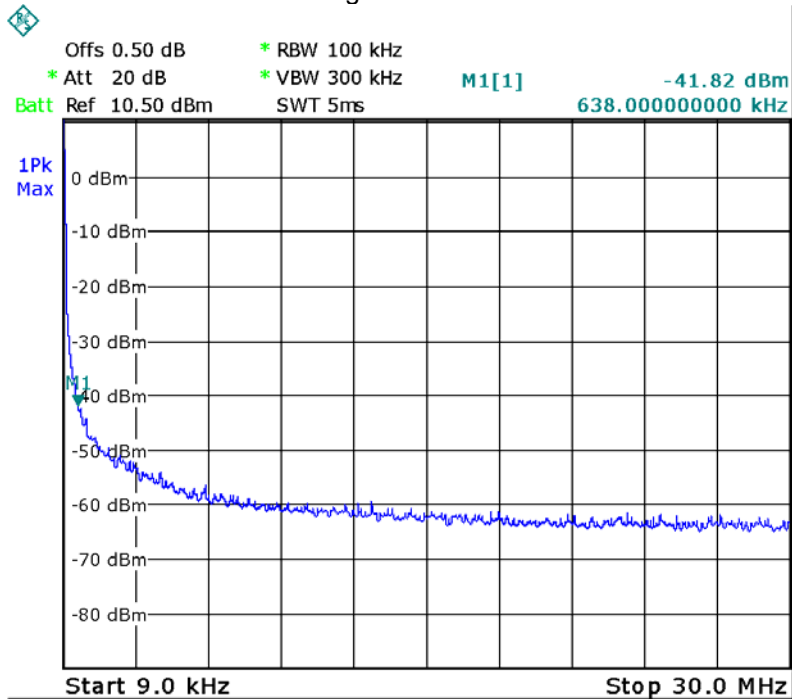


11g: Middle Channel 2437MHz



11g: High Channel 2462MHz

High Channel



Low Channel

Fundamental



Middle Channel

Fundamental

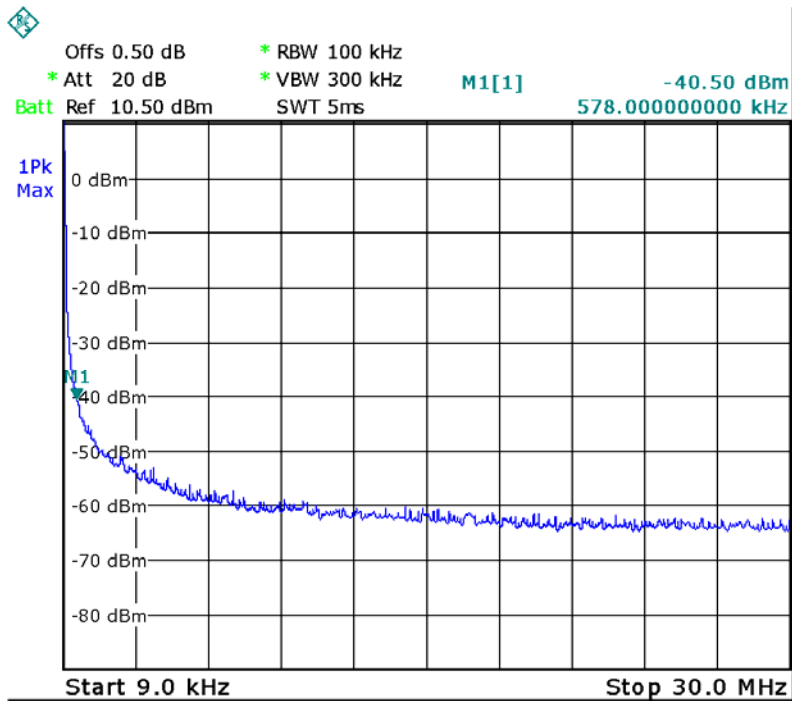


High Channel

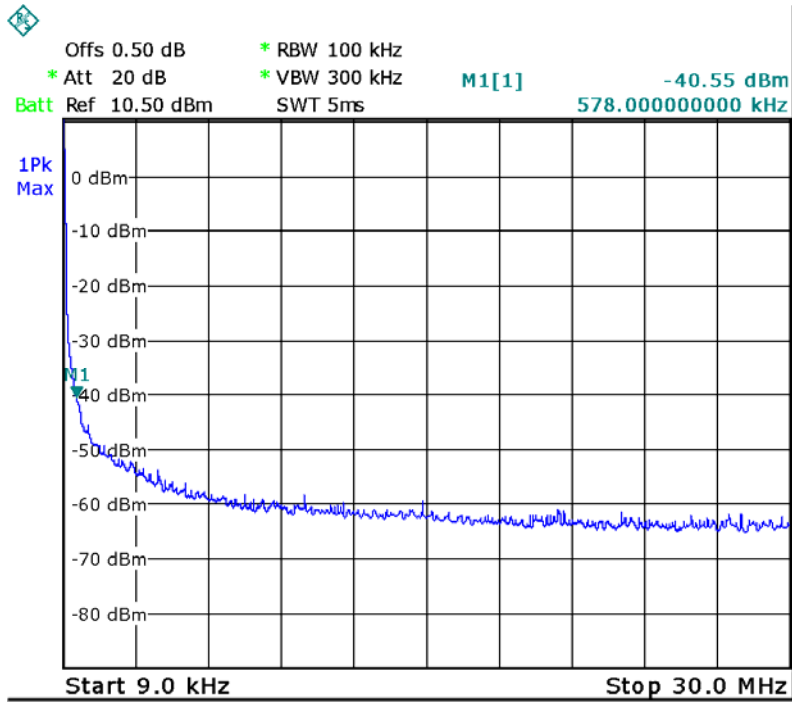
Fundamental



n20: Low Channel 2412MHz

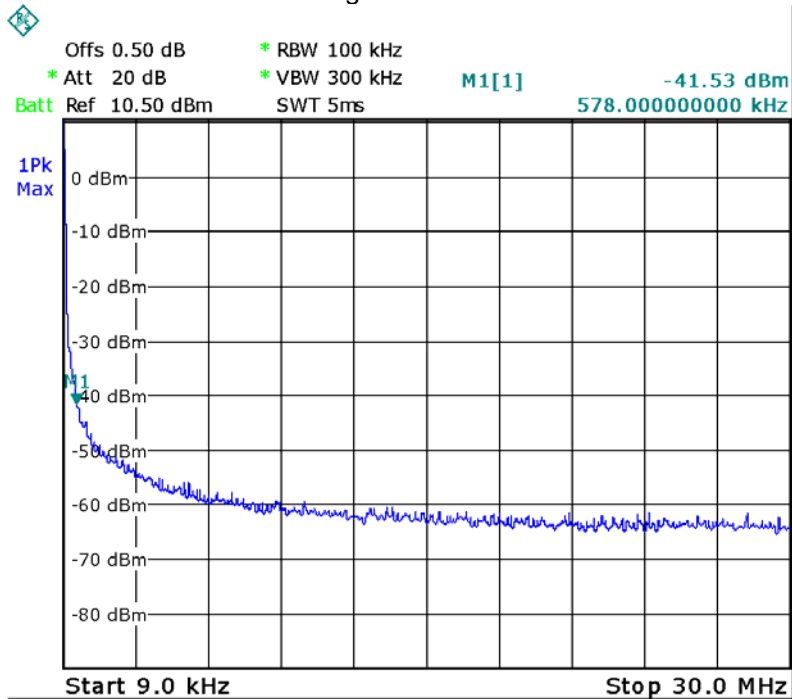


n20: Middle Channel 2437MHz



n20: High Channel 2462MHz

High Channel

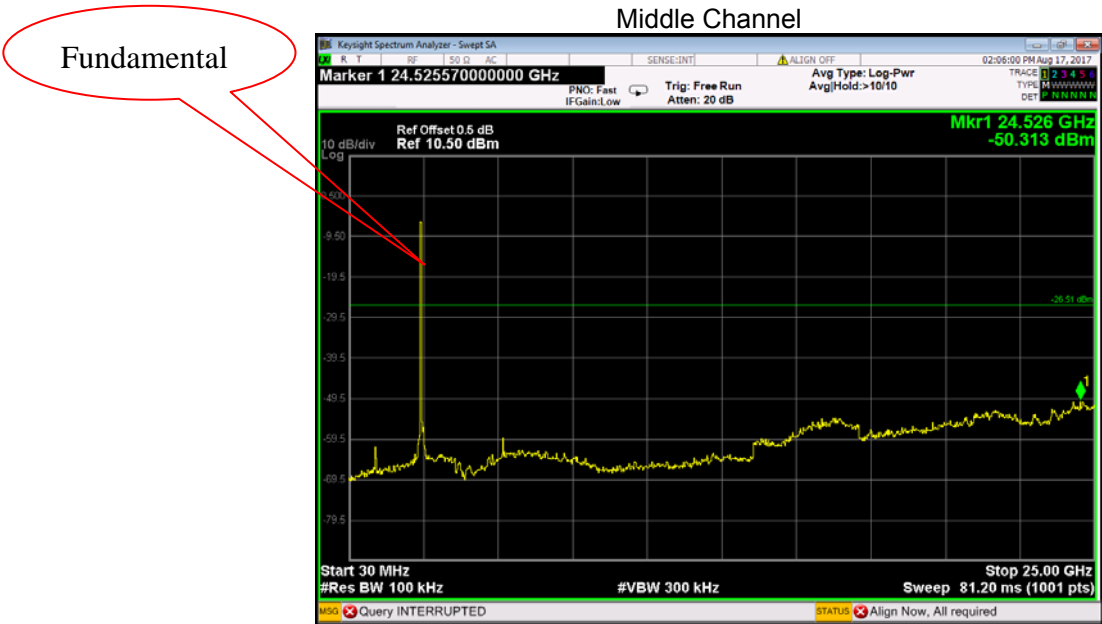


Low Channel

Fundamental



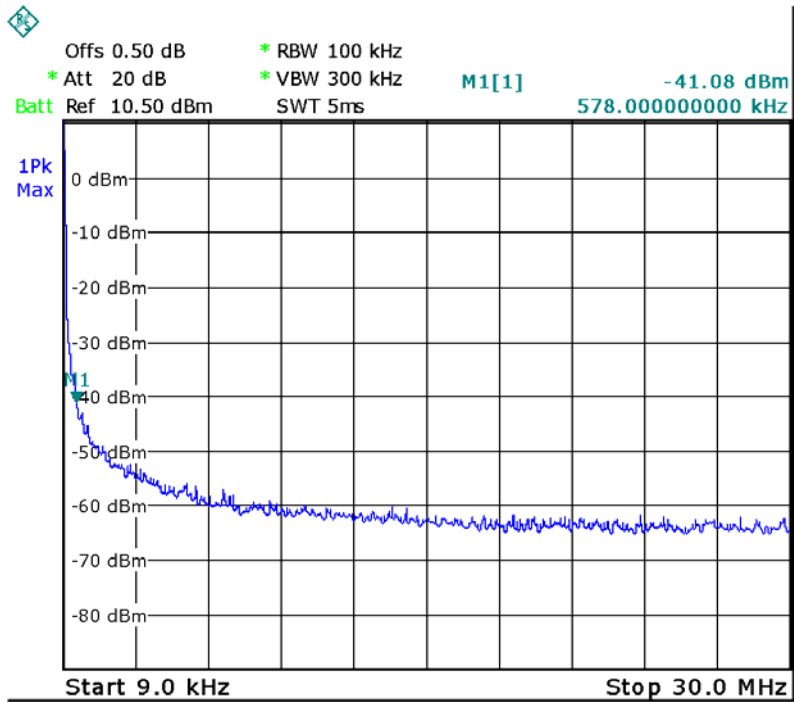
Middle Channel



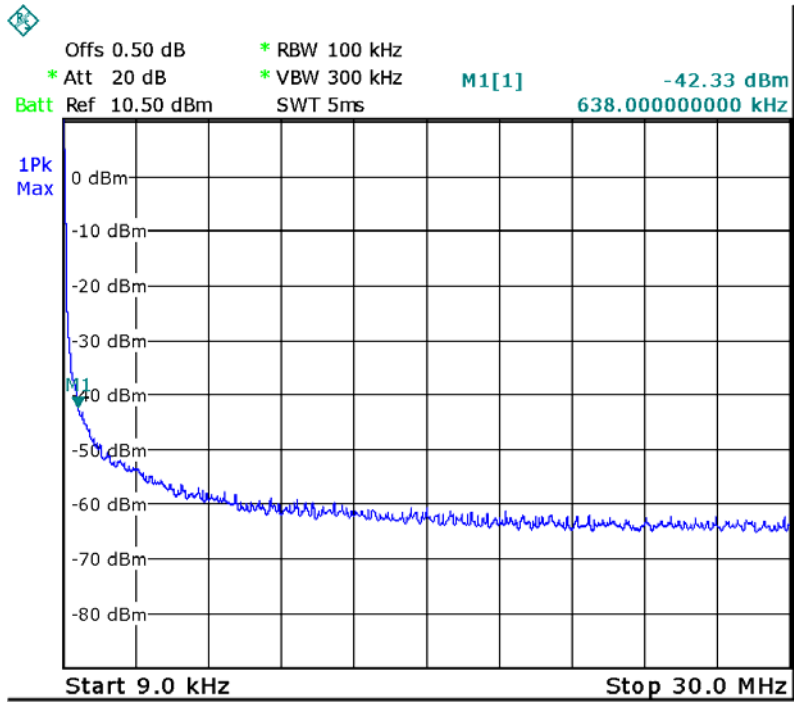
High Channel



n40: Low Channel 2422MHz

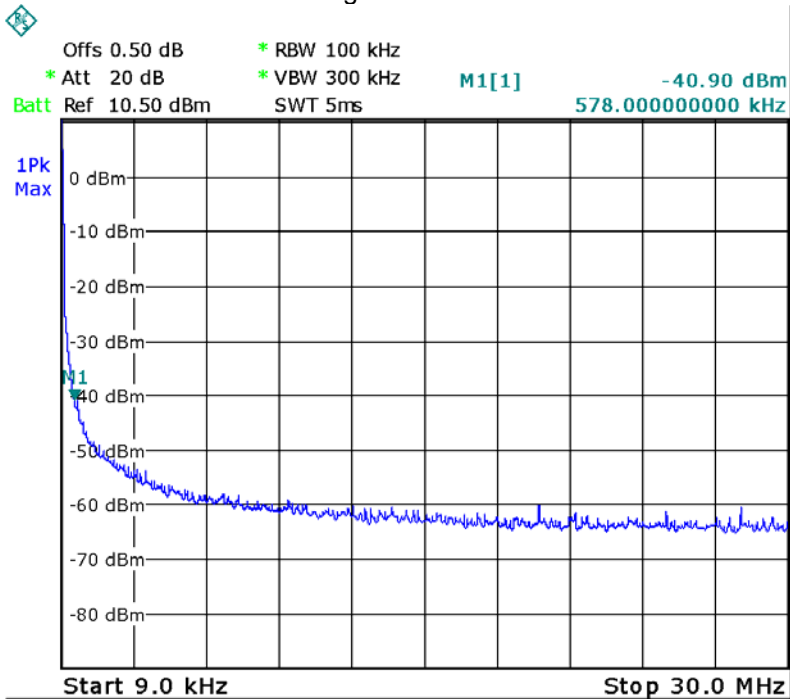


n40: Middle Channel 2437MHz



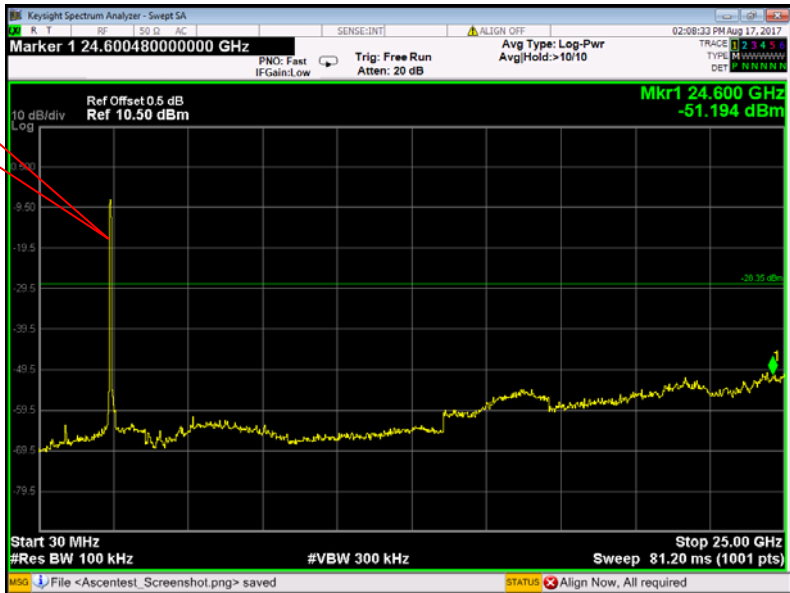
n40: Middle Channel 2452MHz

High Channel



Low Channel

Fundamental



Middle Channel

Fundamental



High Channel

Fundamental



10 Band Edge Measurement

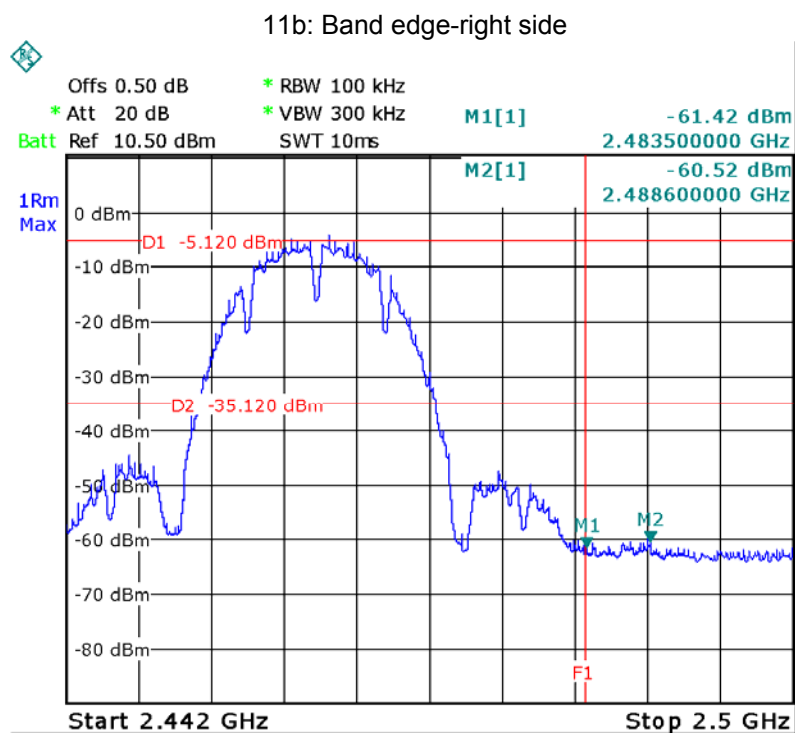
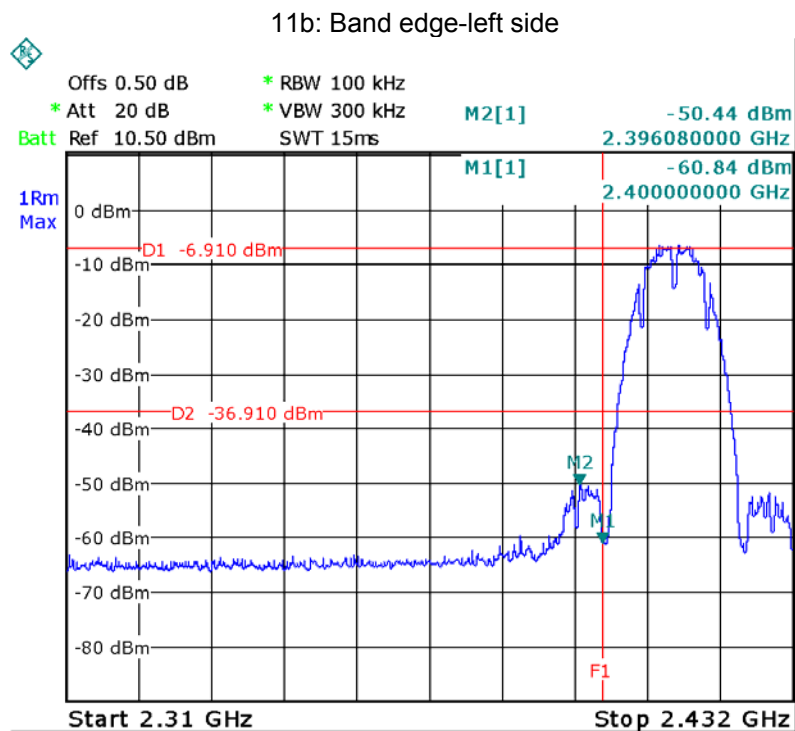
Test Requirement:	FCC CFR47 Part 15 Section 15.247
Test Method:	558074 D01 DTS Meas Guidance V04
Test Limit:	Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that 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

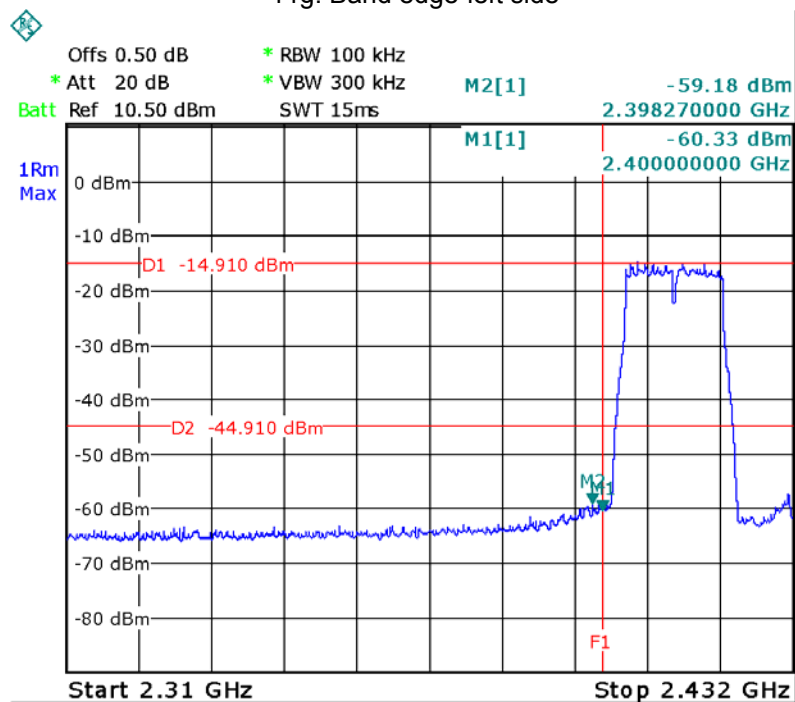
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then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

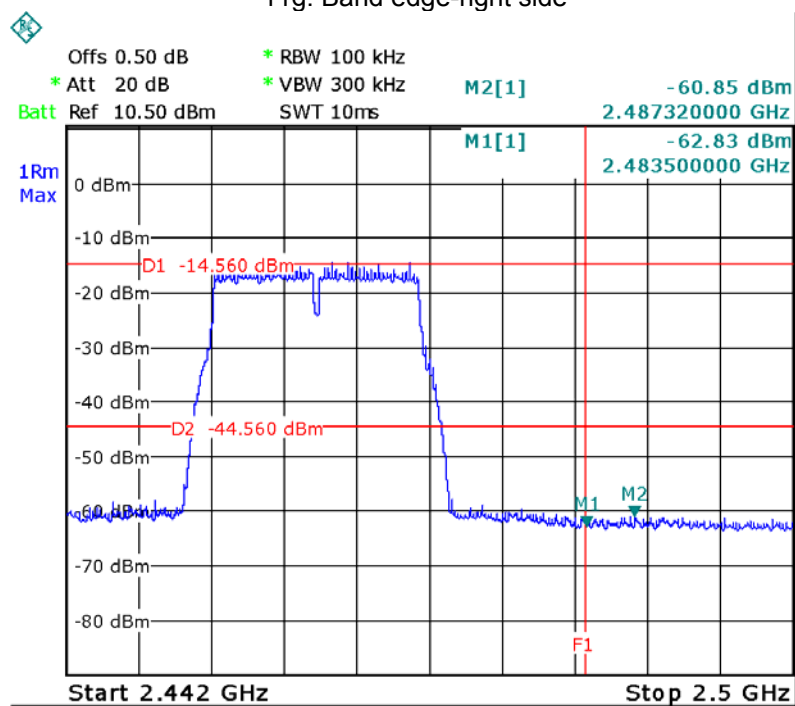
Test result plots shown as follows:



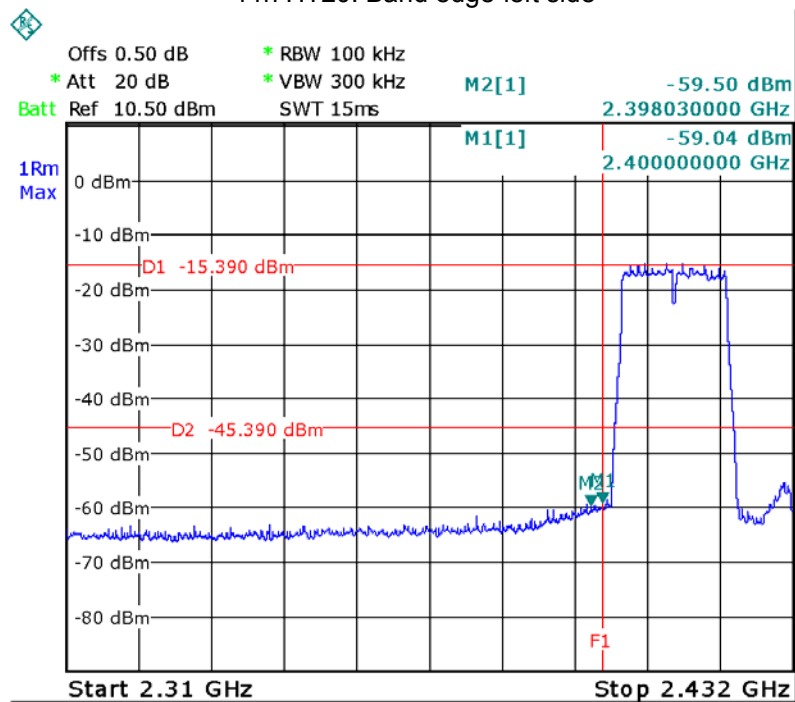
11g: Band edge-left side



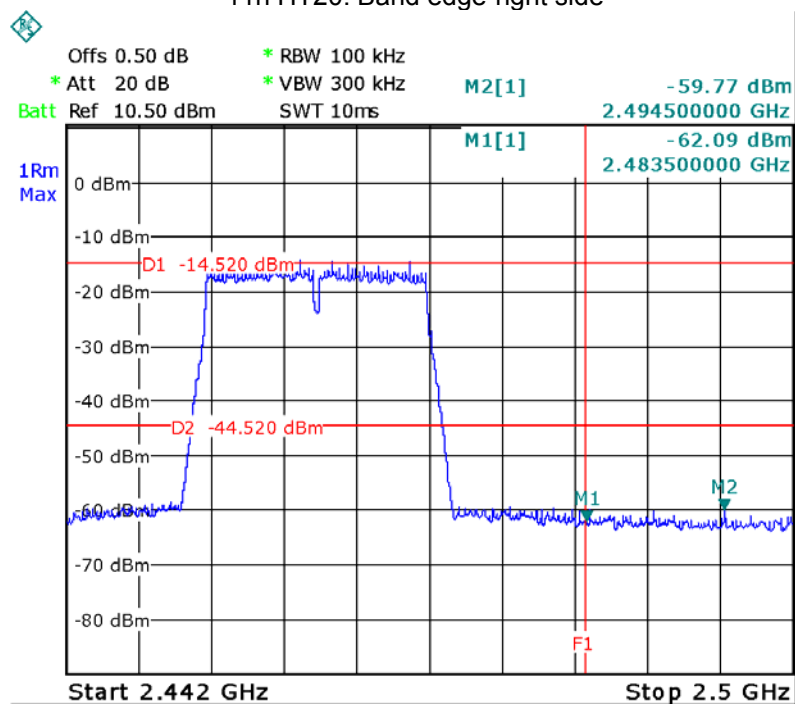
11g: Band edge-right side



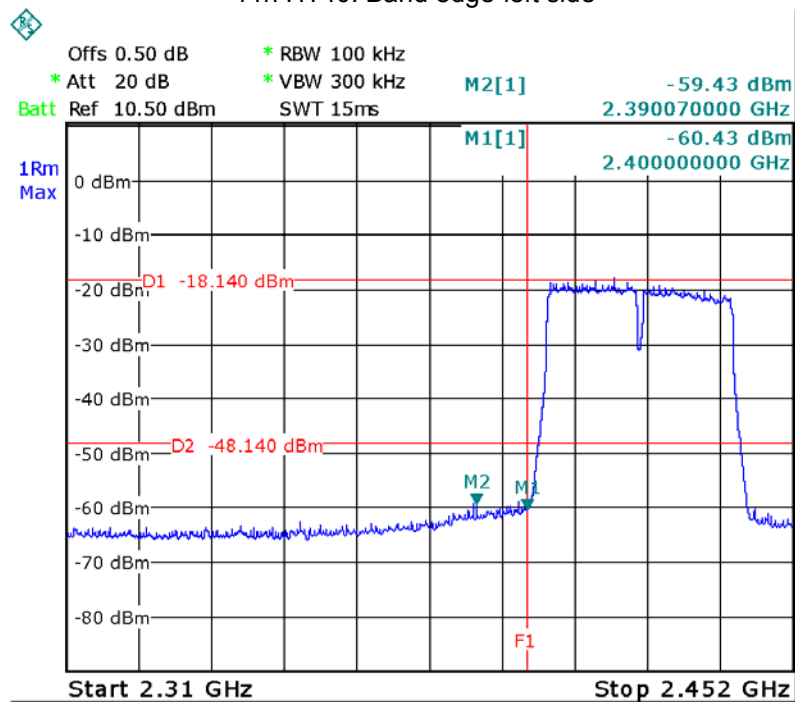
11n HT20: Band edge-left side



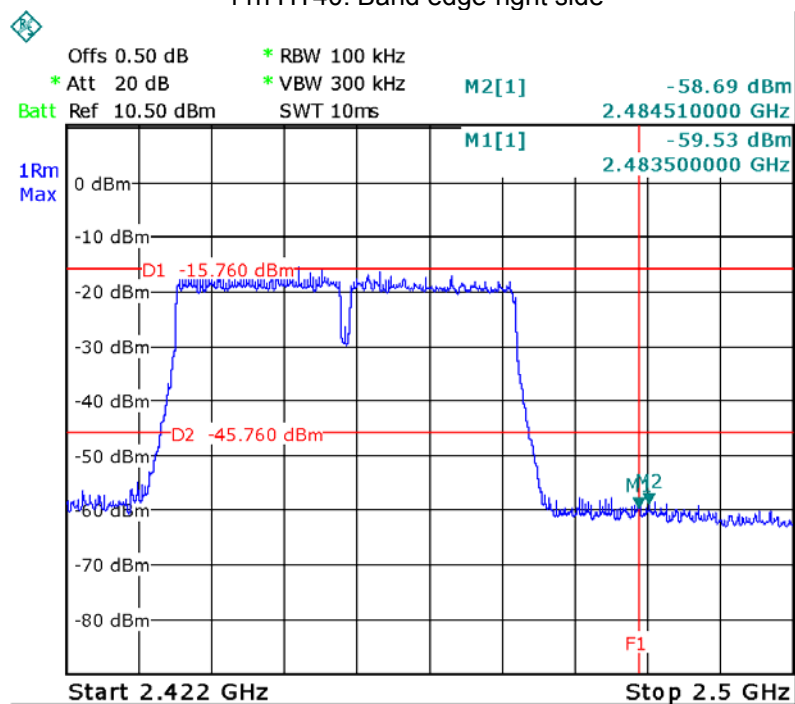
11n HT20: Band edge-right side



11n HT40: Band edge-left side



11n HT40: Band edge-right side



11 Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

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

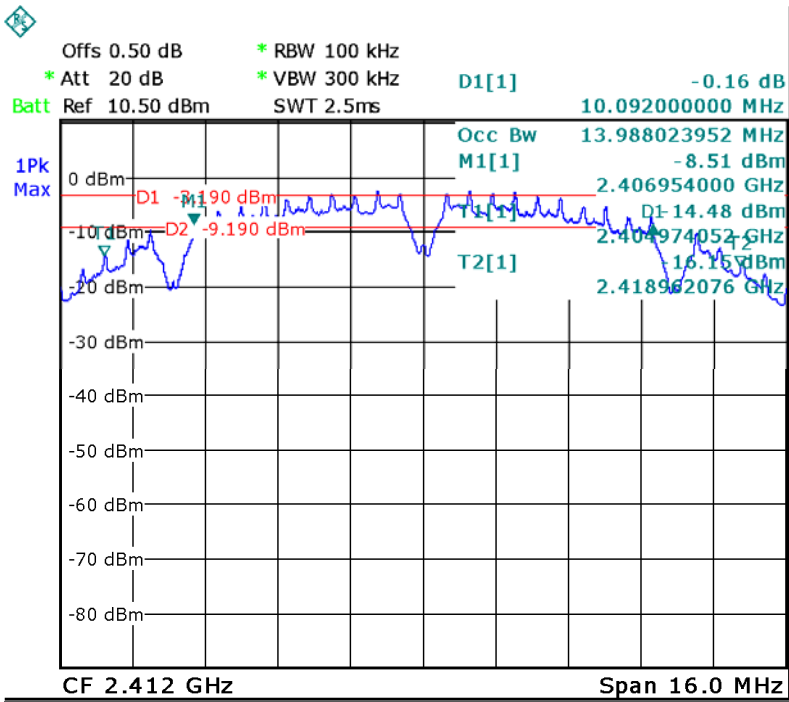
11.2 Test Result:

:

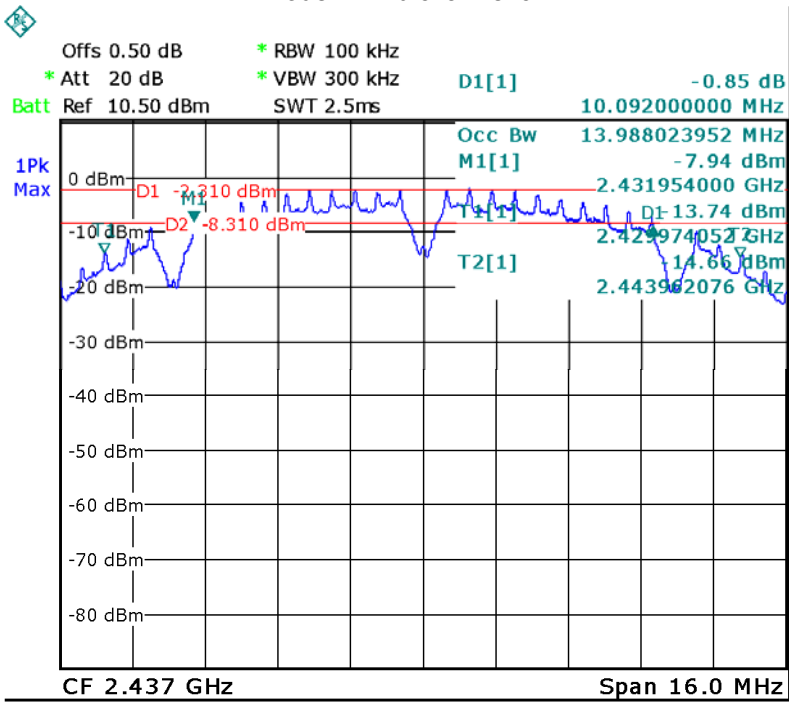
Operation mode	6dB Bandwidth (MHz)			99% Bandwidth (MHz)		
11b	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	10.092	10.092	10.092	13.988	13.988	13.988
11g	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	16.417	16.417	16.417	16.517	16.517	16.517
11n HT20	Channel 1	Channel 6	Channel 11	Channel 1	Channel 6	Channel 11
	17.623	17.623	17.623	17.623	17.623	17.677
11n HT40	Channel 3	Channel 6	Channel 9	Channel 3	Channel 6	Channel 9
	36.010	36.010	36.010	36.008	36.008	36.118

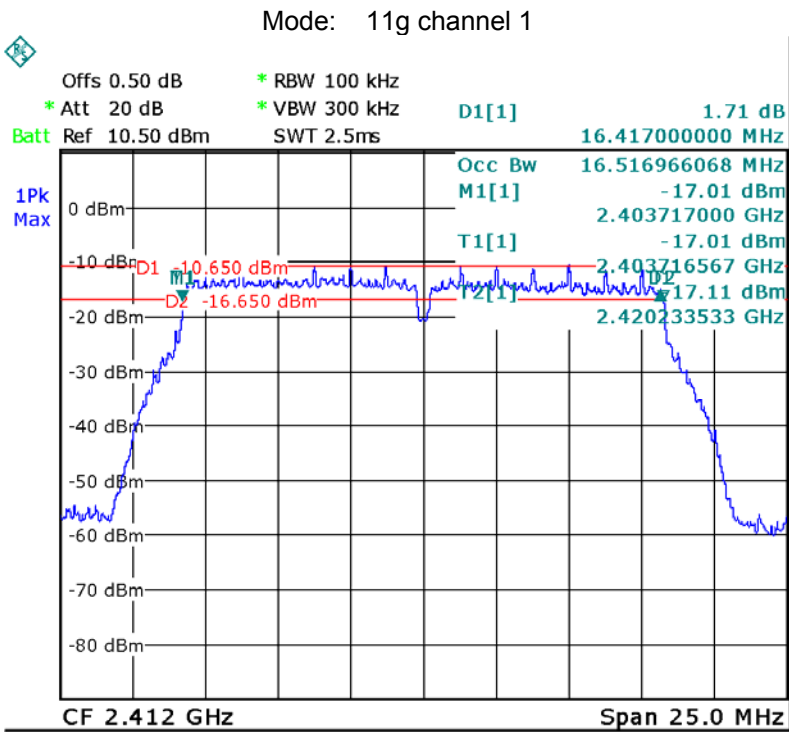
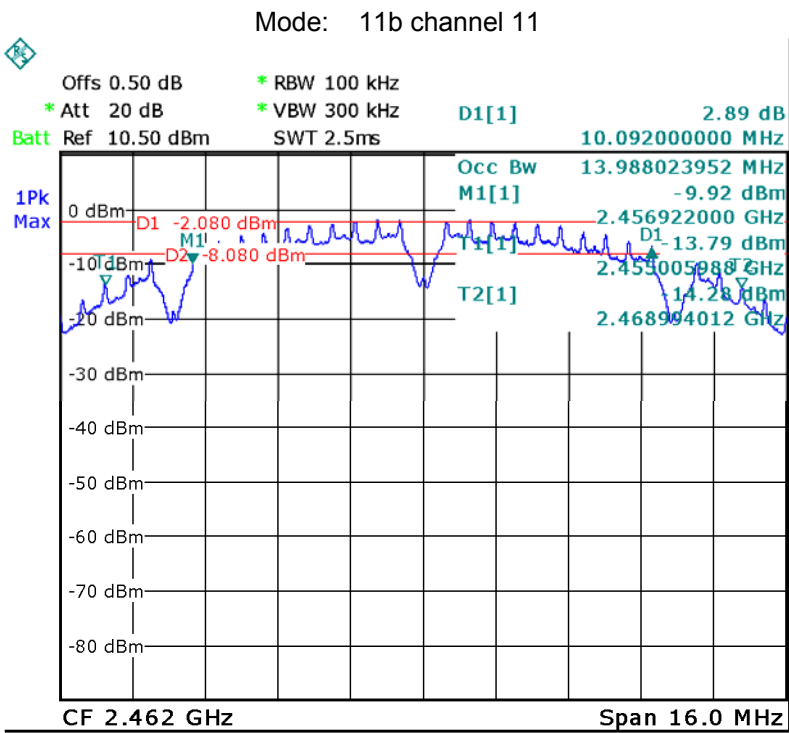
: Test result plot as follows:

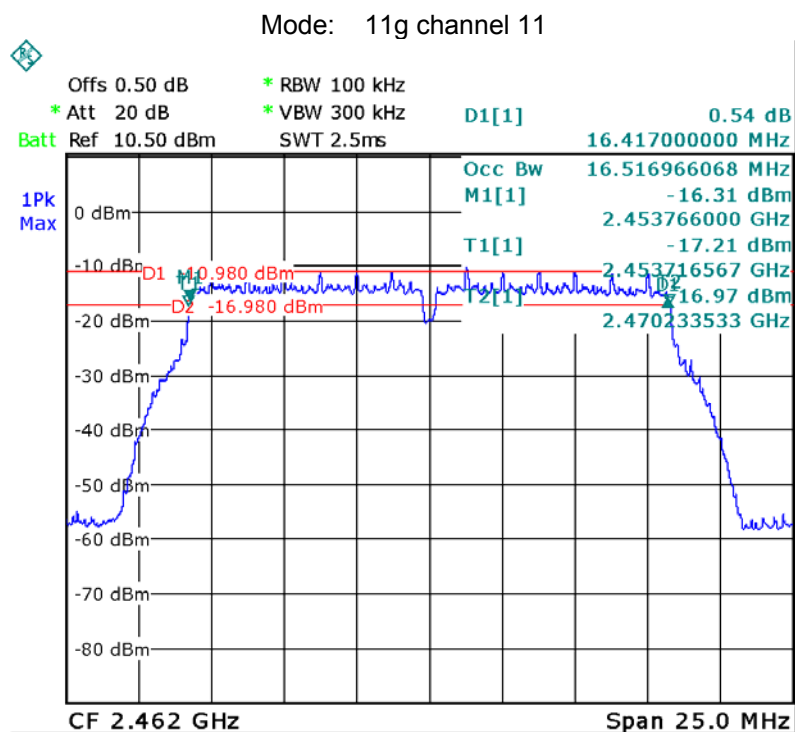
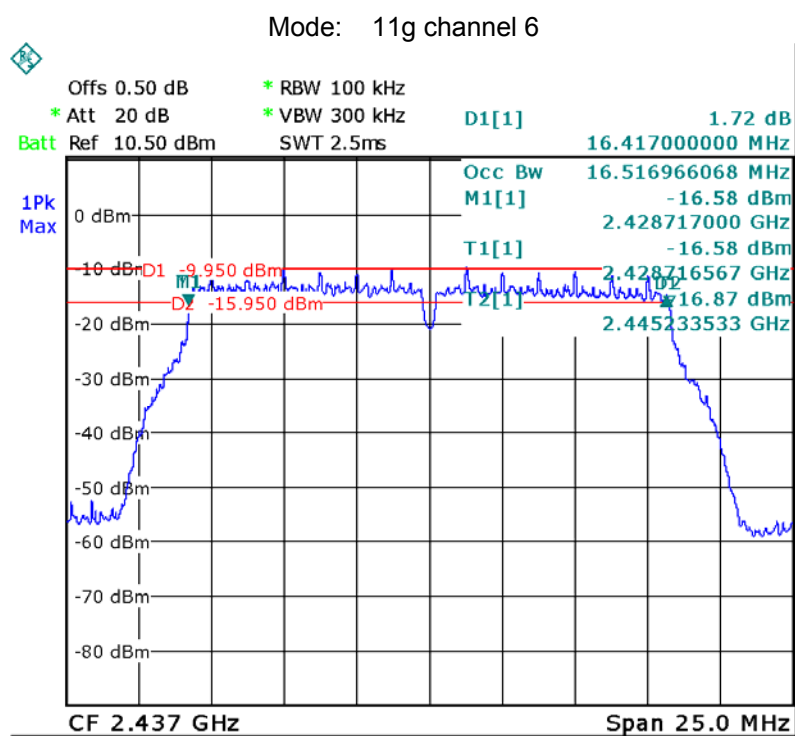
Mode: 11b channel 1

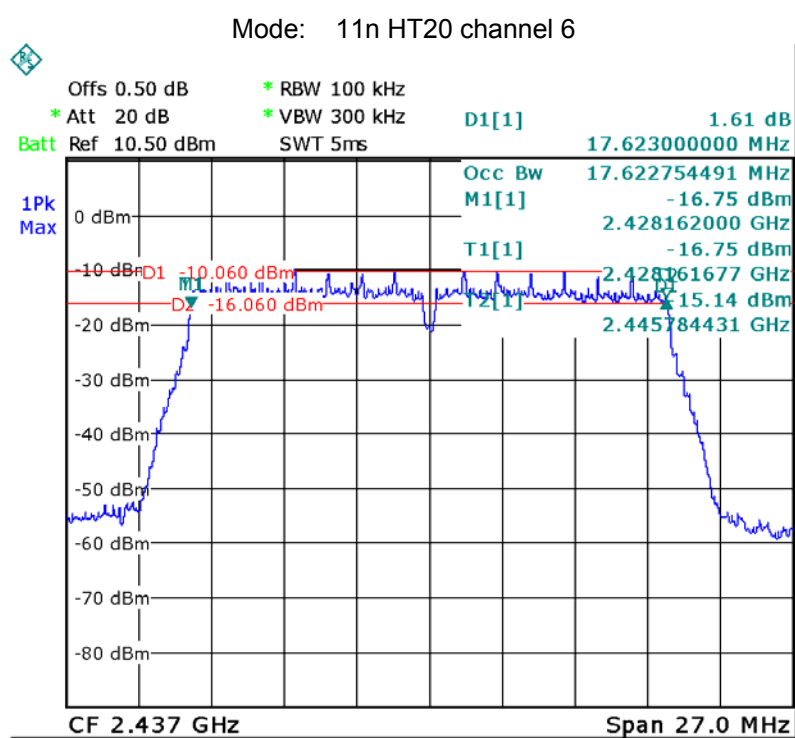
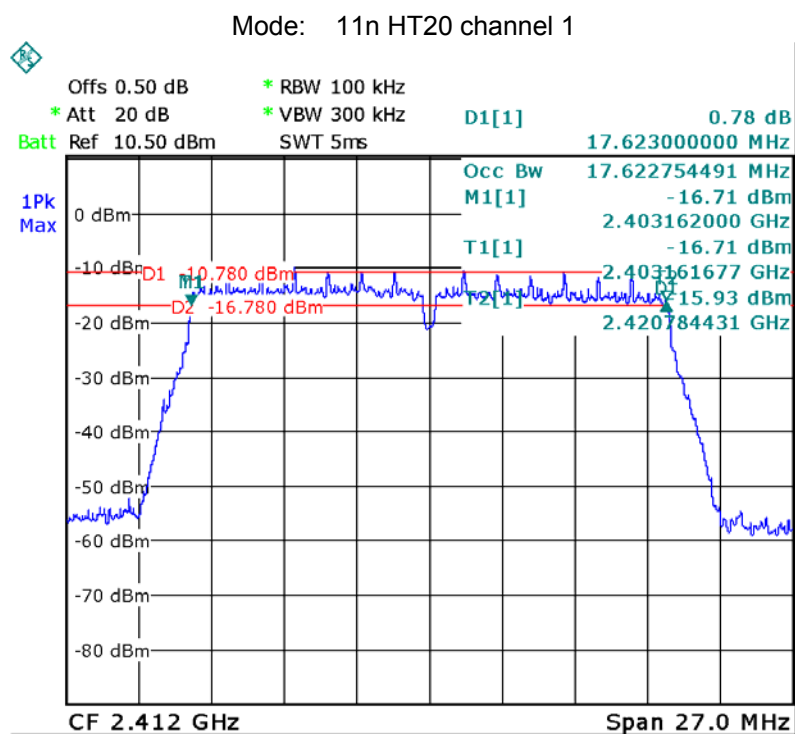


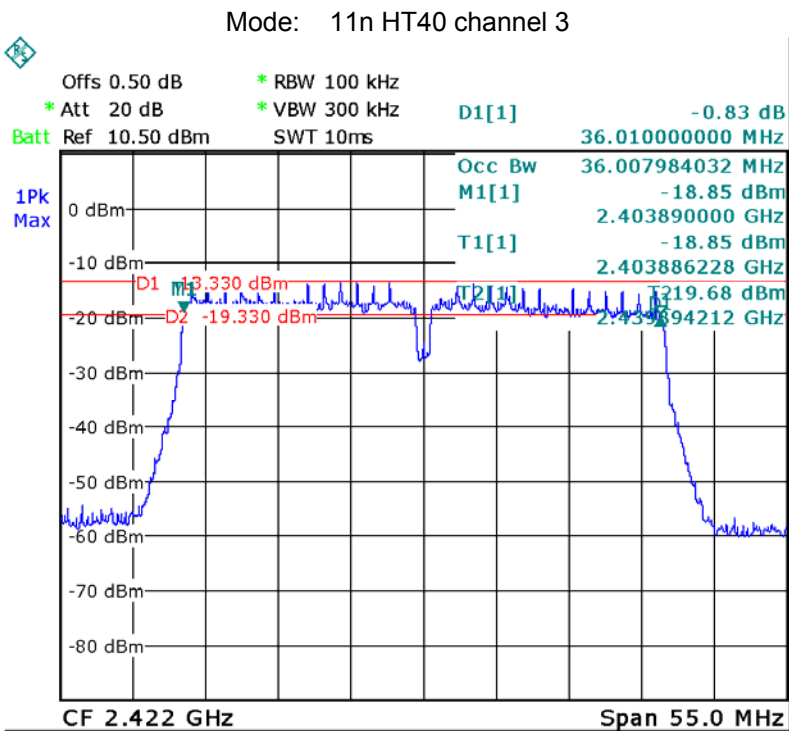
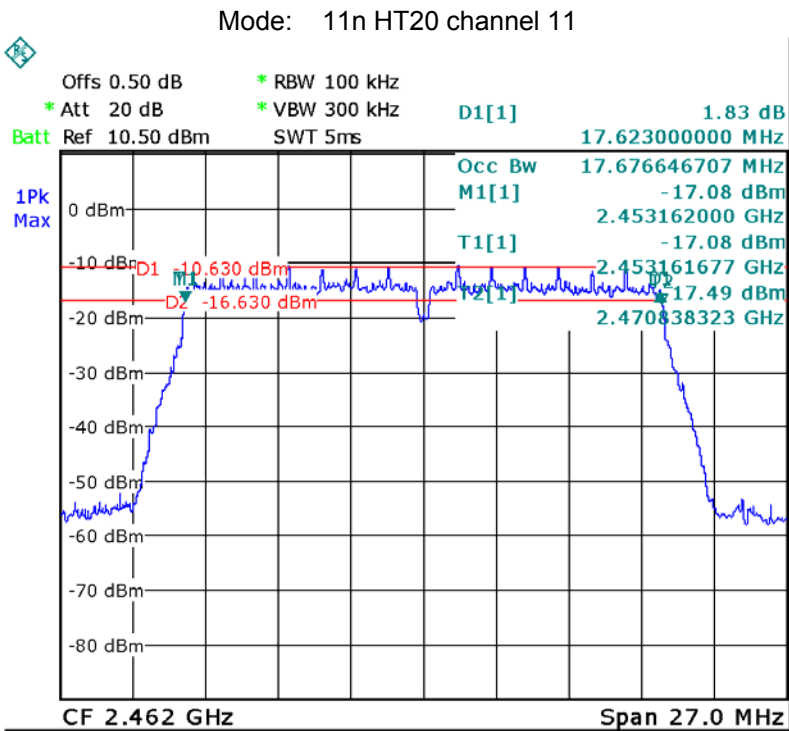
Mode: 11b channel 6

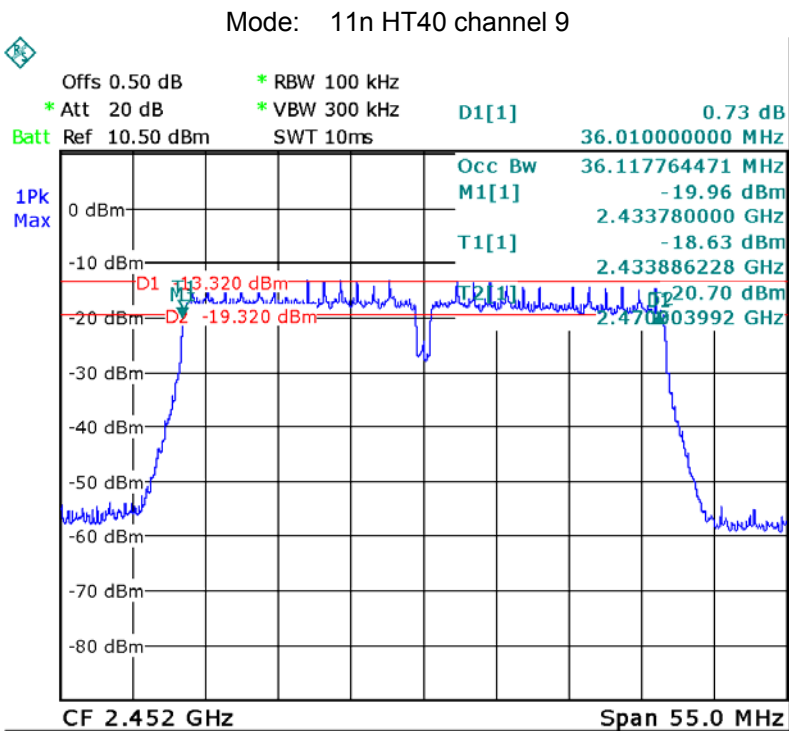
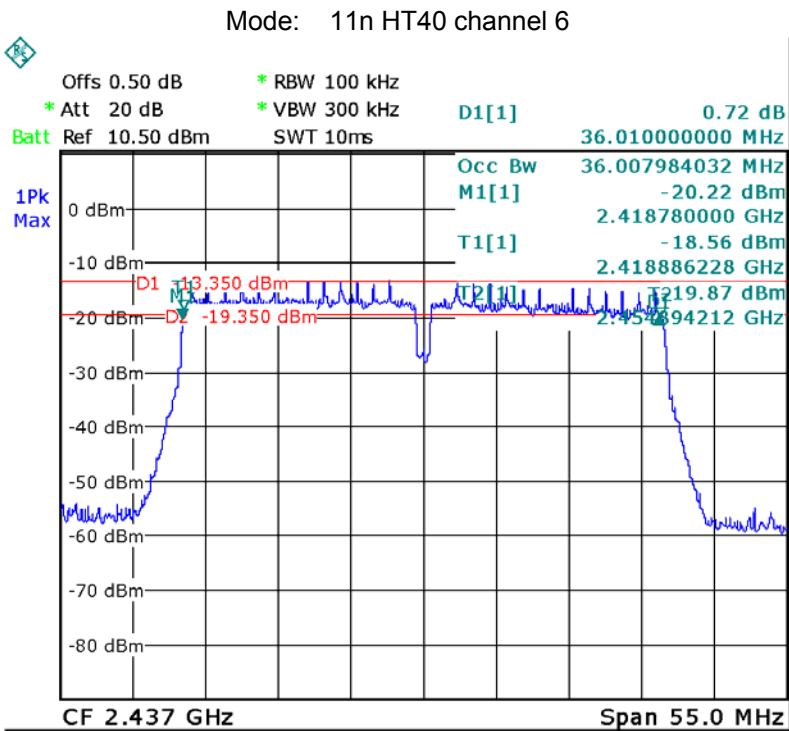












12 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

558074 D01 DTS Meas Guidance V04

12.1 Test Procedure:

558074 D01 DTS Meas Guidance V04

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:

:

Test mode : 11b		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
8.23	8.32	8.50
Limit: 1W/30dBm		

Test mode : 11g		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
8.03	8.21	8.28
Limit: 1W/30dBm		

Test mode : 11n HT20		
Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
8.03	8.39	8.08
Limit: 1W/30dBm		

Test mode : 11n HT40		
Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
8.20	8.13	8.39
Limit: 1W/30dBm		

13 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance V04

13.1 Test Procedure:

558074 D01 DTS Meas Guidance V04

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:

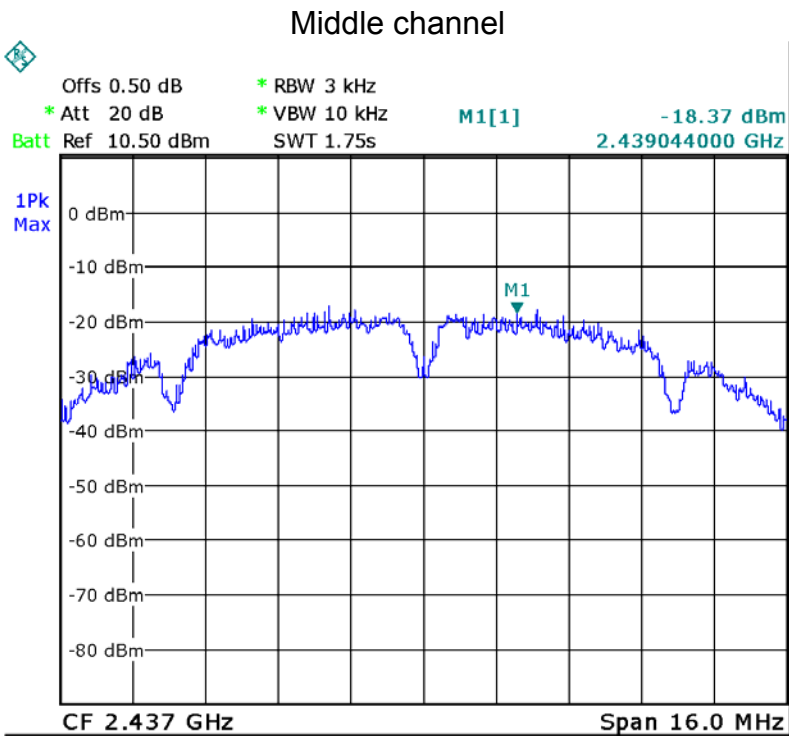
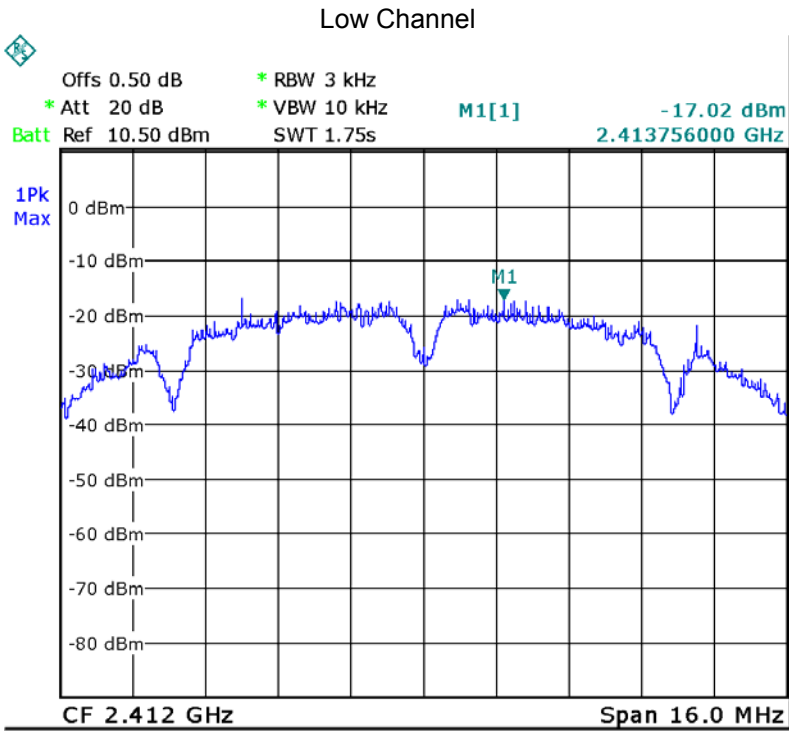
:

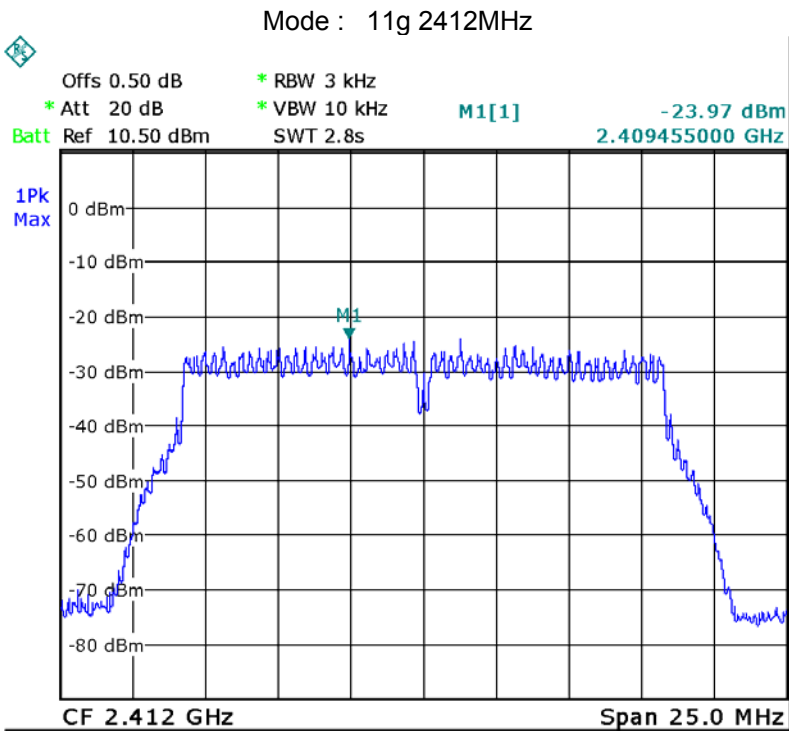
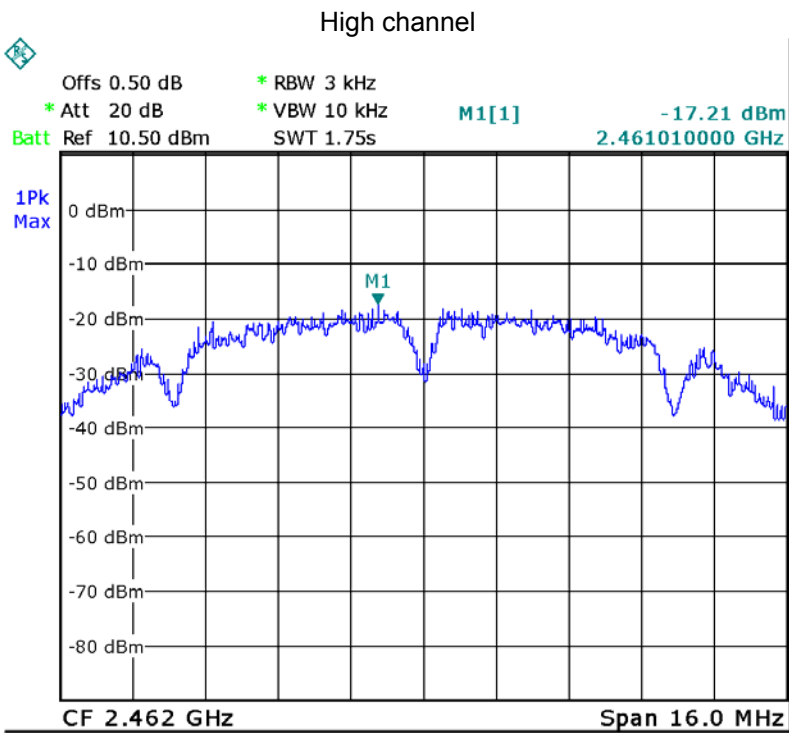
Test mode : 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-17.02	-18.37	-17.21
Limit: 8dBm per 3kHz		

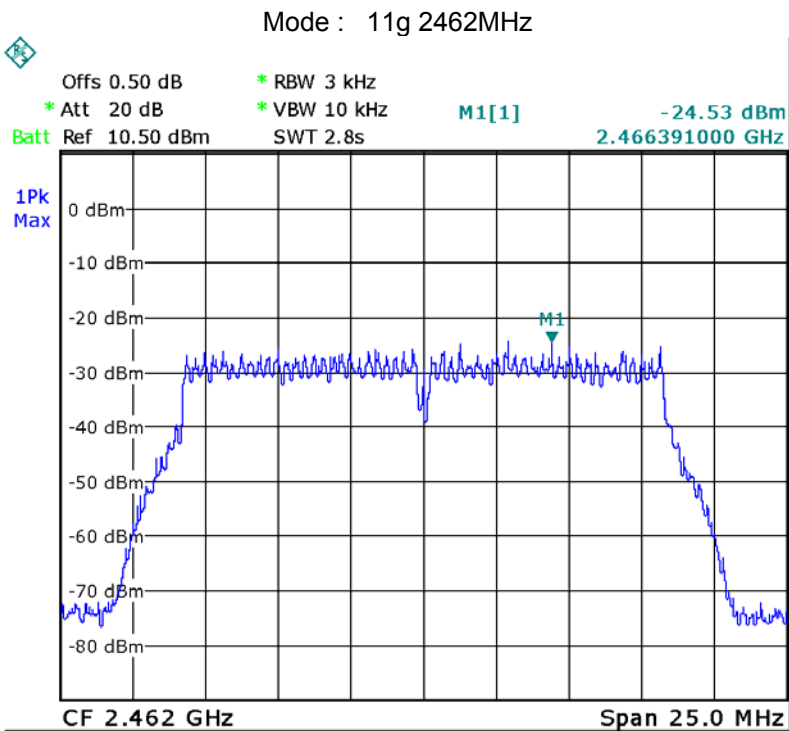
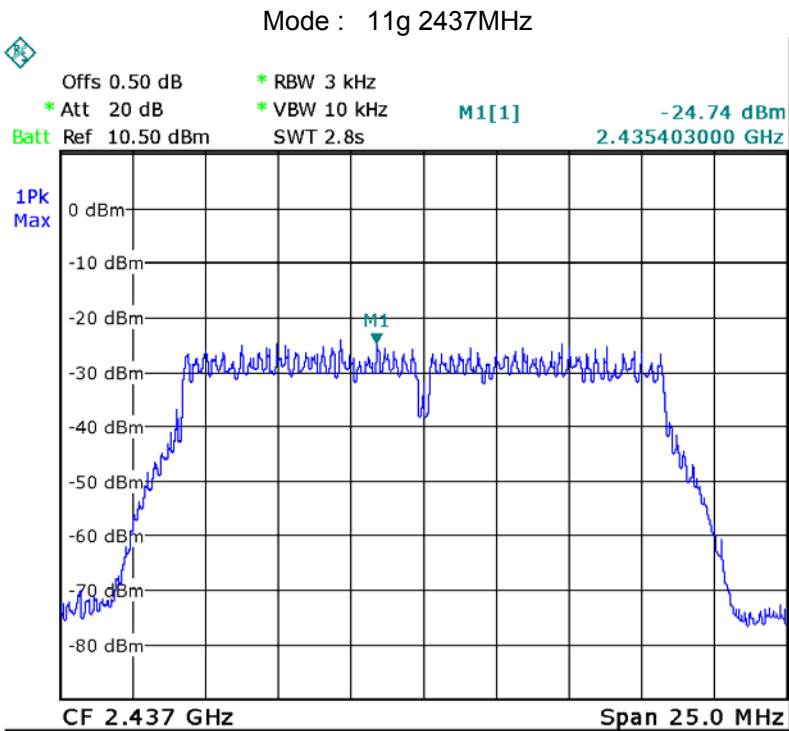
Test mode : 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-23.97	-24.74	-24.53
Limit: 8dBm per 3kHz		

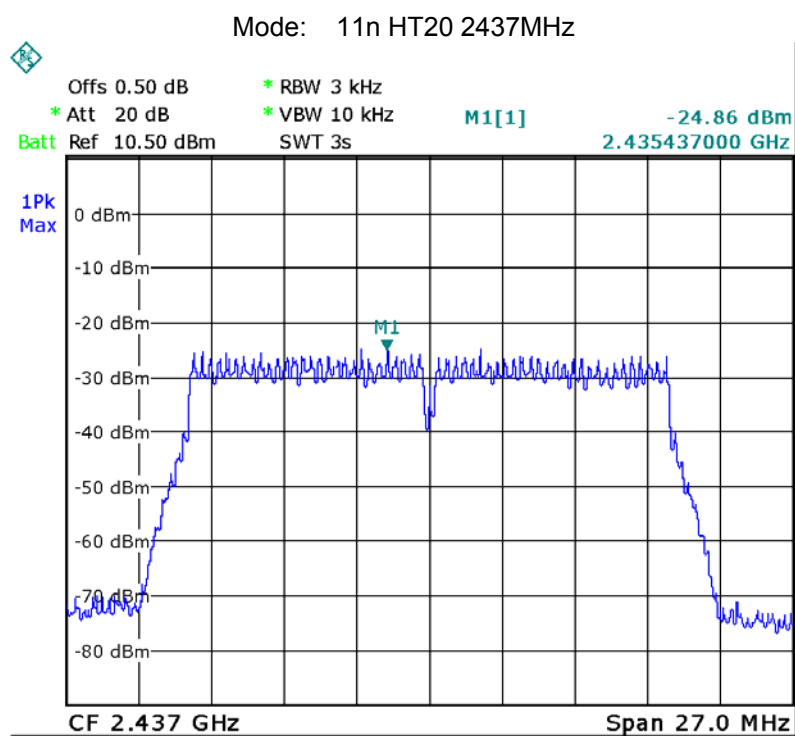
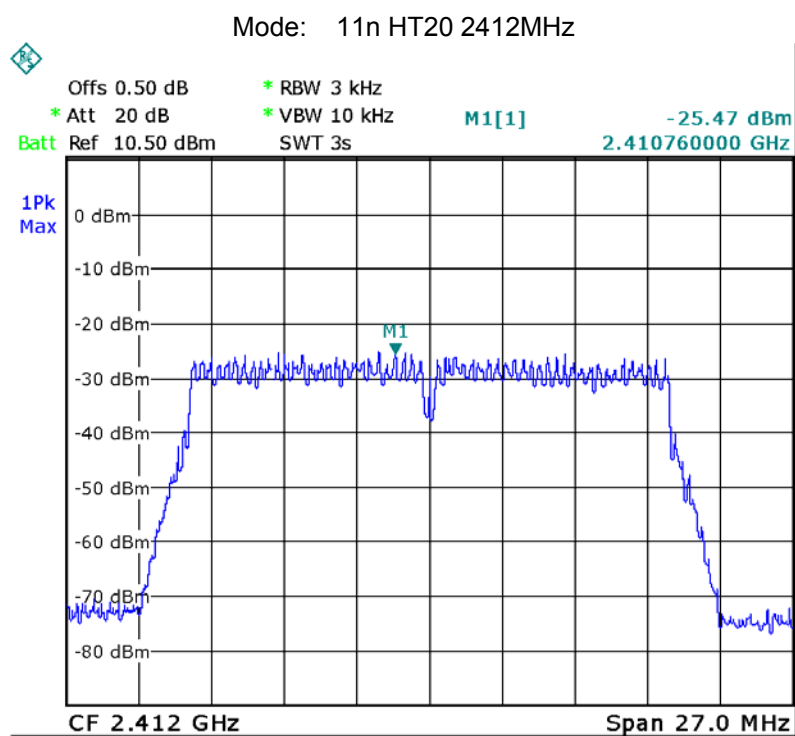
Test mode : 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-25.47	-24.86	-23.54
Limit: 8dBm per 3kHz		

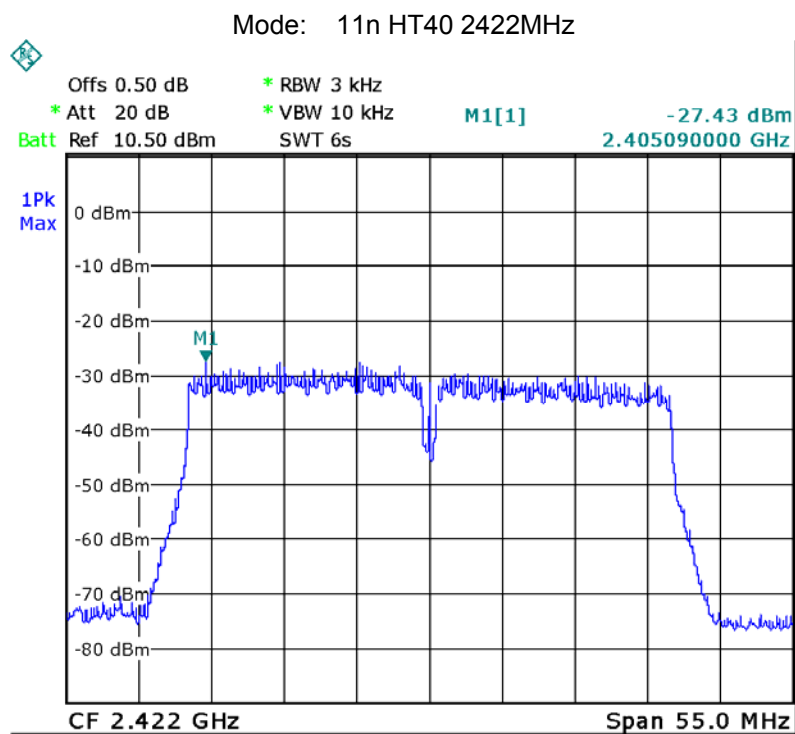
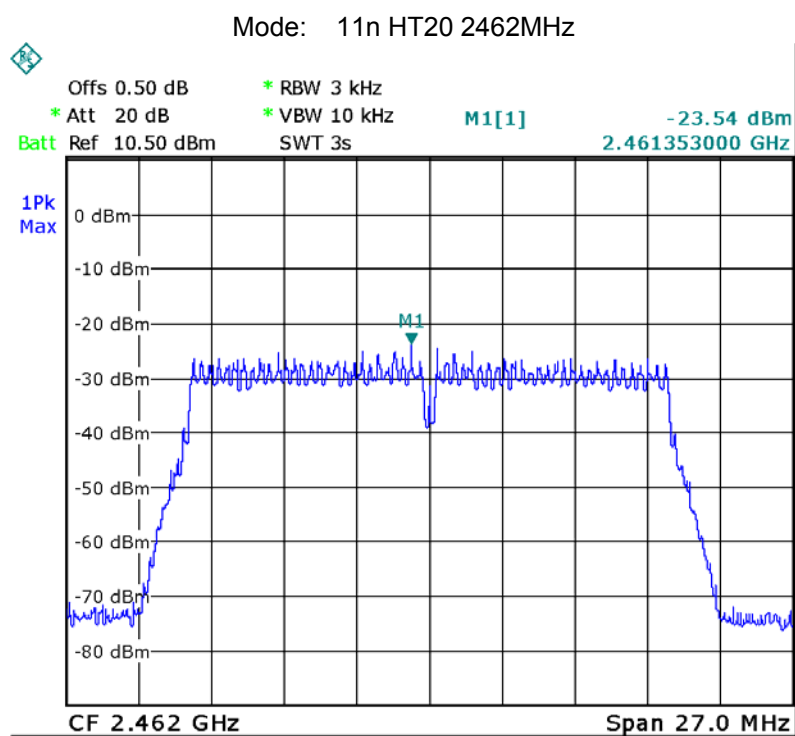
Test mode : 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-27.43	-27.69	-26.34
Limit: 8dBm per 3kHz		

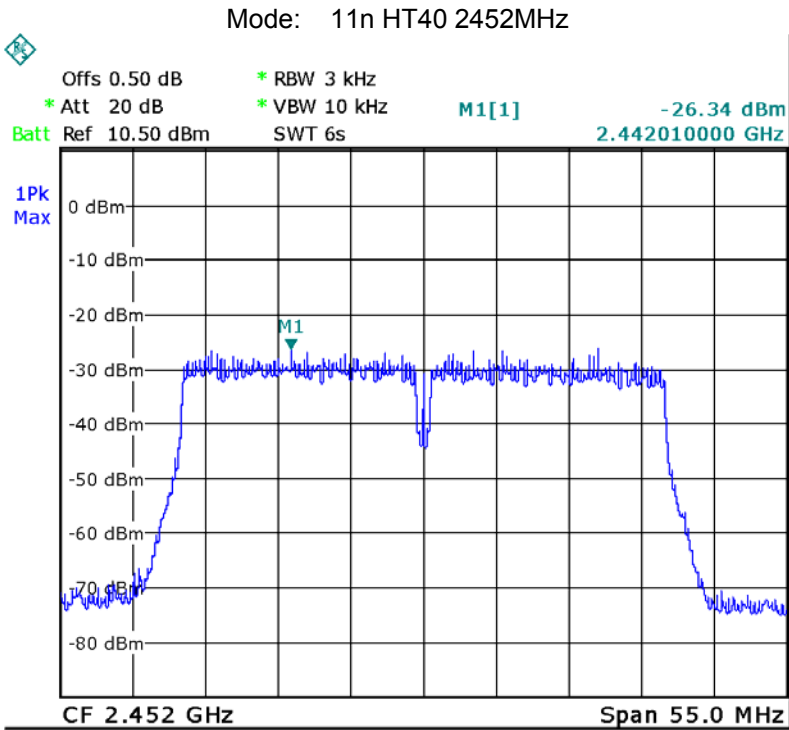
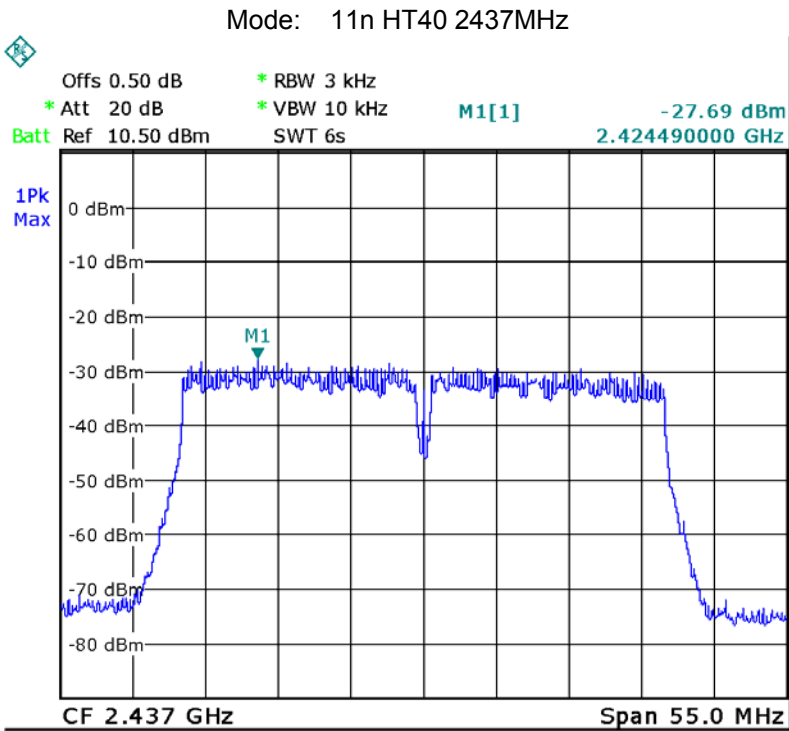












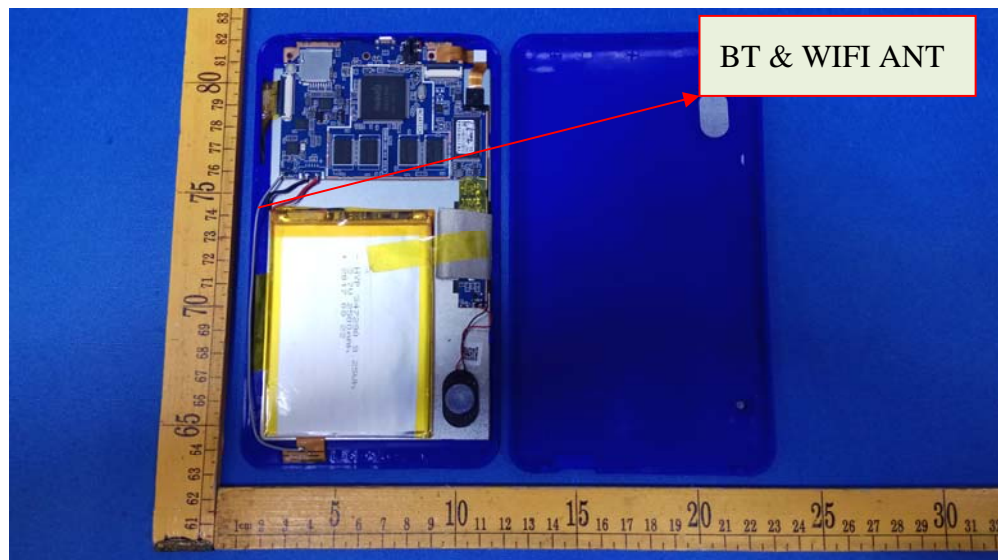
14 Antenna Requirement

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

For intentional device, according to FCC 47 CFR Section 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.

Result:

The EUT has a Integrated Antenna, meets the requirements of FCC 15.203.



15 SAR Evaluation

Please refer to SAR report.

16 Photographs – Test Setup Photos

16.1 Radiated Emission

Test frequency Below 30MHz



Test frequency from 30MHz to 1GHz

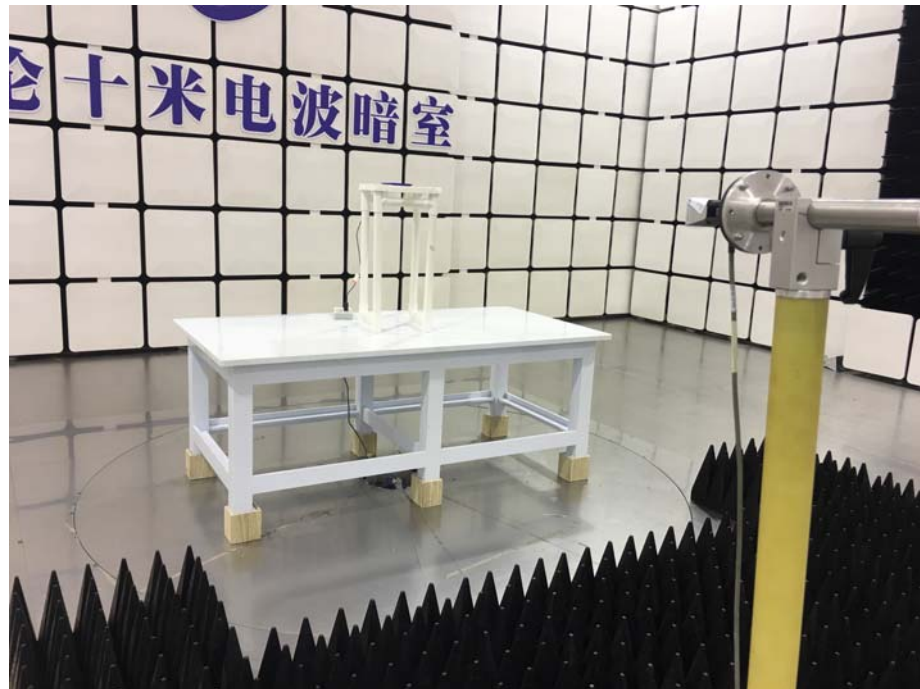




Test frequency above 1GHz



For 18GHz to 25GHz



16.2 Conducted Emission



17 Photographs - Constructional Details

Refer to Annex WTN17S0989813E-Photo.

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