TEST REPORT

Reference No.	:	WTS15S1036113-1E
FCC ID	:	2AGF5T4H
Applicant	:	Somit Solutions Ltd
Address	:	Unit 4-10, The Quadrant, Barton Lane Abingdon Oxfordshire OX14 3YS, United Kingdom
Manufacturer	:	The same as above
Address	:	The same as above
Product Name	:	Diagnostic Tool
Model No.	:	T4H
Brand…… .		LAND ROVER
Standards.....	:	FCC CFR47 Part 15 C Section 15.247:2014
Date of Receipt sample.....	:	Oct. 27, 2015
Date of Test.....	:	Oct. 27, 2015 ~ Nov. 14, 2015
Date of Issue	:	Dec. 03, 2015
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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Philo Zhong / Manager

2 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	15.247 15.205(a) 15.209(a)	PASS
Conducted Emissions	15.207(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:	:Diagnostic Tool
Model No.:	:T4H
Model Difference:	: N/A
Operation Frequency:	802.11b/g/n HT20: 2412MHz ~ 2462MHz, 802.11n HT40: 2422MHz~2452MHz
The Lowest Oscillator:	32.768 kHz
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.

Technical Data:	Battery DC 3.8V, 3000mAh, 11.4Wh or DC 5V, 1000mA powered by adapter (Adapter Input: 100-240V, 50/60Hz, 0.2A model: DPTB050100UB)

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 .

4.5 Test Facility

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

- **IC – Registration No.: 7760A-1**

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

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

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

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

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

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions Test Site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	100947	Sep.15,2015	Sep.14,2016
2.	LISN	R&S	ENV216	101215	Sep.15,2015	Sep.14,2016
3.	Cable	Top	TYPE16(3.5M)	-	Sep.15,2015	Sep.14,2016
Conducted Emissions Test Site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1.	EMI Test Receiver	R&S	ESCI	101155	Sep.15,2015	Sep.14,2016
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	Sep.15,2015	Sep.14,2016
3.	Limiter	York	MTS-IMP-136	261115-001-0024	Sep.15,2015	Sep.14,2016
4.	Cable	LARGE	RF300	-	Sep.15,2015	Sep.14,2016
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No.**	**Last Calibration Date**	**Calibration Due Date**
1	EMC Analyzer	Agilent	E7405A	MY45114943	Sep.15,2015	Sep.14,2016
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Sep.15,2015	Sep.14,2016
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Apr.19,2015	Apr.18,2016
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	Sep.15,2015	Sep.14,2016
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Apr.19,2015	Apr.18,2016
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	Apr.19,2015	Apr.18,2016
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Mar.17,2015	Mar.16,2016
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	Apr.10,2015	Apr.09,2016
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	**Equipment**	**Manufacturer**	**Model No.**	**Serial No**	**Last Calibration Date**	**Calibration Due Date**
1	Test Receiver	R&S	ESCI	101296	Sep.15,2015	Sep.14,2016
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	Sep.15,2015	Sep.14,2016
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	Sep.15,2015	Sep.14,2016
4	Cable	HUBER+SUHNER	CBL2	525178	Sep.15,2015	Sep.14,2016
RF Conducted Testing						

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	Sep.15,2015	Sep.14,2016
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	Sep.15,2015	Sep.14,2016
3.	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	Sep.15,2015	Sep.14,2016

5.2 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)

5.3 Test Equipment Calibration

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

6 Conducted Emission

Test Requirement:	FCC CFR 47 Part 15 Section 15.207
Test Method:	ANSI C63.4:2003
Test Result:	PASS
Frequency Range:	150kHz to 30MHz
Class/Severity:	Class B
Limit:	66-56 dBμV between 0.15MHz & 0.5MHz
	56 dBμV between 0.5MHz & 5MHz
	60 dBμV between 5MHz & 30MHz
Detector:	Peak for pre-scan (9kHz Resolution Bandwidth)

6.1 E.U.T. Operation

Operating Environment **:**

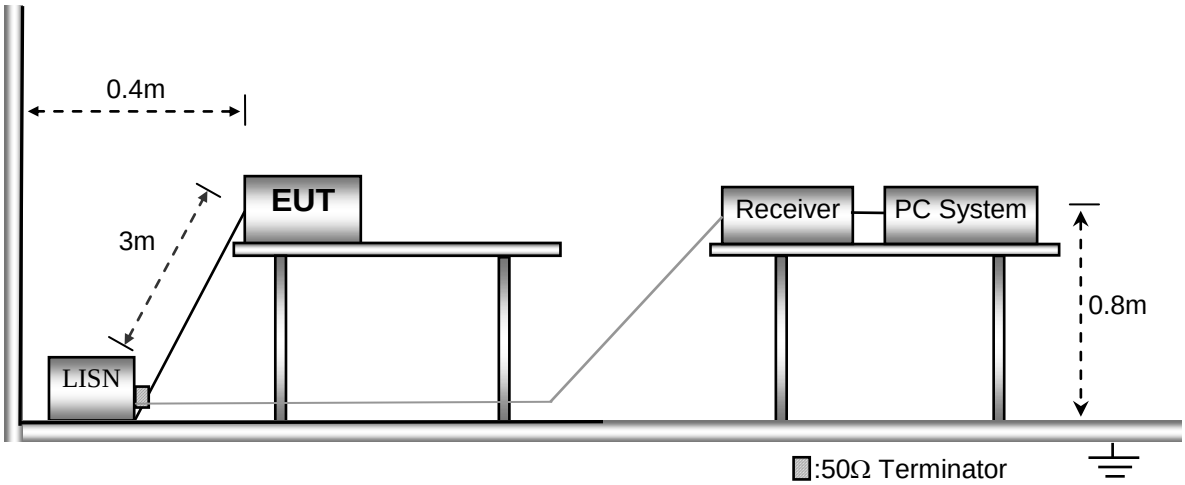
Temperature:	21.5 °C
Humidity:	51.9 % RH
Atmospheric Pressure:	101.2kPa

EUT Operation **:**

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

6.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003.



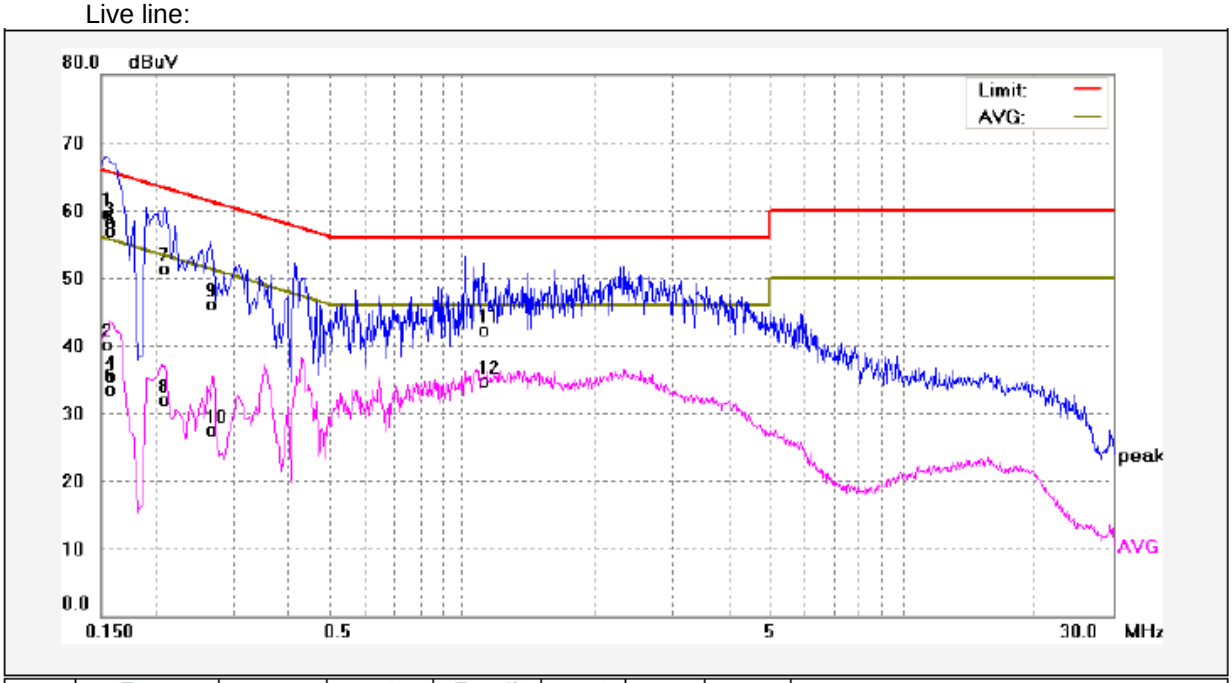
6.3 Measurement Description

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

6.4 Conducted Emission Test Result

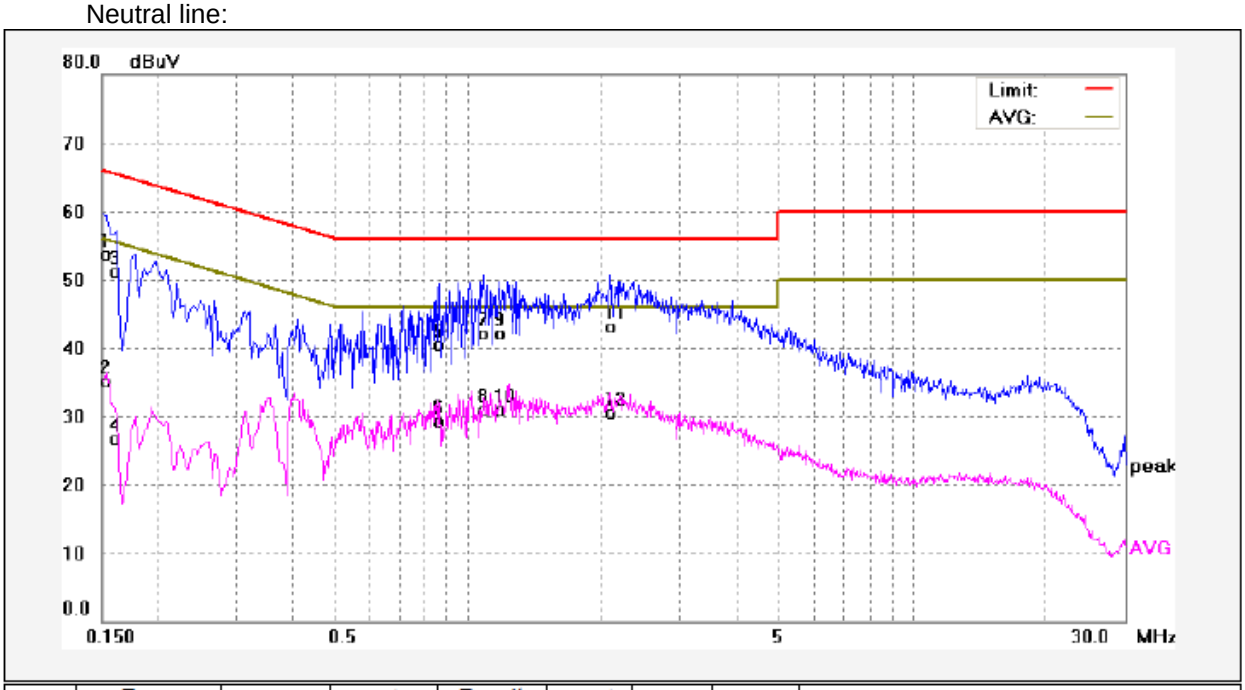
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1539	49.31	10.13	59.44	65.78	-6.34	QP	
2	0.1539	30.06	10.13	40.19	55.78	-15.59	AVG	
3	0.1580	47.96	10.13	58.09	65.56	-7.47	QP	
4	0.1580	25.34	10.13	35.47	55.56	-20.09	AVG	
5	0.1590	46.69	10.13	56.82	65.51	-8.69	QP	
6	0.1590	23.32	10.13	33.45	55.51	-22.06	AVG	
7	0.2100	41.24	10.15	51.39	63.20	-11.81	QP	
8	0.2100	21.73	10.15	31.88	53.20	-21.32	AVG	
9	0.2660	35.98	10.16	46.14	61.24	-15.10	QP	
10	0.2660	17.30	10.16	27.46	51.24	-23.78	AVG	
11	1.1140	32.07	10.22	42.29	56.00	-13.71	QP	
12	1.1140	24.42	10.22	34.64	46.00	-11.36	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1500	43.50	10.13	53.63	65.99	-12.36	QP	
2	0.1500	25.04	10.13	35.17	55.99	-20.82	AVG	
3	0.1620	41.06	10.13	51.19	65.36	-14.17	QP	
4	0.1620	16.59	10.13	26.72	55.36	-28.64	AVG	
5	0.8620	30.36	10.22	40.58	56.00	-15.42	QP	
6	0.8620	19.03	10.22	29.25	46.00	-16.75	AVG	
7	1.0780	31.87	10.22	42.09	56.00	-13.91	QP	
8	1.0780	20.73	10.22	30.95	46.00	-15.05	AVG	
9	1.1740	31.80	10.23	42.03	56.00	-13.97	QP	
10	1.1740	20.67	10.23	30.90	46.00	-15.10	AVG	
11	2.0900	32.92	10.25	43.17	56.00	-12.83	QP	
12	2.0900	20.26	10.25	30.51	46.00	-15.49	AVG	

7 Radiated Emissions

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: ANSI C63.4:2003

Test Result: PASS

Measurement Distance: 3m

Limit:

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

7.1 EUT Operation

Operating Environment **:**

Temperature: 23.5 °C

Humidity: 52.1 % RH

Atmospheric Pressure: 101.2kPa

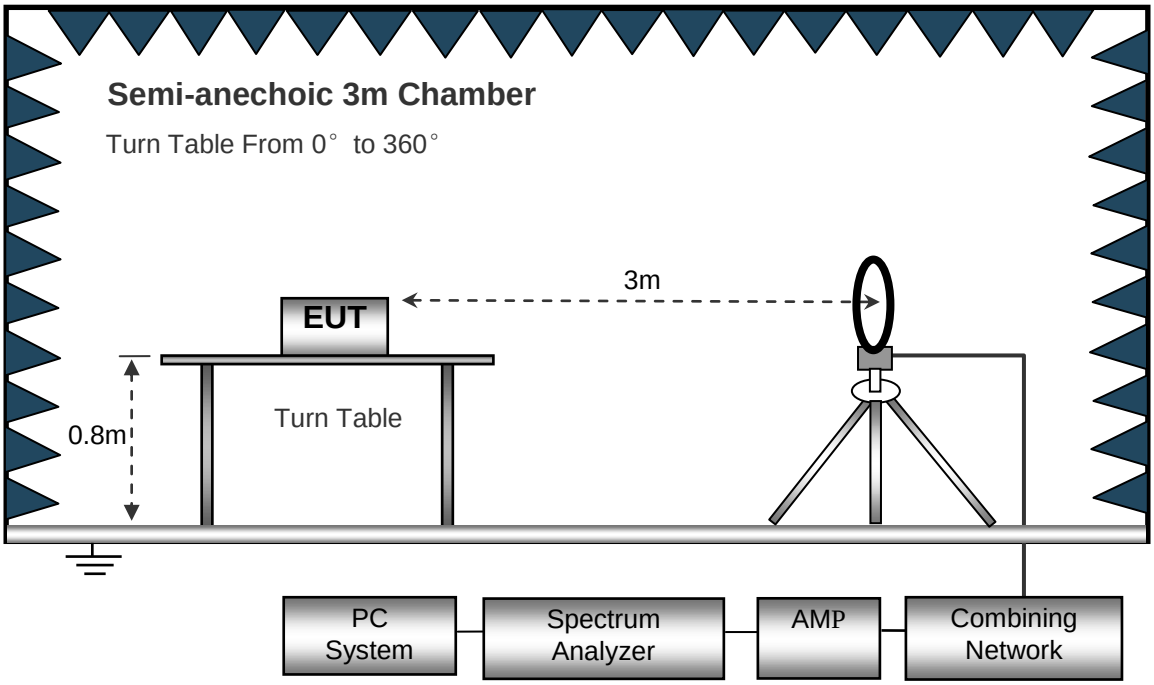
EUT Operation **:**

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

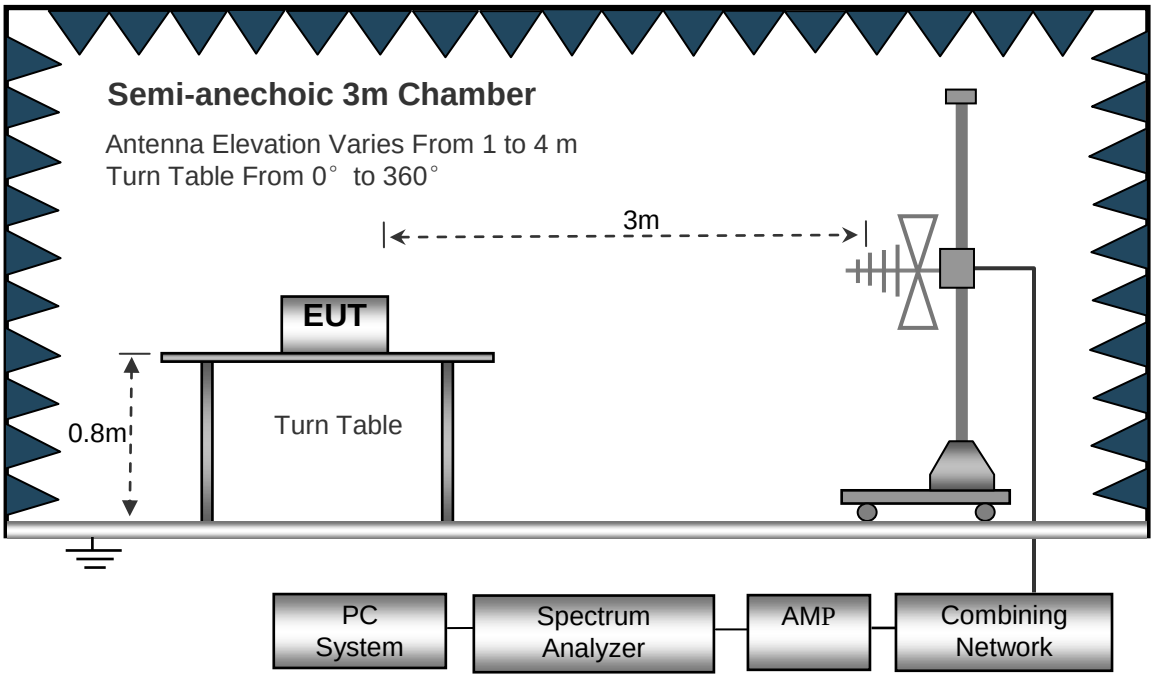
7.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.4: 2003.

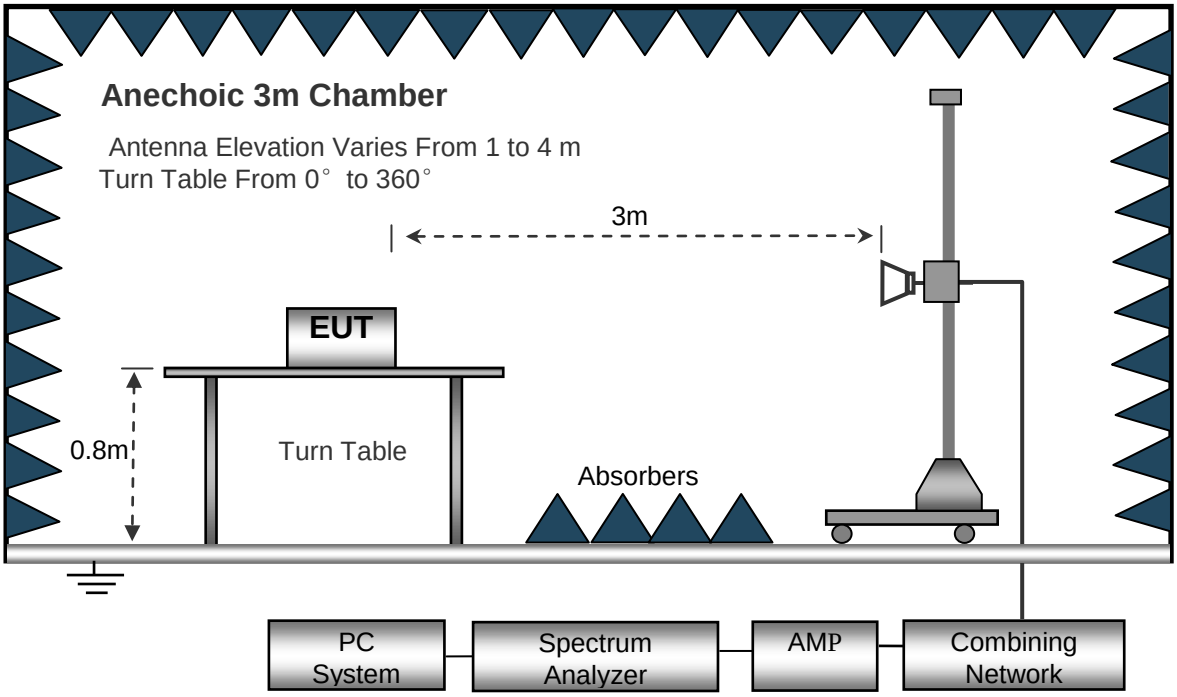
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Below 30MHz

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

30MHz ~ 1GHz

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

Above 1GHz

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

7.4 Test Procedure

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

7.5 Corrected Amplitude & Margin Calculation

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

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

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

Margin = Corr. Ampl. – Limit

7.6 Summary of Test Results

Test Frequency : 32.768 kHz~ 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									
223.20	40.10	QP	133	2.0	H	-11.62	28.48	46.00	-17.52
223.20	33.81	QP	132	1.5	V	-11.62	22.19	46.00	-23.81
4824.00	52.05	PK	351	1.3	V	-1.06	50.99	74.00	-23.01
4824.00	47.92	Ave	351	1.3	V	-1.06	46.86	54.00	-7.14
7236.00	41.97	PK	297	1.1	H	1.33	43.30	74.00	-30.70
7236.00	38.90	Ave	297	1.1	H	1.33	40.23	54.00	-13.77
2331.35	45.17	PK	191	1.1	V	-13.19	31.98	74.00	-42.02
2331.35	39.87	Ave	191	1.1	V	-13.19	26.68	54.00	-27.32
2385.52	44.09	PK	191	1.6	H	-13.14	30.95	74.00	-43.05
2385.52	37.52	Ave	191	1.6	H	-13.14	24.38	54.00	-29.62
2497.73	42.57	PK	217	1.4	V	-13.08	29.49	74.00	-44.51
2497.73	37.43	Ave	217	1.4	V	-13.08	24.35	54.00	-29.65

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									
223.20	40.79	QP	194	1.8	H	-11.62	29.17	46.00	-16.83
223.20	33.11	QP	354	1.9	V	-11.62	21.49	46.00	-24.51
4874.00	53.11	PK	175	1.8	V	-0.62	52.49	74.00	-21.51
4874.00	46.93	Ave	175	1.8	V	-0.62	46.31	54.00	-7.69
7311.00	42.57	PK	63	1.4	H	2.21	44.78	74.00	-29.22
7311.00	38.85	Ave	63	1.4	H	2.21	41.06	54.00	-12.94
2340.51	46.41	PK	268	1.4	V	-13.19	33.22	74.00	-40.78
2340.51	38.29	Ave	268	1.4	V	-13.19	25.10	54.00	-28.90
2382.37	44.79	PK	182	1.3	H	-13.14	31.65	74.00	-42.35
2382.37	38.72	Ave	182	1.3	H	-13.14	25.58	54.00	-28.42
2498.41	44.29	PK	118	1.8	V	-13.08	31.21	74.00	-42.79
2498.41	37.29	Ave	118	1.8	V	-13.08	24.21	54.00	-29.79

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									
223.20	41.68	QP	202	1.5	H	-11.62	30.06	46.00	-15.94
223.20	31.73	QP	269	2.0	V	-11.62	20.11	46.00	-25.89
4924.00	54.10	PK	130	1.9	V	-0.24	53.86	74.00	-20.14
4924.00	46.22	Ave	130	1.9	V	-0.24	45.98	54.00	-8.02
7386.00	42.25	PK	16	1.5	H	2.84	45.09	74.00	-28.91
7386.00	38.50	Ave	16	1.5	H	2.84	41.34	54.00	-12.66
2330.27	45.88	PK	339	1.2	V	-13.19	32.69	74.00	-41.31
2330.27	38.95	Ave	339	1.2	V	-13.19	25.76	54.00	-28.24
2365.35	42.71	PK	126	1.9	H	-13.14	29.57	74.00	-44.43
2365.35	36.29	Ave	126	1.9	H	-13.14	23.15	54.00	-30.85
2498.39	43.21	PK	77	1.2	V	-13.08	30.13	74.00	-43.87
2498.39	38.64	Ave	77	1.2	V	-13.08	25.56	54.00	-28.44

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									
223.20	42.66	QP	307	2.0	H	-11.62	31.04	46.00	-14.96
223.20	31.32	QP	281	1.4	V	-11.62	19.70	46.00	-26.30
4824.00	54.11	PK	257	1.0	V	-1.06	53.05	74.00	-20.95
4824.00	45.35	Ave	257	1.0	V	-1.06	44.29	54.00	-9.71
7236.00	41.95	PK	226	1.6	H	1.33	43.28	74.00	-30.72
7236.00	39.50	Ave	226	1.6	H	1.33	40.83	54.00	-13.17
2312.06	46.06	PK	227	1.1	V	-13.19	32.87	74.00	-41.13
2312.06	37.00	Ave	227	1.1	V	-13.19	23.81	54.00	-30.19
2363.71	44.73	PK	277	1.6	H	-13.14	31.59	74.00	-42.41
2363.71	36.08	Ave	277	1.6	H	-13.14	22.94	54.00	-31.06
2484.20	44.73	PK	181	1.1	V	-13.08	31.65	74.00	-42.35
2484.20	37.81	Ave	181	1.1	V	-13.08	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)
11g: Middle Channel 2437MHz									
223.20	43.30	QP	68	1.6	H	-11.62	31.68	46.00	-14.32
223.20	30.46	QP	49	1.9	V	-11.62	18.84	46.00	-27.16
4874.00	55.20	PK	325	1.8	V	-0.62	54.58	74.00	-19.42
4874.00	46.53	Ave	325	1.8	V	-0.62	45.91	54.00	-8.09
7311.00	42.28	PK	76	1.1	H	2.21	44.49	74.00	-29.51
7311.00	39.74	Ave	76	1.1	H	2.21	41.95	54.00	-12.05
2323.16	45.38	PK	61	1.7	V	-13.19	32.19	74.00	-41.81
2323.16	38.62	Ave	61	1.7	V	-13.19	25.43	54.00	-28.57
2351.69	44.51	PK	198	1.2	H	-13.14	31.37	74.00	-42.63
2351.69	36.82	Ave	198	1.2	H	-13.14	23.68	54.00	-30.32
2498.73	44.41	PK	23	1.4	V	-13.08	31.33	74.00	-42.67
2498.73	37.58	Ave	23	1.4	V	-13.08	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)
11g: High Channel 2462MHz									
223.20	42.40	QP	243	1.5	H	-11.62	30.78	46.00	-15.22
223.20	29.62	QP	144	1.2	V	-11.62	18.00	46.00	-28.00
4924.00	56.20	PK	159	1.5	V	-0.24	55.96	74.00	-18.04
4924.00	45.89	Ave	159	1.5	V	-0.24	45.65	54.00	-8.35
7386.00	43.61	PK	148	1.4	H	2.84	46.45	74.00	-27.55
7386.00	40.69	Ave	148	1.4	H	2.84	43.53	54.00	-10.47
2312.53	45.54	PK	233	1.3	V	-13.19	32.35	74.00	-41.65
2312.53	39.66	Ave	233	1.3	V	-13.19	26.47	54.00	-27.53
2360.84	43.59	PK	266	1.1	H	-13.14	30.45	74.00	-43.55
2360.84	37.01	Ave	266	1.1	H	-13.14	23.87	54.00	-30.13
2494.10	42.80	PK	202	1.6	V	-13.08	29.72	74.00	-44.28
2494.10	37.80	Ave	202	1.6	V	-13.08	24.72	54.00	-29.28

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									
223.20	43.18	QP	216	1.8	H	-11.62	31.56	46.00	-14.44
223.20	29.13	QP	182	1.2	V	-11.62	17.51	46.00	-28.49
4824.00	56.77	PK	22	1.6	V	-1.06	55.71	74.00	-18.29
4824.00	45.23	Ave	22	1.6	V	-1.06	44.17	54.00	-9.83
7236.00	44.27	PK	343	1.0	H	1.33	45.60	74.00	-28.40
7236.00	41.29	Ave	343	1.0	H	1.33	42.62	54.00	-11.38
2349.05	46.09	PK	89	1.9	V	-13.19	32.90	74.00	-41.10
2349.05	39.59	Ave	89	1.9	V	-13.19	26.40	54.00	-27.60
2385.79	43.11	PK	55	1.5	H	-13.14	29.97	74.00	-44.03
2385.79	36.68	Ave	55	1.5	H	-13.14	23.54	54.00	-30.46
2489.61	42.36	PK	270	1.8	V	-13.08	29.28	74.00	-44.72
2489.61	37.75	Ave	270	1.8	V	-13.08	24.67	54.00	-29.33

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									
223.20	44.56	QP	329	1.2	H	-11.62	32.94	46.00	-13.06
223.20	27.78	QP	1	1.1	V	-11.62	16.16	46.00	-29.84
4874.00	55.76	PK	137	1.7	V	-0.62	55.14	74.00	-18.86
4874.00	43.89	Ave	137	1.7	V	-0.62	43.27	54.00	-10.73
7311.00	45.01	PK	46	1.3	H	2.21	47.22	74.00	-26.78
7311.00	39.89	Ave	46	1.3	H	2.21	42.10	54.00	-11.90
2340.79	45.91	PK	130	1.5	V	-13.19	32.72	74.00	-41.28
2340.79	37.19	Ave	130	1.5	V	-13.19	24.00	54.00	-30.00
2378.18	44.44	PK	332	1.2	H	-13.14	31.30	74.00	-42.70
2378.18	36.97	Ave	332	1.2	H	-13.14	23.83	54.00	-30.17
2485.22	44.34	PK	85	1.3	V	-13.08	31.26	74.00	-42.74
2485.22	38.28	Ave	85	1.3	V	-13.08	25.20	54.00	-28.80

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									
223.20	45.74	QP	139	1.4	H	-11.62	34.12	46.00	-11.88
223.20	26.55	QP	55	1.4	V	-11.62	14.93	46.00	-31.07
4924.00	56.44	PK	279	1.6	V	-0.24	56.20	74.00	-17.80
4924.00	42.45	Ave	279	1.6	V	-0.24	42.21	54.00	-11.79
7386.00	45.83	PK	138	1.3	H	2.84	48.67	74.00	-25.33
7386.00	38.95	Ave	138	1.3	H	2.84	41.79	54.00	-12.21
2313.12	45.80	PK	46	1.0	V	-13.19	32.61	74.00	-41.39
2313.12	38.66	Ave	46	1.0	V	-13.19	25.47	54.00	-28.53
2366.12	43.53	PK	205	1.2	H	-13.14	30.39	74.00	-43.61
2366.12	36.56	Ave	205	1.2	H	-13.14	23.42	54.00	-30.58
2486.49	42.59	PK	201	1.8	V	-13.08	29.51	74.00	-44.49
2486.49	37.52	Ave	201	1.8	V	-13.08	24.44	54.00	-29.56

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									
223.20	47.06	QP	78	1.6	H	-11.62	35.44	46.00	-10.56
223.20	26.06	QP	1	1.8	V	-11.62	14.44	46.00	-31.56
4844.00	53.96	PK	223	1.6	V	-1.06	52.90	74.00	-21.10
4844.00	40.47	Ave	223	1.6	V	-1.06	39.41	54.00	-14.59
7266.00	43.68	PK	53	1.2	H	1.33	45.01	74.00	-28.99
7266.00	37.82	Ave	53	1.2	H	1.33	39.15	54.00	-14.85
2312.78	45.81	PK	14	1.1	V	-13.19	32.62	74.00	-41.38
2312.78	39.05	Ave	14	1.1	V	-13.19	25.86	54.00	-28.14
2353.25	42.29	PK	86	1.5	H	-13.14	29.15	74.00	-44.85
2353.25	38.51	Ave	86	1.5	H	-13.14	25.37	54.00	-28.63
2499.29	43.34	PK	245	1.8	V	-13.08	30.26	74.00	-43.74
2499.29	38.24	Ave	245	1.8	V	-13.08	25.16	54.00	-28.84

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									
223.20	46.93	QP	119	1.3	H	-11.62	35.31	46.00	-10.69
223.20	26.04	QP	151	1.4	V	-11.62	14.42	46.00	-31.58
4874.00	54.42	PK	93	1.2	V	-0.62	53.80	74.00	-20.20
4874.00	41.33	Ave	93	1.2	V	-0.62	40.71	54.00	-13.29
7311.00	42.78	PK	84	1.3	H	2.21	44.99	74.00	-29.01
7311.00	38.04	Ave	84	1.3	H	2.21	40.25	54.00	-13.75
2320.07	45.74	PK	2	1.7	V	-13.19	32.55	74.00	-41.45
2320.07	39.39	Ave	2	1.7	V	-13.19	26.20	54.00	-27.80
2389.26	42.90	PK	302	1.7	H	-13.14	29.76	74.00	-44.24
2389.26	36.75	Ave	302	1.7	H	-13.14	23.61	54.00	-30.39
2499.05	42.82	PK	69	1.9	V	-13.08	29.74	74.00	-44.26
2499.05	38.94	Ave	69	1.9	V	-13.08	25.86	54.00	-28.14

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									
223.20	46.08	QP	252	1.7	H	-11.62	34.46	46.00	-11.54
223.20	26.61	QP	153	1.6	V	-11.62	14.99	46.00	-31.01
4904.00	54.50	PK	23	1.3	V	-0.24	54.26	74.00	-19.74
4904.00	41.30	Ave	23	1.3	V	-0.24	41.06	54.00	-12.94
7356.00	41.90	PK	303	1.8	H	2.84	44.74	74.00	-29.26
7356.00	38.20	Ave	303	1.8	H	2.84	41.04	54.00	-12.96
2337.07	45.72	PK	224	1.5	V	-13.19	32.53	74.00	-41.47
2337.07	37.86	Ave	224	1.5	V	-13.19	24.67	54.00	-29.33
2371.48	43.00	PK	359	1.4	H	-13.14	29.86	74.00	-44.14
2371.48	38.81	Ave	359	1.4	H	-13.14	25.67	54.00	-28.33
2496.74	43.86	PK	53	1.7	V	-13.08	30.78	74.00	-43.22
2496.74	37.94	Ave	53	1.7	V	-13.08	24.86	54.00	-29.14

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:	558074 D01 DTS Meas Guidance v03r03
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

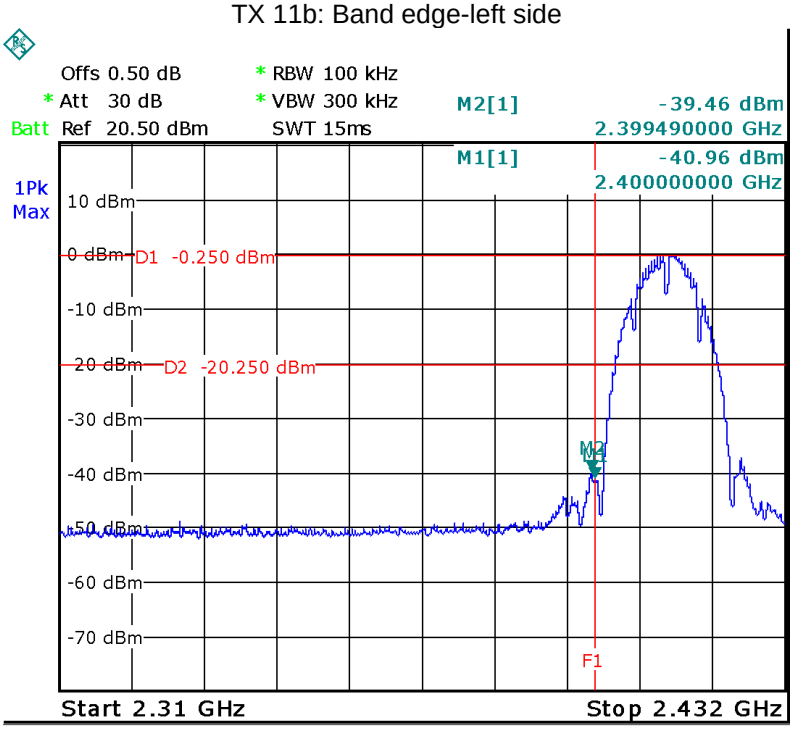
8.1 Test Produce

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.

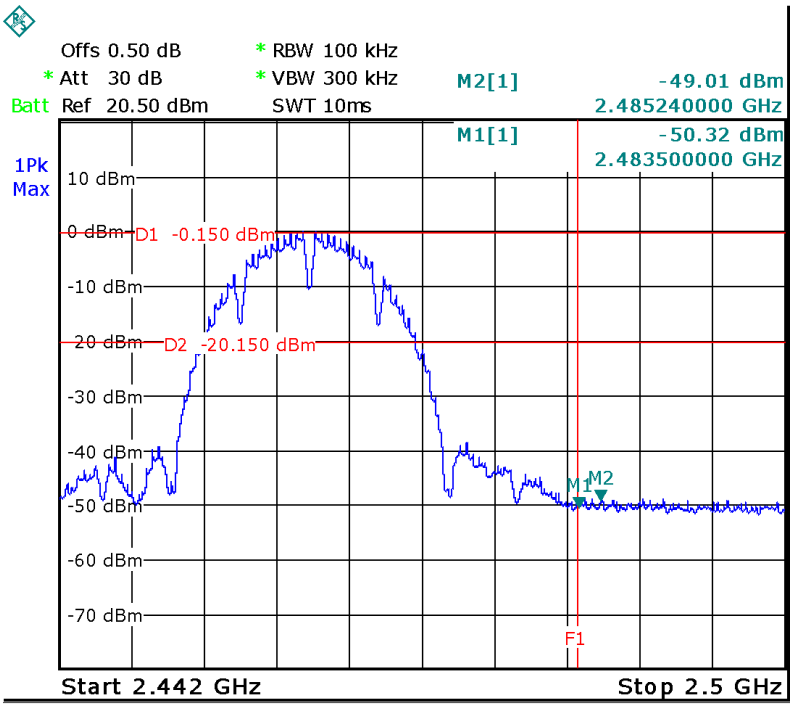
8.2 Test Result

Test result plots shown as follows:

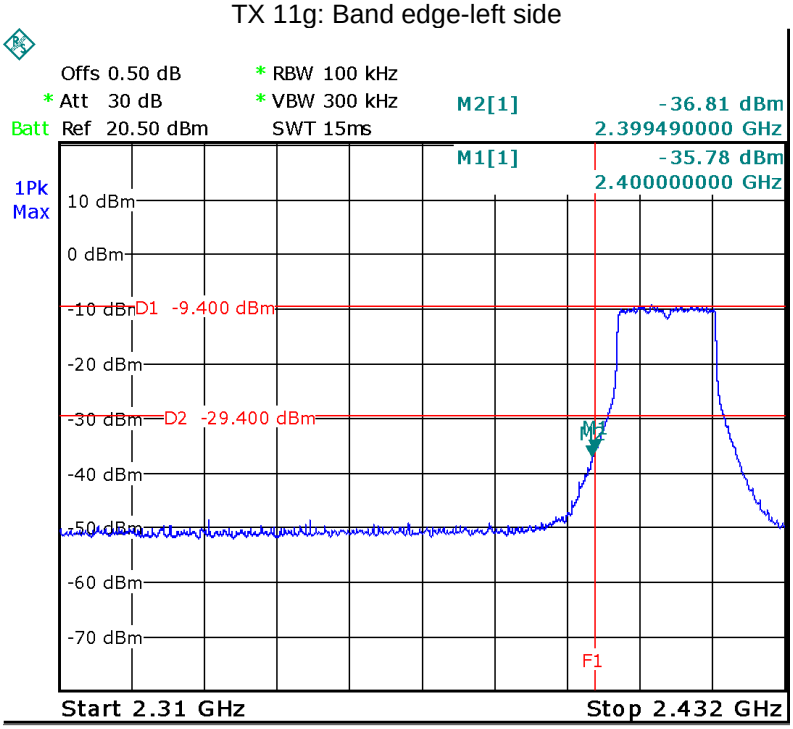
TX 11b: Band edge-left side



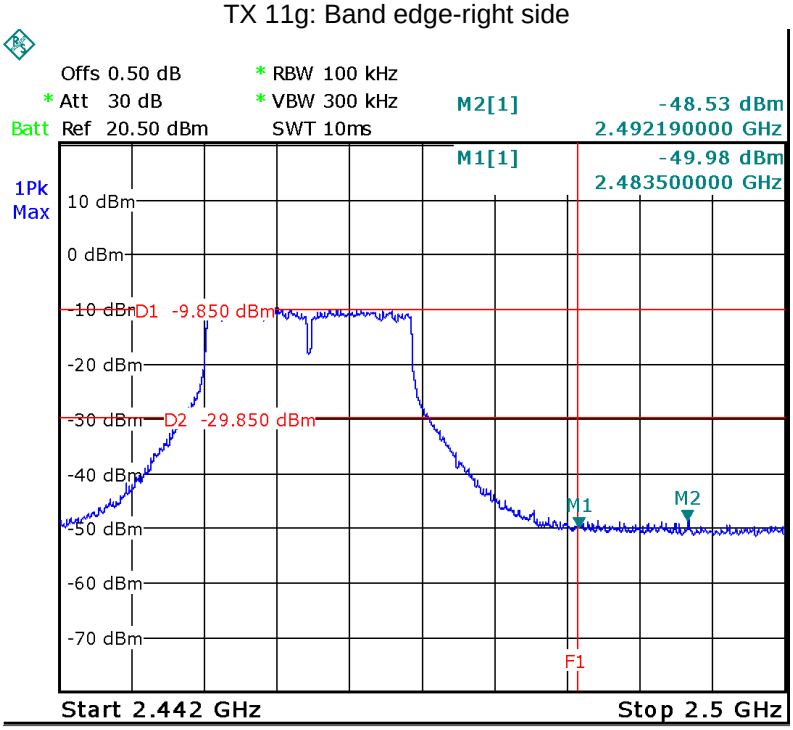
TX 11b: Band edge-right side



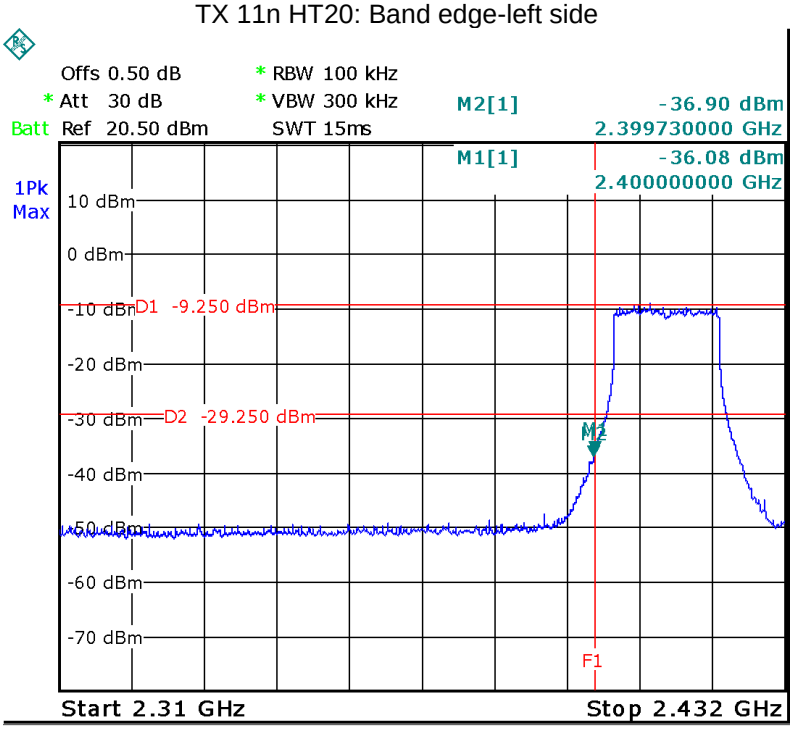
TX 11g: Band edge-left side



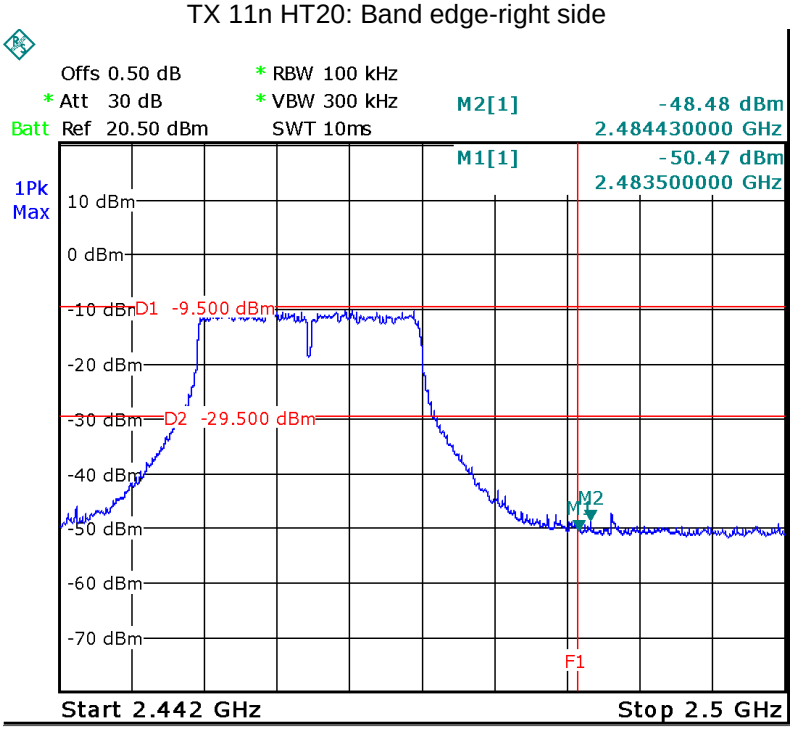
TX 11g: Band edge-right side



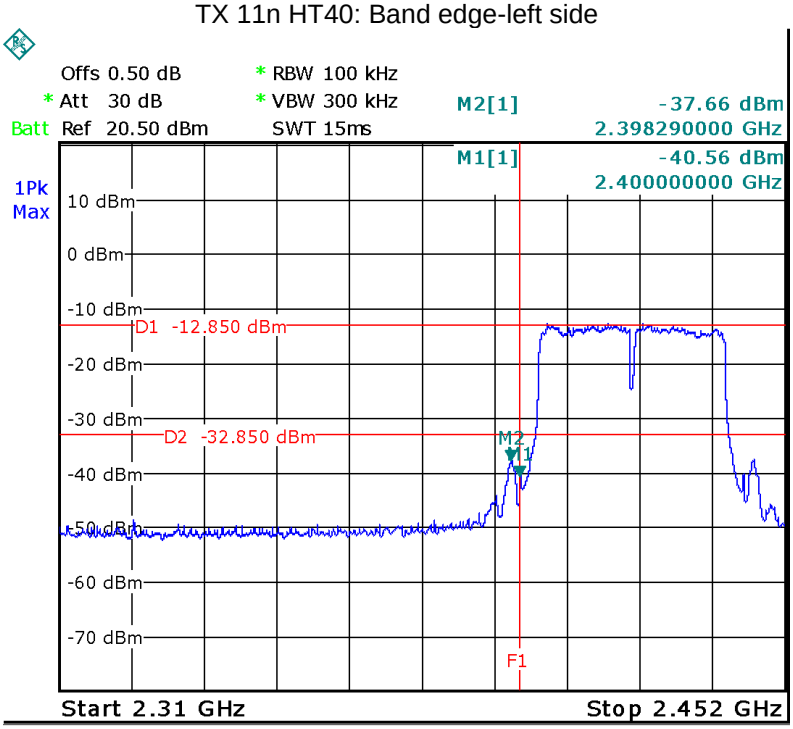
TX 11n HT20: Band edge-left side



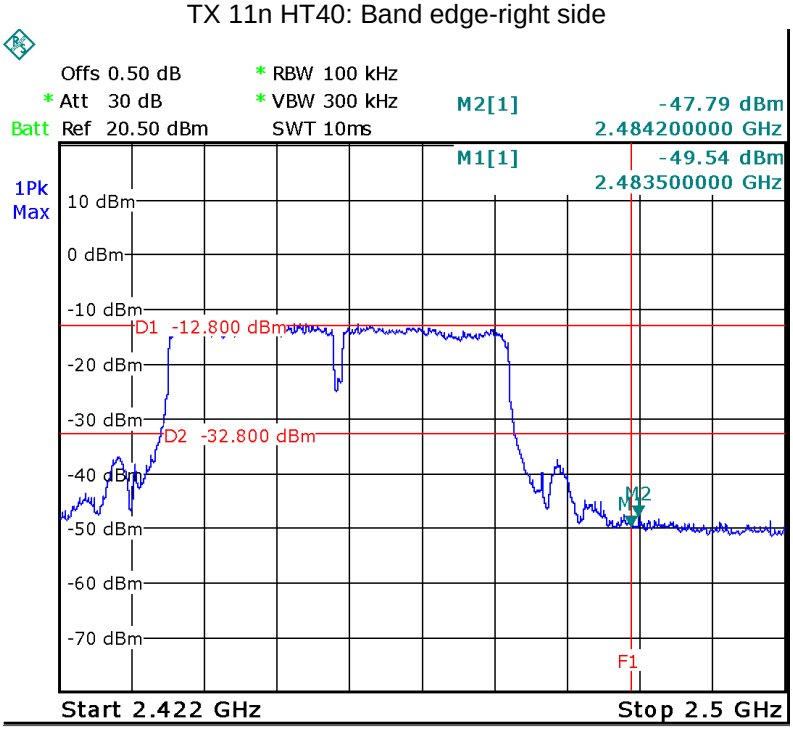
TX 11n HT20: Band edge-right side



TX 11n HT40: Band edge-left side



TX 11n HT40: Band edge-right side



9 6 dB Bandwidth Measurement

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance v03r03

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;

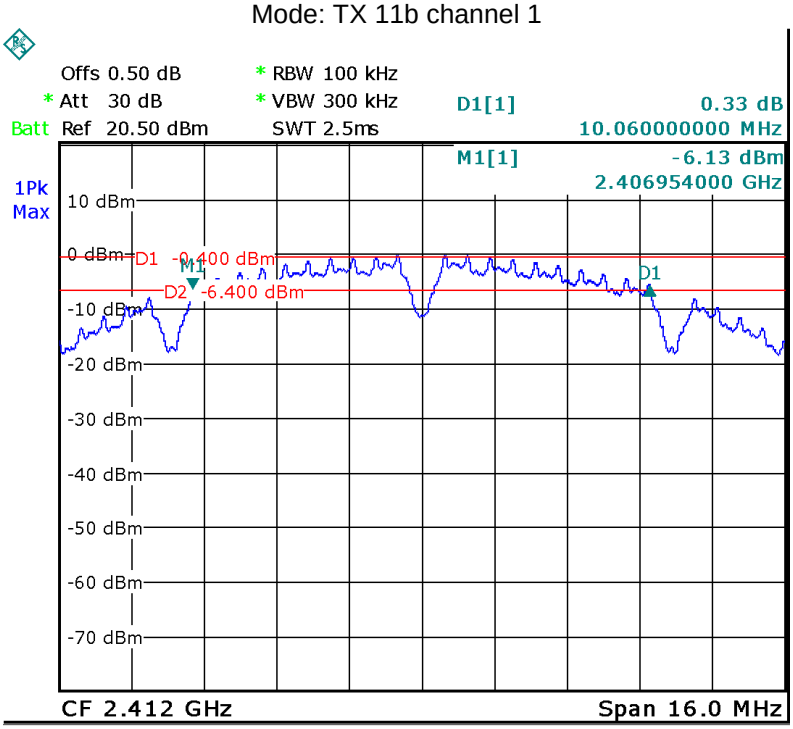
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

9.2 Test Result:

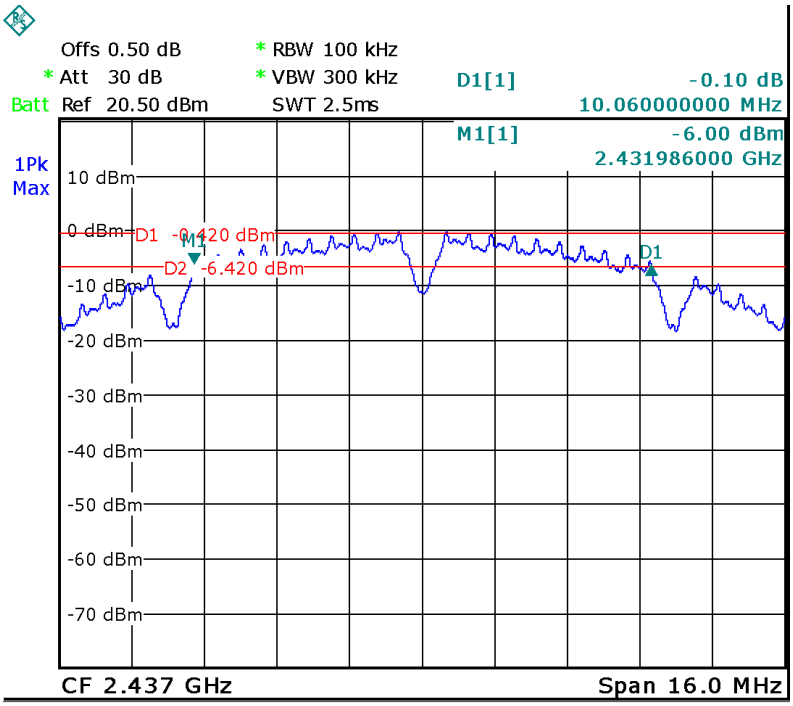
Operation mode	Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11
	10.060	10.060	10.060
TX 11g	Channel 1	Channel 6	Channel 11
	16. 567	16. 567	16.567
TX 11n HT20	Channel 1	Channel 6	Channel 11
	17.838	17.838	17.838
TX 11n HT40	Channel 3	Channel 6	Channel 9
	36.560	36.560	36.560

Test result plot as follows:

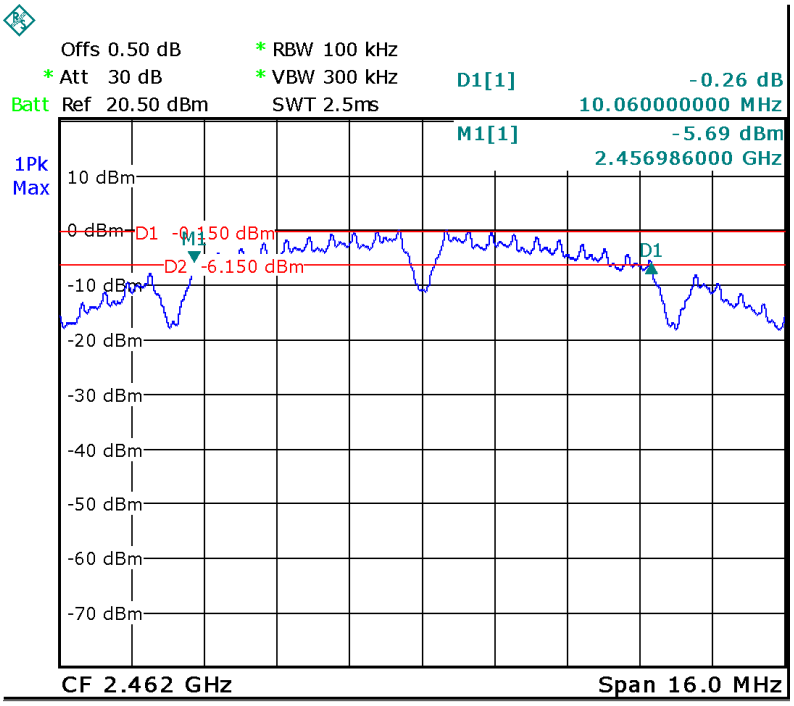
Mode: TX 11b channel 1



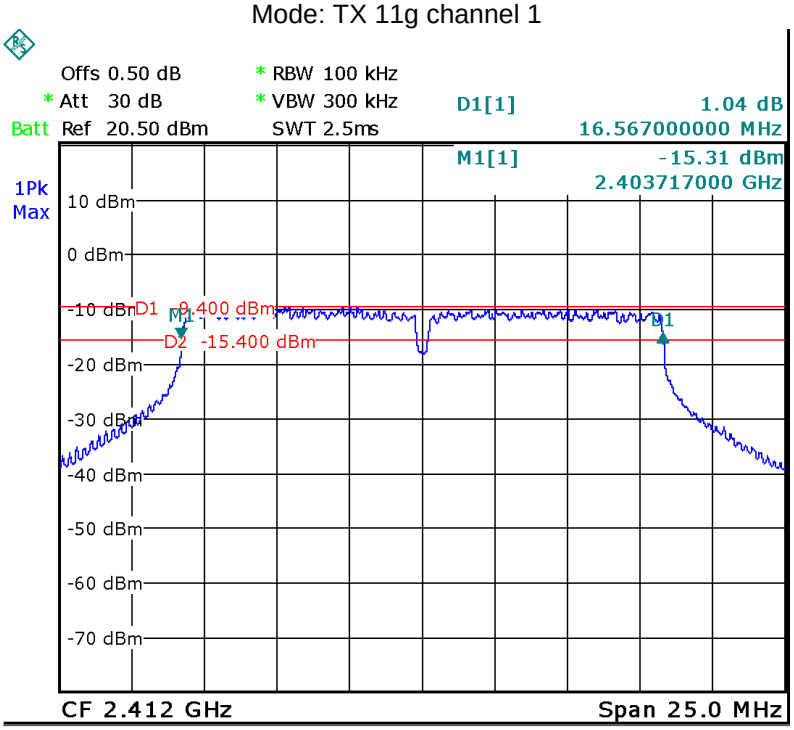
Mode: TX 11b channel 6



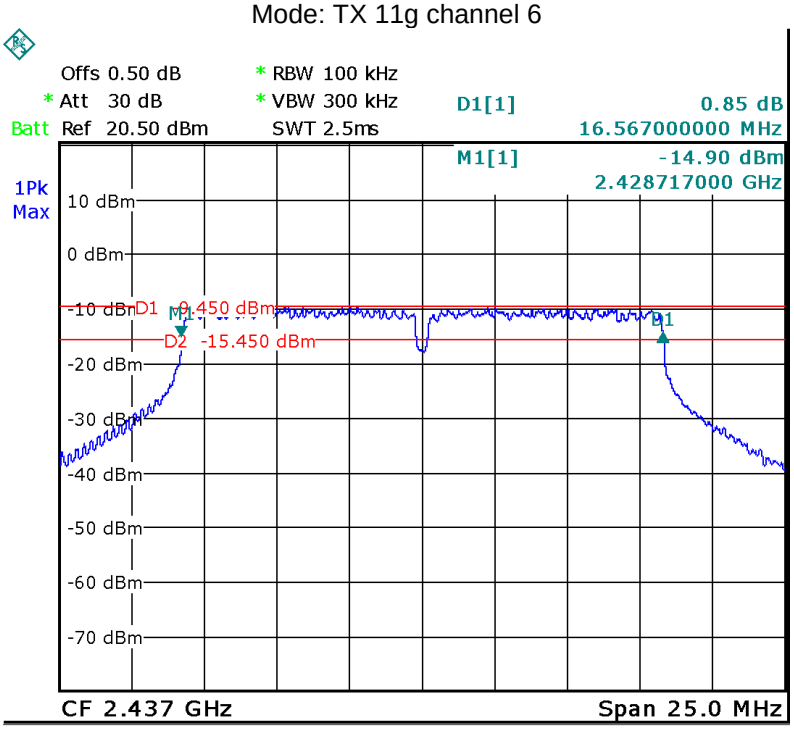
Mode: TX 11b channel 11



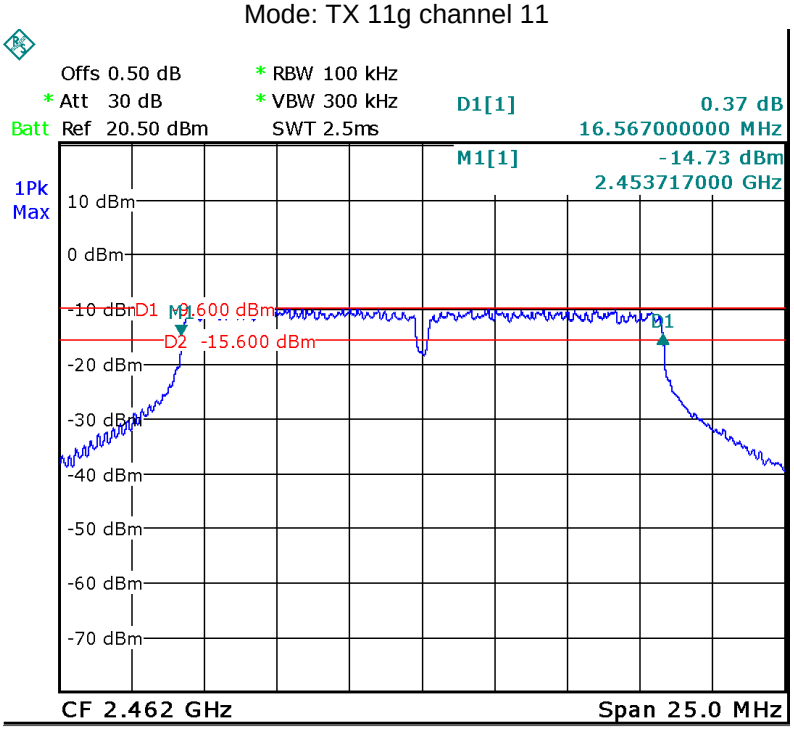
Mode: TX 11g channel 1



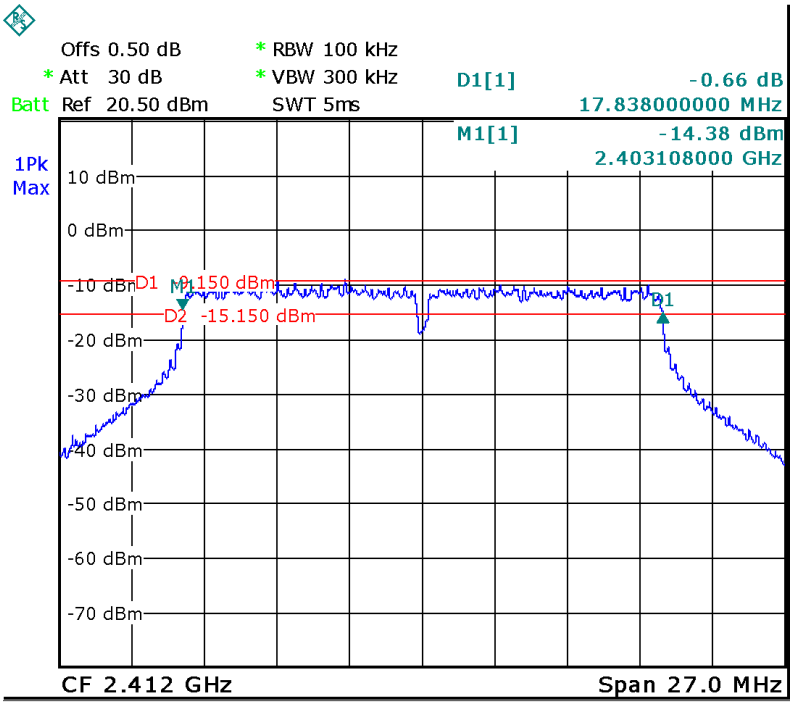
Mode: TX 11g channel 6



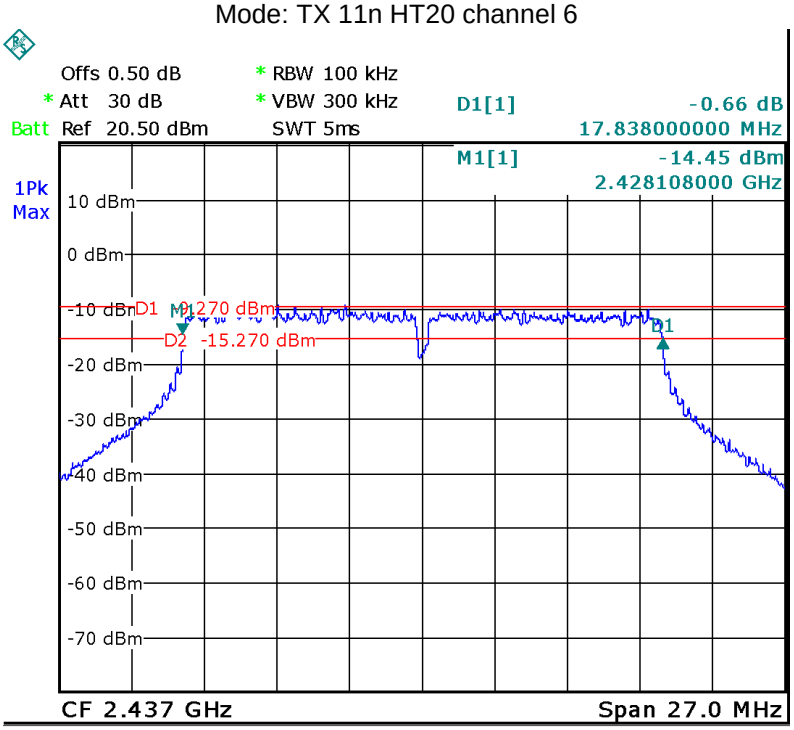
Mode: TX 11g channel 11



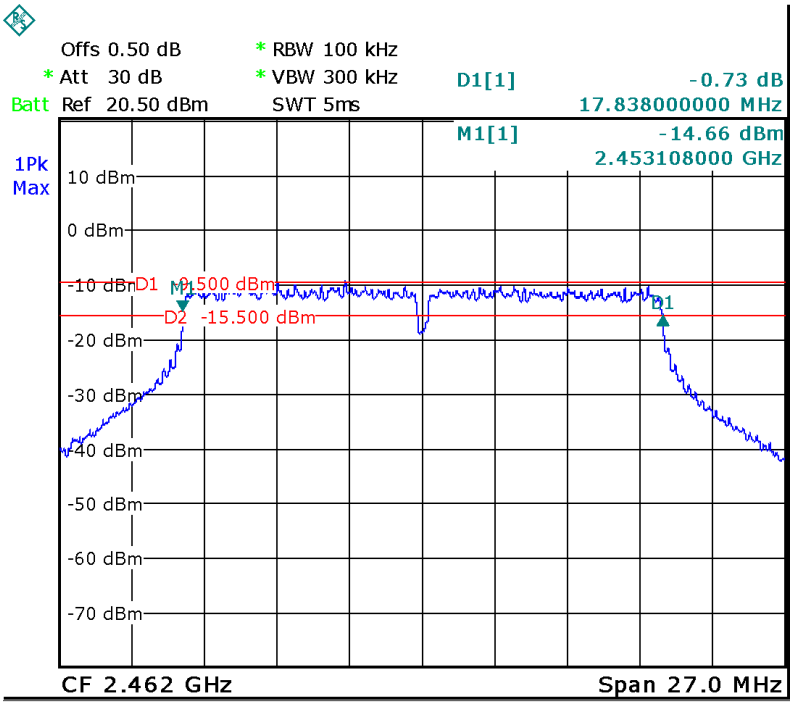
Mode: TX 11n HT20 channel 1



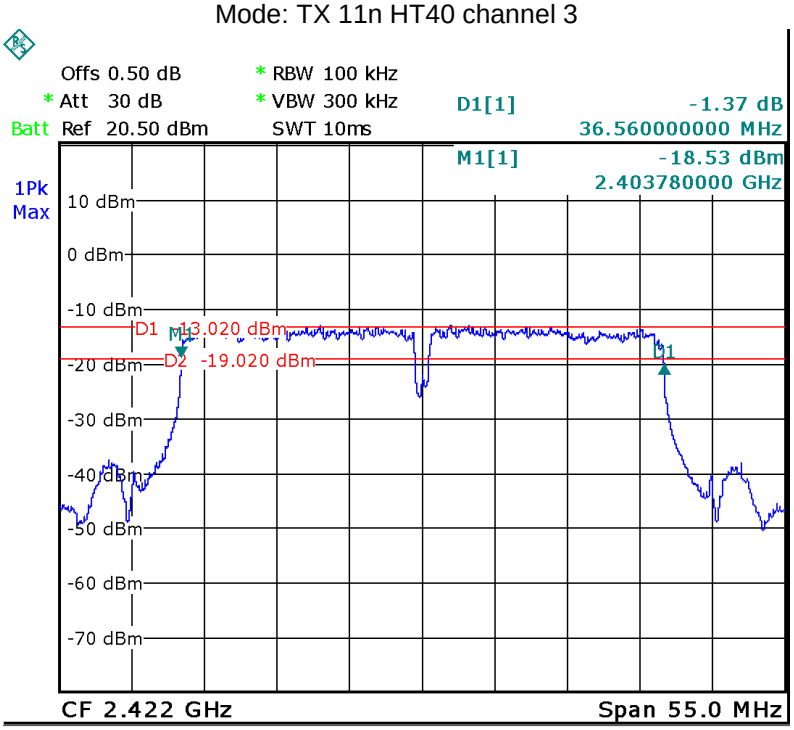
Mode: TX 11n HT20 channel 6



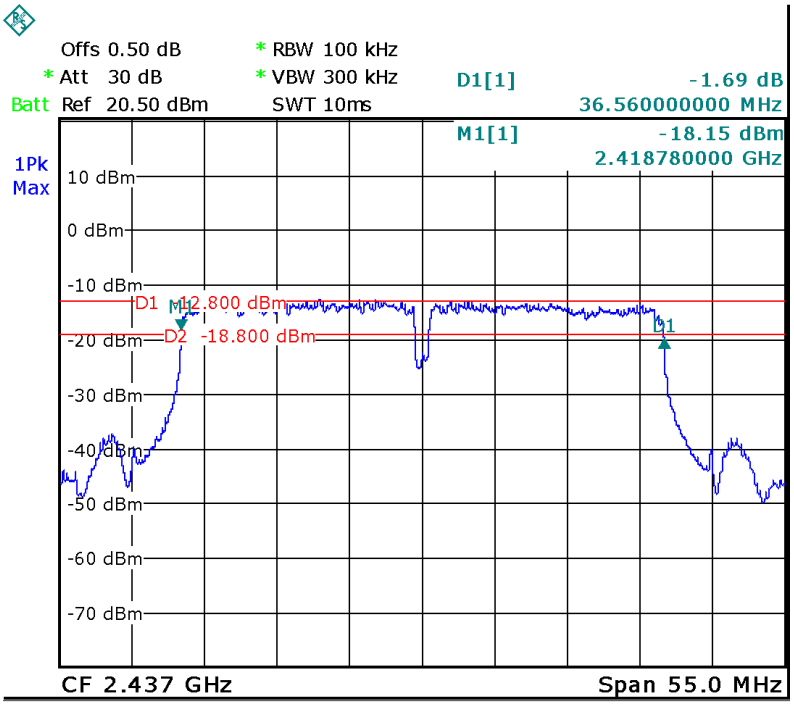
Mode: TX 11n HT20 channel 11



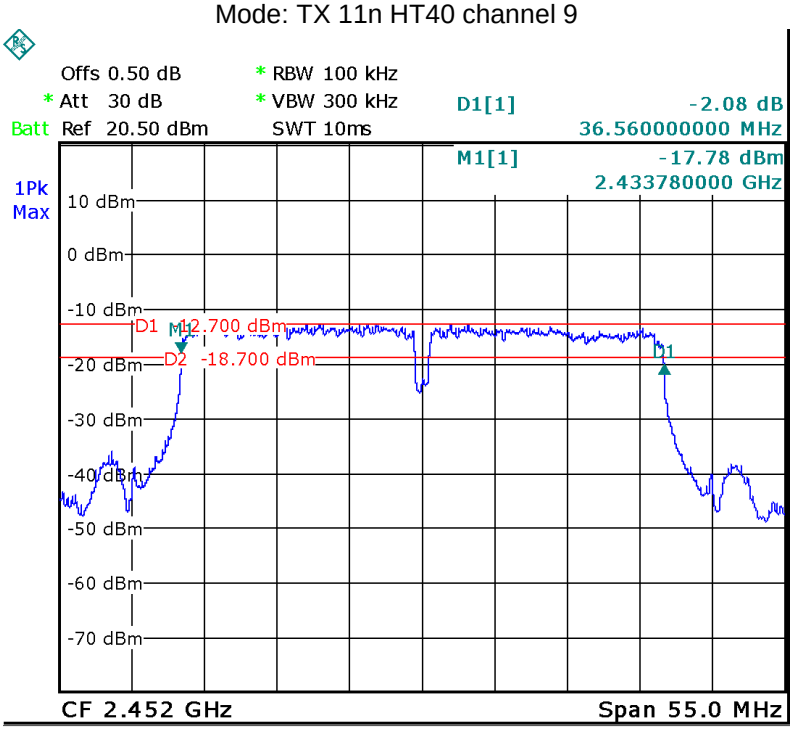
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



10 Maximum Peak Output Power

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance v03r03

10.1 Test Procedure:

KDB558074 D01 v03r03

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:

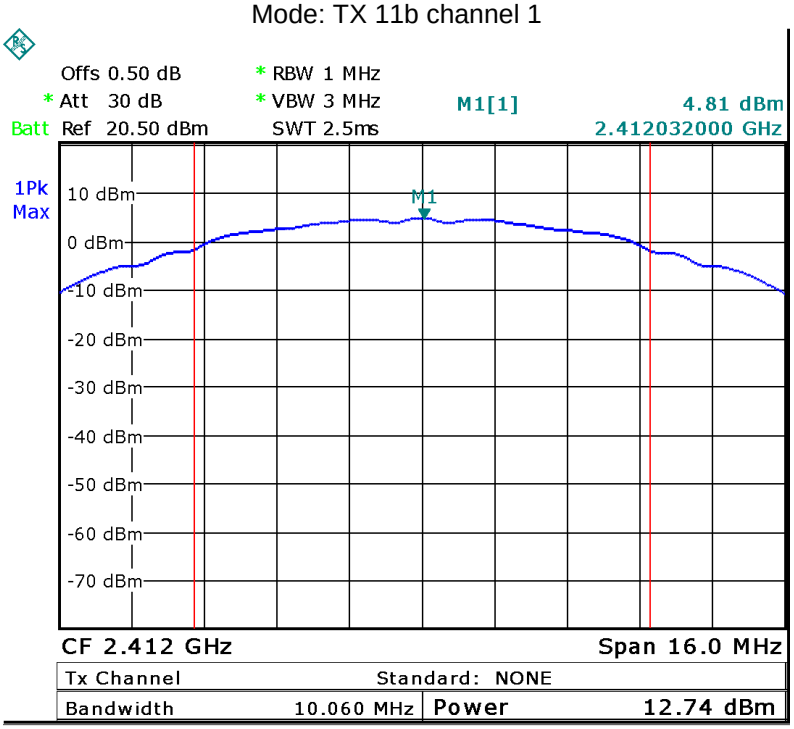
Test mode :TX 11b		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
12.74	12.71	12.79
Limit: 1W/30dBm		

Test mode :TX 11g		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
12.67	12.71	12.79
Limit: 1W/30dBm		

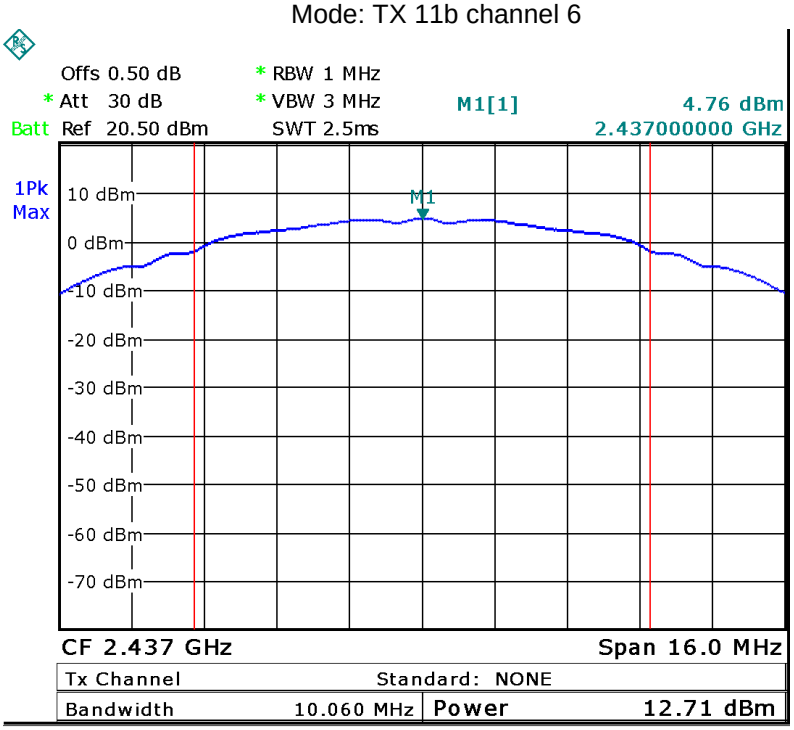
Test mode :TX 11n HT20		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
12.77	12.77	12.71
Limit: 1W/30dBm		

Test mode : TX 11n HT40		
10 Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
12.65	12.77	12.75
Limit: 1W/30dBm		

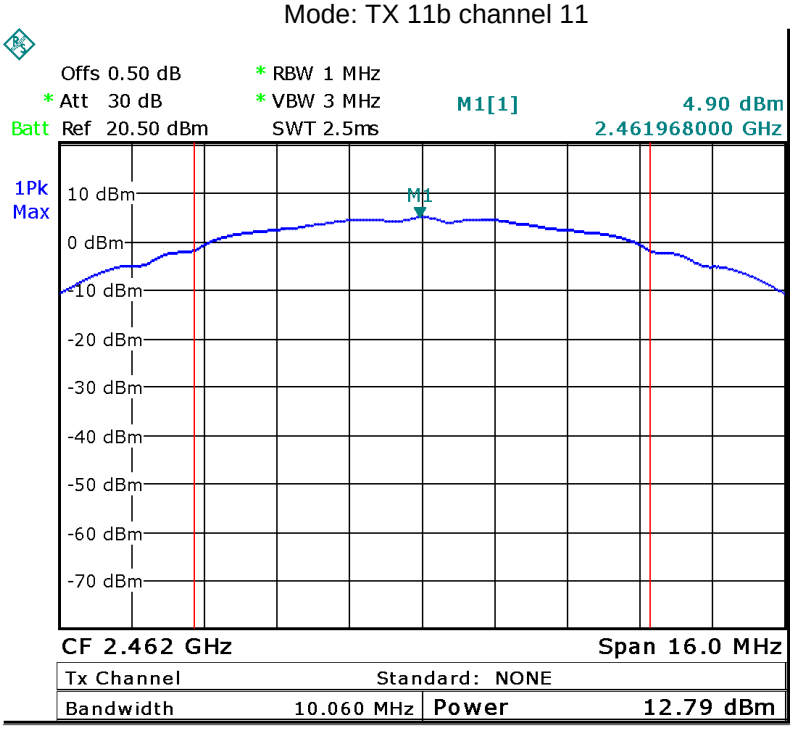
Mode: TX 11b channel 1



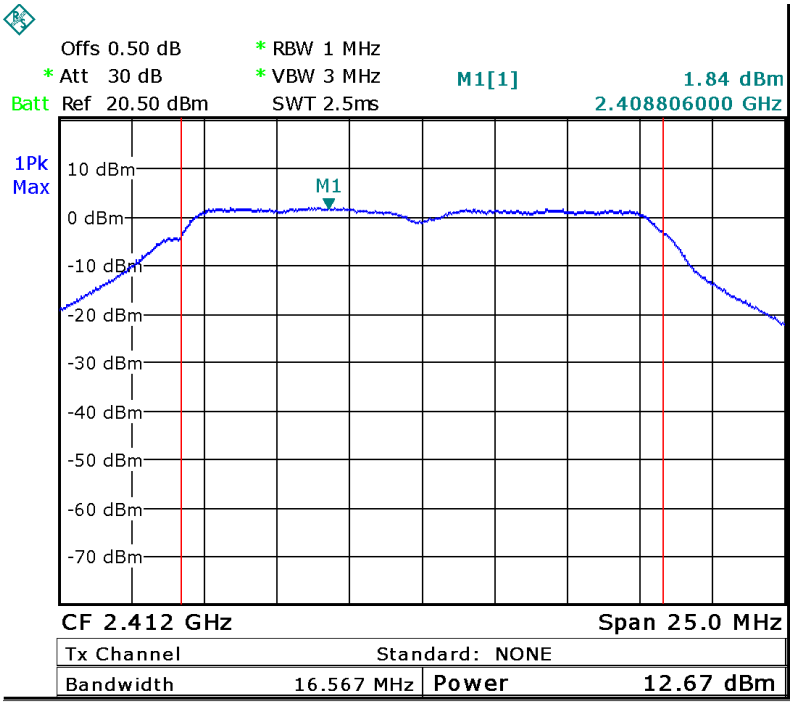
Mode: TX 11b channel 6



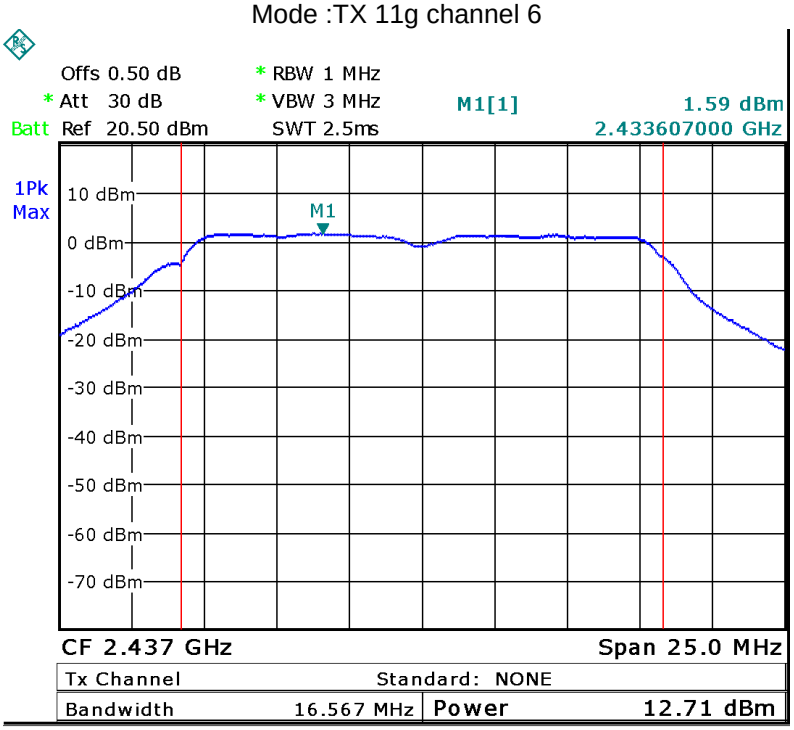
Mode: TX 11b channel 11



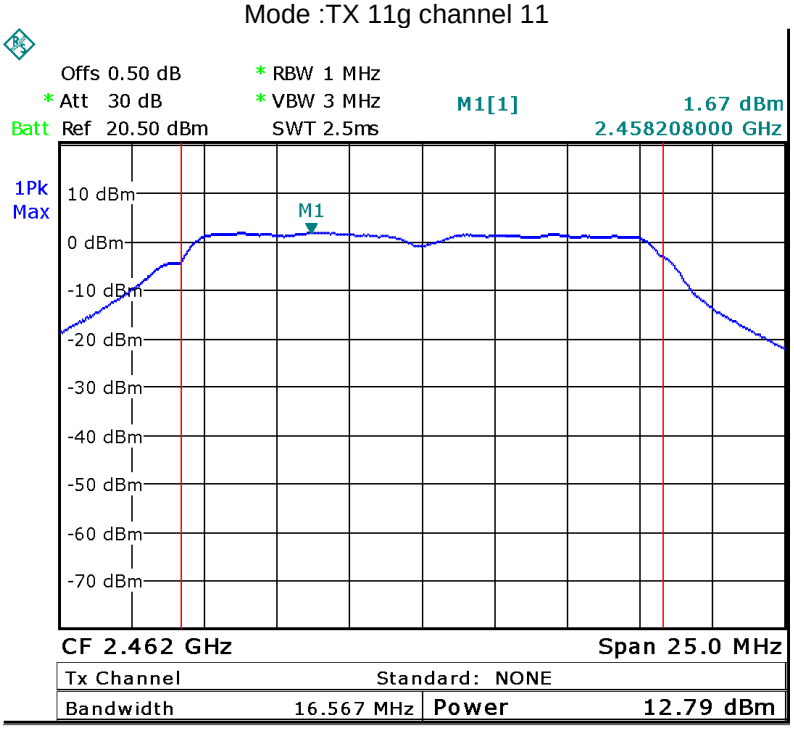
Mode :TX 11g channel 1



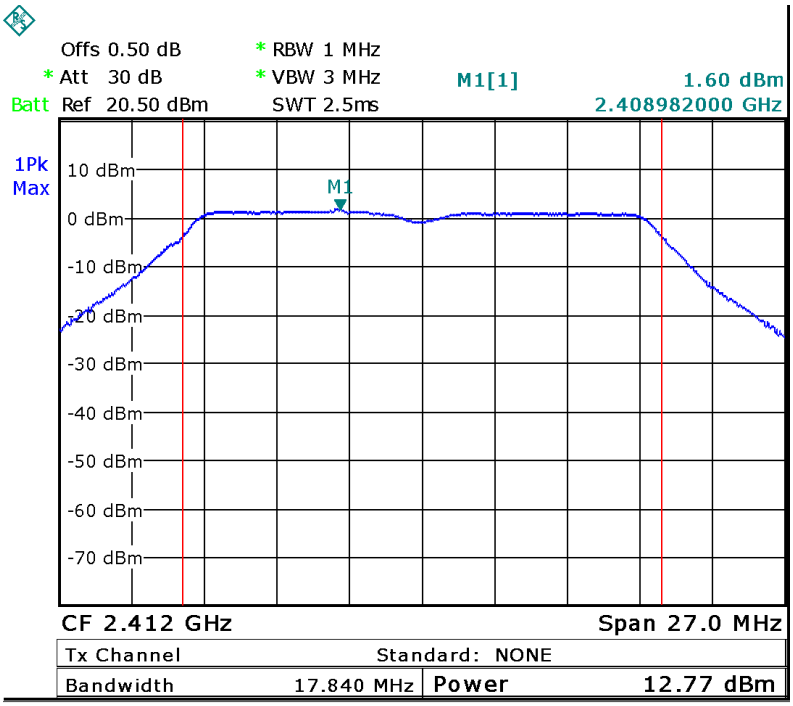
Mode :TX 11g channel 6



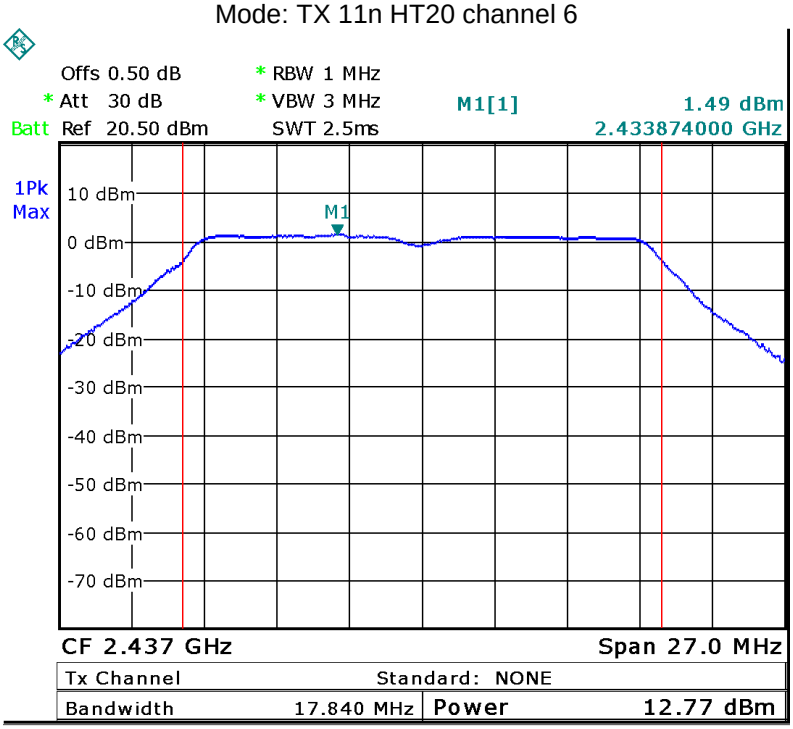
Mode :TX 11g channel 11



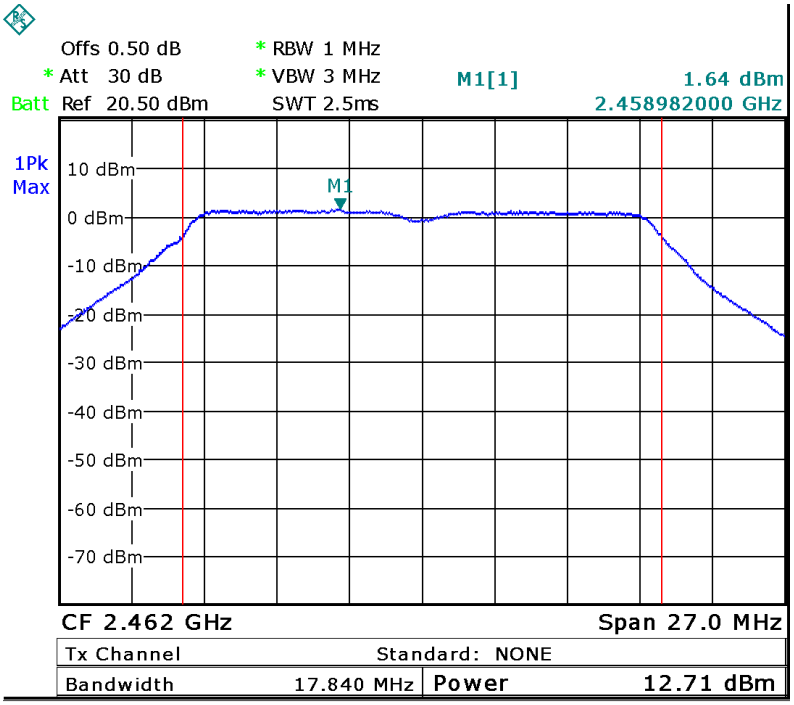
Mode: TX 11n HT20 channel 1



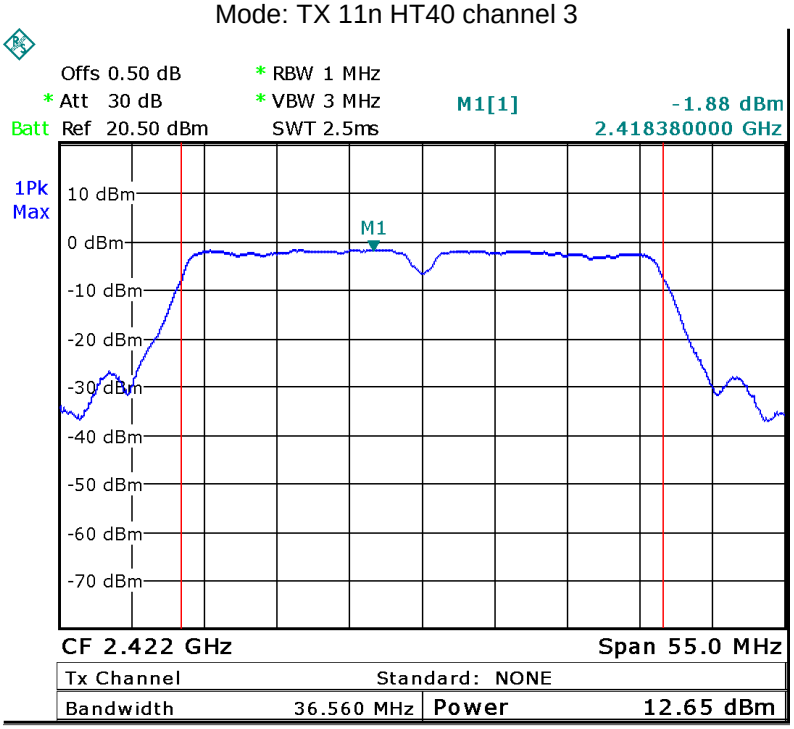
Mode: TX 11n HT20 channel 6



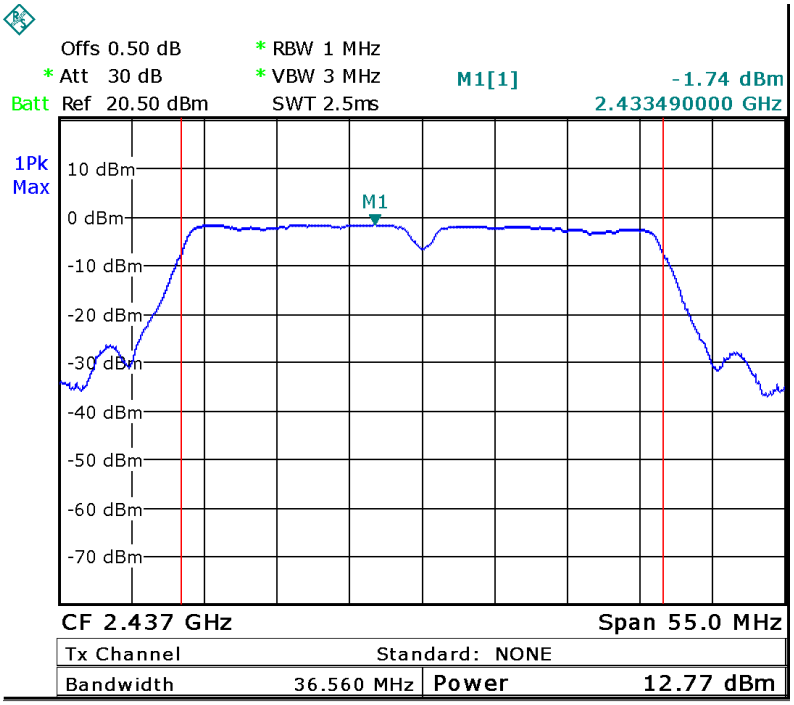
Mode: TX 11n HT20 channel 11



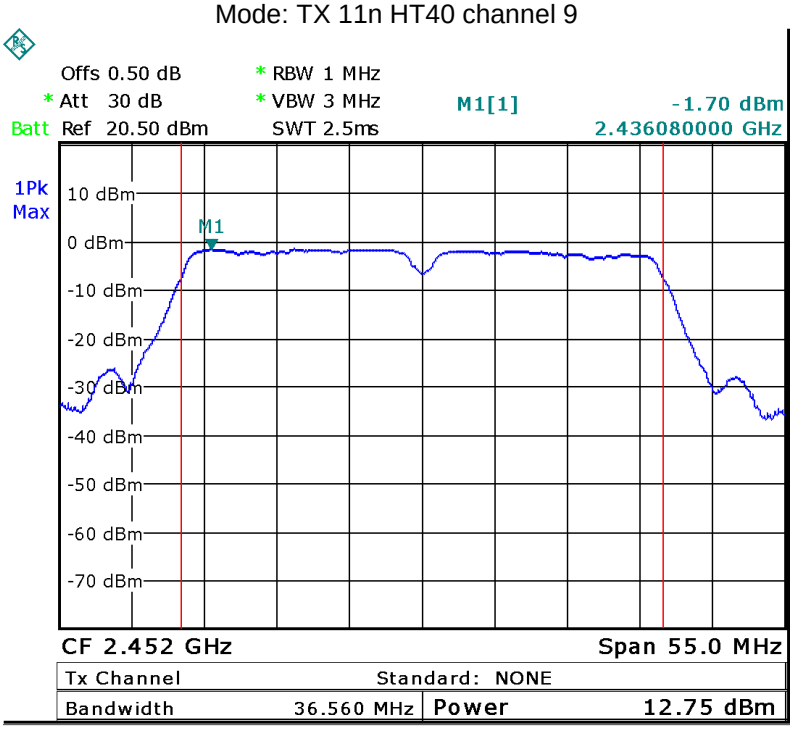
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: 558074 D01 DTS Meas Guidance v03r03

11.1 Test Procedure:

KDB558074 D01 v03r01 04/09/2013 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:

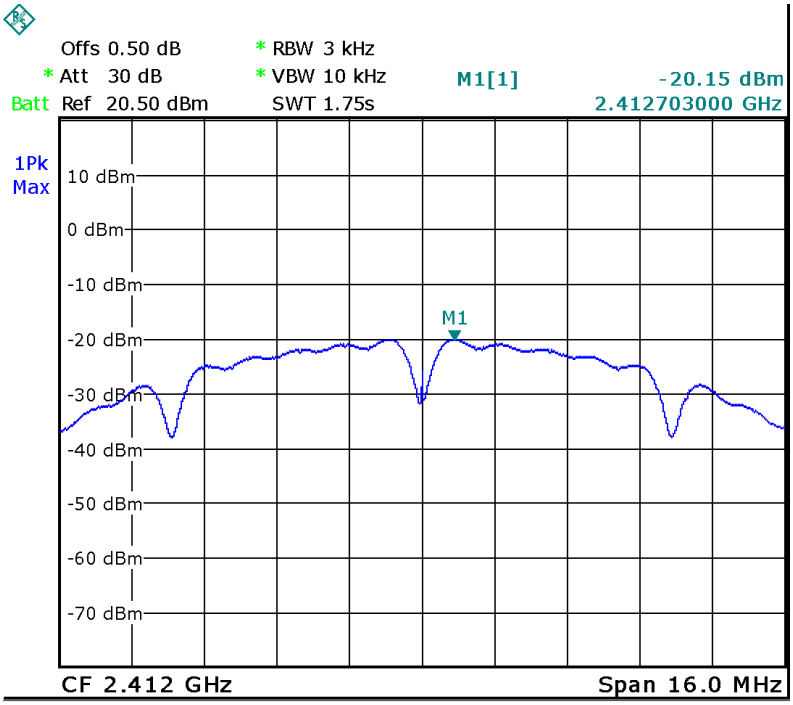
Test mode :TX 11b		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-20.15	-20.85	-20.29
Limit: 8dBm per 3kHz		

Test mode :TX 11g		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-23.94	-24.21	-24.25
Limit: 8dBm per 3kHz		

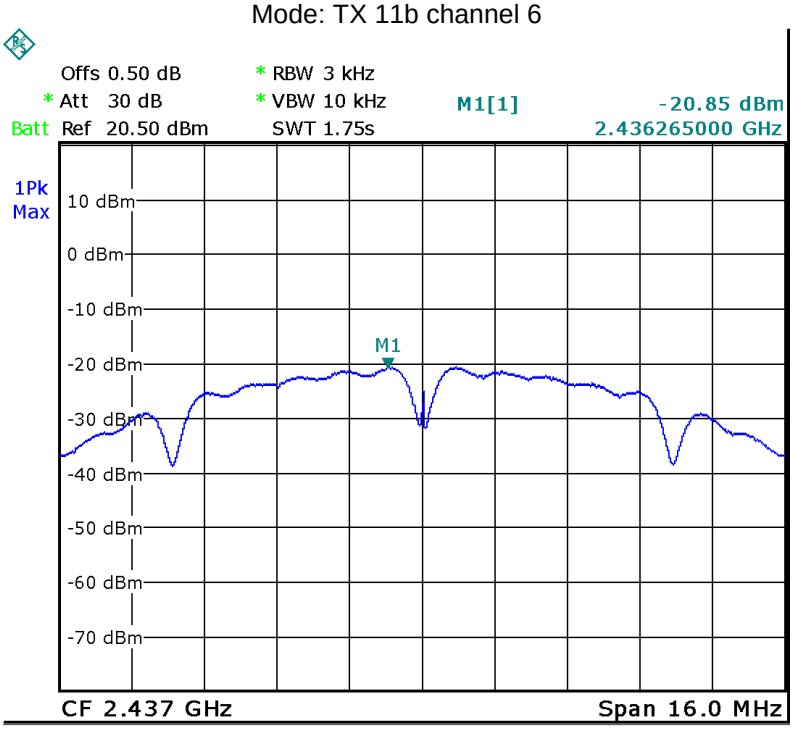
Test mode :TX 11n HT20		
Power Spectral (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-23.12	-23.62	-23.81
Limit: 8dBm per 3kHz		

Test mode : TX 11n HT40		
Power Spectral (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-23.57	-25.24	-23.44
Limit: 8dBm per 3kHz		

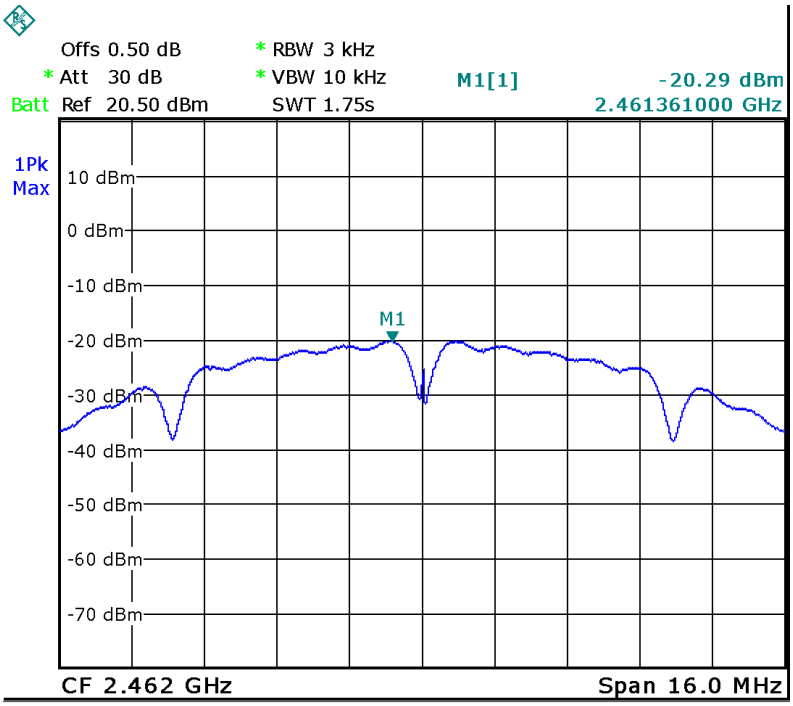
Mode: TX 11b channel 1



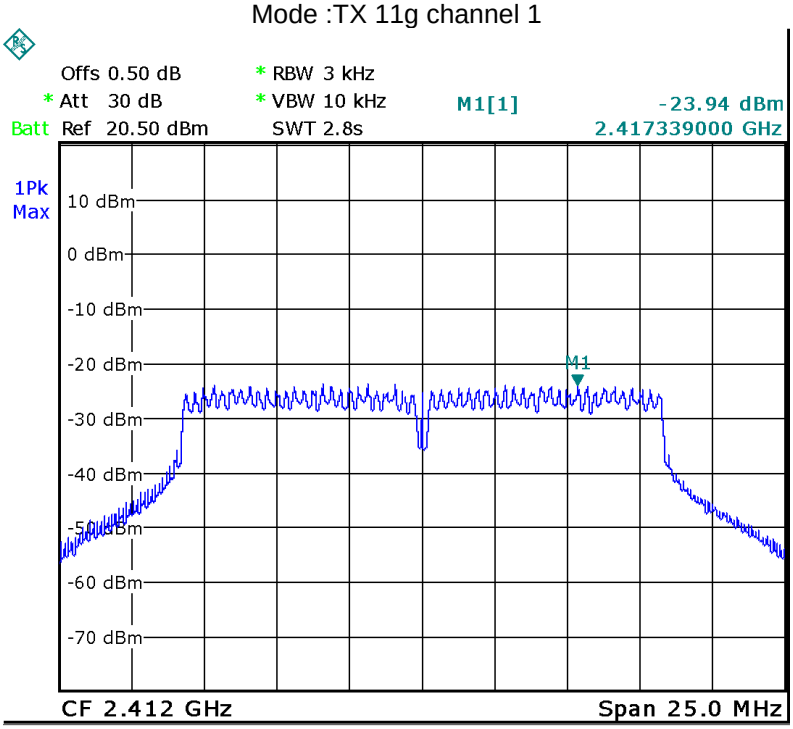
Mode: TX 11b channel 6



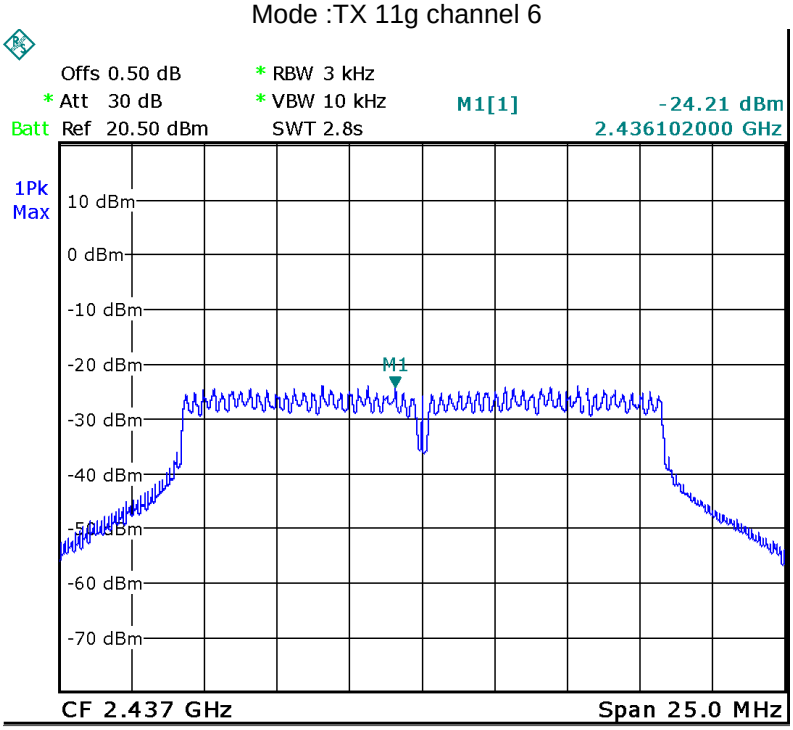
Mode: TX 11b channel 11



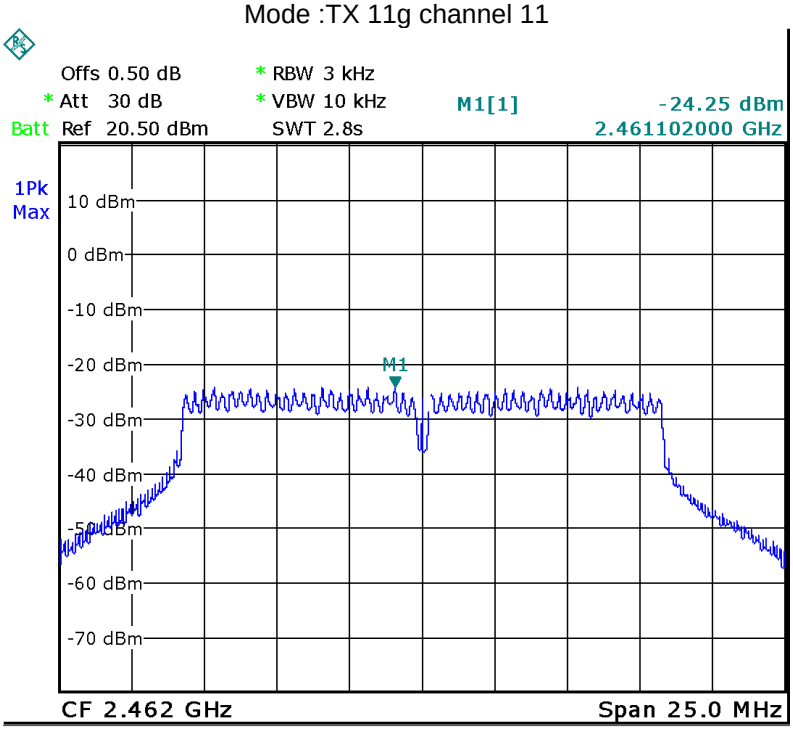
Mode :TX 11g channel 1



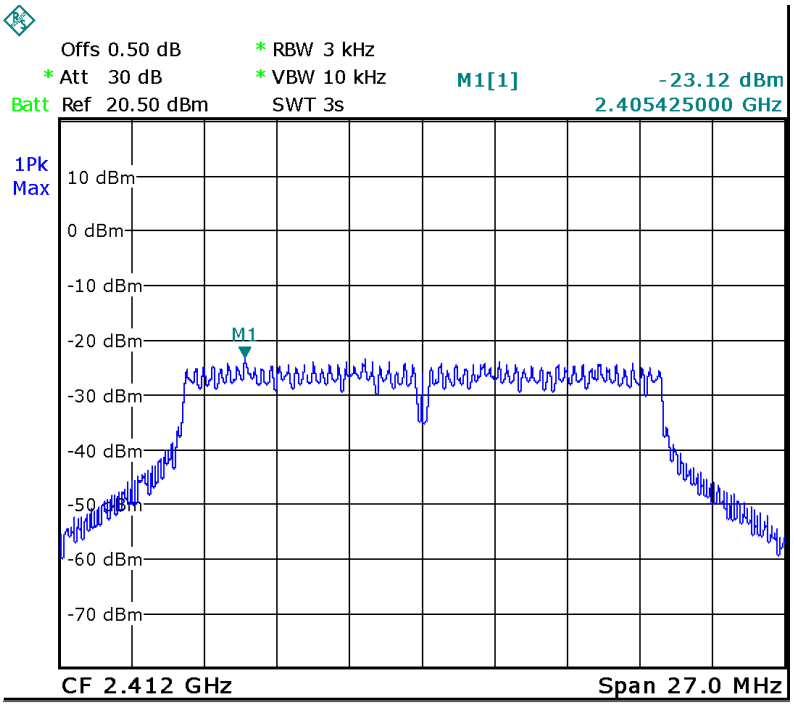
Mode :TX 11g channel 6



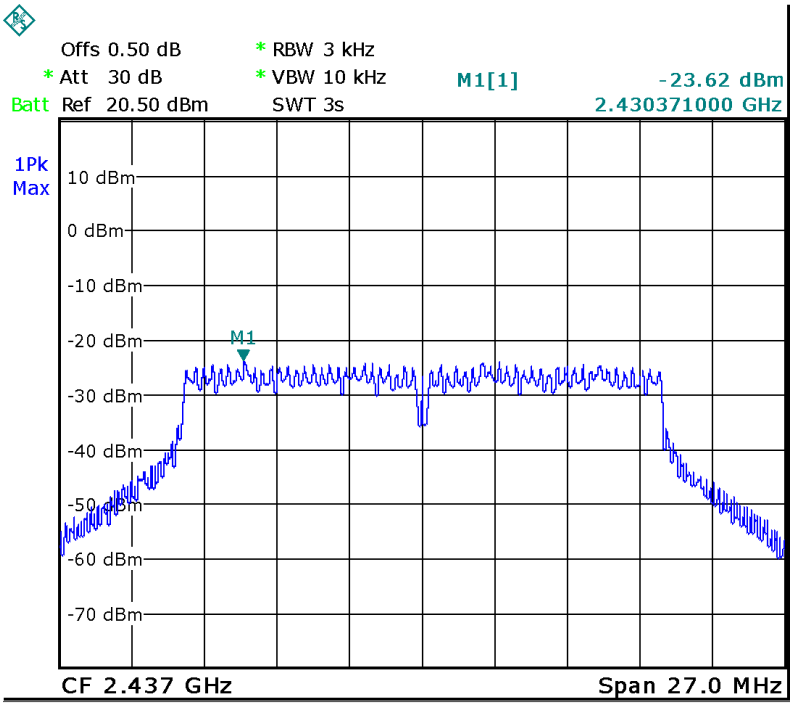
Mode :TX 11g channel 11



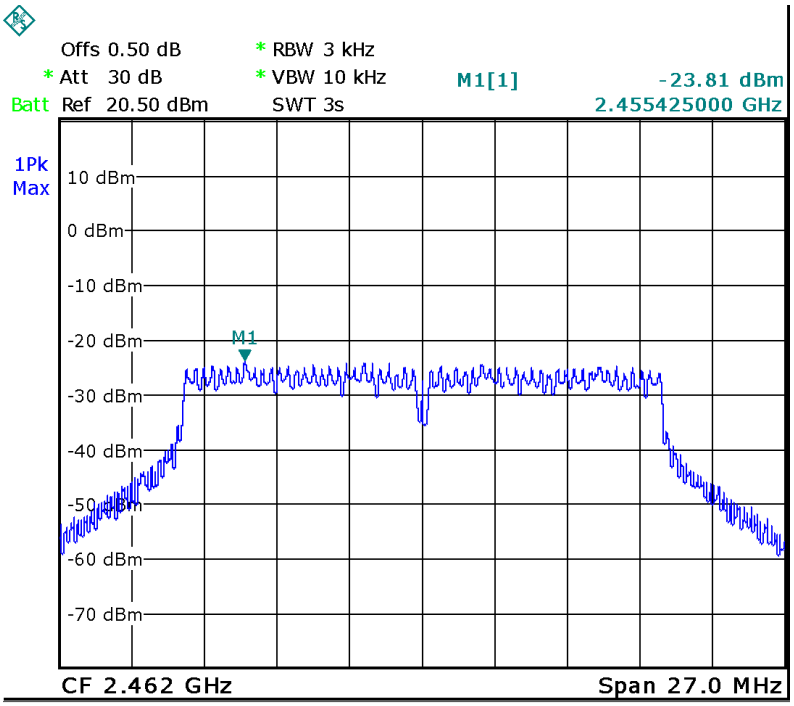
Mode: TX 11n HT20 channel 1



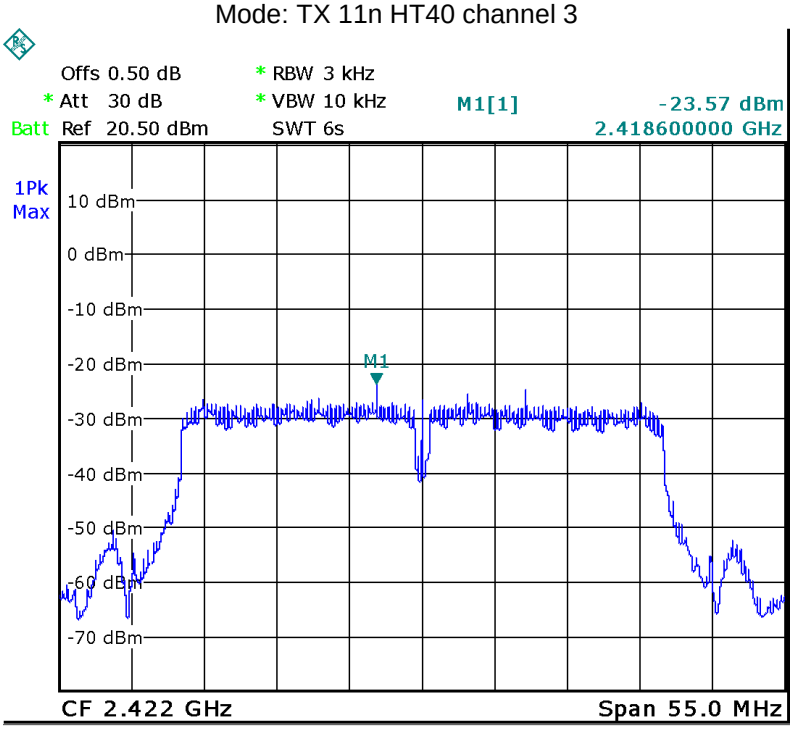
Mode: TX 11n HT20 channel 6



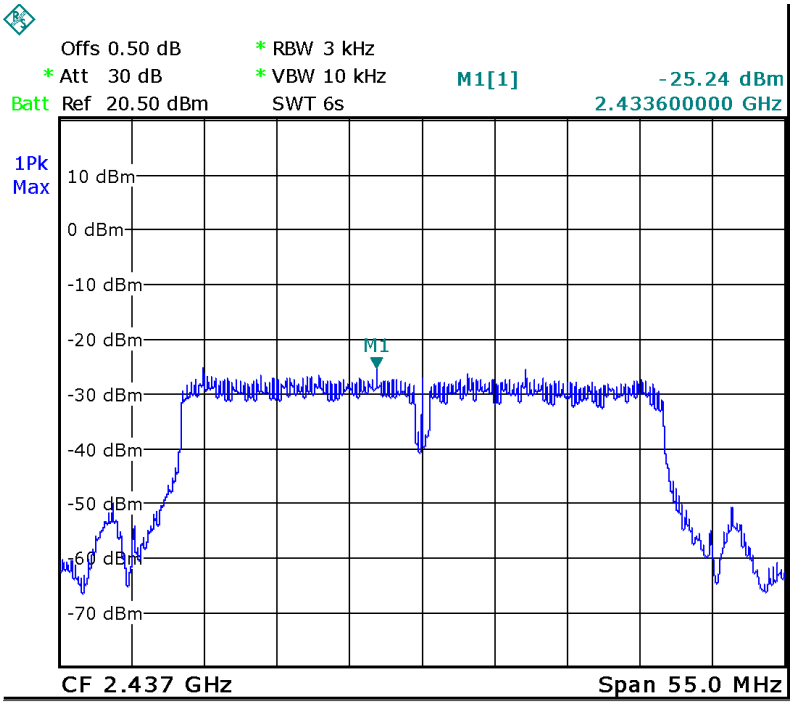
Mode: TX 11n HT20 channel 11



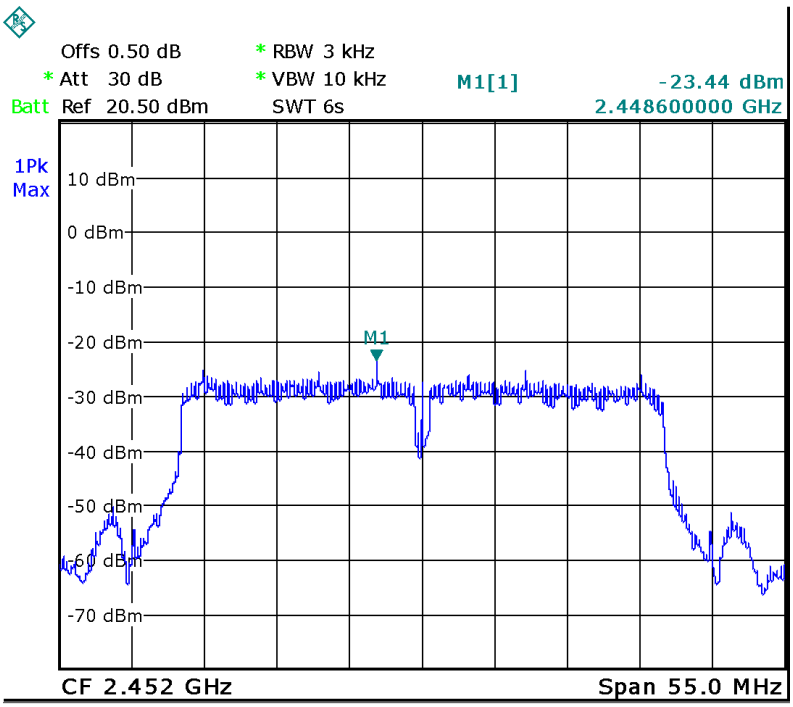
Mode: TX 11n HT40 channel 3



Mode: TX 11n HT40 channel 6



Mode: TX 11n HT40 channel 9



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 a PCB antenna fulfill the requirement of this section.

13 RF Exposure

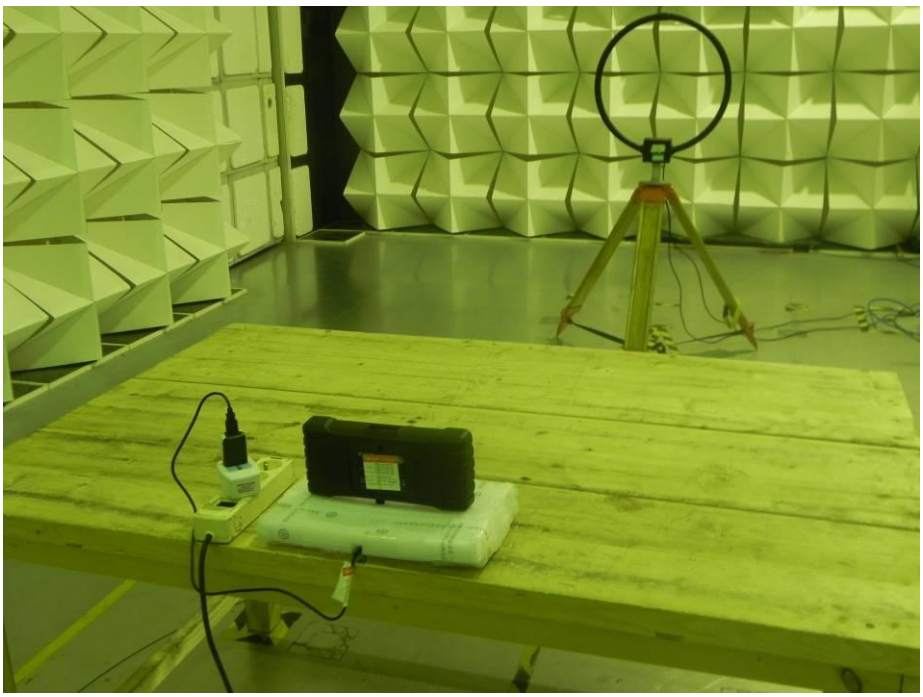
Remark: refer to SAR test report: WTS15S1036113-2E.

14 Photographs – Model T4H Test Setup

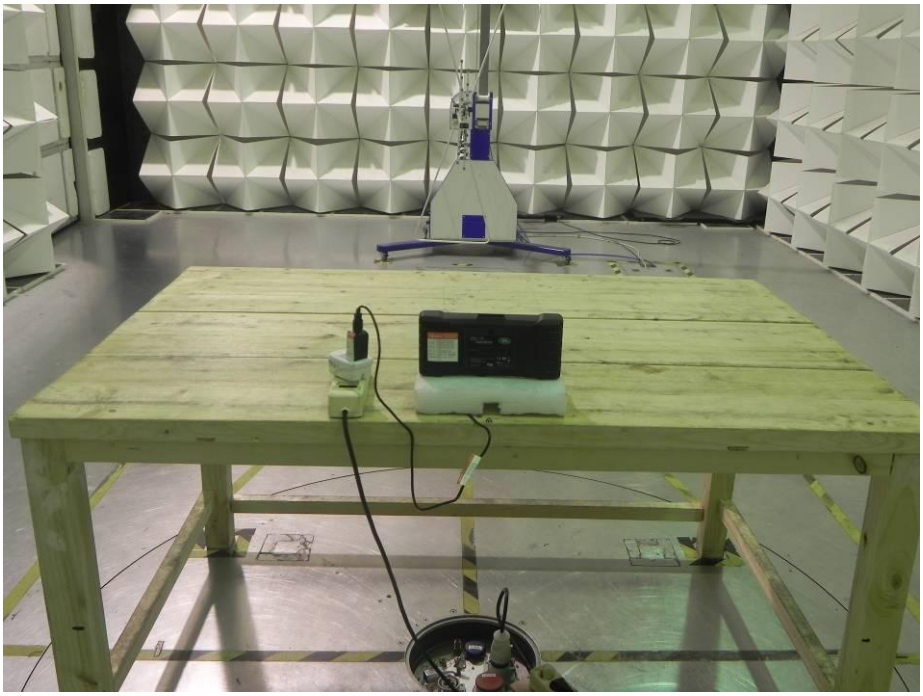
14.1 Conducted Emission at Test Site 1#

14.2 Radiated Emission

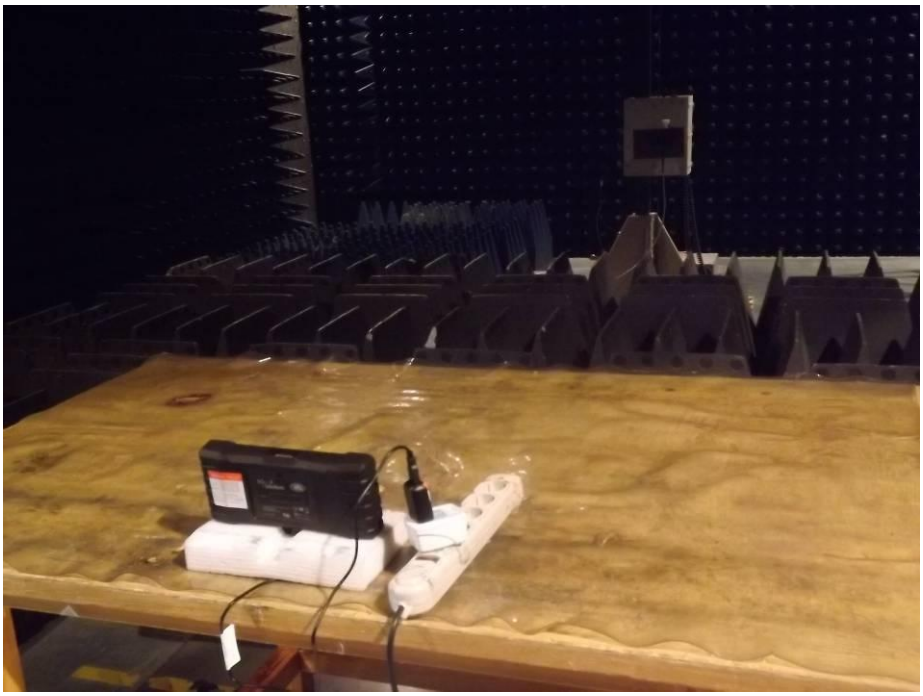
Test frequency 32.768 kHz ~30MHz at Test Site 2#



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

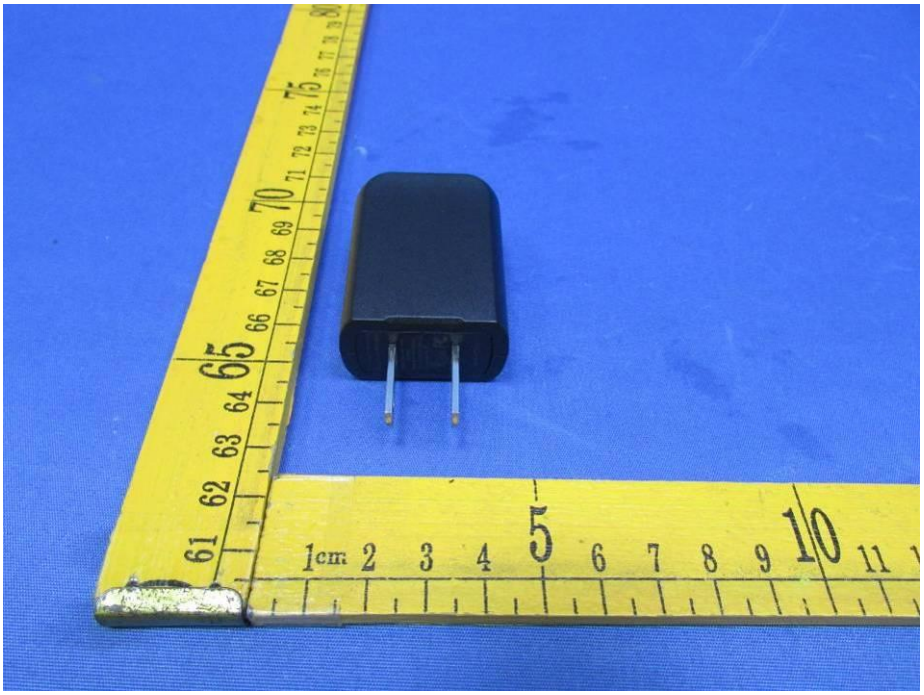


Test frequency above 1GHz at Test Site 1#



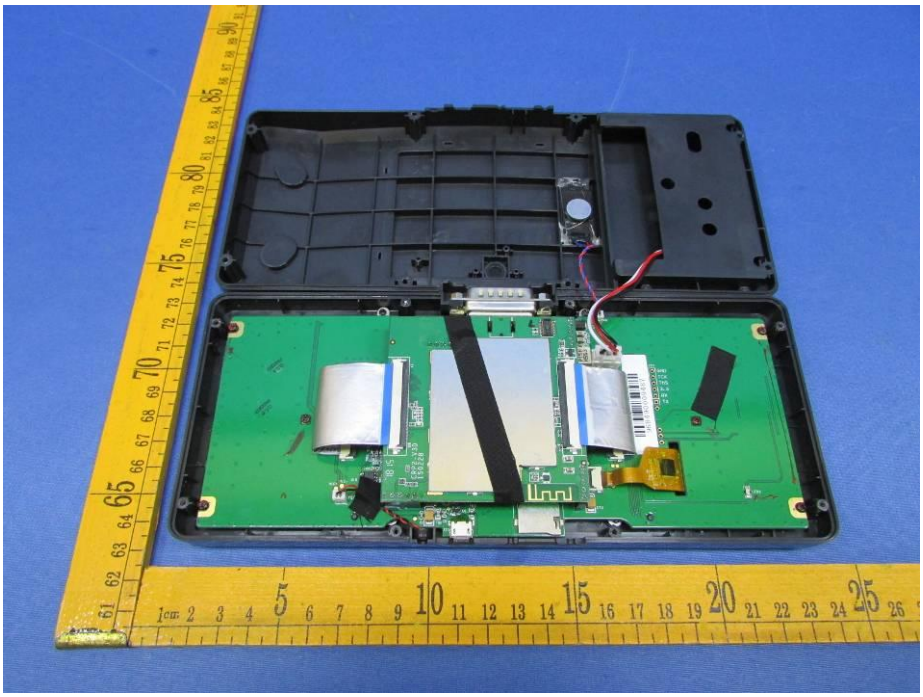
15 Photographs - Constructional Details

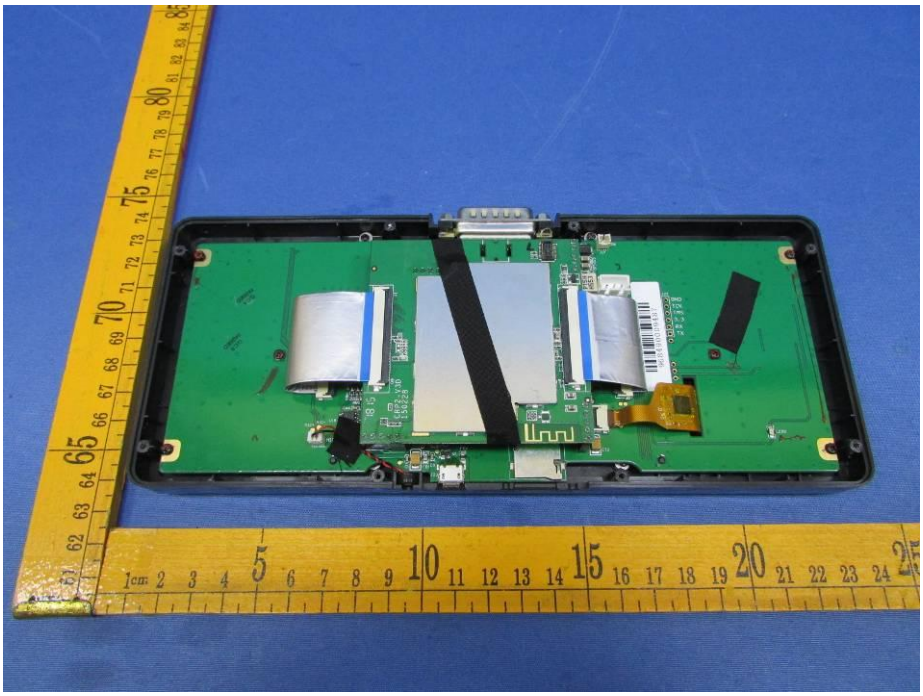
15.1 Model T4H–External Photos

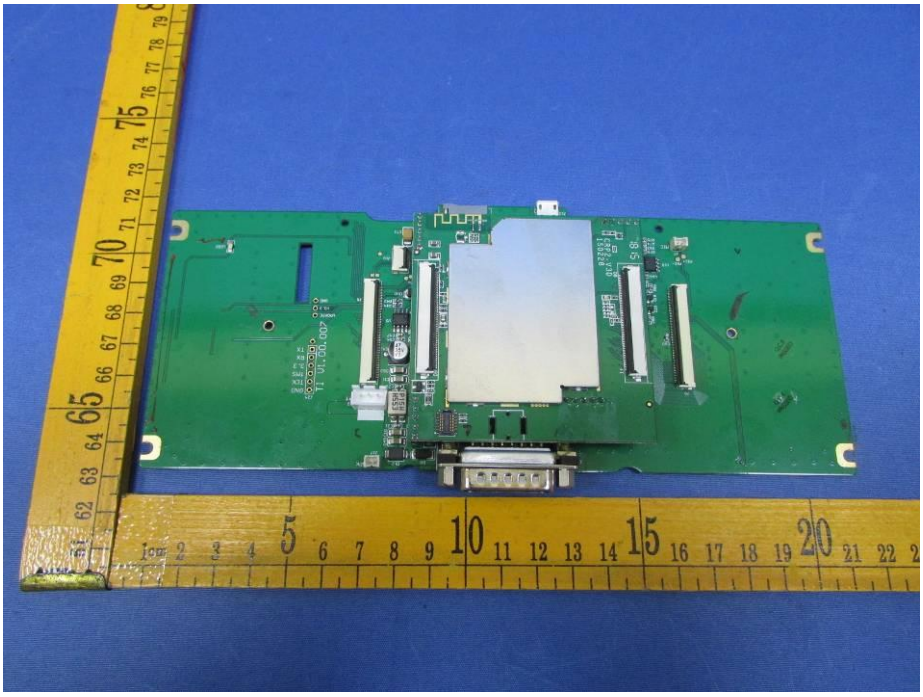


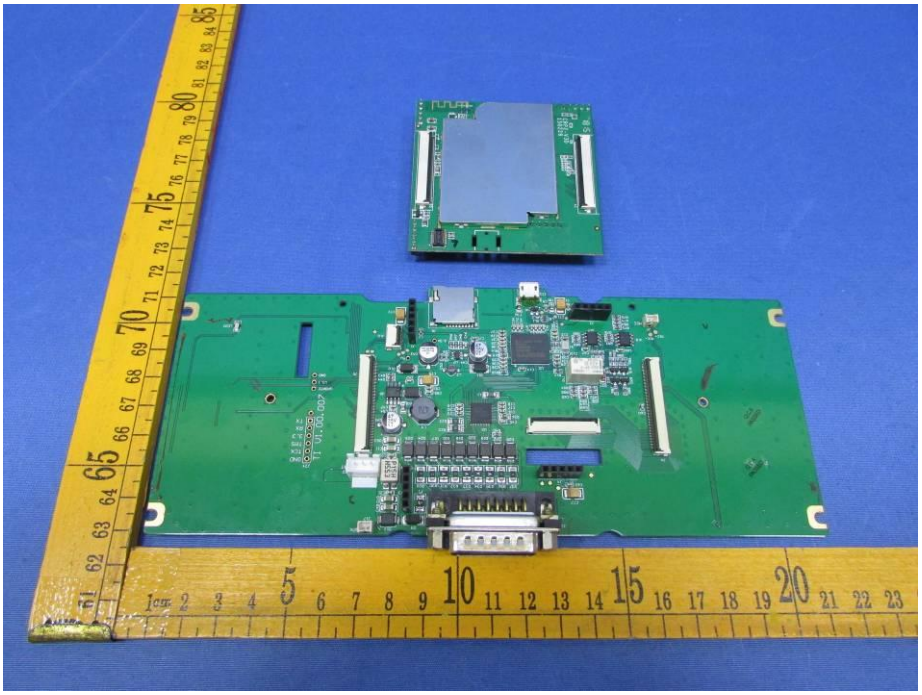
Date code: 1415
Made in China

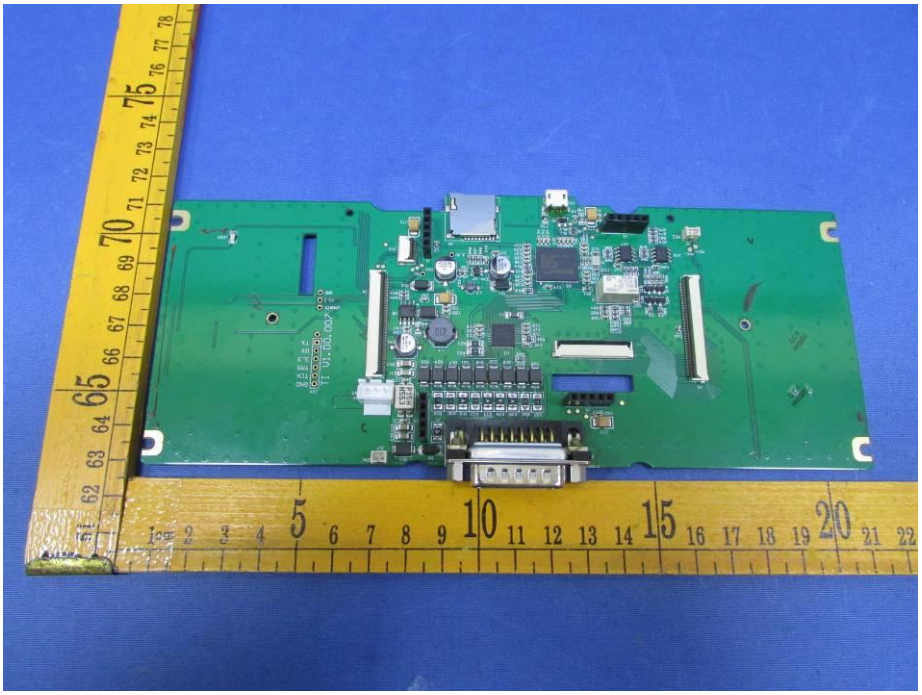
15.2 Model T4H– Internal Photos

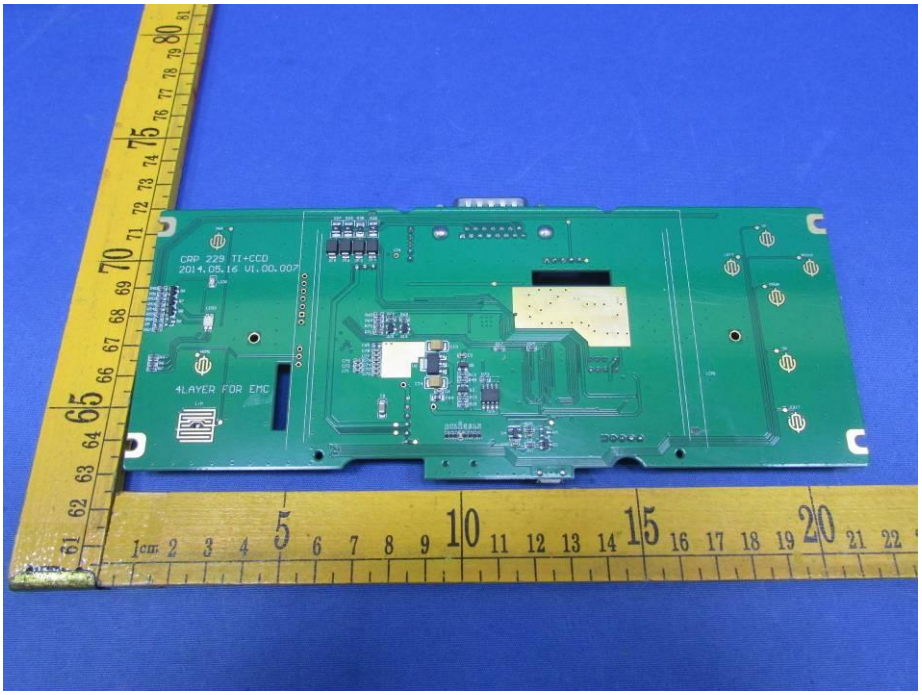


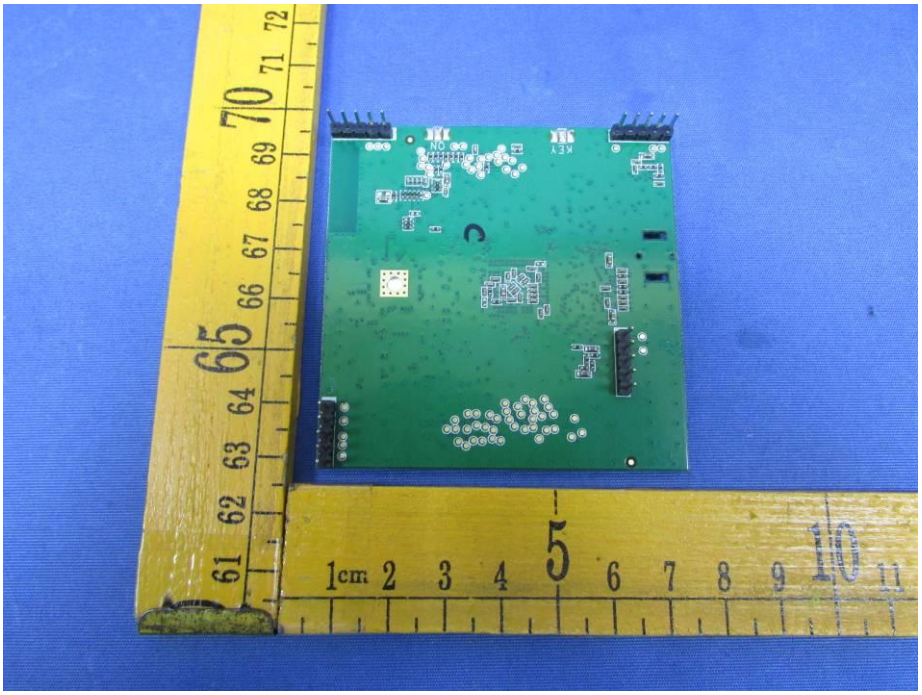


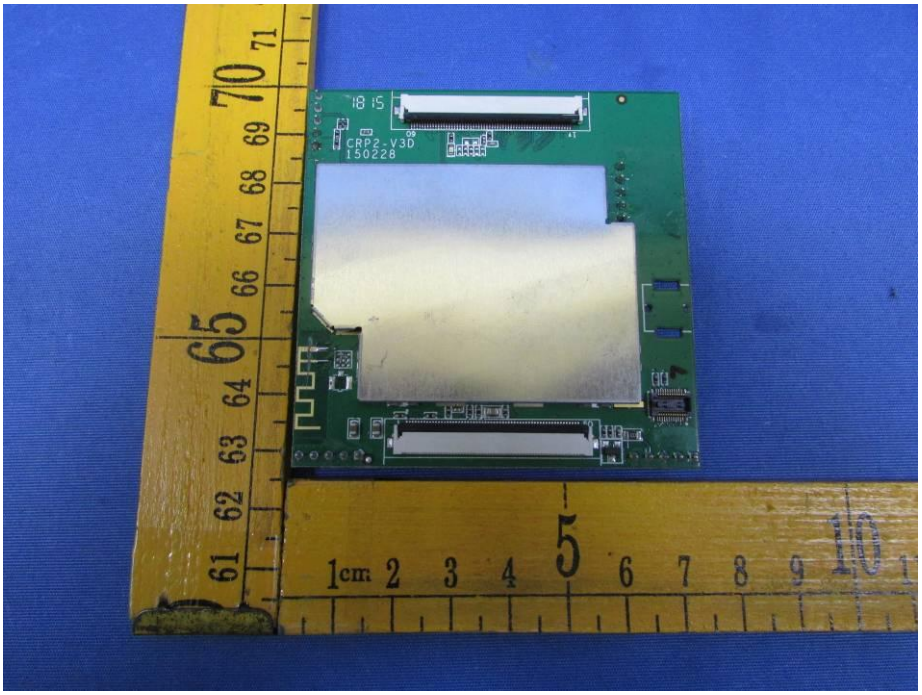


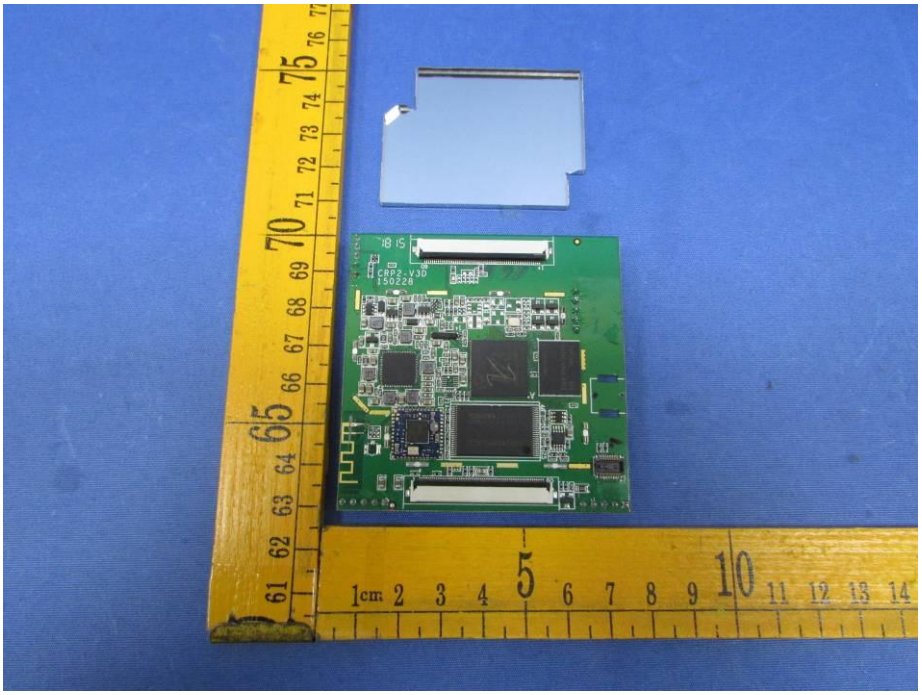


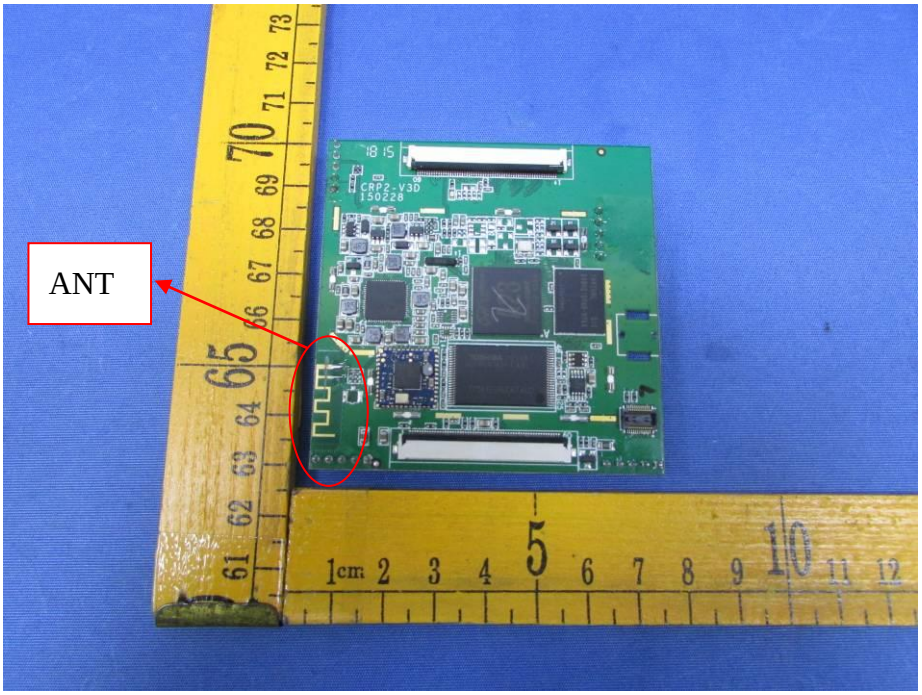



CRP 229 TI+CCD
2014.05.16 V1.00.007
4LAYER FOR EMC




CRP2-V3D
I50228

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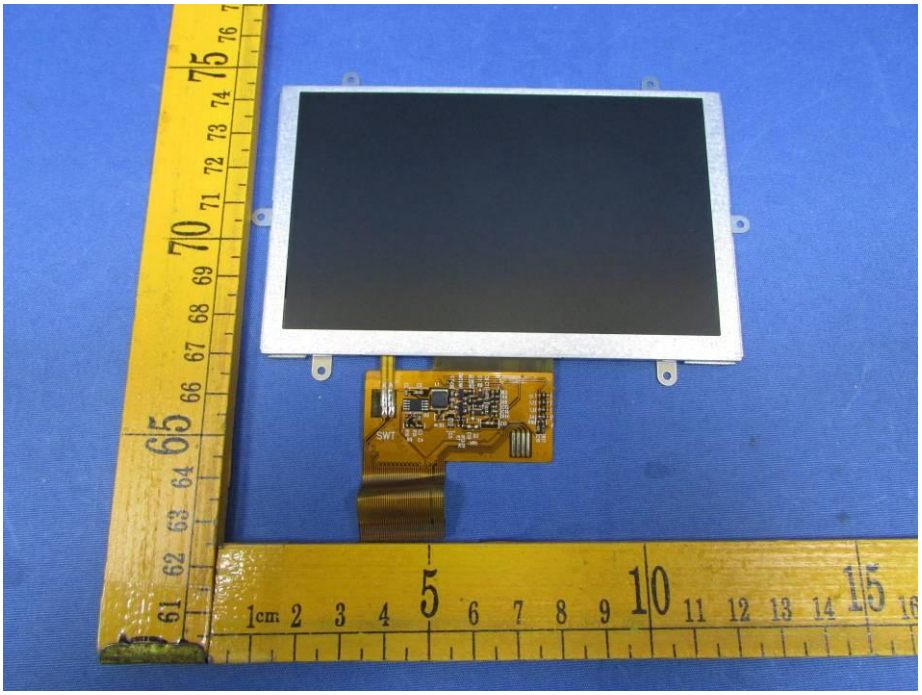

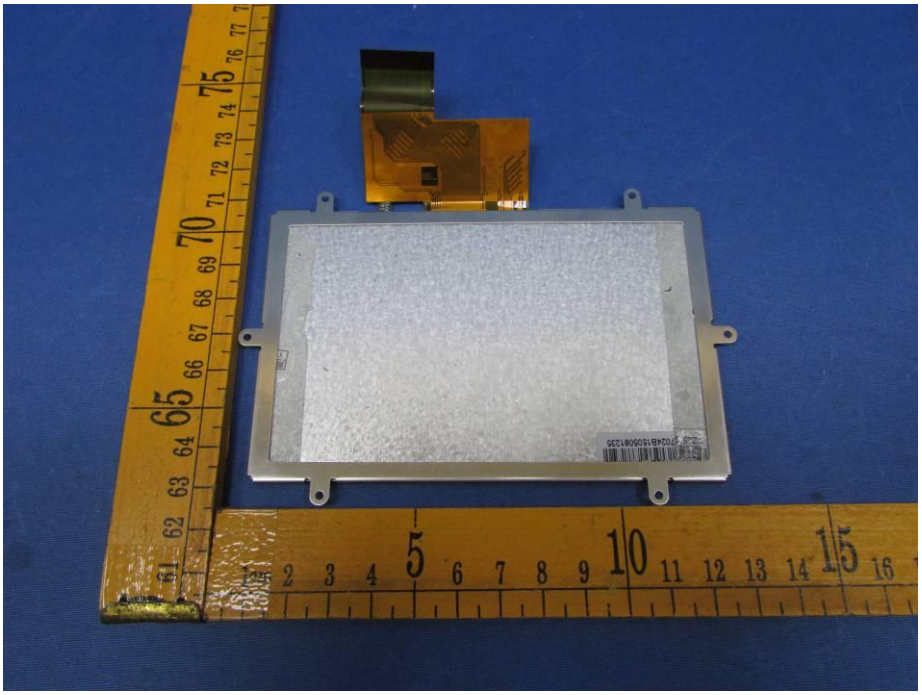

======End of Report======