

FCC TEST REPORT

FCC ID : RHNGF22
Applicant : Guangxi Weitong Automobile Information Technology Co., Ltd
Address : China-ASEAN Enterprise Headquarters Basephase II, Nanning, Guangxi, China
Manufacturer : Guangxi Weitong Automobile Information Technology Co., Ltd
Address : China-ASEAN Enterprise Headquarters Basephase II Nanning, China

Equipment Under Test (EUT) :

Product Name : MID
Model No. : GF22
Rules : FCC CFR47 Part 15 C Section 15.247:2012

Date of Test : September 25~26, 2013
Date of Issue : October 10, 2013
Test Result : PASS*

Remark:

* The sample detailed above has been tested to the requirements of FCC rules mentioned above.

The test results have been reviewed against the directives above and found to meet their essential requirements.

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.

PERPARED BY:

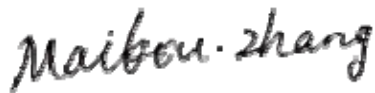
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2 Test Summary

Test Items	Test Requirement	Result
Radiated Emissions	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
Emissions from out of band	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	: MID
Model No.	: GF22
Model Difference	: N/A
Operation Frequency	: 2412MHz ~ 2462MHz
Antenna Gain	: 0dBi
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.)
Note	: All the modulation modes were tested, all the test data deeply conform to the rules and the data of the worst mode are recorded in the following pages.

4.2 Details of E.U.T.

Technical Data	: (1)Internal Li-ion Battery: DC 3.7V, 3500mAh (2)DC 5.0V, 2A powered from adapter (Adapter Input: AC 100-240V, 50/60Hz, 0.3A Max.)
Adapter	: Manufacturer: Winna, M/N: YN12W0500200UU

4.3 Test Mode

Table 1 Tests Carried Out Under FCC part 15.247

Test Items	Test 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	72 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	72 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
6 dB Bandwidth	802.11b	11 Mbps	1/11	TX
	802.11g	54 Mbps	1/11	TX
	802.11n HT20	72 Mbps	1/11	TX
	802.11n HT40	150 Mbps	3/9	TX
Band Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	72 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX
Transmitter Spurious Emissions	802.11b	11 Mbps	1/6/11	TX
	802.11g	54 Mbps	1/6/11	TX
	802.11n HT20	72 Mbps	1/6/11	TX
	802.11n HT40	150 Mbps	3/6/9	TX

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

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

Test Item	Test Mode
Radiation Emission, 30MHz ~ 1GHz	Wifi linking
Conduction Emission, 0.15MHz to 30MHz	Wifi linking

4.4 Test Facility

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

- **IC – Registration No.: 7760A**

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, July 12, 2012.

- **FCC – 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, May 26, 2011.

4.5 Test Location

Waltek Services(Shenzhen) Co., Ltd. at 1/F, Fukangtai Building, West Baima Rd.,Songgang Street, Baoan District, Shenzhen, China

4.6 General condition

Ambient Condition: 25.5 °C 58 %RH

For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. For battery operated equipment, the equipment tests shall be performed using a new battery.

The follow condition is not applicable for adapter:

Test Voltage	Input voltage
Rated voltage-15%	AC V
normal	AC V
Rated voltage+15%	AC V

The follow condition is applicable.

Test voltage	Test Voltage
Rated voltage	DC 3.7V

5 Equipment Used during Test

5.1 Equipments List

Conducted Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	Spe.21,2013	Spe.20,2014
2.	LISN	R&S	ENV216	101215	Spe.21,2013	Spe.20,2014
3.	Cable	Top	TYPE16(3.5M)	-	Spe.21,2013	Spe.20,2014
3m Semi-anechoic Chamber for Radiation Emissions						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer	Agilent	E7405A	MY45114943	Spe.21,2013	Spe.20,2014
2.	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	Spe.21,2013	Spe.20,2014
3.	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	Spe.21,2013	Spe.20,2014
4.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	Spe.21,2013	Spe.20,2014
5.	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	399	Spe.21,2013	Spe.20,2014
6.	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	Spe.21,2013	Spe.20,2014
7.	Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-148	Spe.21,2013	Spe.20,2014
8.	Cable	Top	EWO2014-7	-	Spe.21,2013	Spe.20,2014
9.	Cable	Top	TYPE16(13M)	-	Spe.21,2013	Spe.20,2014
10.	DC POWER SUPPLY	LWDQGS	PS-303D	-	Spe.21,2013	Spe.20,2014
11.	Humidity Chamber	GTH-225-40-1P	IAA061213	-	Spe.21,2013	Spe.20,2014
12.	Spectrum Analyzer	ROHDE & SCHWARZ	FSL6	-	Spe.21,2013	Spe.20,2014

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)
	± 4.74 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:	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) Quasi-Peak & Average if maximised peak within 6dB of Average Limit

6.1 E.U.T. Operation

Operating Environment:

Temperature:	25.5 °C
Humidity:	50 % RH
Atmospheric Pressure:	1010 mbar

EUT Operation:

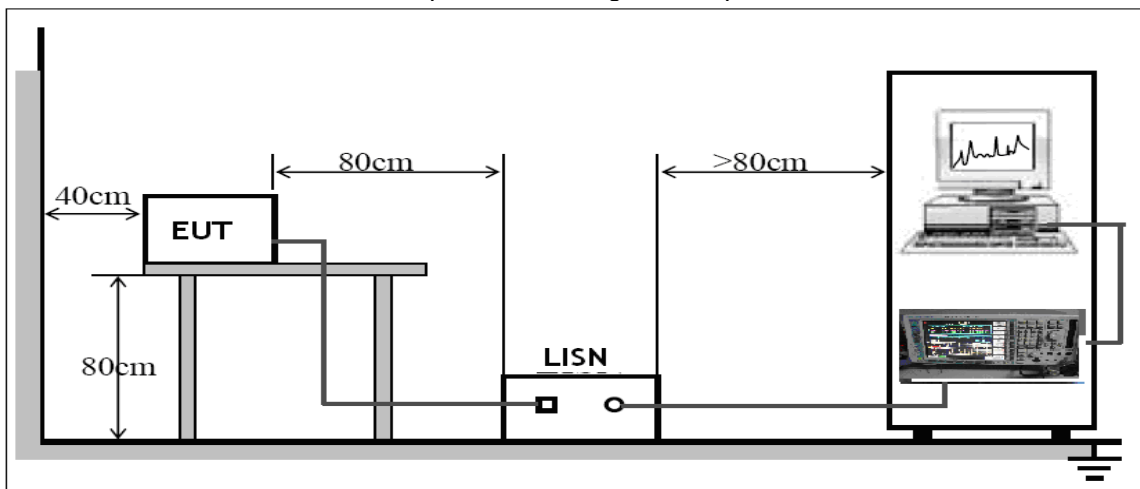
The pre-test was performed in wifi transmission mode, and the test data were shown as follow.

The EUT was tested according to ANSI C63.4:2003. The frequency spectrum from 150kHz to 30MHz was investigated.

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.

6.2 EUT Setup

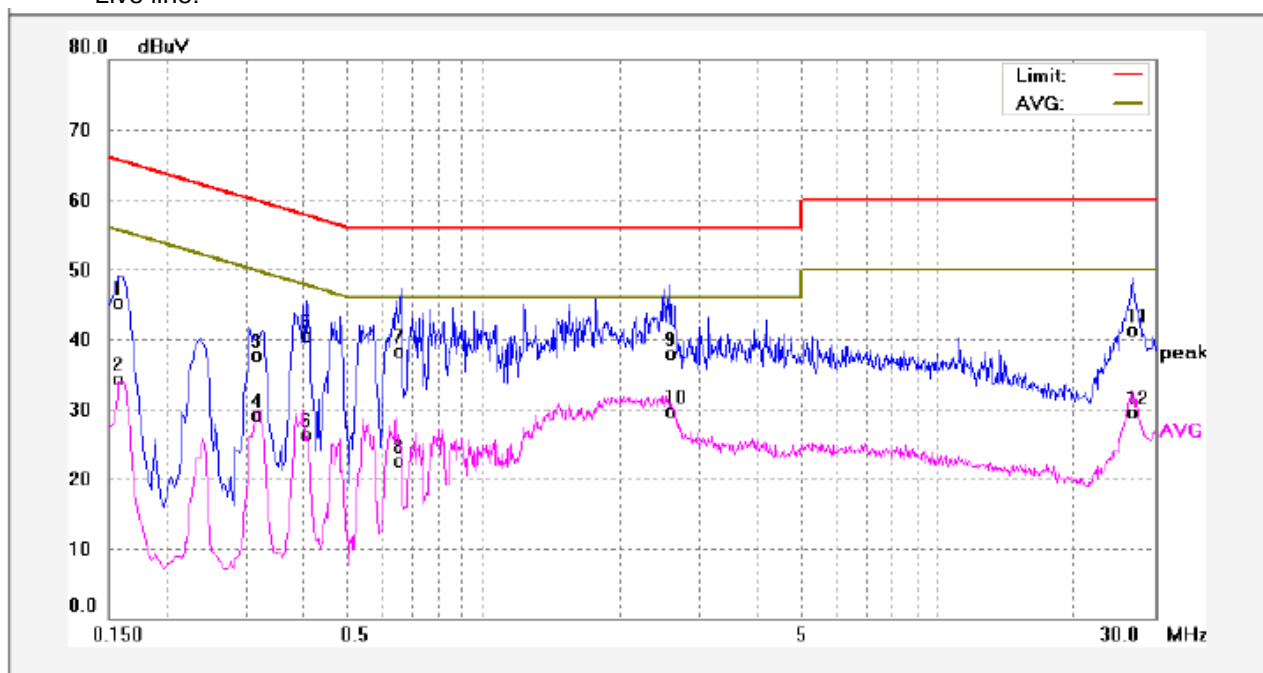
The conducted emission tests were performed using the setup accordance with the ANSI C63.4:2003.



6.3 Conducted Emission Test Result

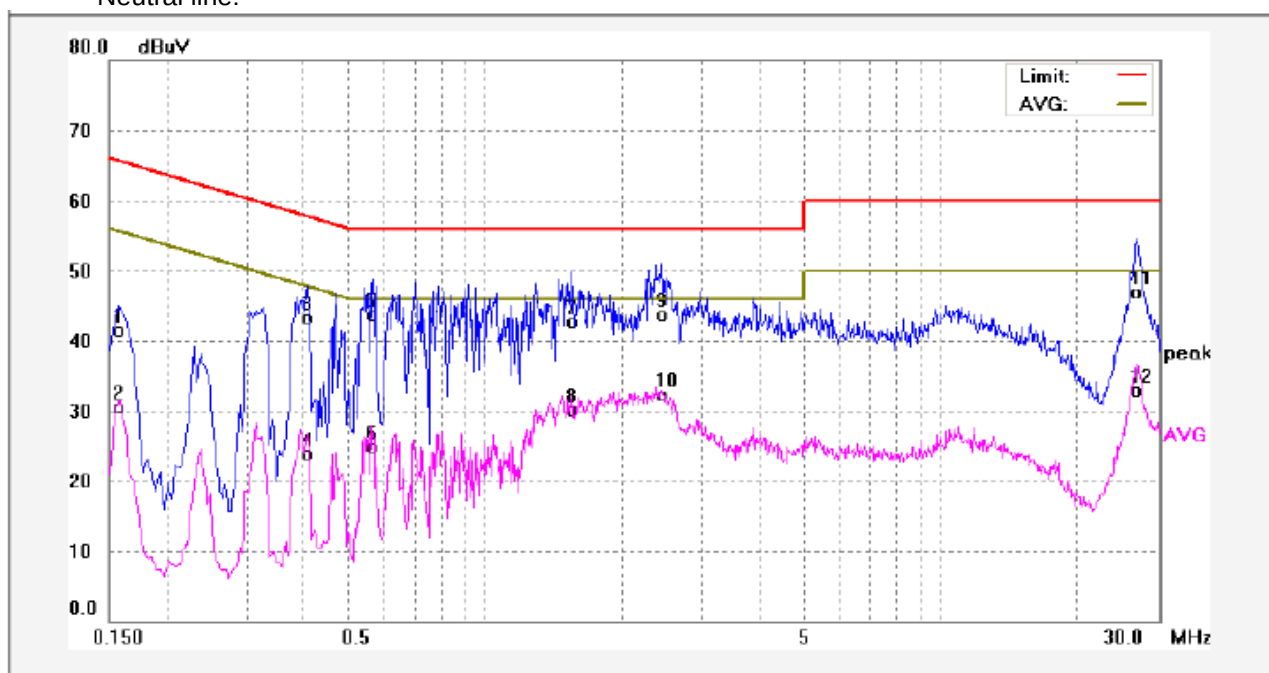
An initial pre-scan was performed on the live and neutral lines.

Live line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector	Remark
1	0.1580	35.52	9.81	45.33	65.56	-20.23	QP	
2	0.1580	24.51	9.81	34.32	55.56	-21.24	AVG	
3	0.3180	27.77	9.88	37.65	59.76	-22.11	QP	
4	0.3180	19.20	9.88	29.08	49.76	-20.68	AVG	
5	0.4100	30.54	9.90	40.44	57.65	-17.21	QP	
6	0.4100	16.37	9.90	26.27	47.65	-21.38	AVG	
7	0.6580	28.34	9.95	38.29	56.00	-17.71	QP	
8	0.6580	12.59	9.95	22.54	46.00	-23.46	AVG	
9	2.5820	27.93	10.02	37.95	56.00	-18.05	QP	
10	2.5820	19.72	10.02	29.74	46.00	-16.26	AVG	
11	26.8060	29.44	11.86	41.30	60.00	-18.70	QP	
12	26.8060	17.62	11.86	29.48	50.00	-20.52	AVG	

Neutral line:



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Margin (dB)	Detector	Remark
1	0.1580	31.75	9.81	41.56	65.56	-24.00	QP	
2	0.1580	20.76	9.81	30.57	55.56	-24.99	AVG	
3	0.4100	33.40	9.90	43.30	57.65	-14.35	QP	
4	0.4100	13.91	9.90	23.81	47.65	-23.84	AVG	
5	0.5700	33.71	9.94	43.65	56.00	-12.35	QP	
6	0.5700	14.96	9.94	24.90	46.00	-21.10	AVG	
7	1.5580	32.63	10.00	42.63	56.00	-13.37	QP	
8	1.5580	20.17	10.00	30.17	46.00	-15.83	AVG	
9	2.4420	33.76	10.01	43.77	56.00	-12.23	QP	
10	2.4420	22.21	10.01	32.22	46.00	-13.78	AVG	
11	26.7060	35.14	11.84	46.98	60.00	-13.02	QP	
12	26.7060	21.06	11.84	32.90	50.00	-17.10	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	$20\log^{(500)}$

Test mode: see section 4.4

7.1 EUT Operation :

Operating Environment:

Temperature: 25.5 °C

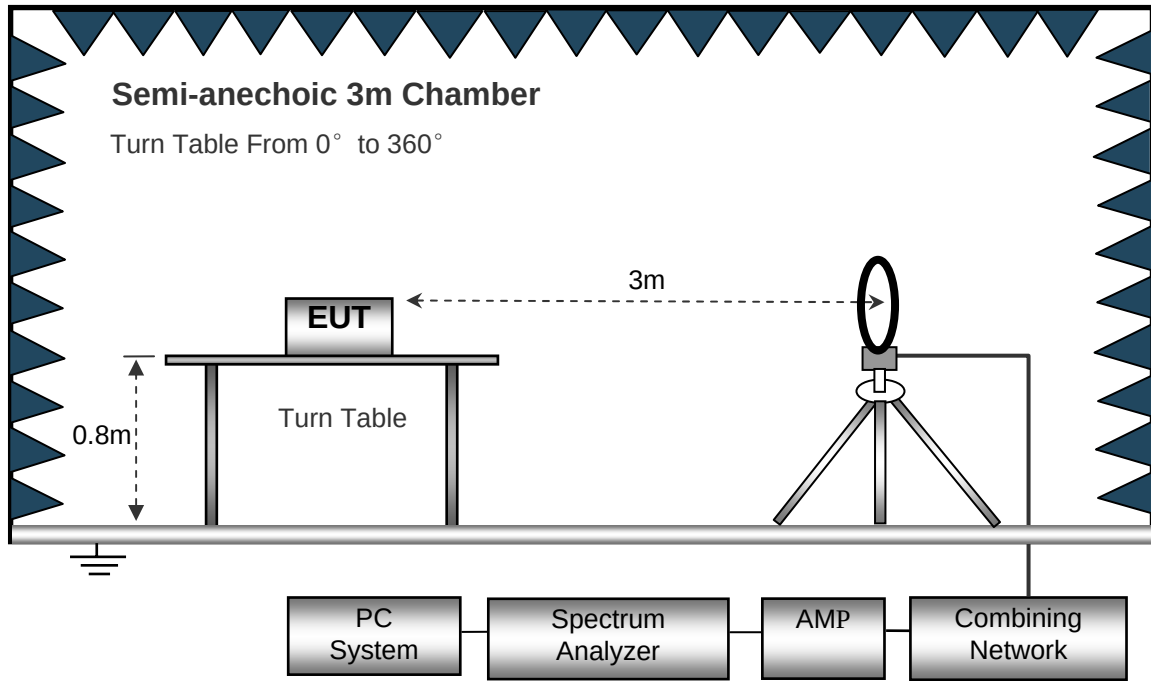
Humidity: 51 % RH

Atmospheric Pressure: 1010 mbar

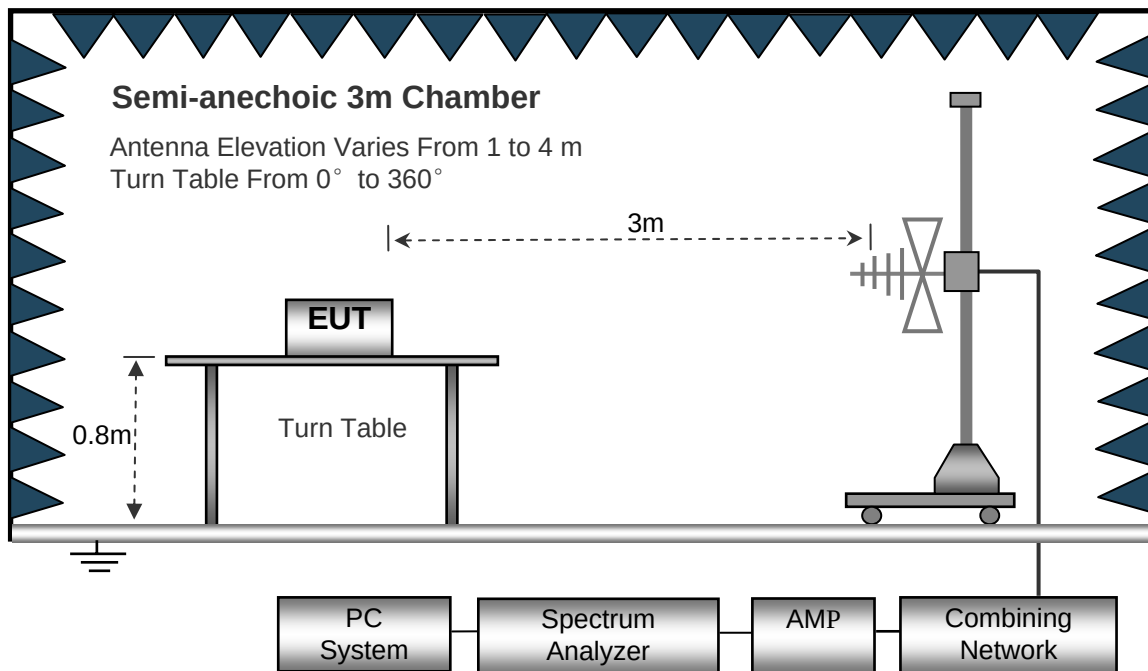
7.2 Test Setup

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

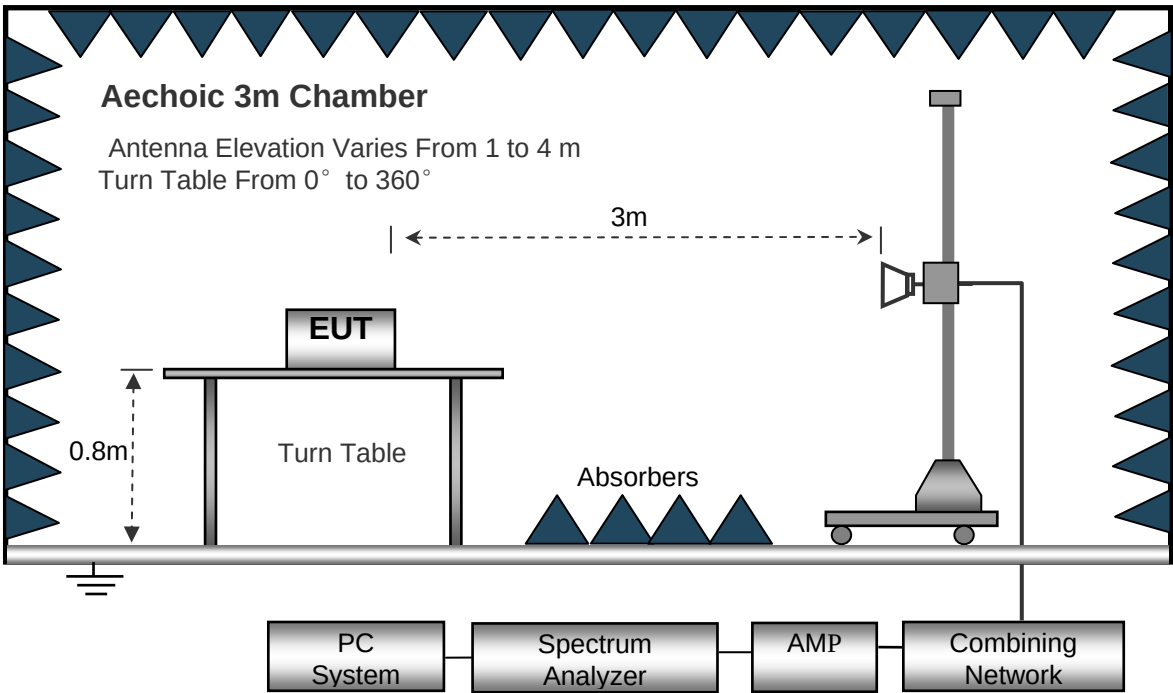
The test setup for emission measurement below 30MHz.



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

According to FCC Part15 Rules, the system was tested from 9kHz to 25000MHz.

Below 30MHz

Sweep SpeedAuto
IF Bandwidth.....10KHz
Video Bandwidth.....10KHz
Resolution Bandwidth.....10KHz

30MHz ~ 1GHz

Sweep SpeedAuto
IF Bandwidth.....120 KHz
Video Bandwidth.....100KHz
Quasi-Peak Adapter Bandwidth120 KHz
Quasi-Peak Adapter ModeNormal
Resolution Bandwidth.....100KHz

Above 1GHz

Sweep SpeedAuto
IF Bandwidth.....120 KHz
Video Bandwidth.....3MHz
Quasi-Peak Adapter Bandwidth120 KHz
Quasi-Peak Adapter ModeNormal
Resolution Bandwidth.....1MHz

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 during radiated emissions above 1GHz measurement.

7.5 Corrected Amplitude & Margin Calculation

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

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

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

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

7.6 Summary of Test Results

Test Frequency : Below 30MHz

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

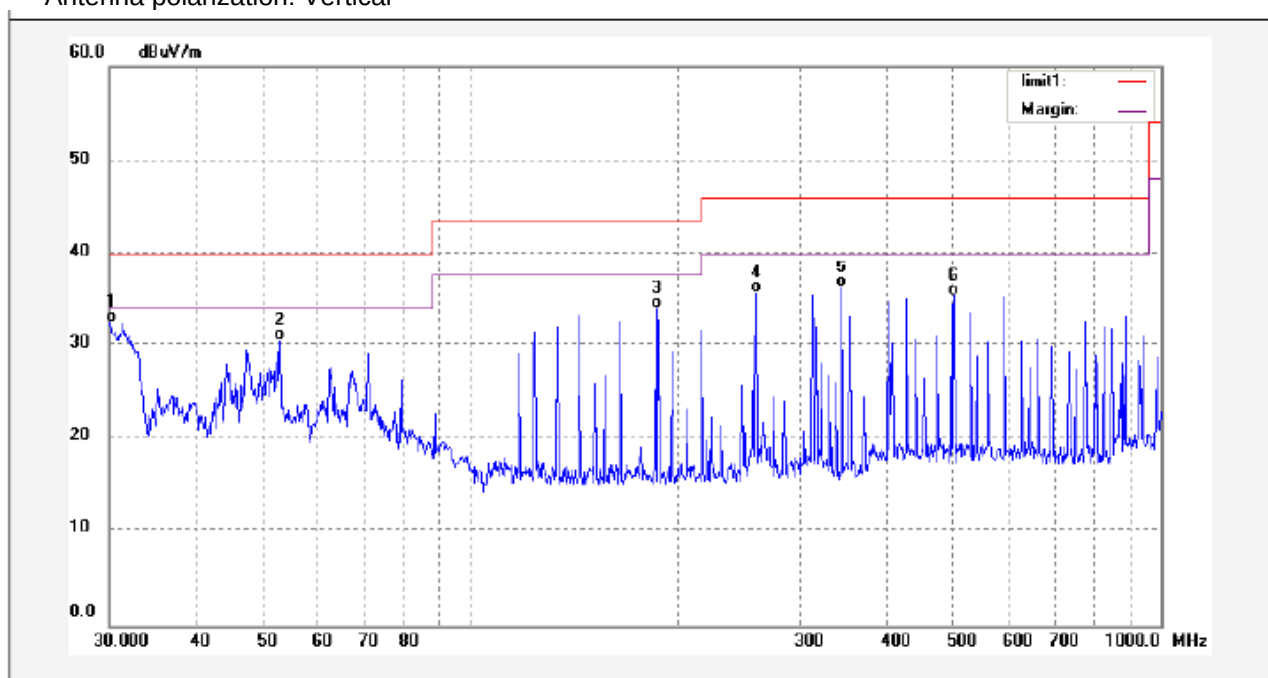
Test Frequency : 30MHz ~ 1000MHz

Remark: The pre-test was performed at TX 11b, TX 11g, TX 11n HT20 and TX 11n HT40 mode, and the worst is TX 11b mode, so the data shown is that mode's only.

Test worst mode: Wifi transmission mode(Power input by Adapter input operation)

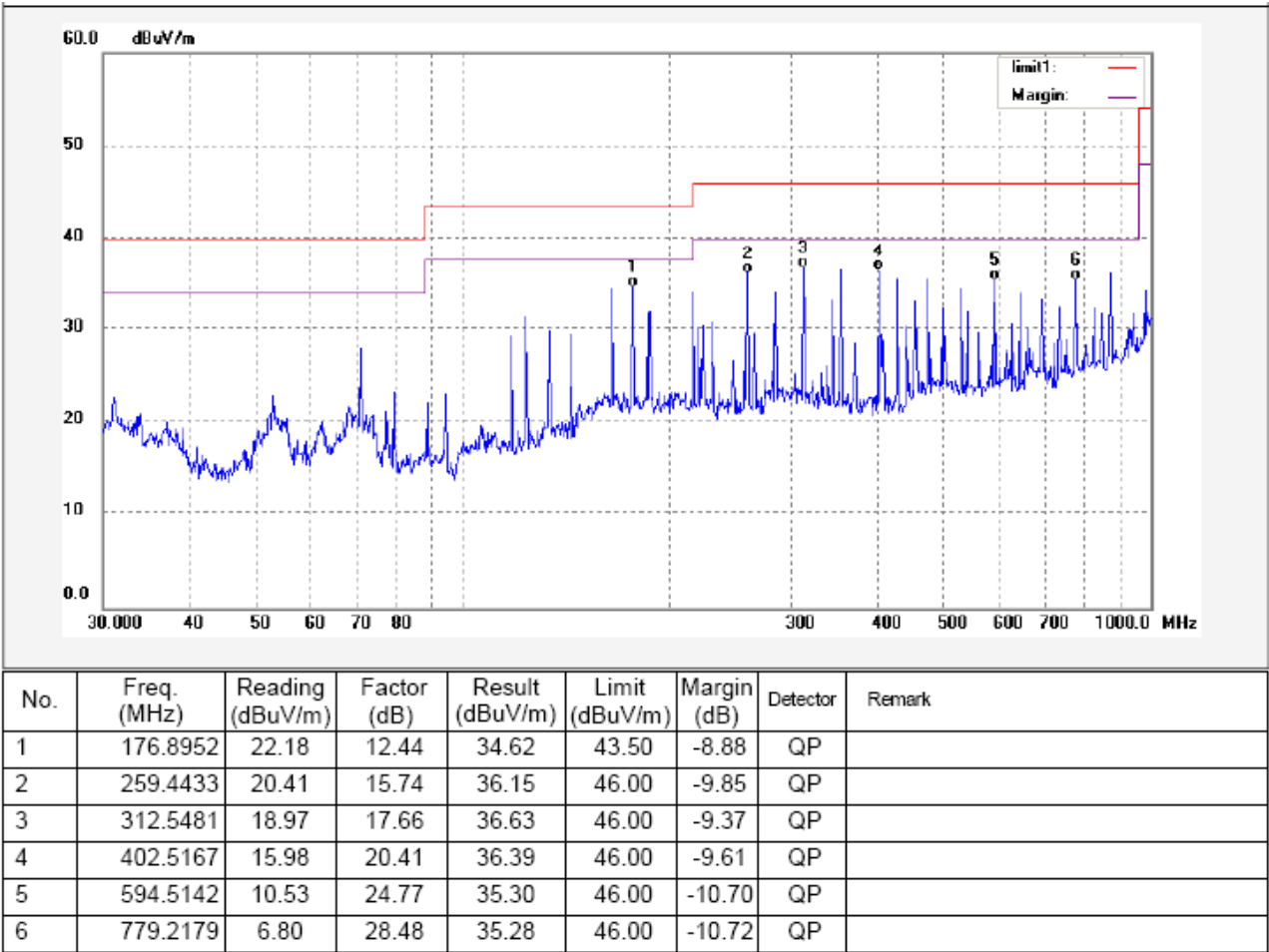
Test Channel: 2412MHz

Antenna polarization: Vertical



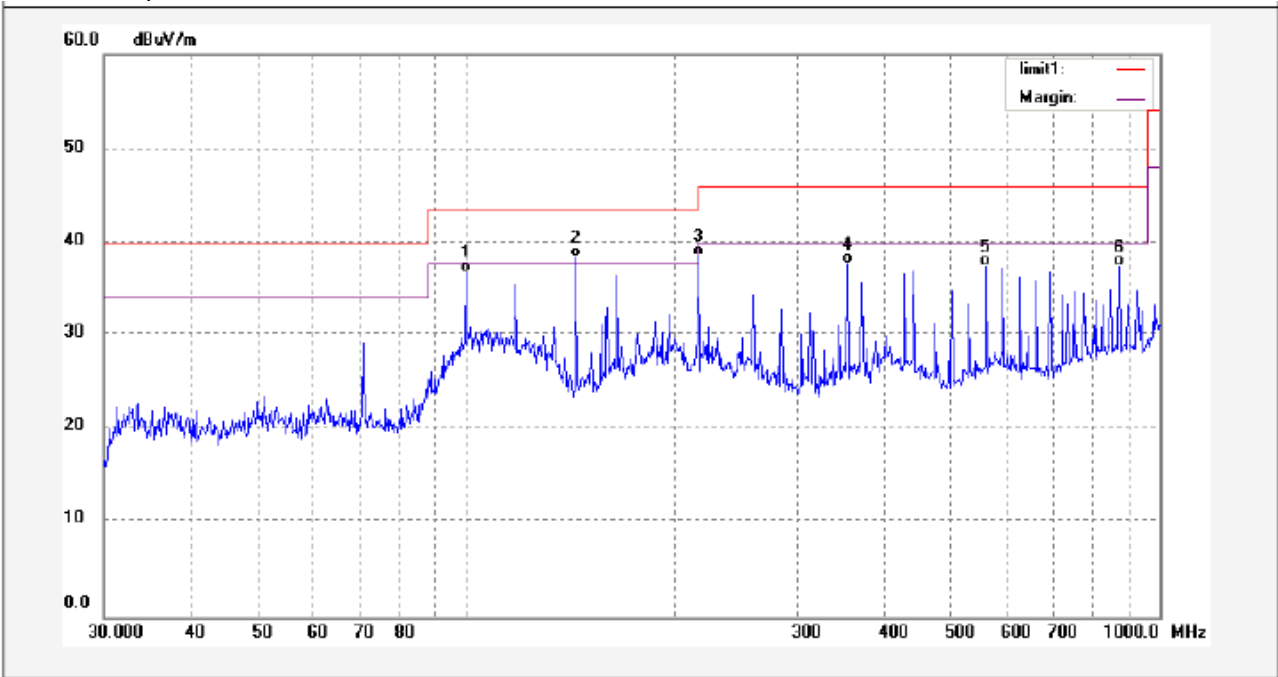
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	30.0000	16.25	16.20	32.45	40.00	-7.55	QP	
2	53.0056	16.14	14.36	30.50	40.00	-9.50	QP	
3	185.8143	20.29	13.70	33.99	43.50	-9.51	QP	
4	259.4433	19.85	15.74	35.59	46.00	-10.41	QP	
5	344.8599	16.72	19.48	36.20	46.00	-9.80	QP	
6	502.2472	12.57	22.73	35.30	46.00	-10.70	QP	

Antenna polarization: Horizontal



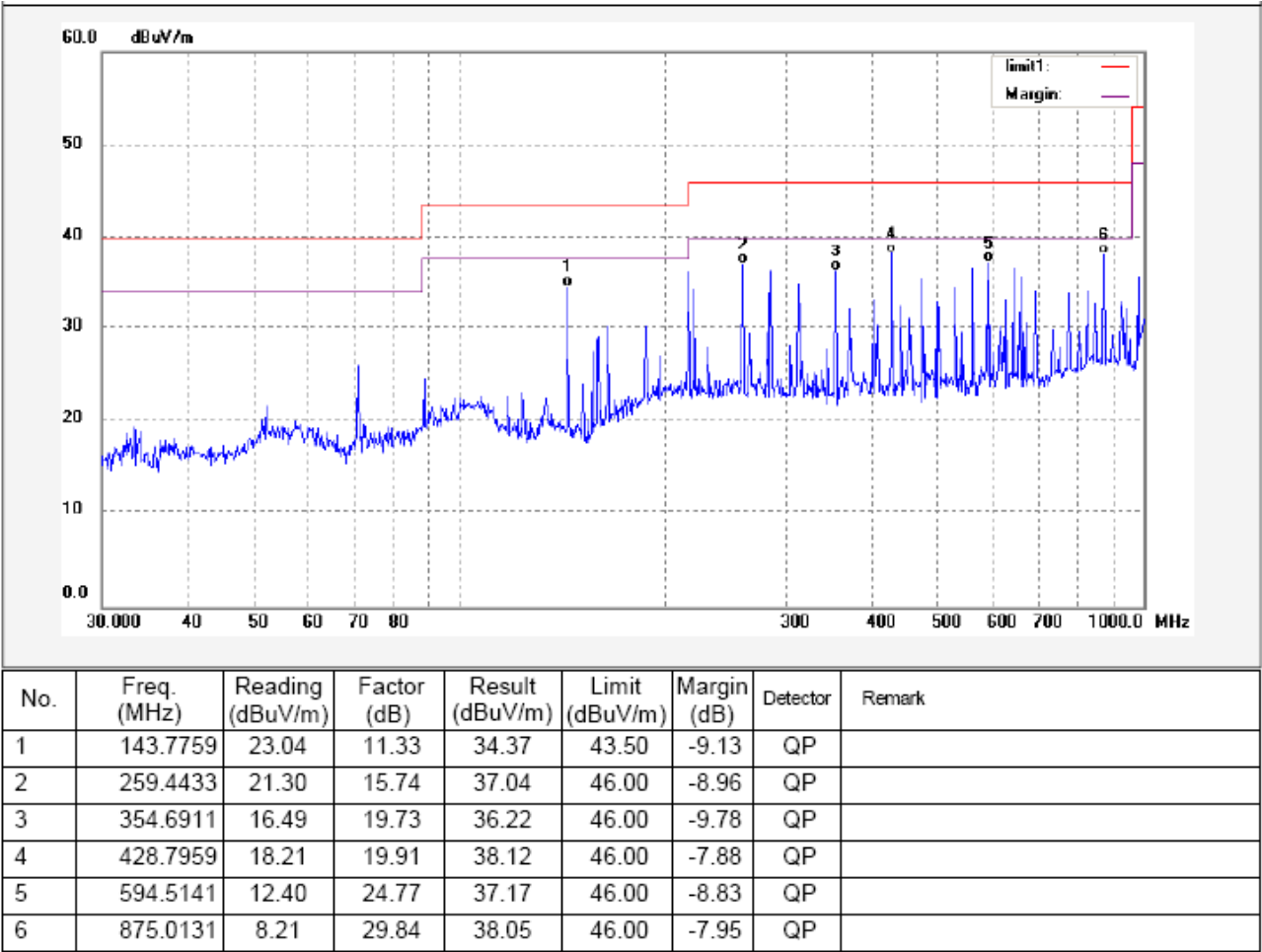
Test Channel: 2437MHz

Antenna polarization: Vertical



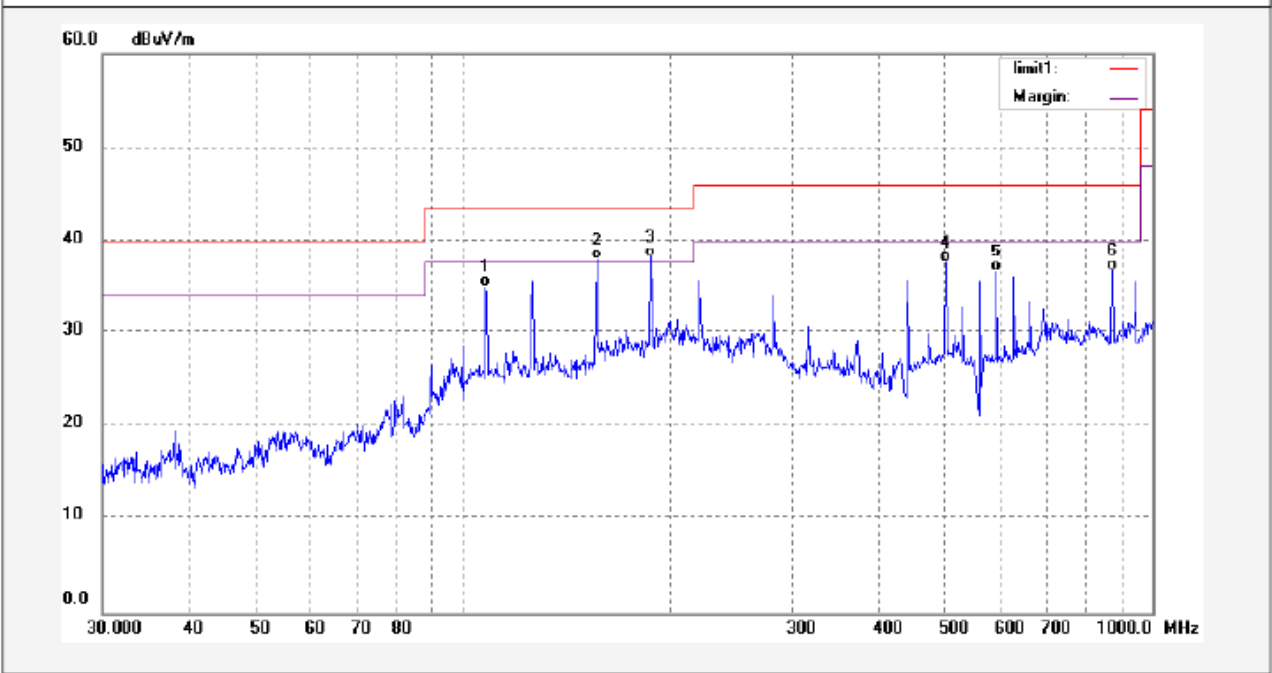
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	99.7674	22.63	14.01	36.64	43.50	-6.86	QP	
2	143.7759	26.94	11.33	38.27	43.50	-5.23	QP	
3	216.1195	23.75	14.72	38.47	46.00	-7.53	QP	
4	354.6911	17.90	19.73	37.63	46.00	-8.37	QP	
5	562.0143	14.18	23.02	37.20	46.00	-8.80	QP	
6	875.0131	7.43	29.84	37.27	46.00	-8.73	QP	

Antenna polarization: Horizontal



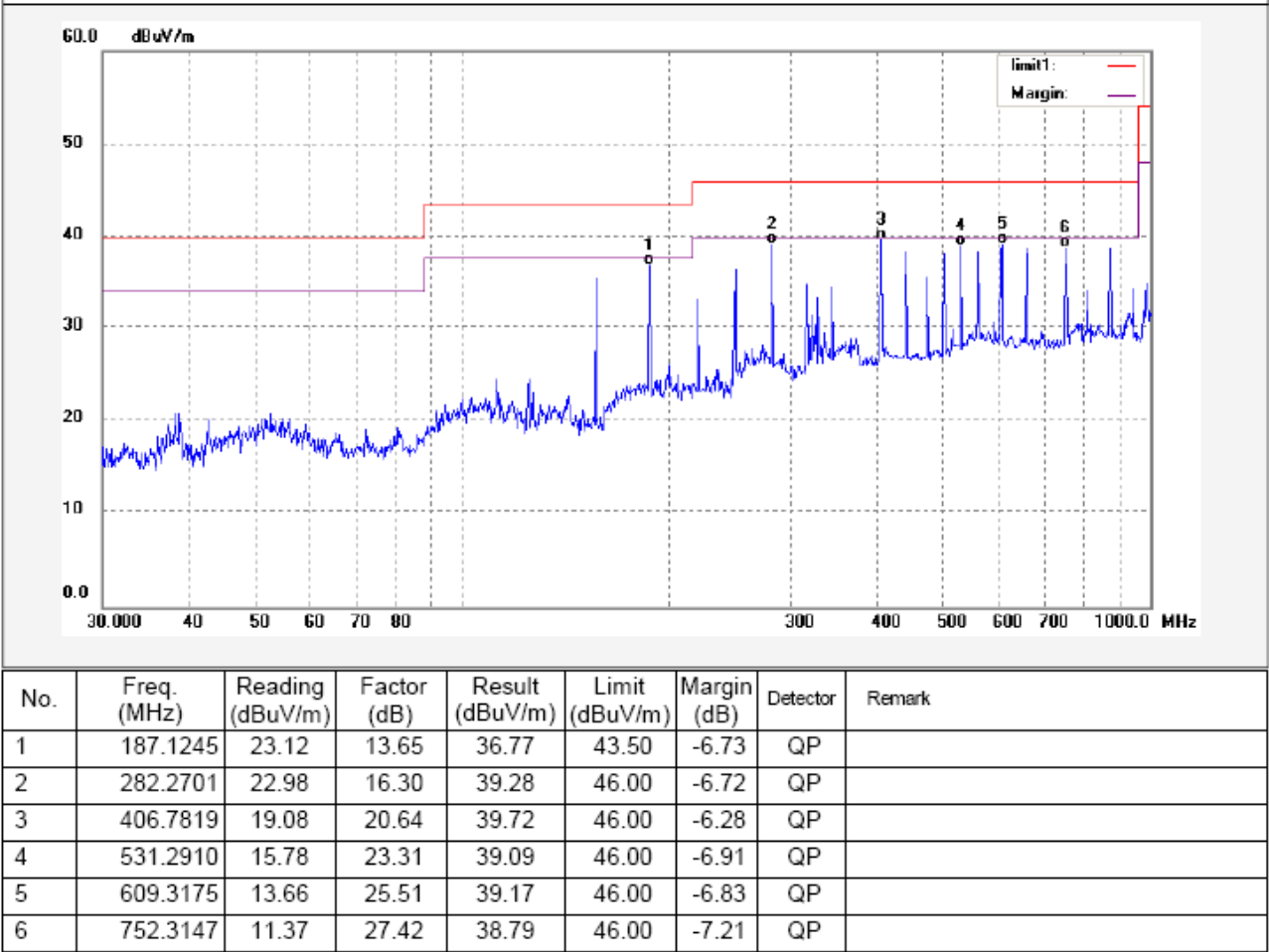
Test Channel: 2462MHz

Antenna polarization: Vertical



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	107.7853	20.82	14.01	34.83	43.50	-8.67	QP	
2	156.4258	27.04	10.86	37.90	43.50	-5.60	QP	
3	187.1245	24.58	13.65	38.23	43.50	-5.27	QP	
4	502.2472	14.90	22.73	37.63	46.00	-8.37	QP	
5	594.5140	11.77	24.77	36.54	46.00	-9.46	QP	
6	875.0131	6.88	29.84	36.72	46.00	-9.28	QP	

Antenna polarization: Horizontal



Test Frequency: From 1GHz -18GHz

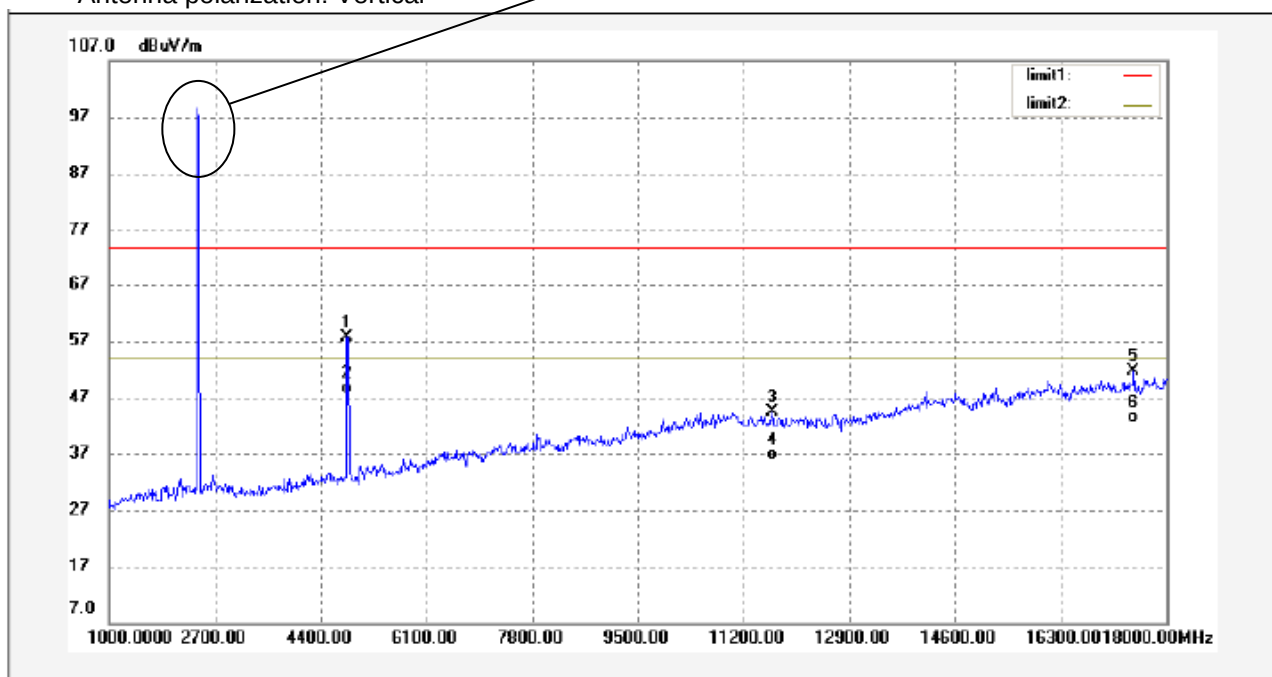
Remark: The pre-test was performed at TX 11b, TX 11g, TX 11n HT20 and TX 11n HT40 mode, and the worst is TX 11b mode, so the data shown is that mode's only.

Test mode: Continuously Transmit

Modulation:TX 11b, Test Channel: 2412MHz

Antenna polarization: Vertical

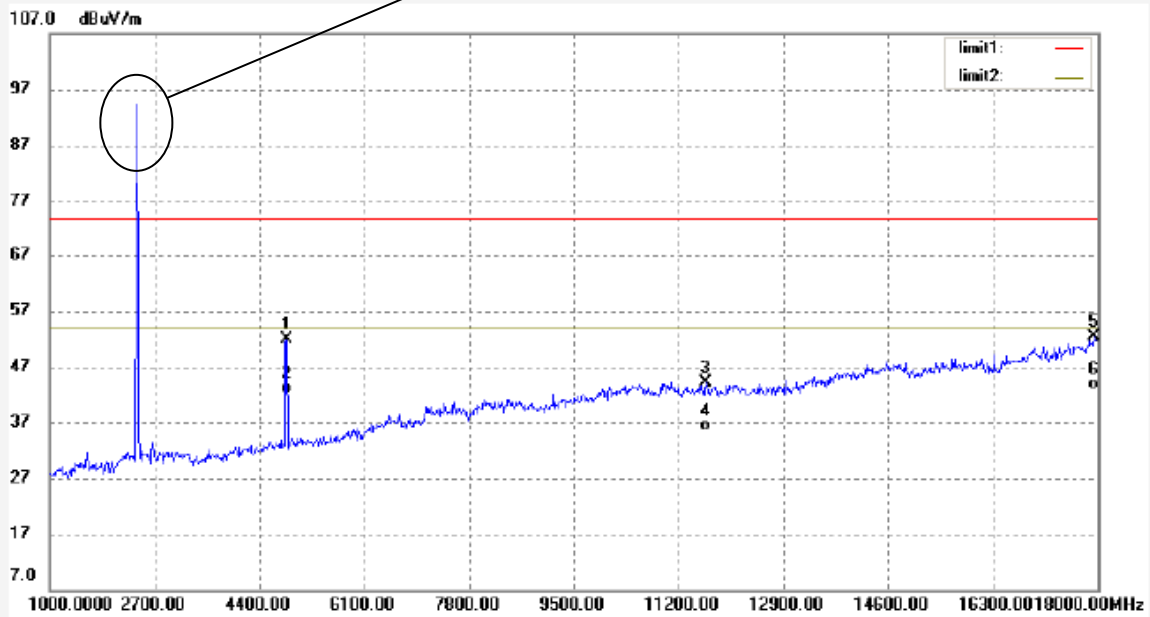
Fundamental wave



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4824.000	69.61	-11.96	57.65	74.00	-16.35	peak	
2	4824.000	59.57	-11.96	47.61	54.00	-6.39	AVG	
3	11659.000	48.49	-4.22	44.27	74.00	-29.73	peak	
4	11659.000	40.21	-4.22	35.99	54.00	-18.01	AVG	
5	17473.000	49.39	2.23	51.62	74.00	-22.38	peak	
6	17473.000	40.25	2.23	42.48	54.00	-11.52	AVG	

Antenna polarization: Horizontal

Fundamental wave

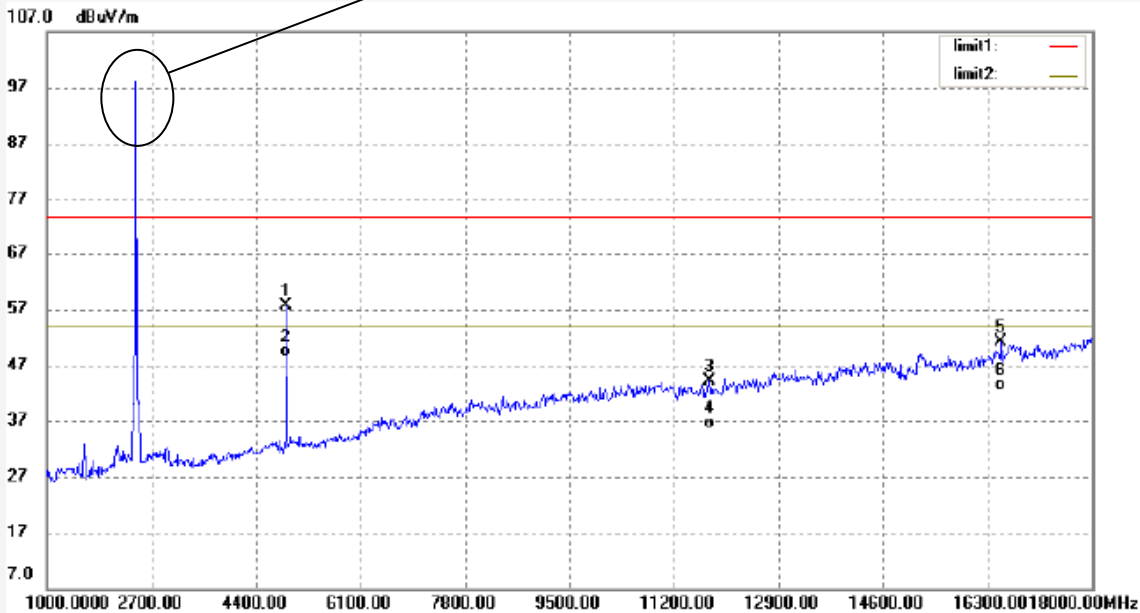


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4842.000	63.80	-11.95	51.85	74.00	-22.15	peak	
2	4842.000	54.02	-11.95	42.07	54.00	-11.93	AVG	
3	11642.000	48.23	-4.17	44.06	74.00	-29.94	peak	
4	11642.000	39.52	-4.17	35.35	54.00	-18.65	AVG	
5	17949.000	45.98	6.31	52.29	74.00	-21.71	peak	
6	17949.000	36.45	6.31	42.76	54.00	-11.24	AVG	

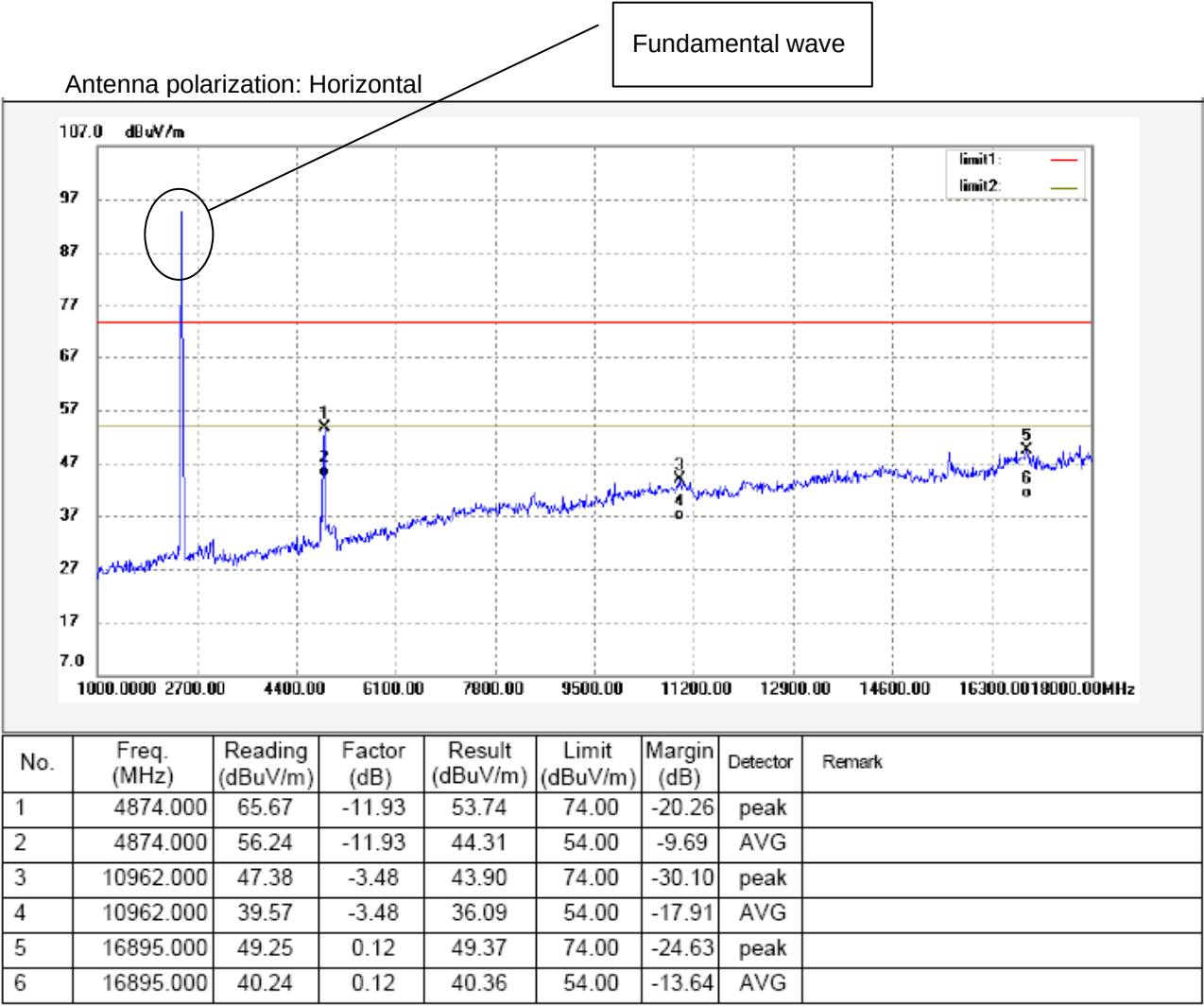
Modulation:TX 11b, Test Channel: 2437MHz

Antenna polarization: Vertical

Fundamental wave



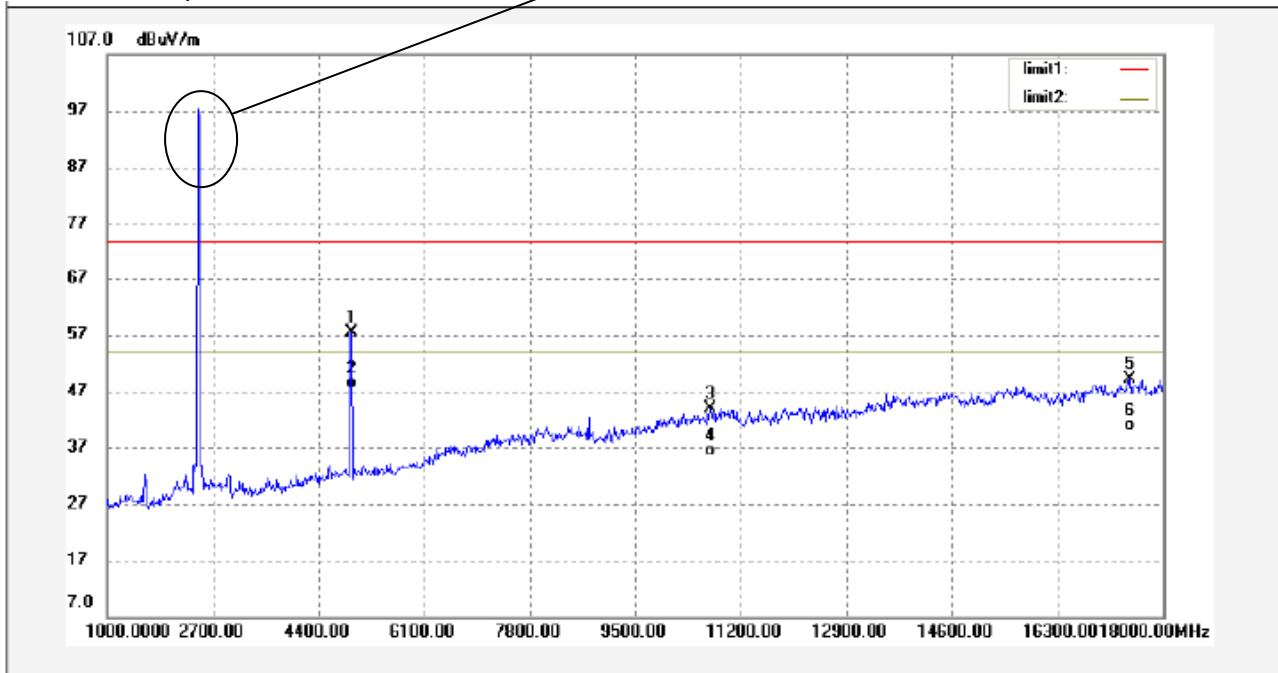
No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4893.000	69.61	-11.91	57.70	74.00	-16.30	peak	
2	4893.000	60.21	-11.91	48.30	54.00	-5.70	AVG	
3	11778.000	48.78	-4.53	44.25	74.00	-29.75	peak	
4	11778.000	40.26	-4.53	35.73	54.00	-18.27	AVG	
5	16521.000	53.09	-1.85	51.24	74.00	-22.76	peak	
6	16521.000	44.25	-1.85	42.40	54.00	-11.60	AVG	



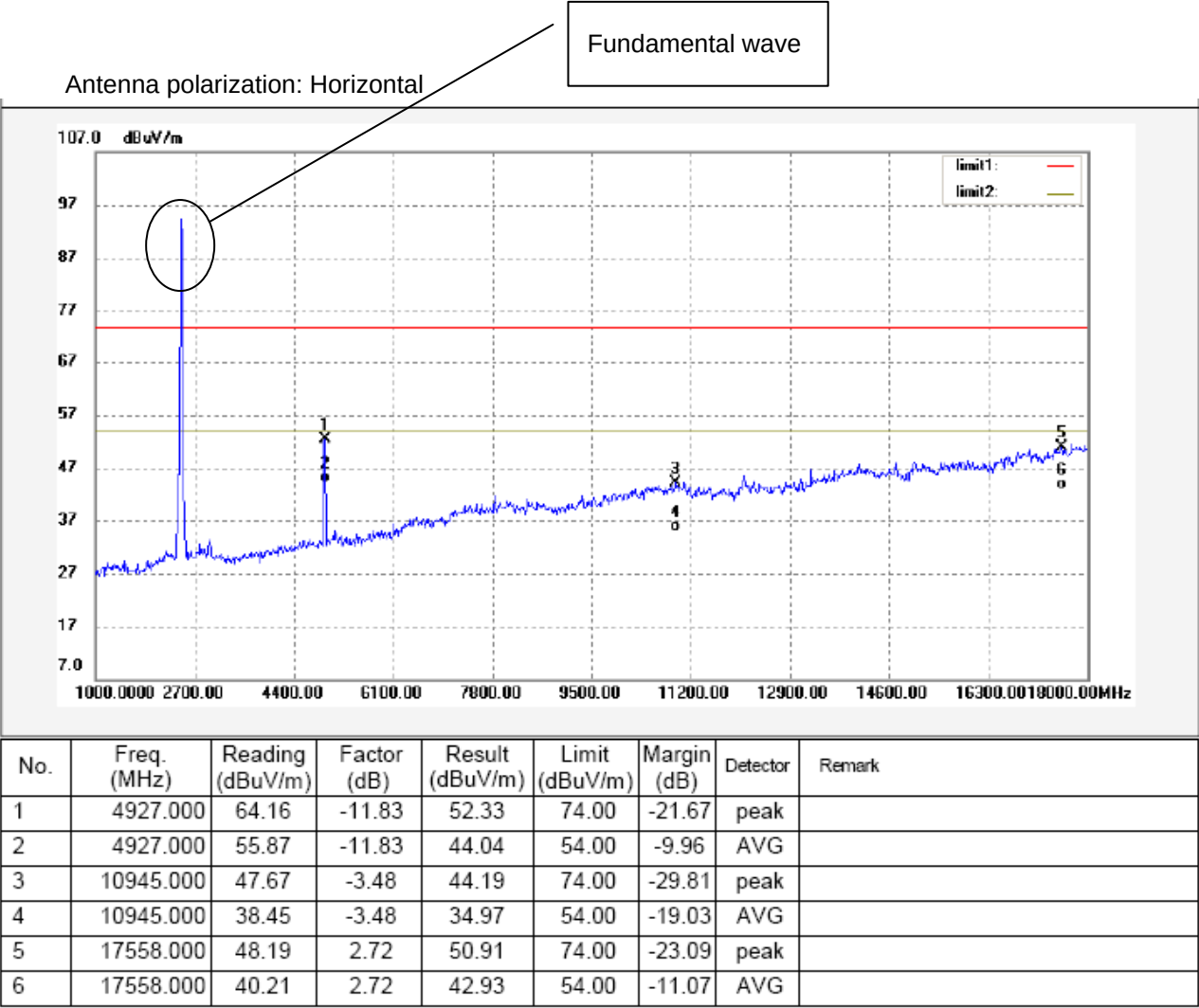
Modulation:TX 11b, Test Channel: 2462MHz

Antenna polarization: Vertical

Fundamental wave



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Remark
1	4927.000	69.13	-11.83	57.30	74.00	-16.70	peak	
2	4927.000	59.10	-11.83	47.27	54.00	-6.73	AVG	
3	10707.000	48.05	-4.09	43.96	74.00	-30.04	peak	
4	10707.000	39.51	-4.09	35.42	54.00	-18.58	AVG	
5	17473.000	46.82	2.23	49.05	74.00	-24.95	peak	
6	17473.000	37.58	2.23	39.81	54.00	-14.19	AVG	



Test Frequency: Above 18GHz

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

8 Band Edge Measurement

Test Requirement:	Section 15.247(d) 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) and 15.205(c).
Test Method:	KDB558074 D01 v03r01 04/09/2013
Measurement Distance:	3m
Detector:	For Peak value: RBW = 1MHz VBW = 3MHz; Sweep = auto Detector function = peak Trace = max hold For Average value: RBW = 1MHz VBW=10Hz; Sweep = auto Detector function = Average Trace = max hold

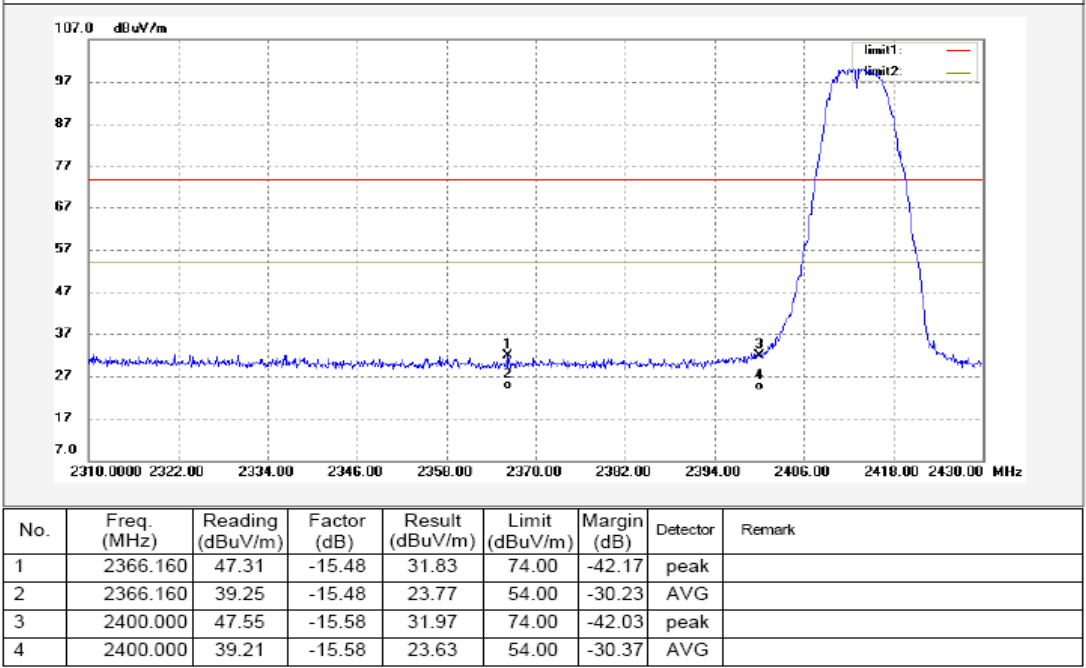
8.1 Test Produce

1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. continuous transmitting

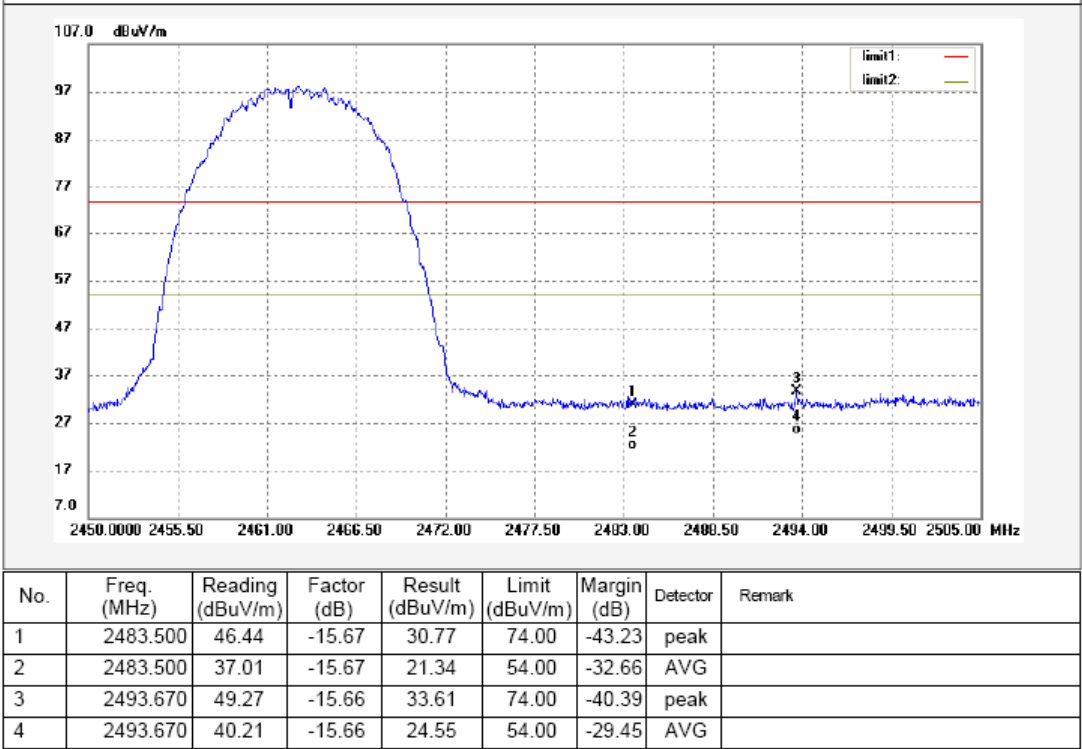
8.2 Test Result

Remark: the EUT was pretested at received antenna Vertical polarity, Horizontal polarity, and the worse case was the Vertical polarity, so the data show was the Vertical polarity only.

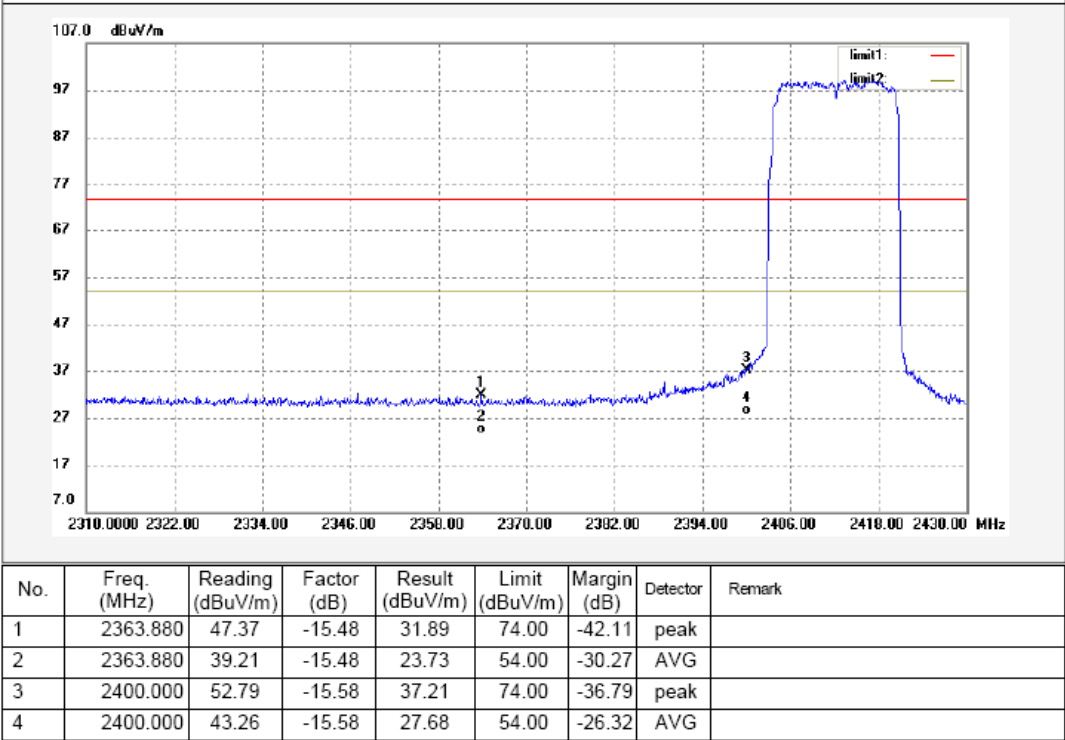
Mode: TX 11b channel 1



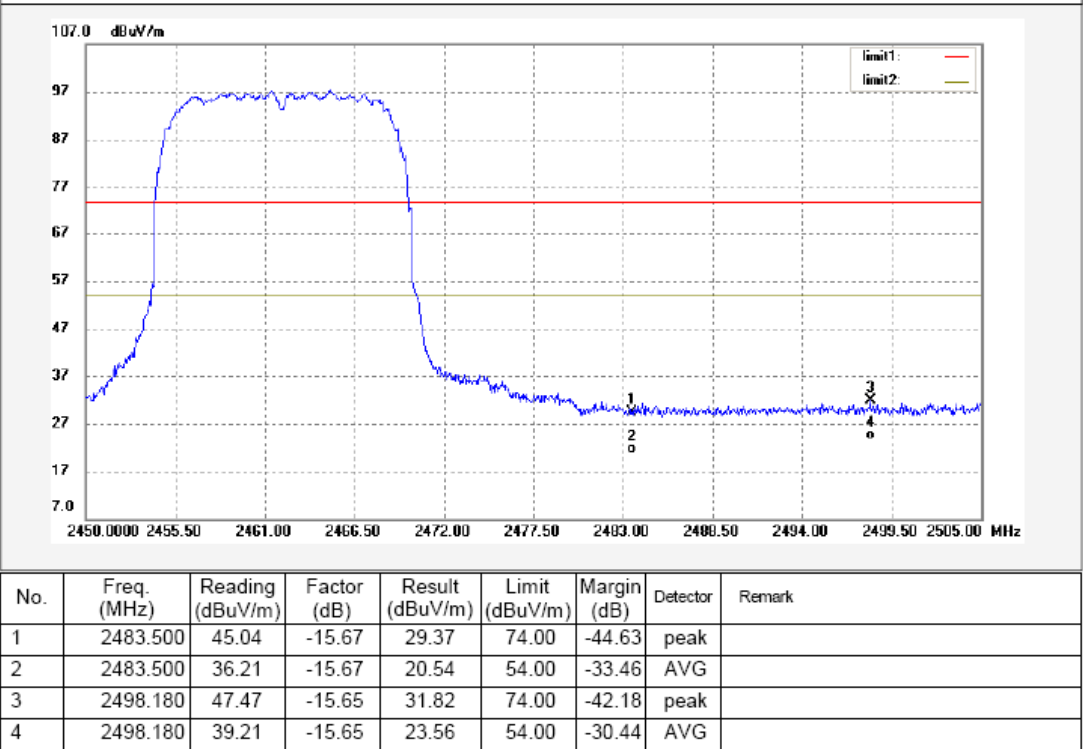
Mode: TX 11b channel 11



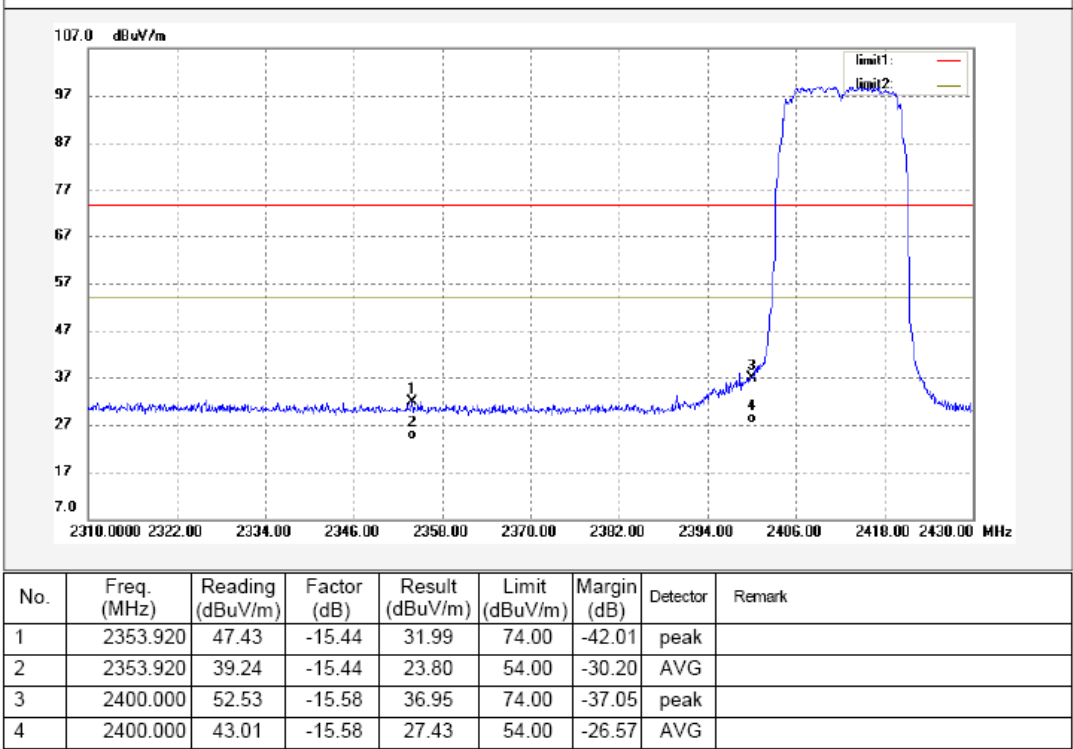
Mode: TX 11g channel 1



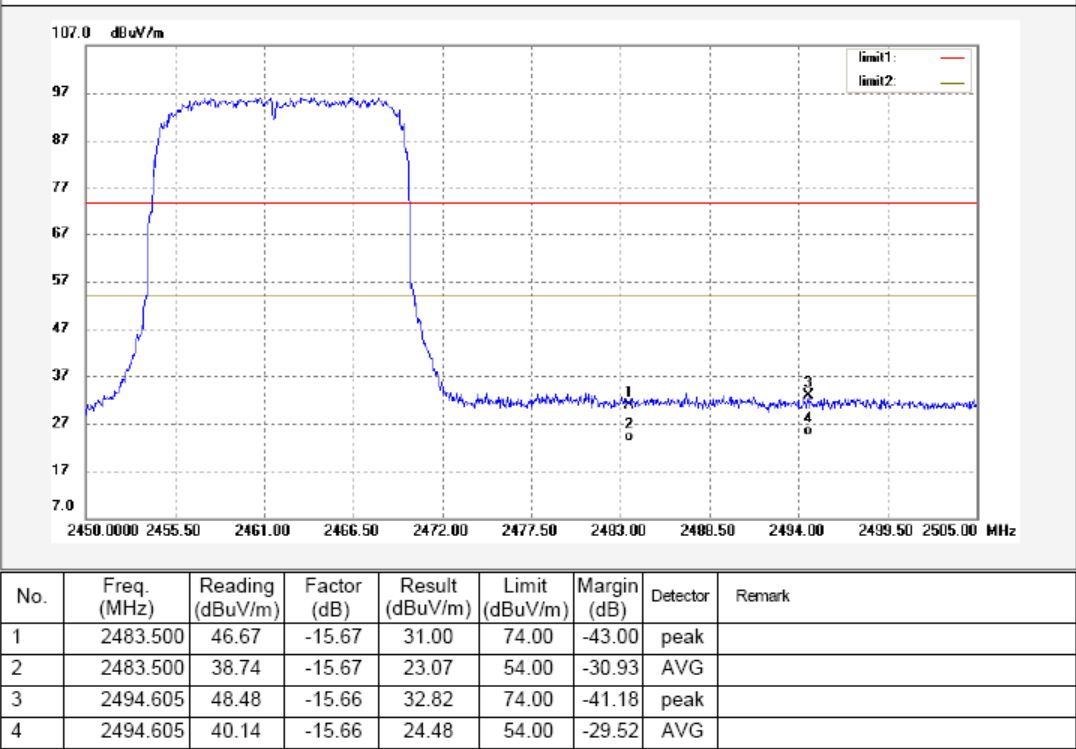
Mode: TX 11g channel 11



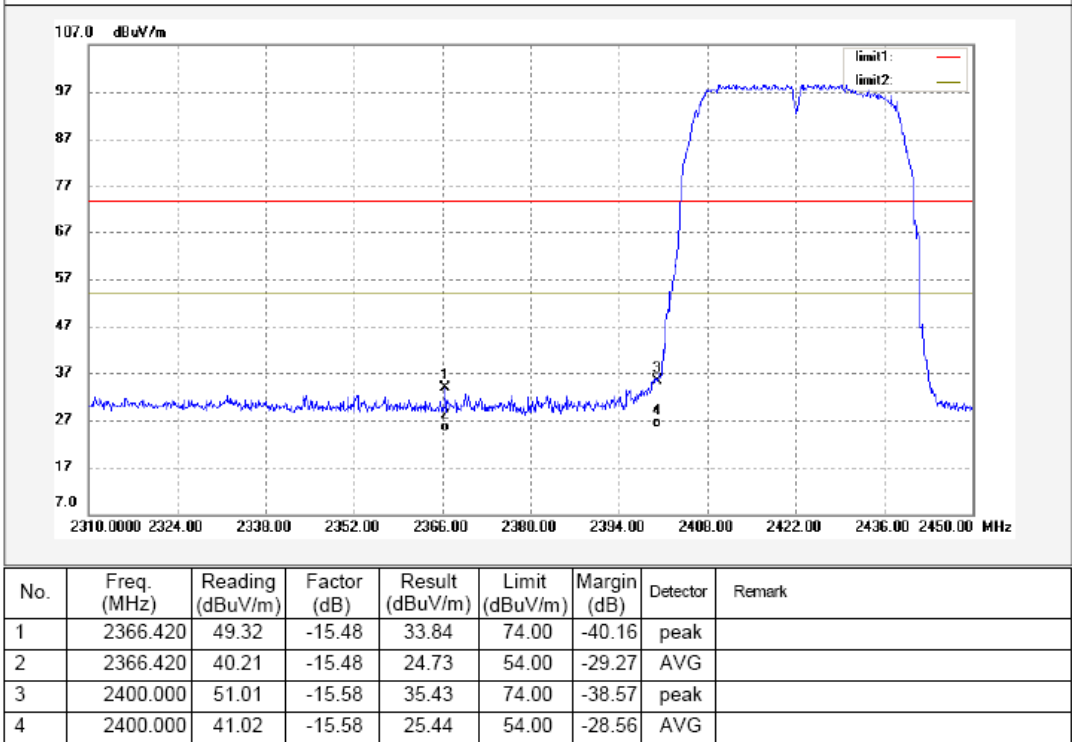
Mode: TX 11n HT 20 channel 1



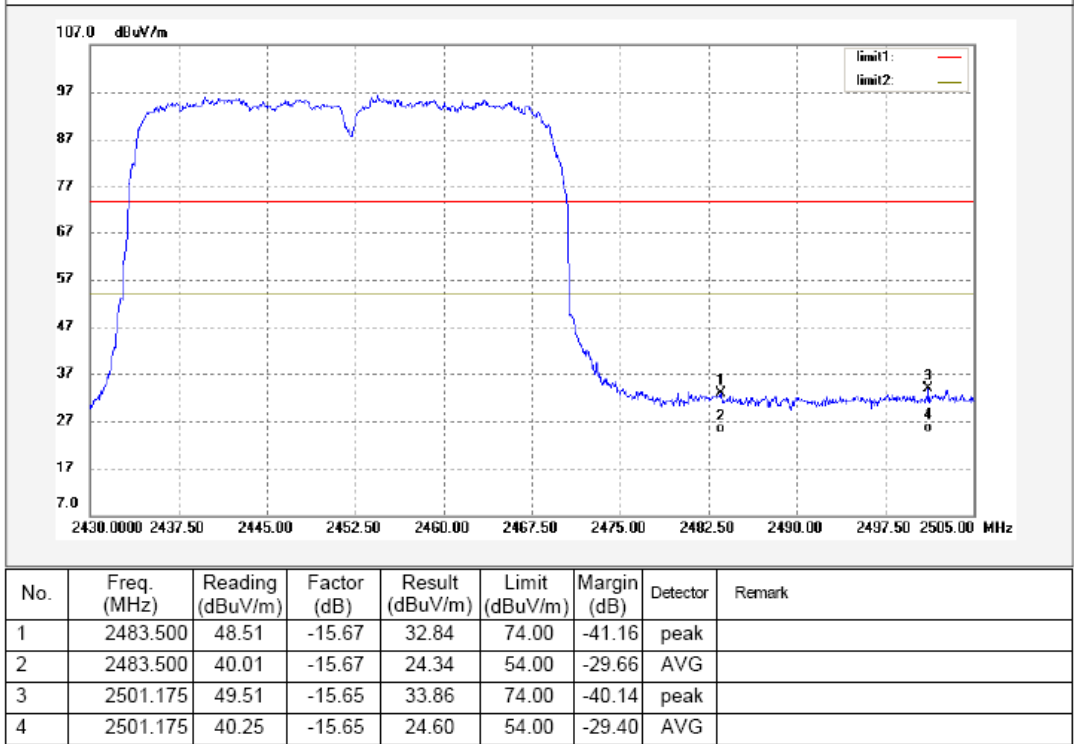
Mode: TX 11n HT 20 channel 11



Mode: TX 11n HT 40 channel 3



Mode: TX 11n HT 40 channel 9



9 6 dB Bandwidth Measurement

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB558074 D01 v03r01 04/09/2013

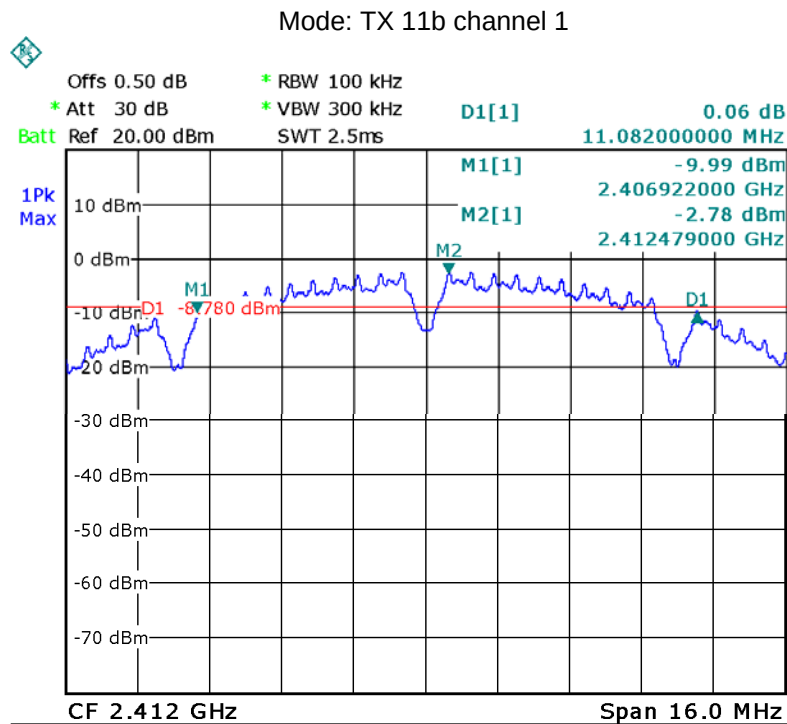
9.1 Test Procedure:

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

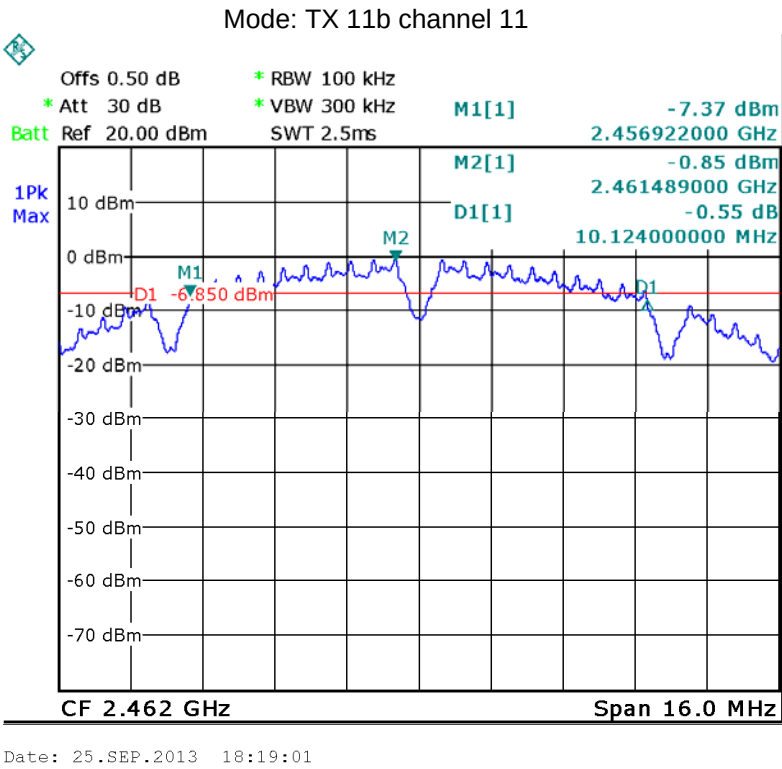
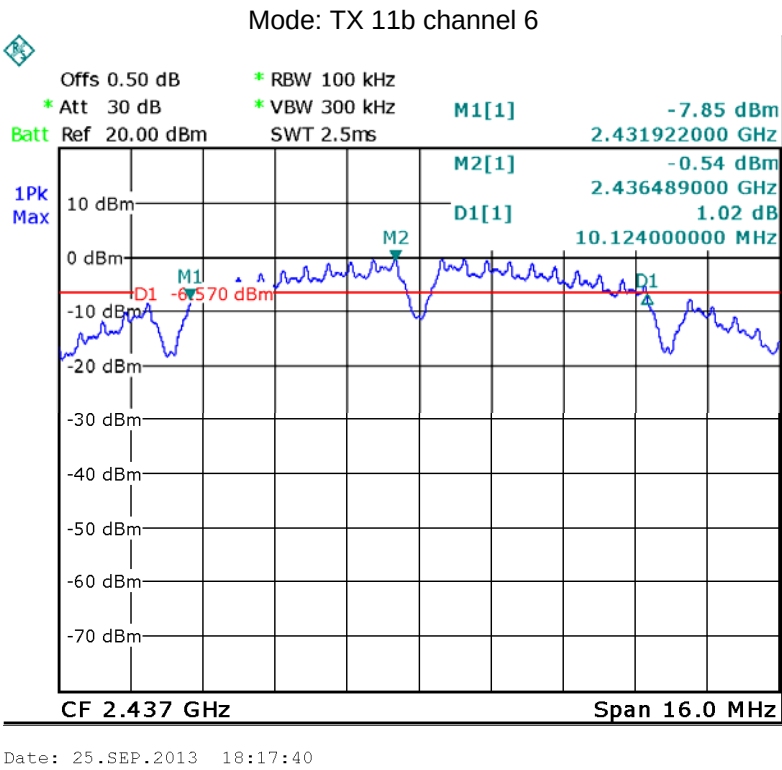
9.2 Test Result:

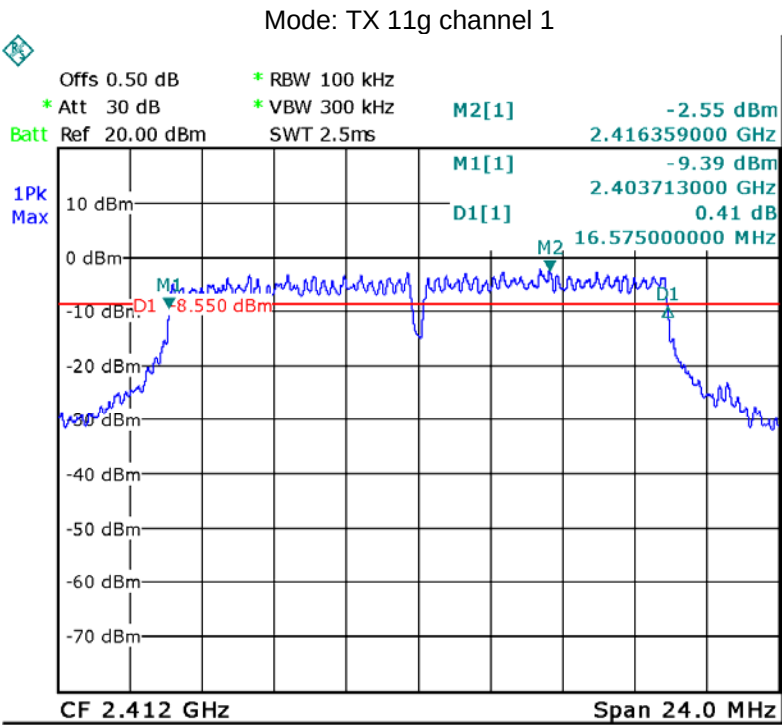
Operation mode	Bandwidth (MHz)		
TX 11b	Channel 1	Channel 6	Channel 11
	11.082	10.124	10.124
TX 11g	Channel 1	Channel 6	Channel 11
	16.575	16.623	16.623
TX 11n HT 20	Channel 1	Channel 6	Channel 11
	17.577	17.673	17.627
TX 11n HT 40	Channel 3	Channel 6	Channel 9
	36.430	36.410	36.400

Test result plot as follows:

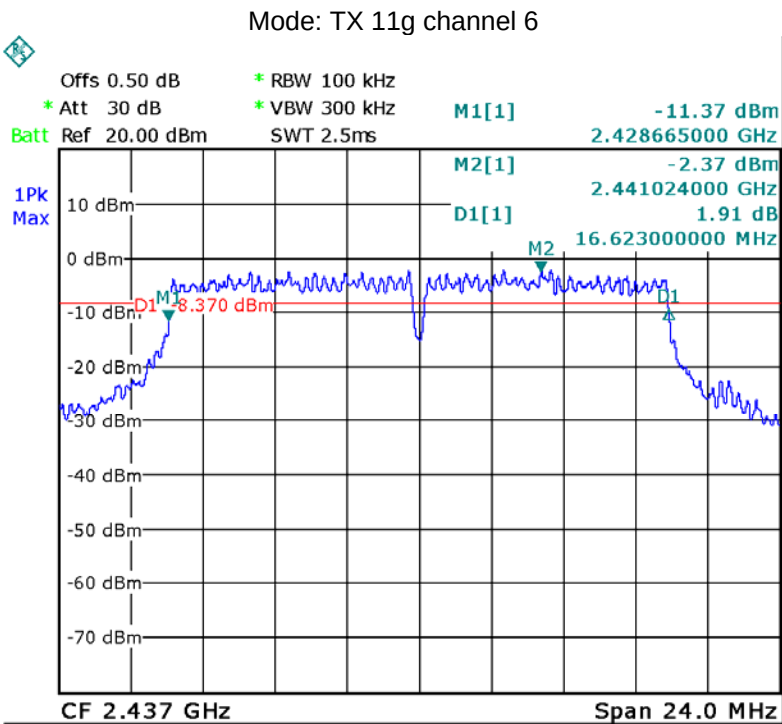


Date: 25.SEP.2013 18:14:37

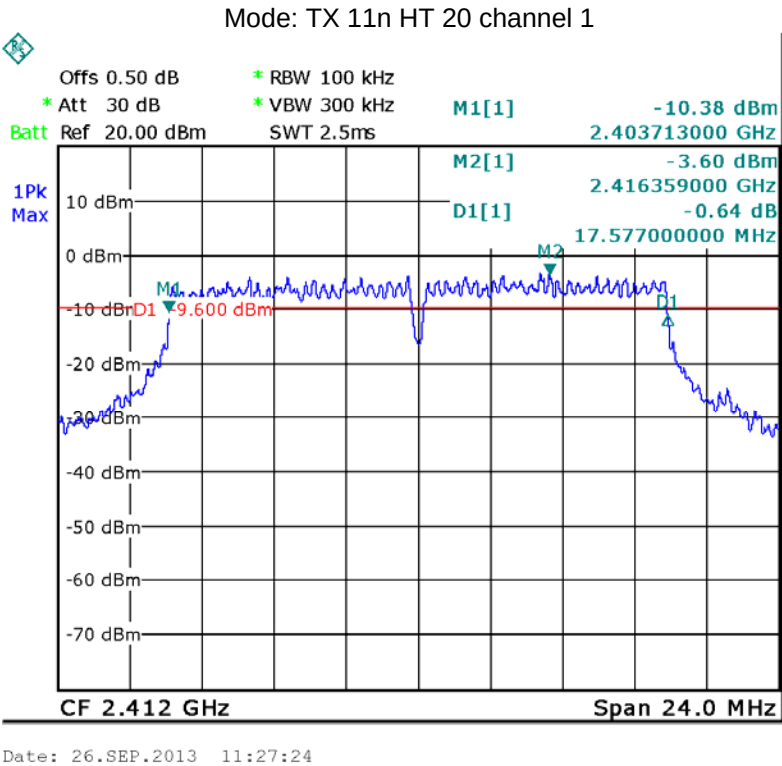
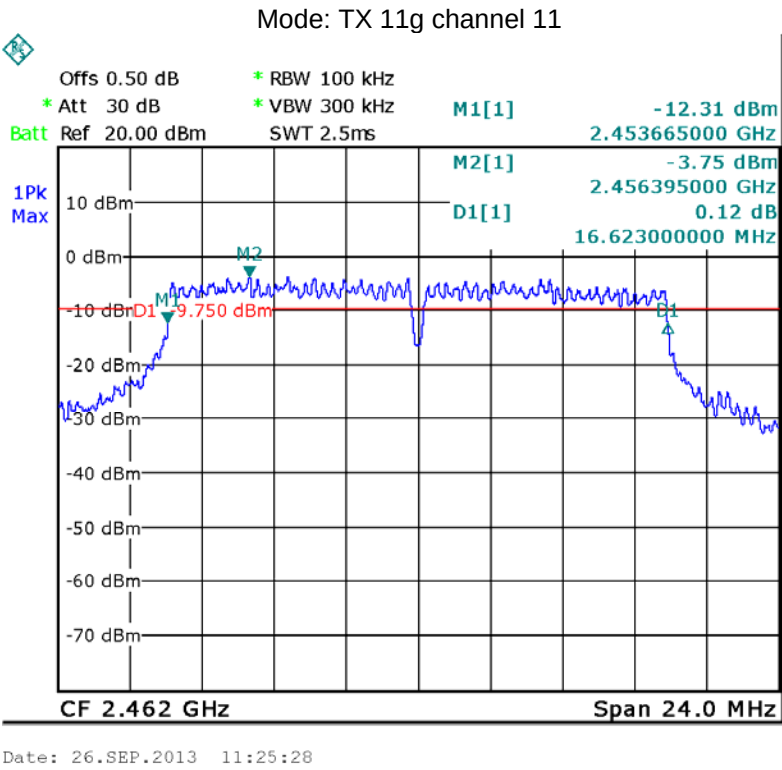


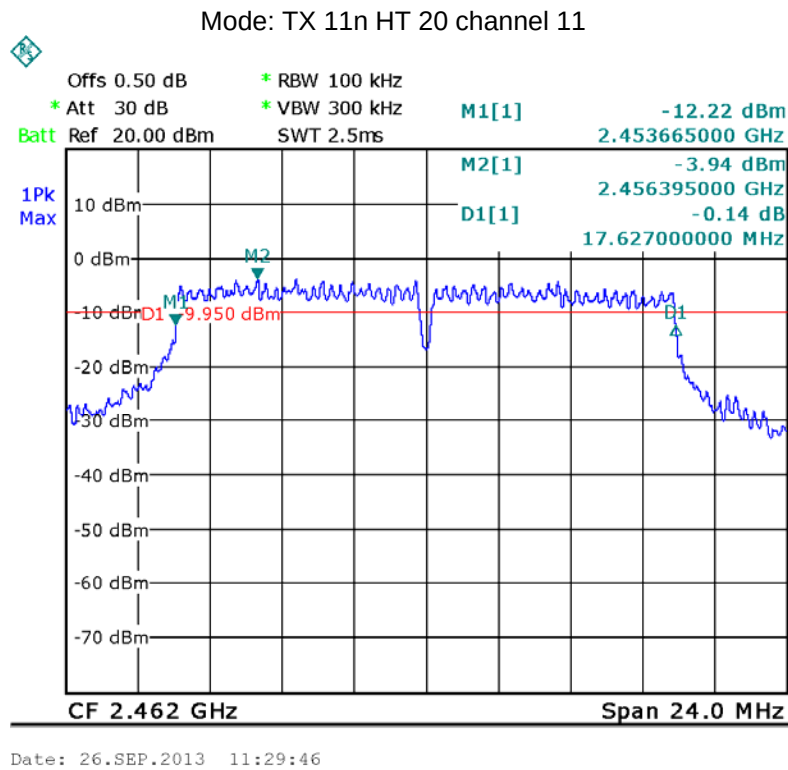
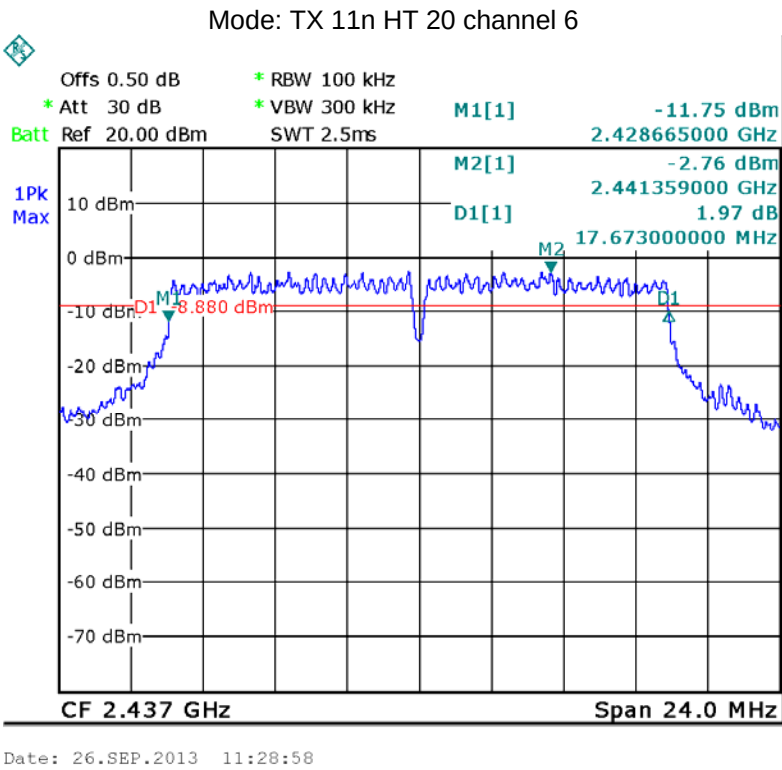


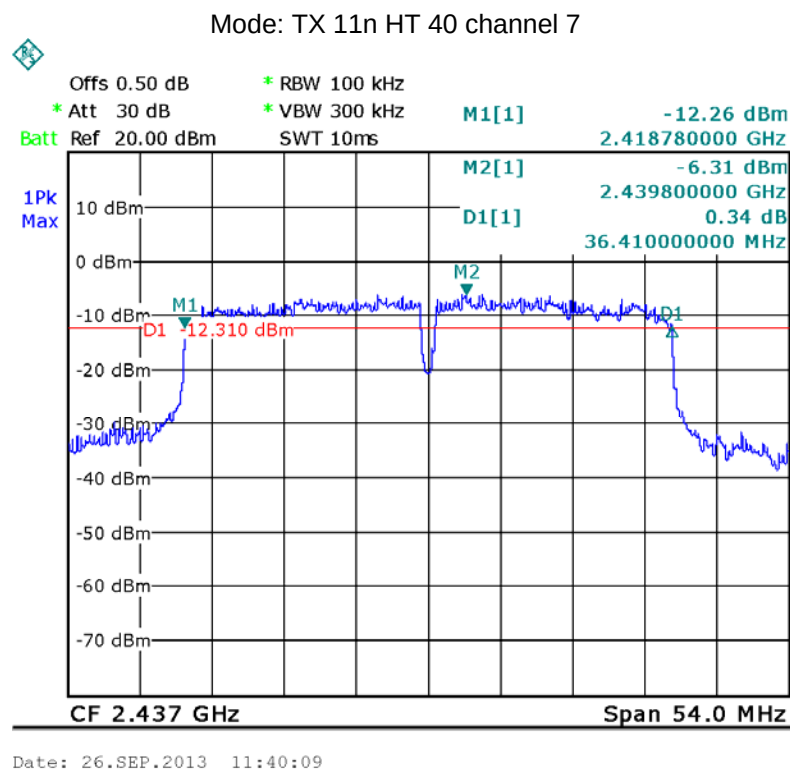
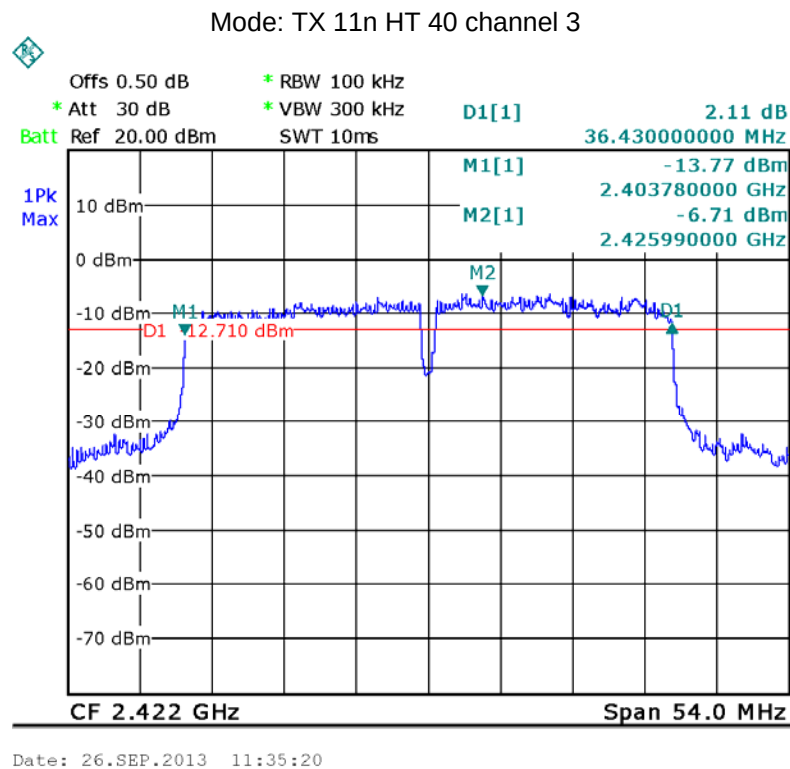
Date: 26.SEP.2013 11:20:34



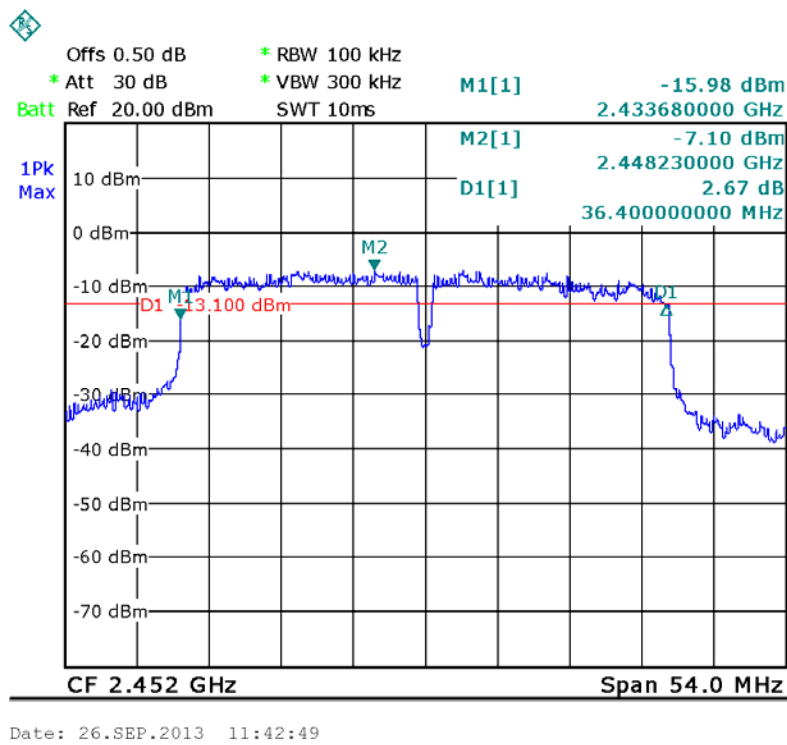
Date: 26.SEP.2013 11:24:35







Mode: TX 11n HT 40 channel 9



10 Maximum Peak Output Power

Test Requirement:

FCC CFR47 Part 15 Section 15.247

Test Method:

KDB558074 D01 v03r01 04/09/2013

10.1 Test Procedure:

KDB558074 D01 V02 10/04/2012 section 8.1.2 Option 2

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

10.2 Test Result:

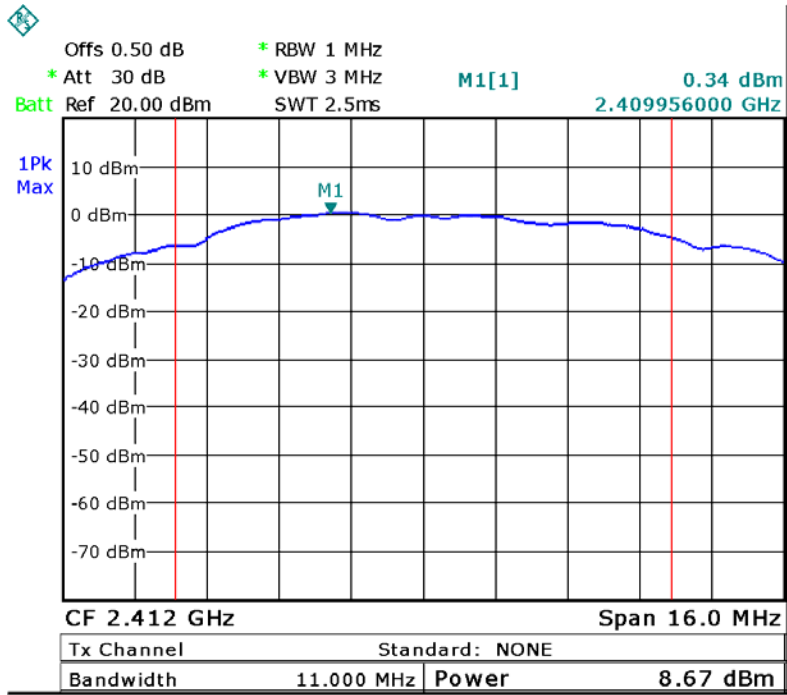
Test mode :TX 11b		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
8.67	7.89	8.49
Limit		
1W/30dBm		

Test mode :TX 11g		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
6.49	7.09	7.42
Limit		
1W/30dBm		

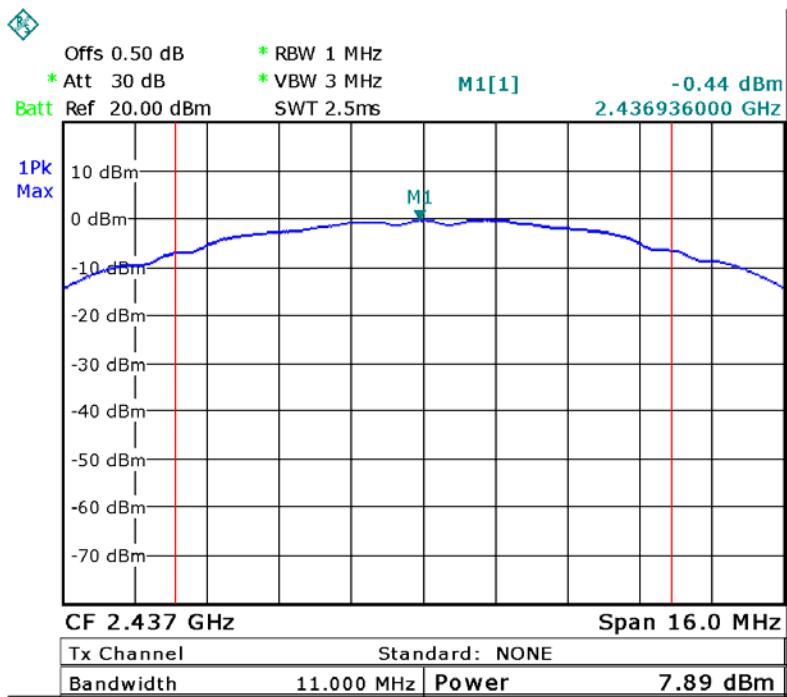
Test mode :TX 11n HT 20		
10 Maximum Peak Output Power (dBm)		
2412MHz	2437MHz	2462MHz
5.77	5.81	5.81
Limit		
1W/30dBm		

Test mode :TX 11n HT 40		
10 Maximum Peak Output Power (dBm)		
2422MHz	2437MHz	2452MHz
4.76	4.72	4.77
Limit		
1W/30dBm		

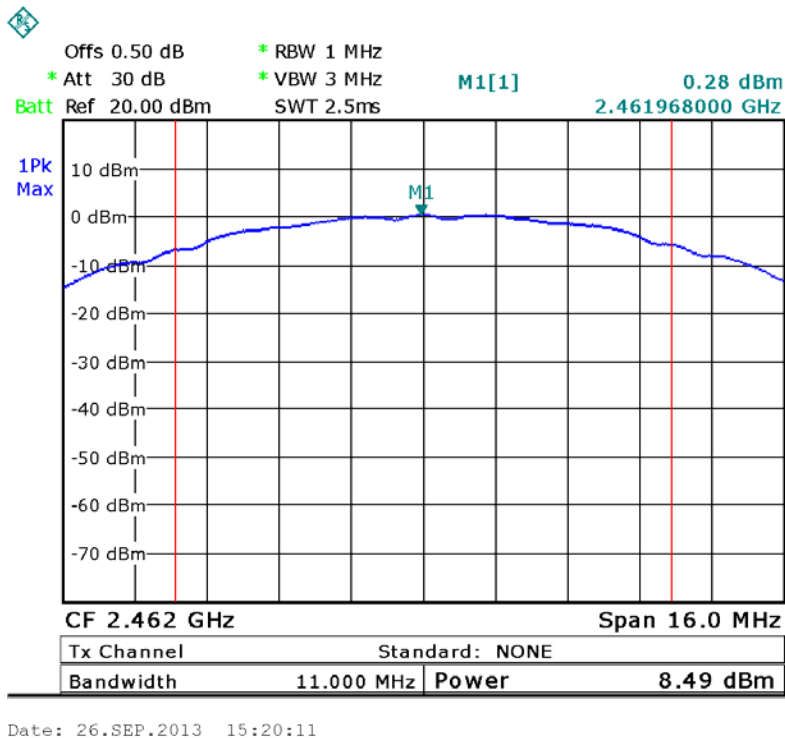
Test mode :TX 11b



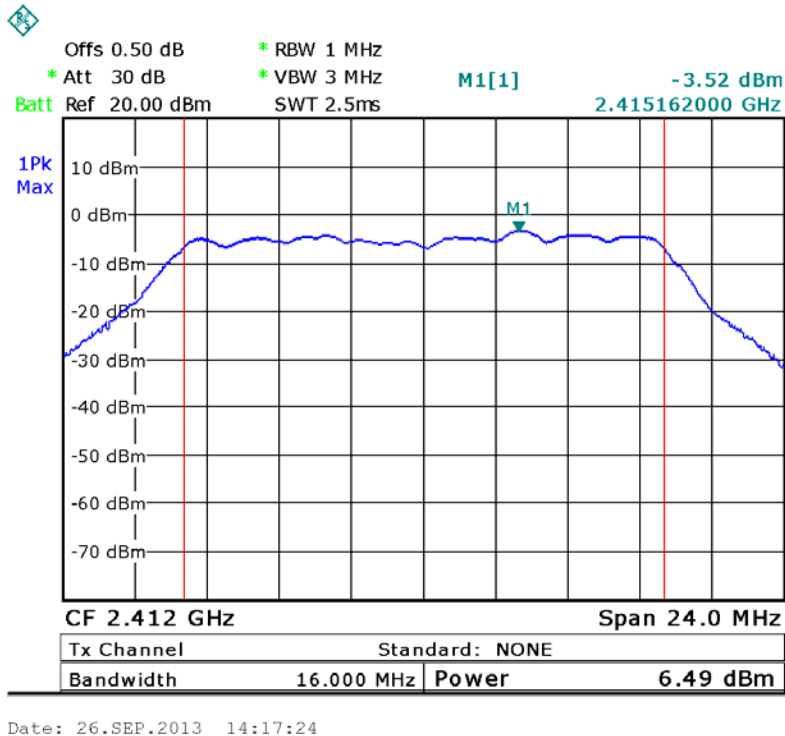
Date: 26.SEP.2013 15:18:27

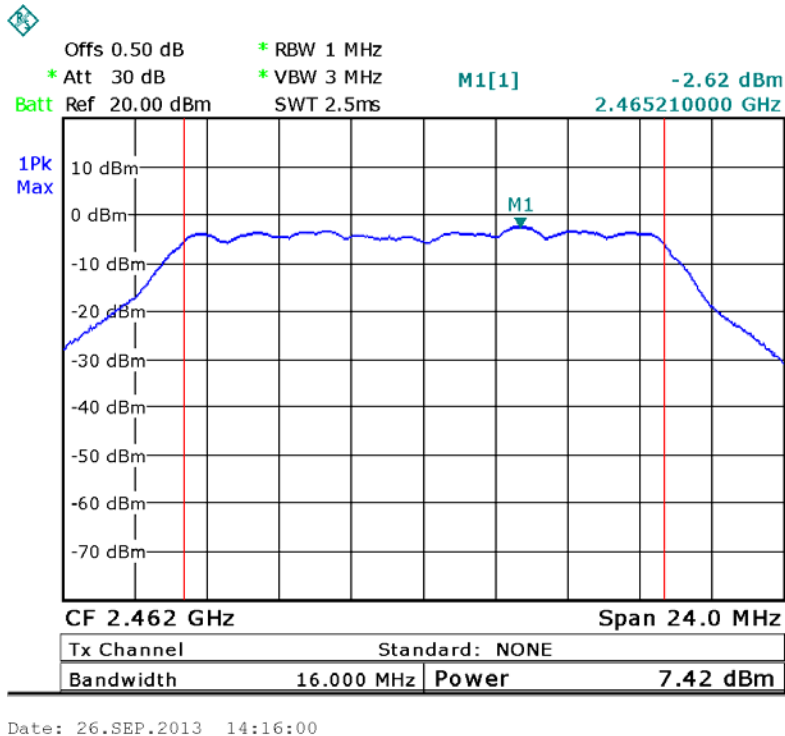
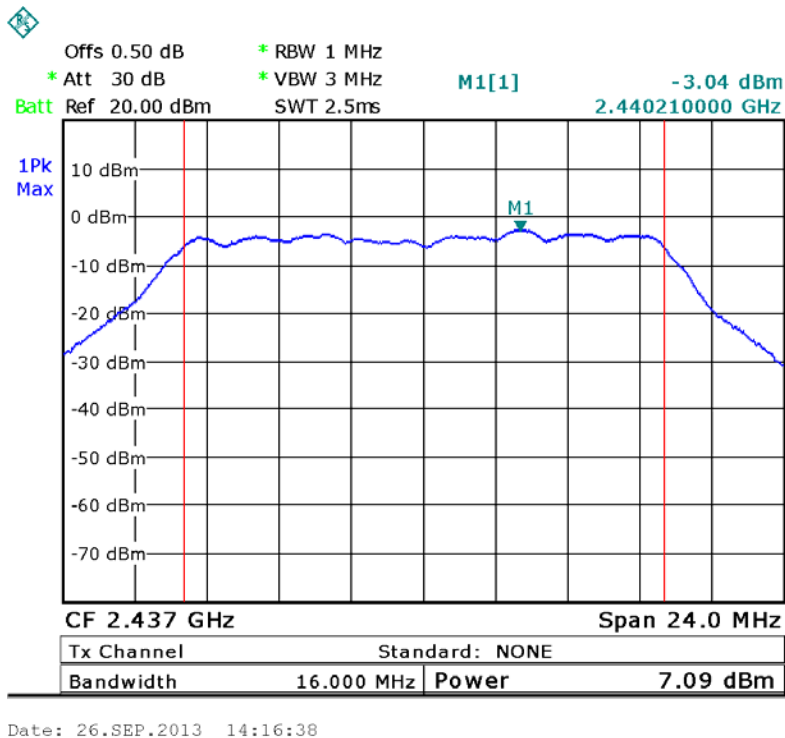


Date: 26.SEP.2013 15:19:31

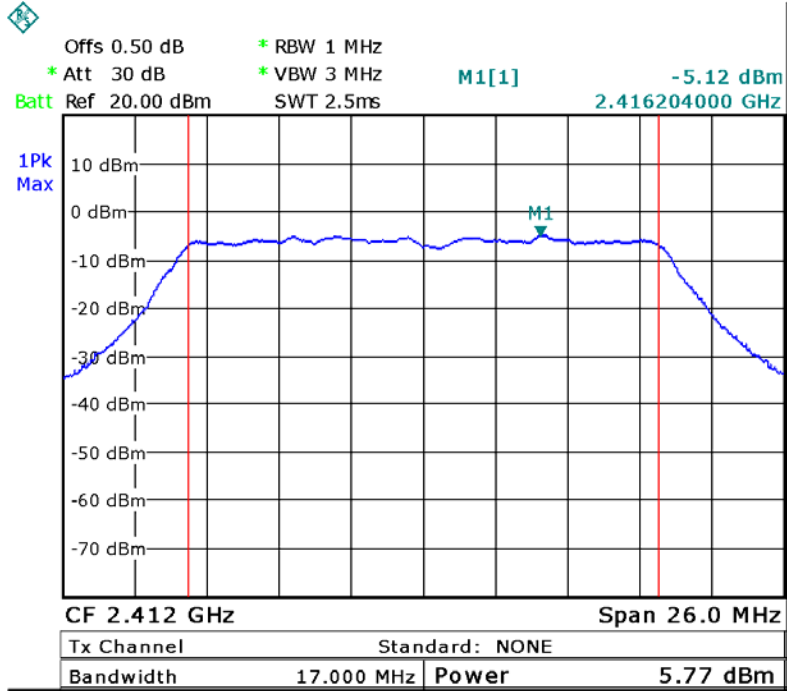


Test mode :TX 11g

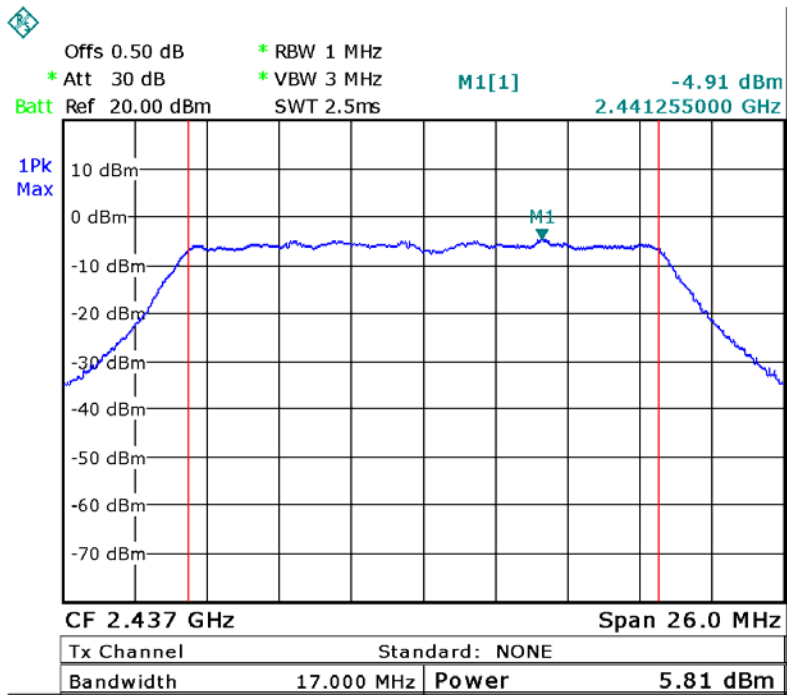




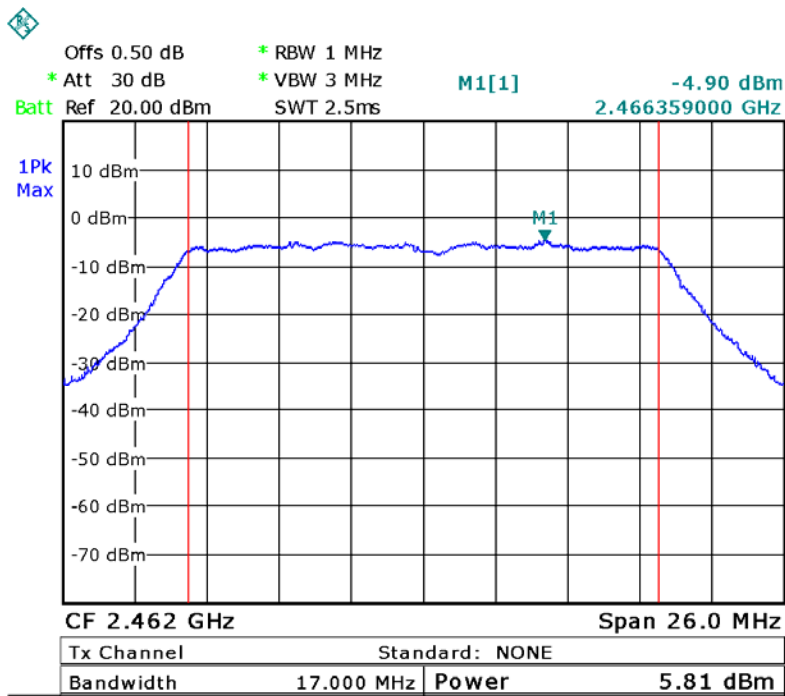
Test mode :TX 11n HT 20



Date: 26.SEP.2013 12:09:43

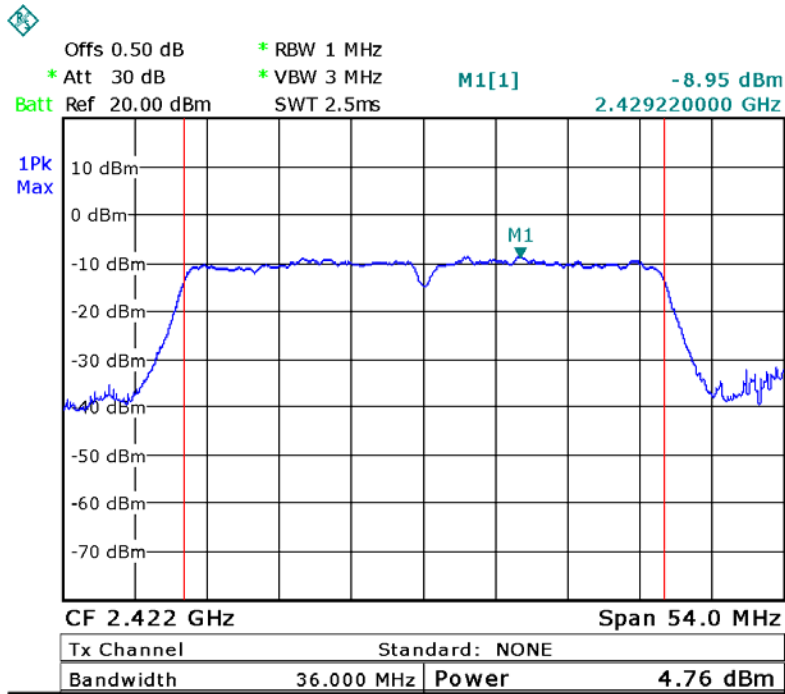


Date: 26.SEP.2013 12:10:17

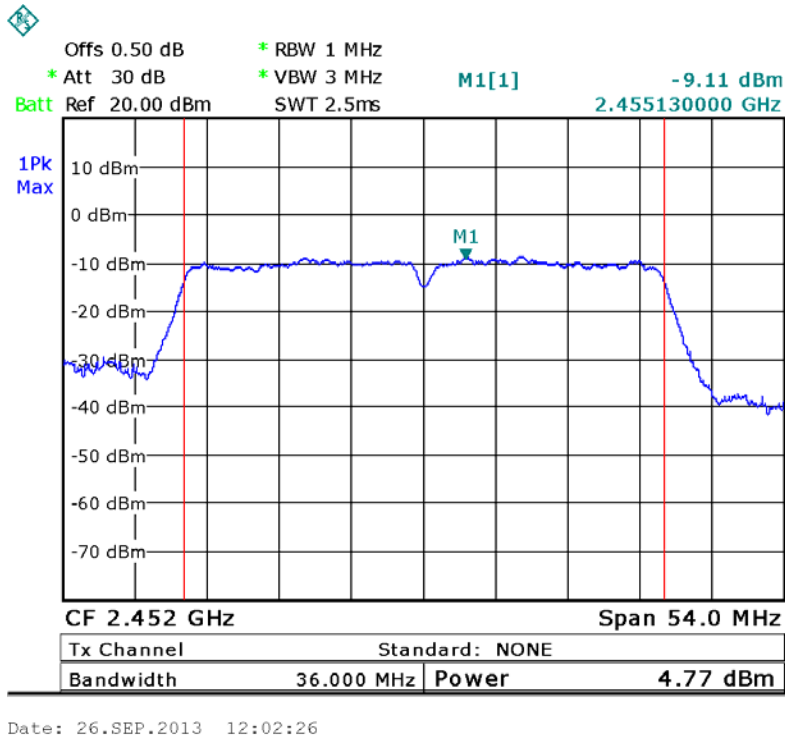
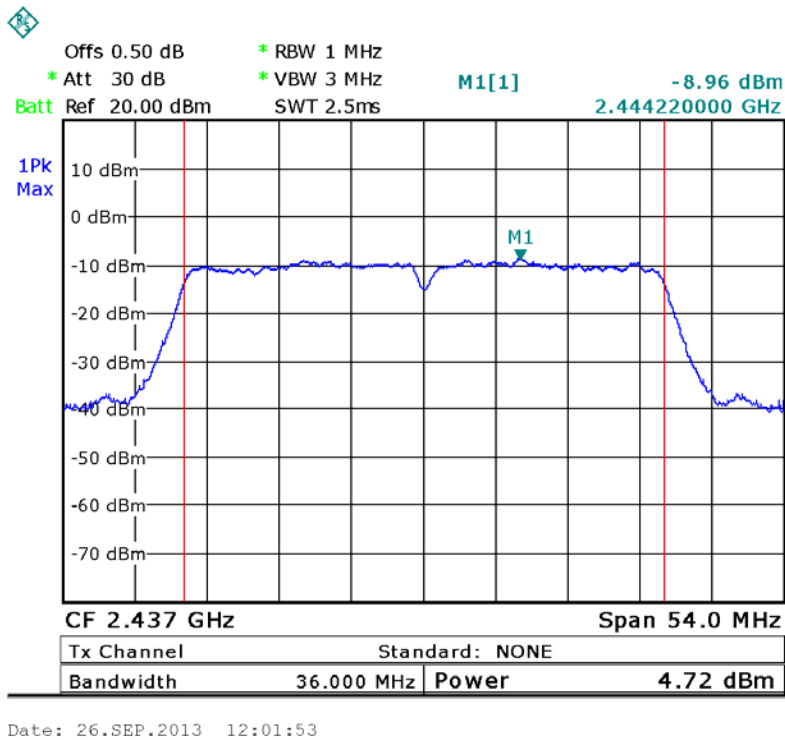


Date: 26.SEP.2013 12:10:50

Test mode :TX 11n HT 40



Date: 26.SEP.2013 12:00:12



11 Power Spectral density

Test Requirement: FCC CFR47 Part 15 Section 15.247

Test Method: KDB558074 D01 v03r01 04/09/2013

11.1 Test Procedure:

KDB558074 D01 V02 10/04/2012 section 9.1 Option 1

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:

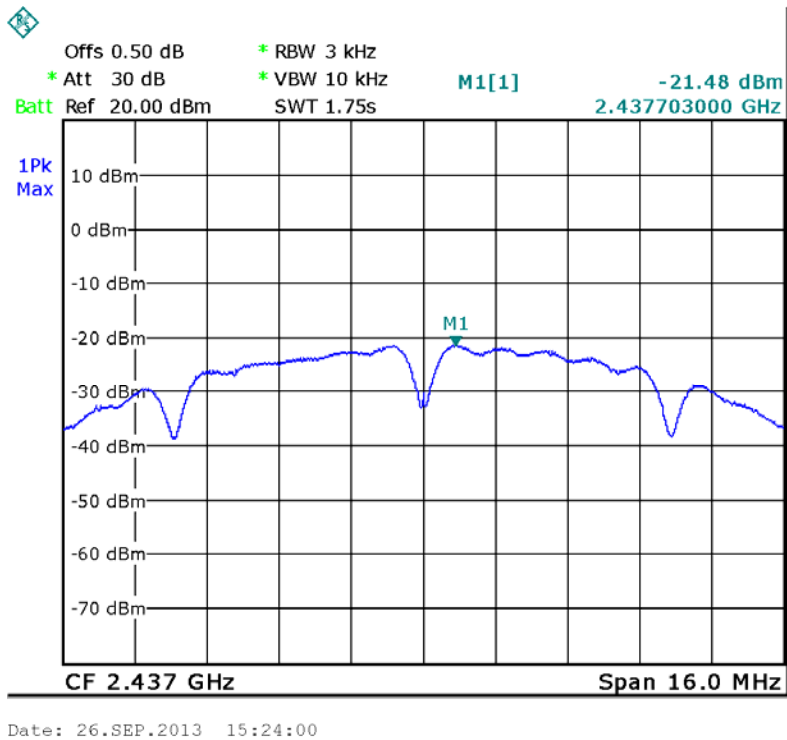
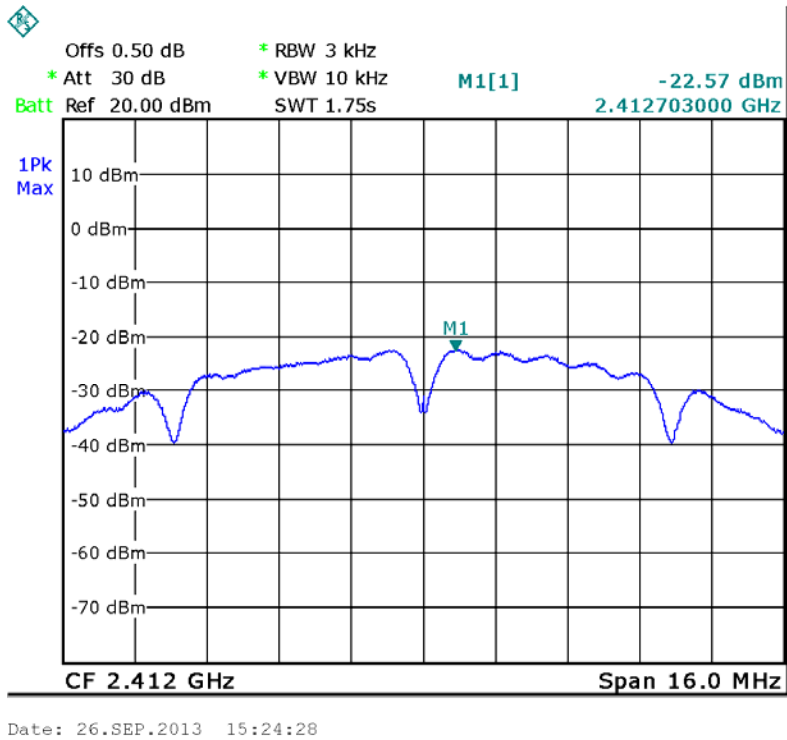
Test mode :TX 11b		
10 Maximum Peak Output Power (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-22.57	-21.48	-20.92
Limit		
8dBm per 3kHz		

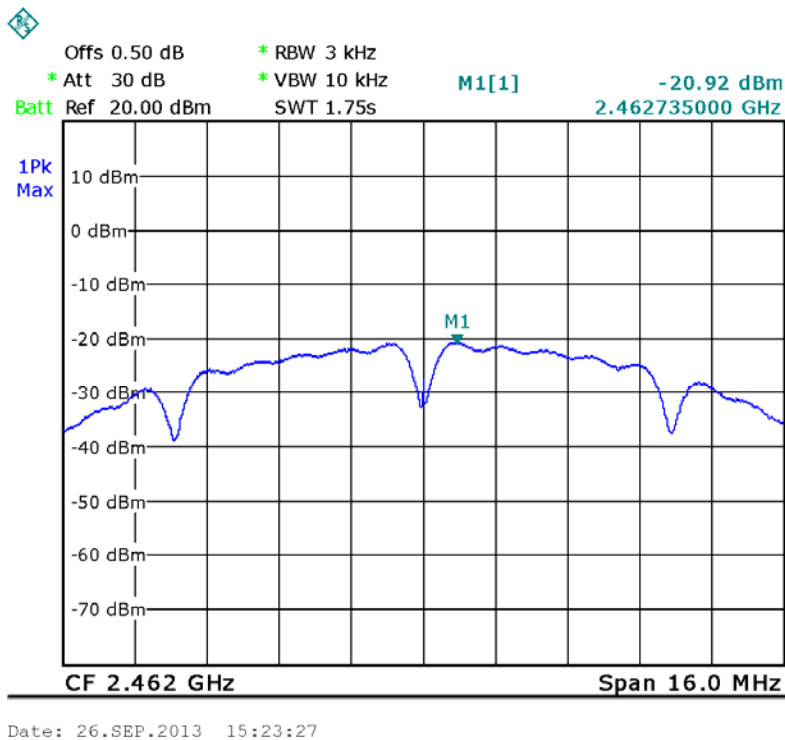
Test mode :TX 11g		
10 Maximum Peak Output Power (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-22.34	-22.04	-22.08
Limit		
8dBm per 3kHz		

Test mode :TX 11n HT 20		
10 Maximum Peak Output Power (dBm per 3kHz)		
2412MHz	2437MHz	2462MHz
-24.04	-24.37	-24.48
Limit		
8dBm per 3kHz		

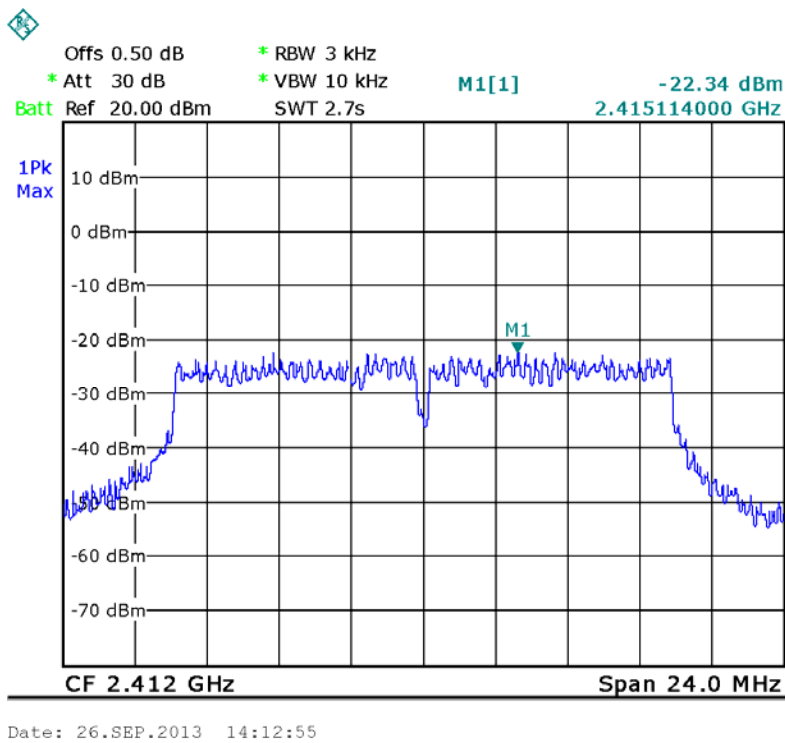
Test mode :TX 11n HT 40		
10 Maximum Peak Output Power (dBm per 3kHz)		
2422MHz	2437MHz	2452MHz
-20.06	-19.35	-19.95
Limit		
8dBm per 3kHz		

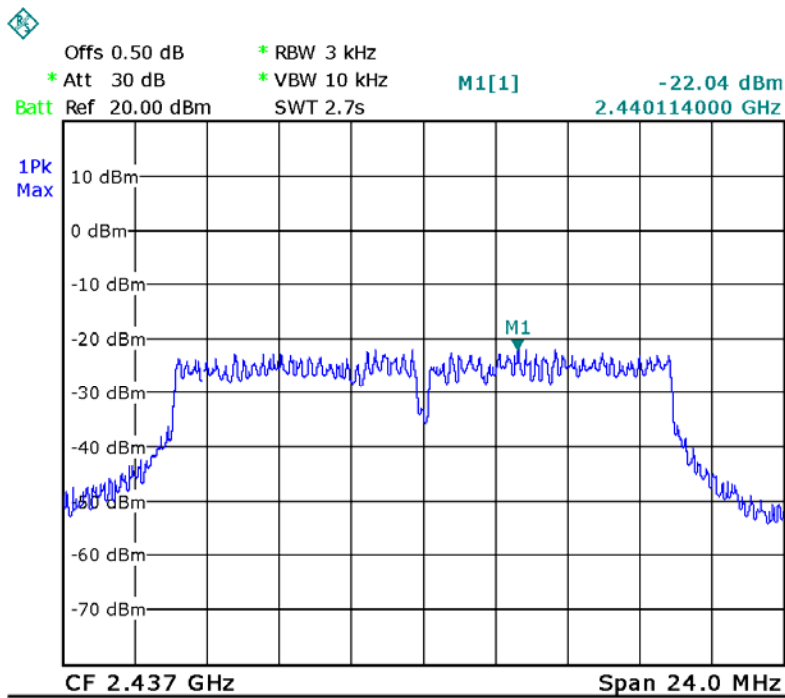
Test mode :TX 11b



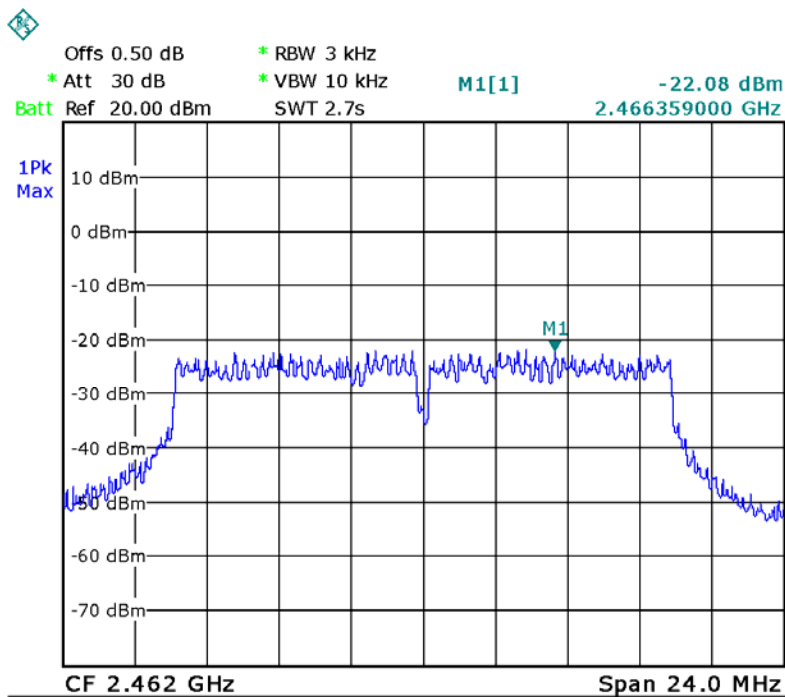


Test mode :TX 11g



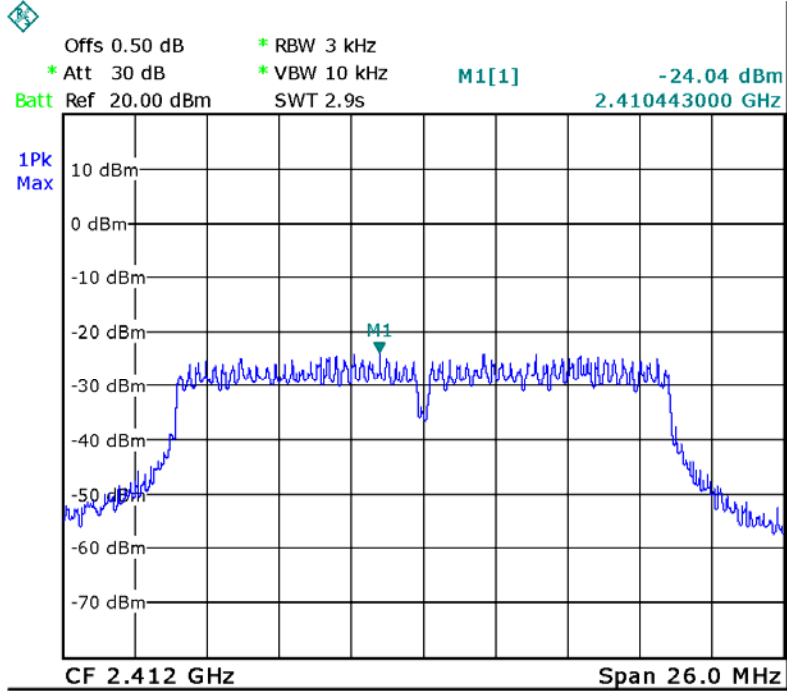


Date: 26.SEP.2013 14:13:28

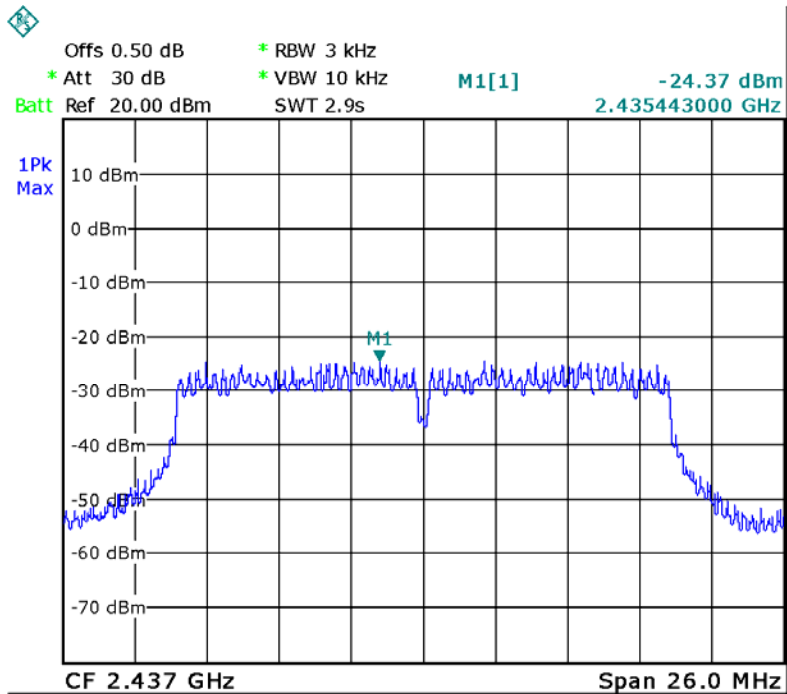


Date: 26.SEP.2013 14:14:11

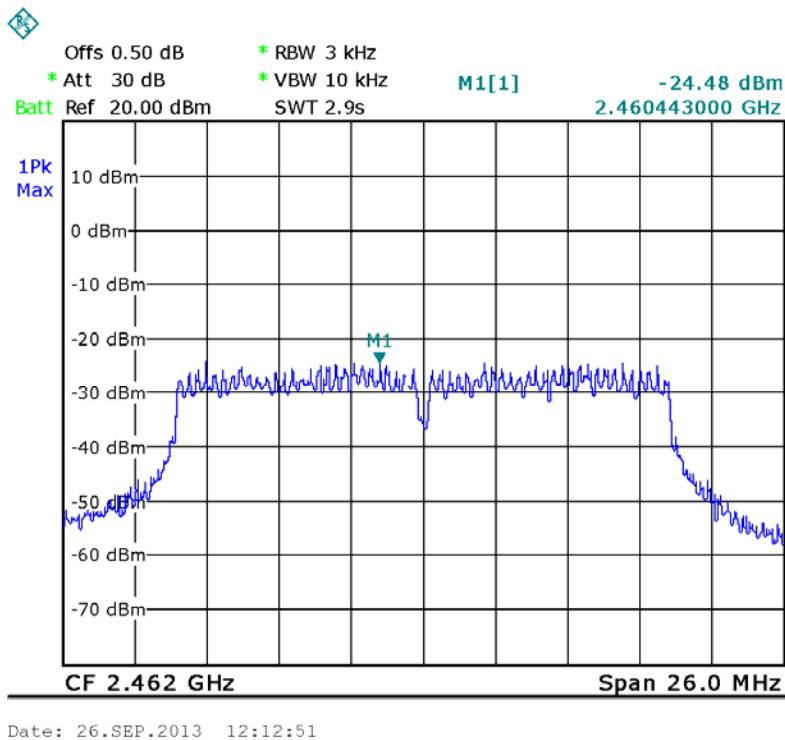
Test mode :TX 11n HT 20



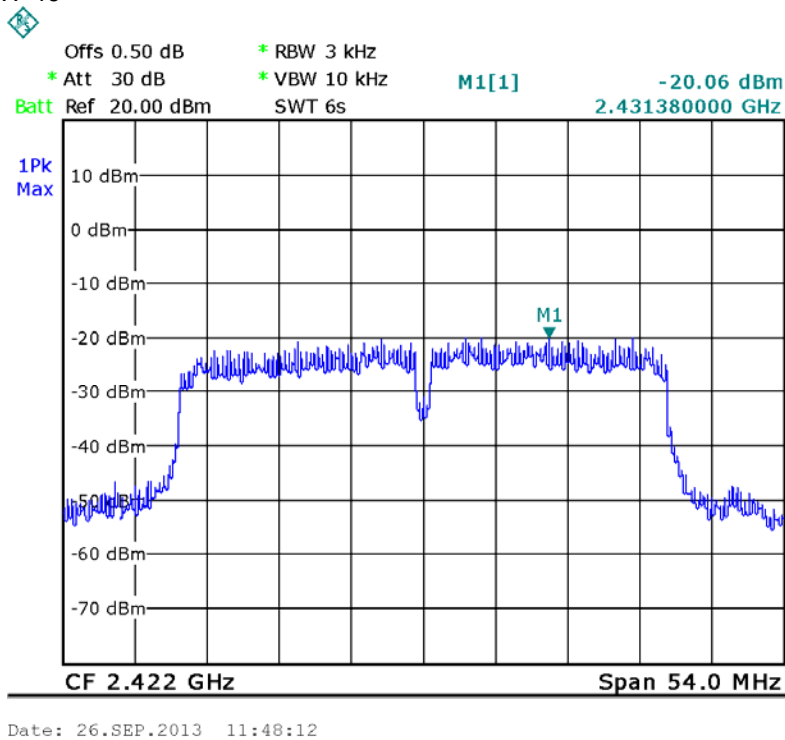
Date: 26.SEP.2013 12:17:31

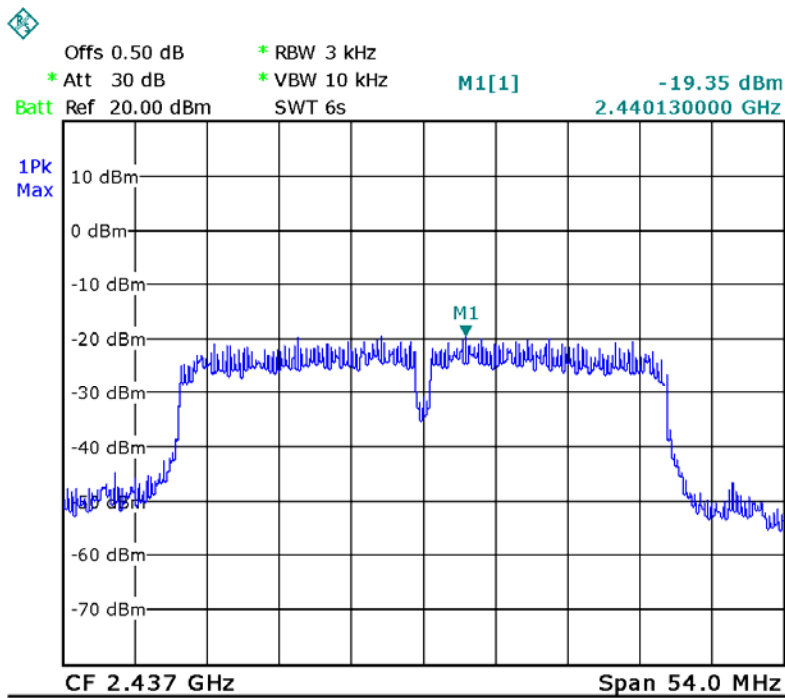


Date: 26.SEP.2013 12:14:47

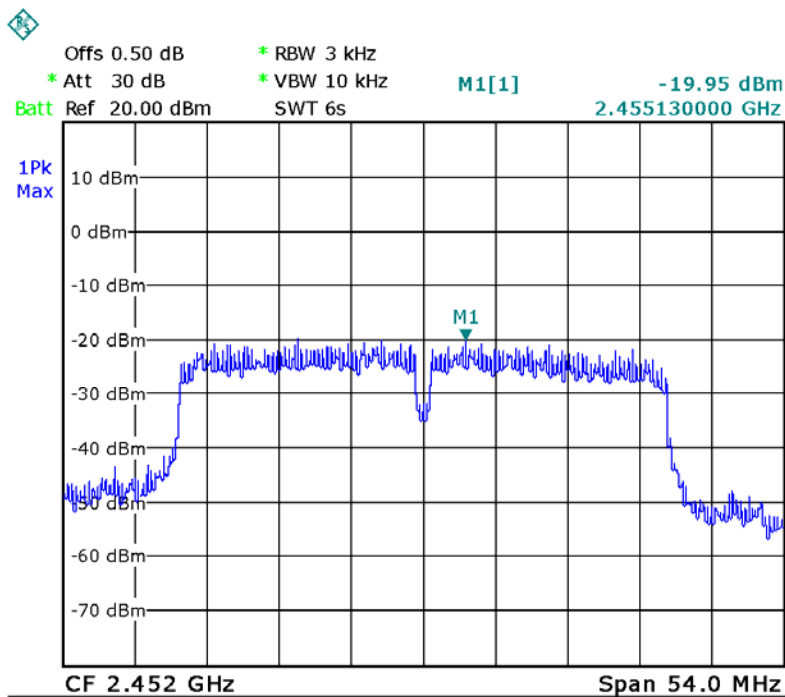


Test mode :TX 11n HT 40





Date: 26.SEP.2013 11:46:36



Date: 26.SEP.2013 11:44:32

12 Emissions from out of band

Test Requirement:	FCC CFR47 Part 15 Section 15.247(d)
Test Method:	KDB558074 D01 v03r01
Test Limit:	Emissions produced by the device outside the authorized frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the fundamental.
Test Mode:	Test in fixing operating frequency at lower, middle, upper channel.

12.1 Test Procedure:

KDB558074 D01 v03r01 04/09/2013 section 10.1 clause1

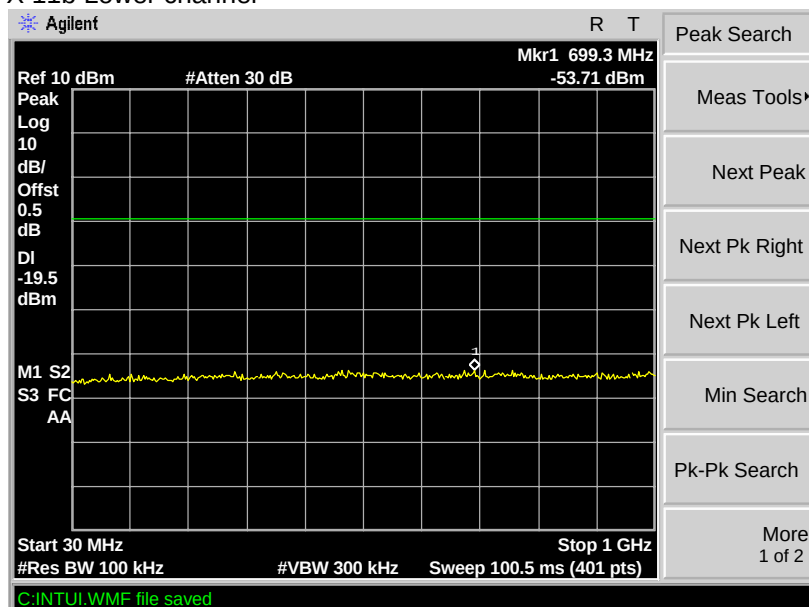
The maximum peak conducted output power procedure was used to demonstrate compliance to 15.247(b)(3) requirements, then the peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz. This measurement was performed over a frequency range that spans from the lowest frequency generated in the device up to and including the tenth harmonic of the highest fundamental frequency.

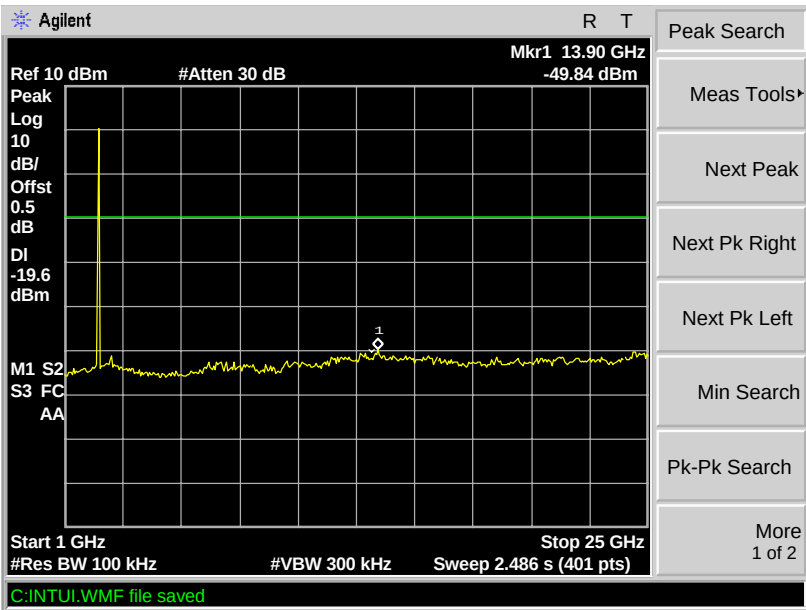
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set to span from the lowest frequency generated in the device up to and including the tenth harmonic of the highest fundamental frequency
3. For below 1GHz, Set RBW = 100kHz and VBW = 100kHz. Sweep = auto. For above 1GHz, Set RBW = 100kHz and VBW = 100kHz. Sweep = auto.
4. mark the worst point and record.

12.2 Test Result:

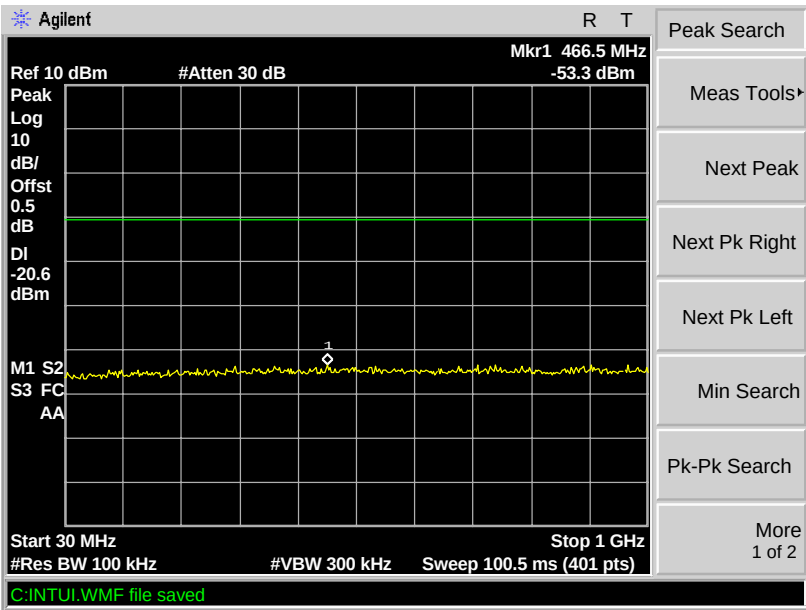
Remark: For emissions below 30MHz, no emission higher than background level, so the data does not show in the report.

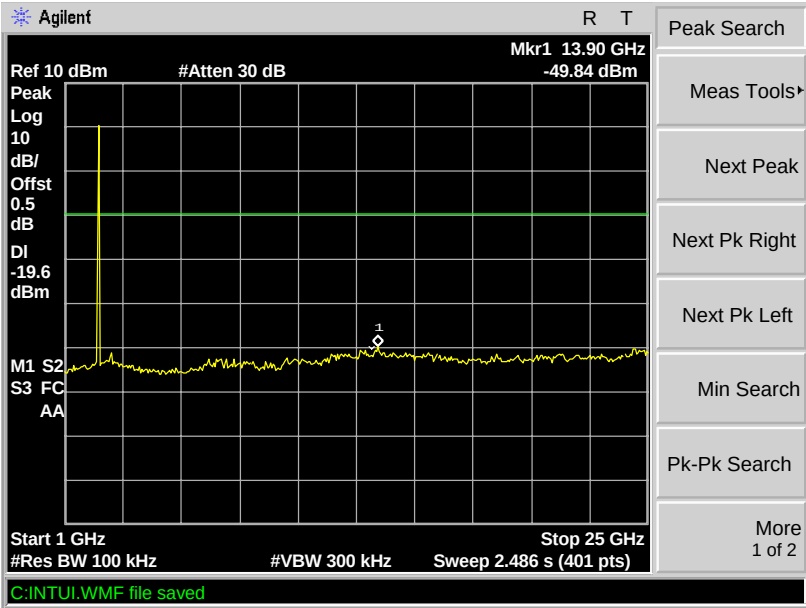
Test mode :TX 11b Lower channel



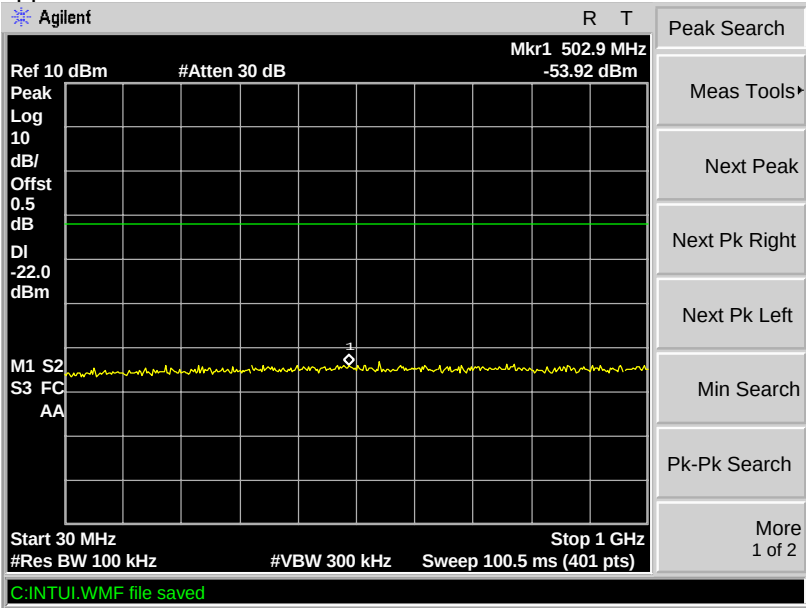


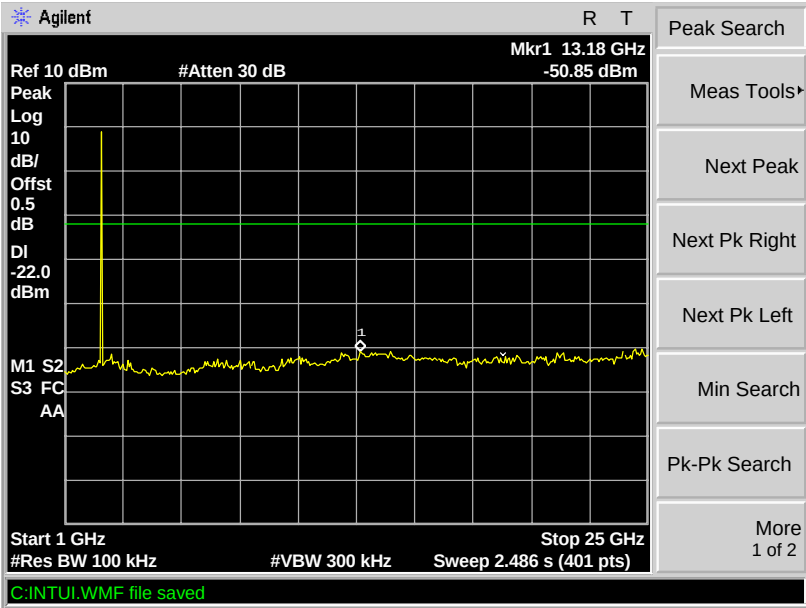
Test mode :TX 11b Middle channel



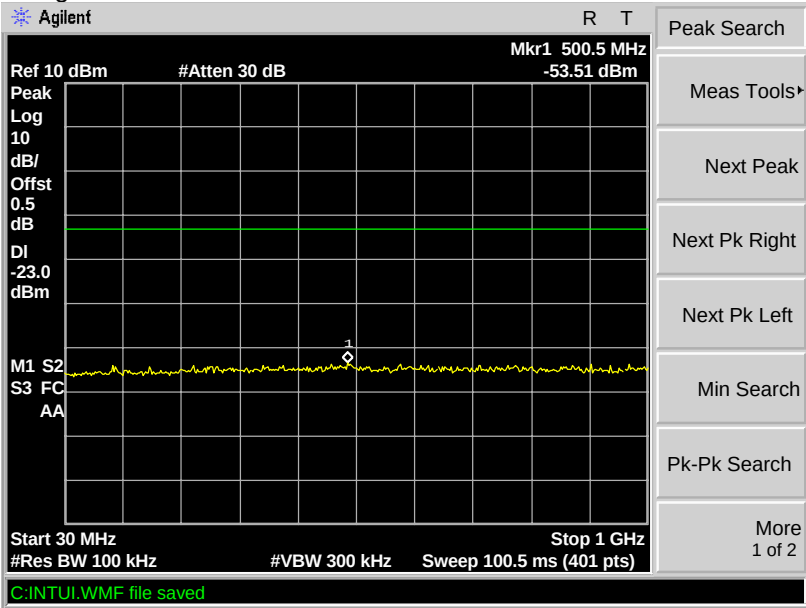


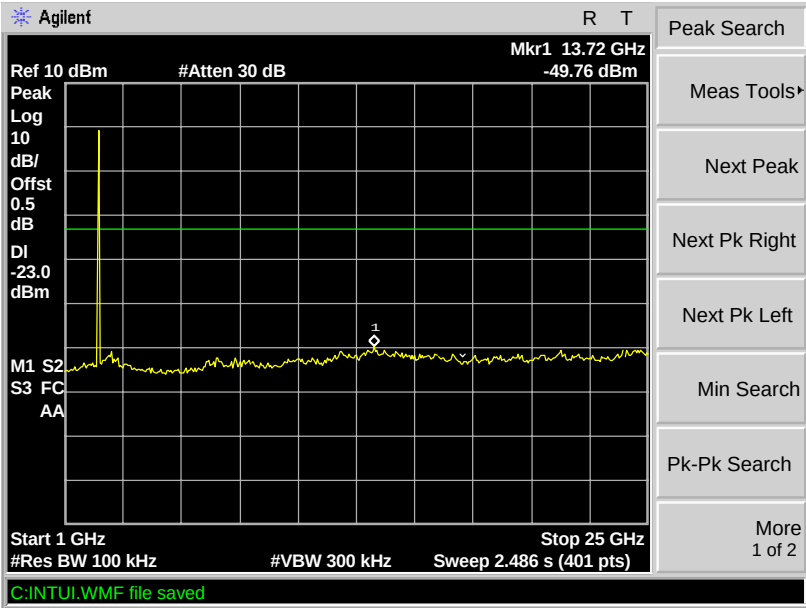
Test mode :TX 11b Upper channel



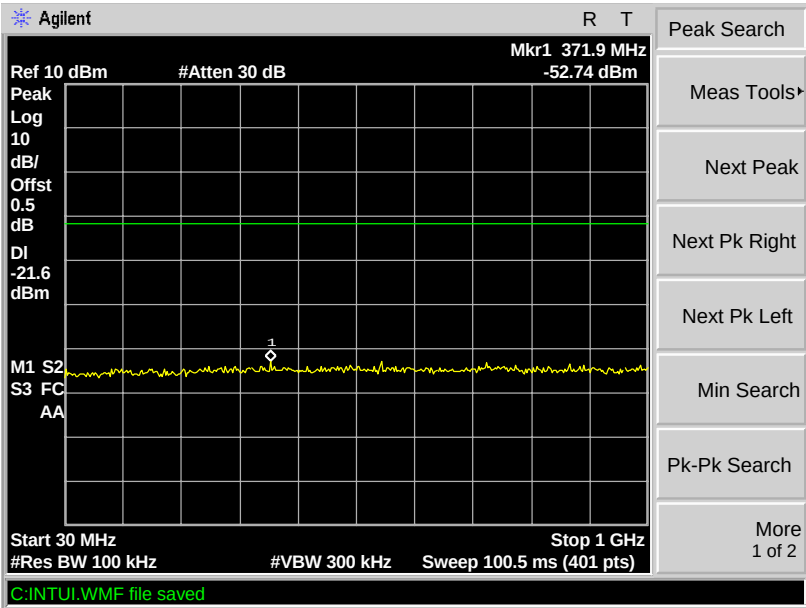


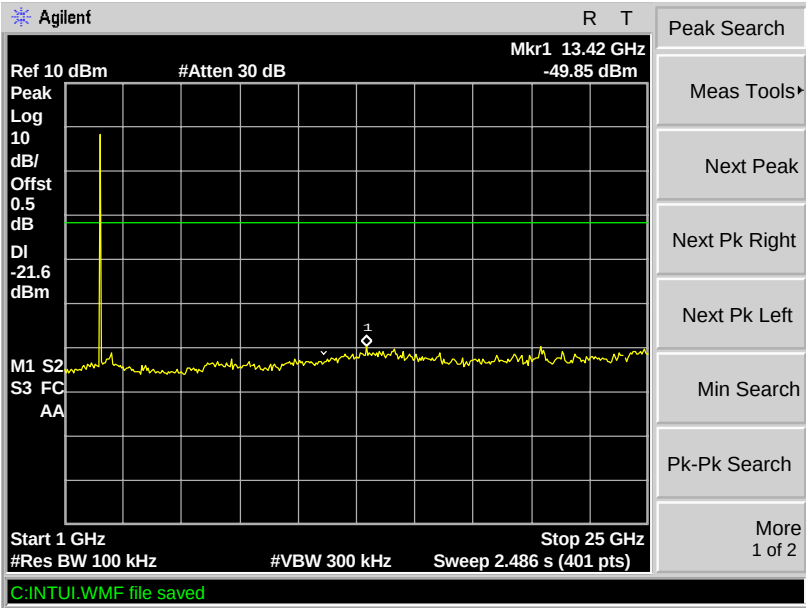
Test mode :TX 11g Lower channel



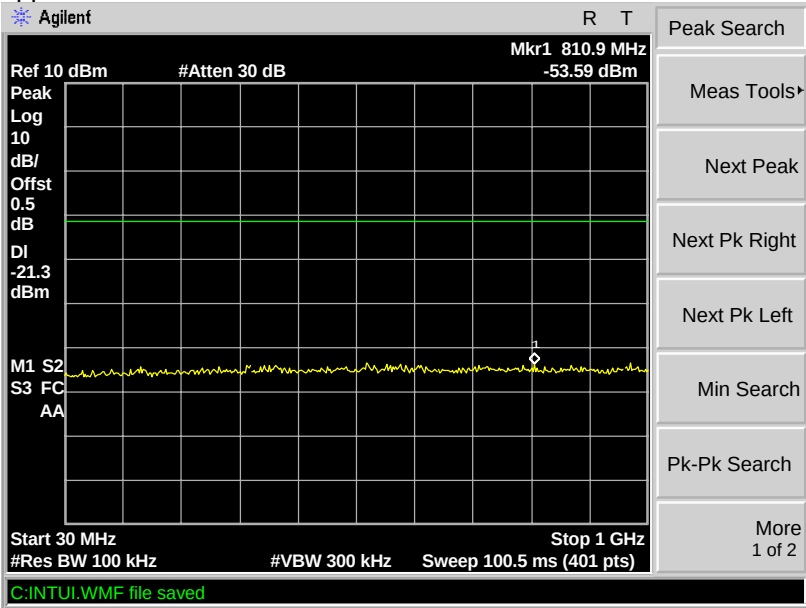


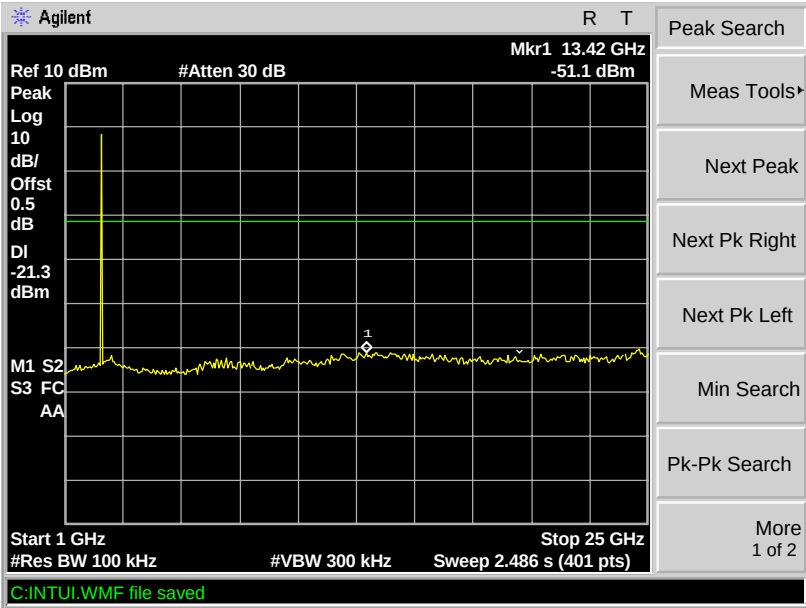
Test mode :TX 11g Middle channel



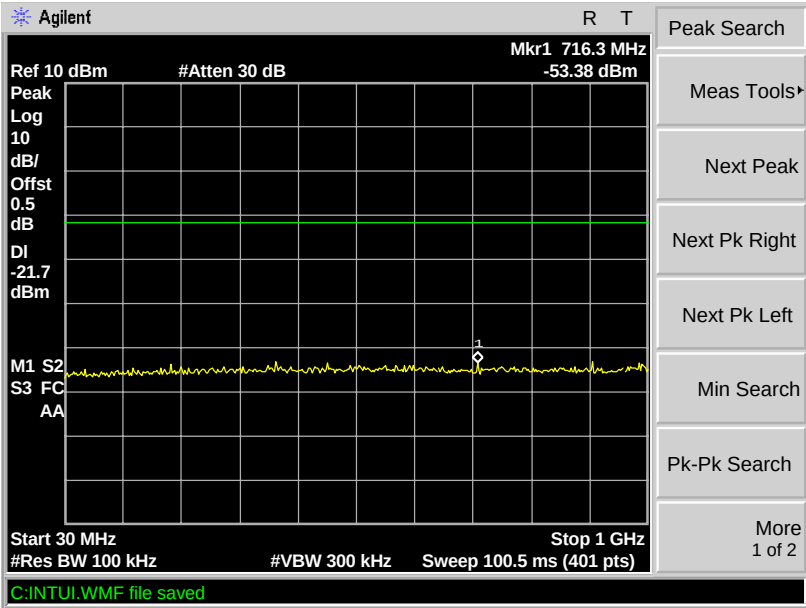


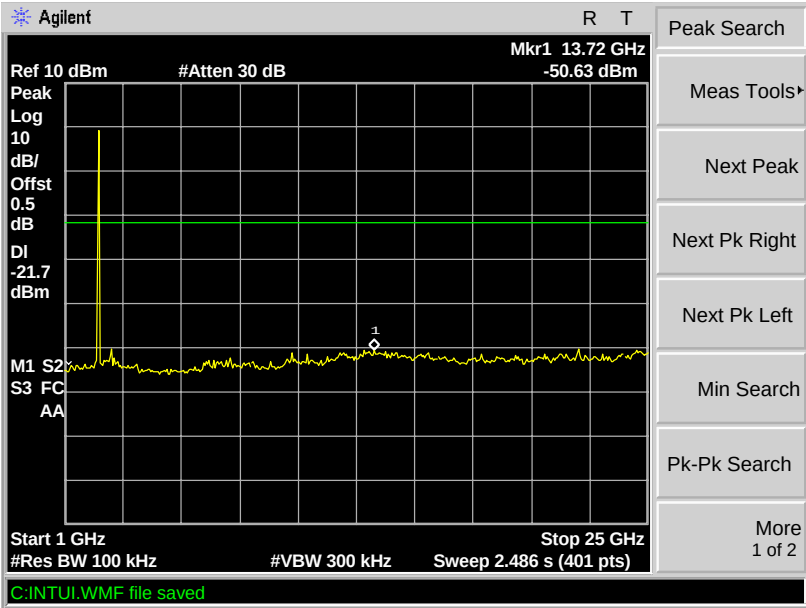
Test mode :TX 11g Upper channel



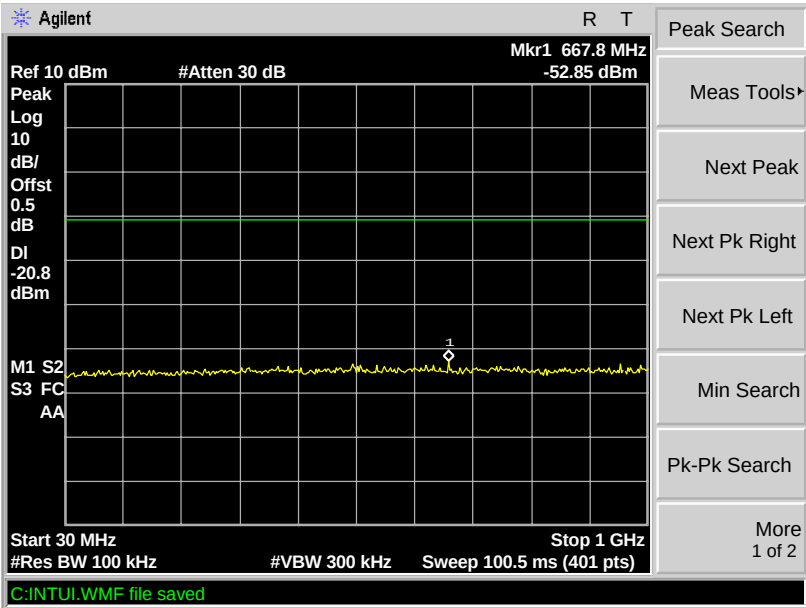


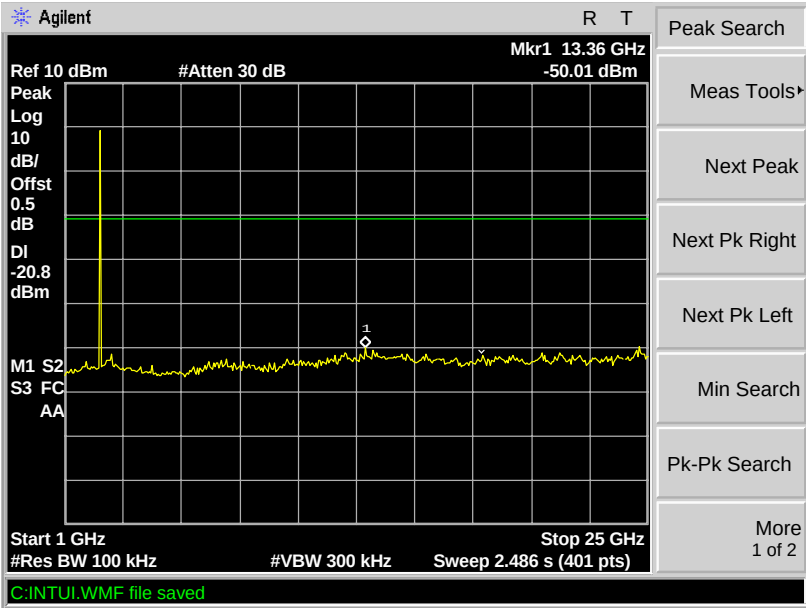
Test mode :TX 11n HT20 Lower channel



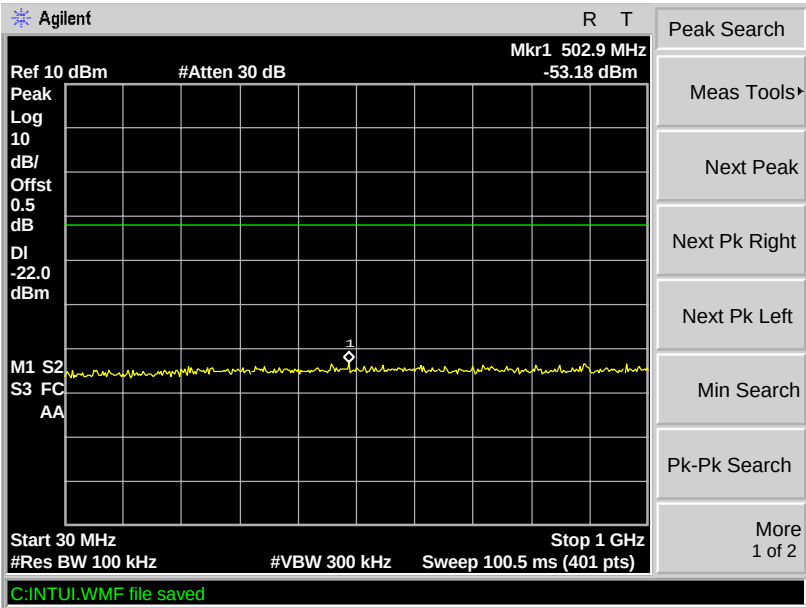


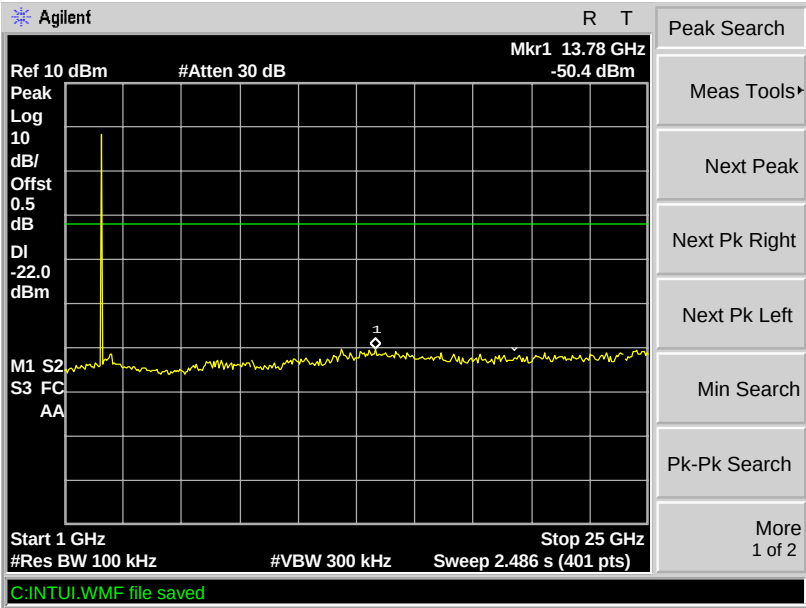
Test mode :TX 11n HT20 Middle channel



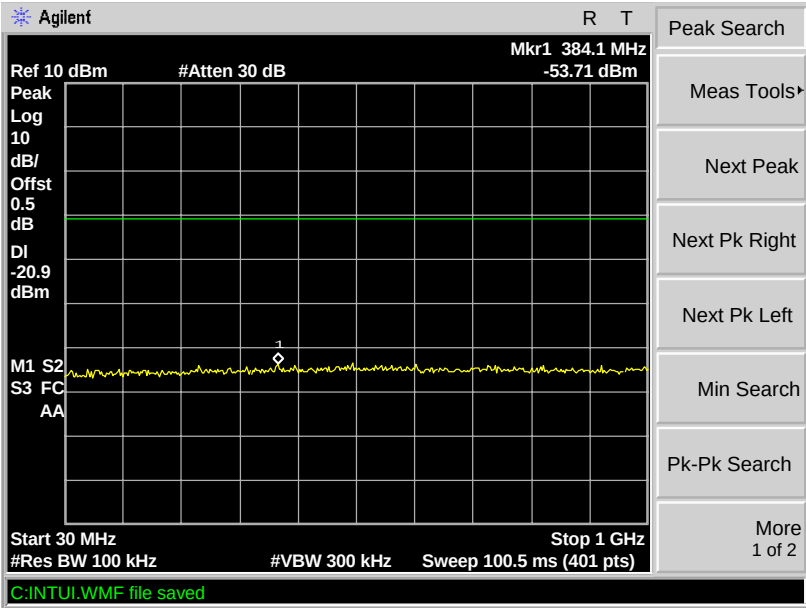


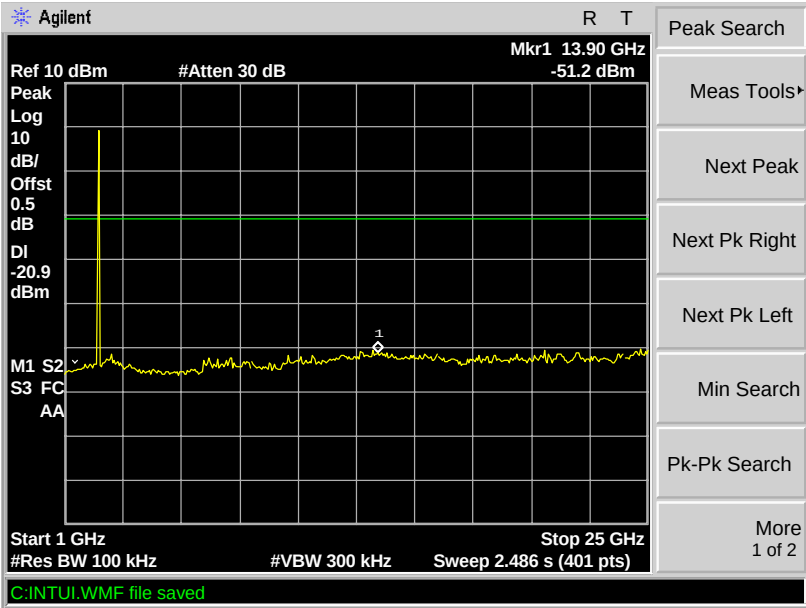
Test mode :TX 11n HT20 Upper channel



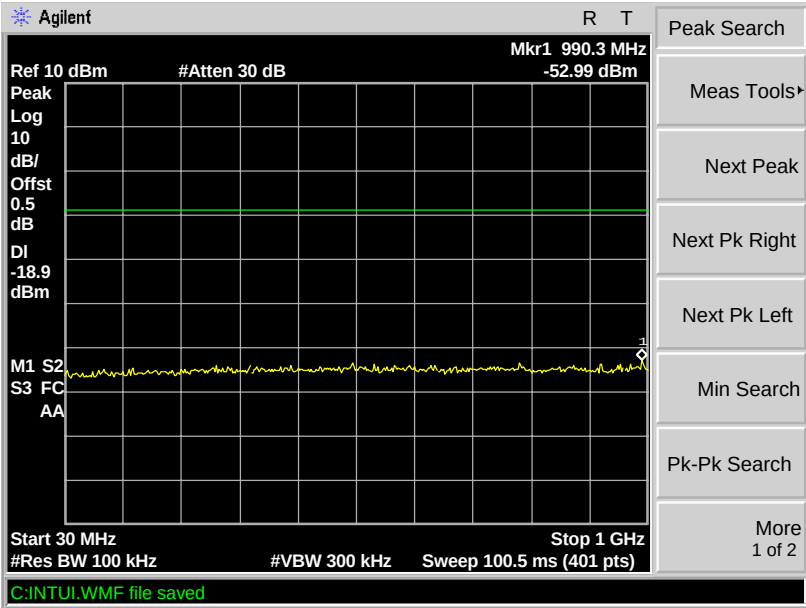


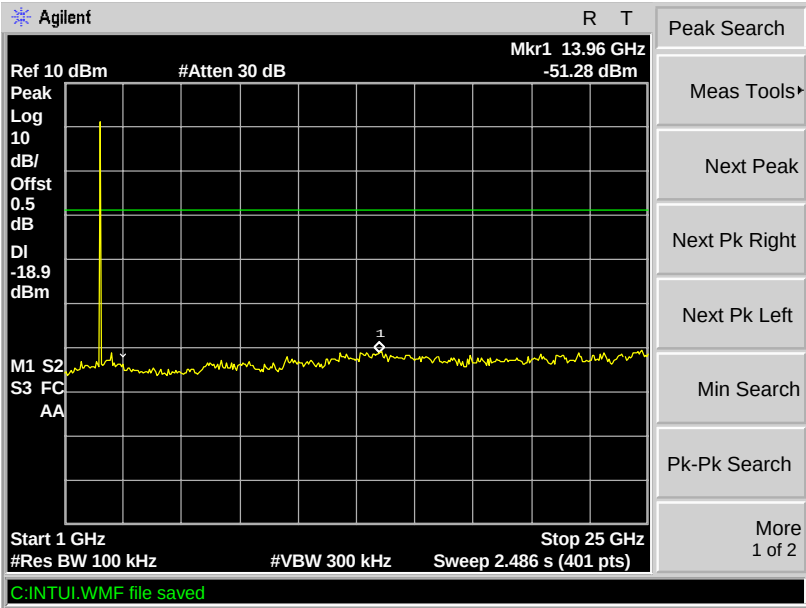
Test mode :TX 11n HT40 Lower channel



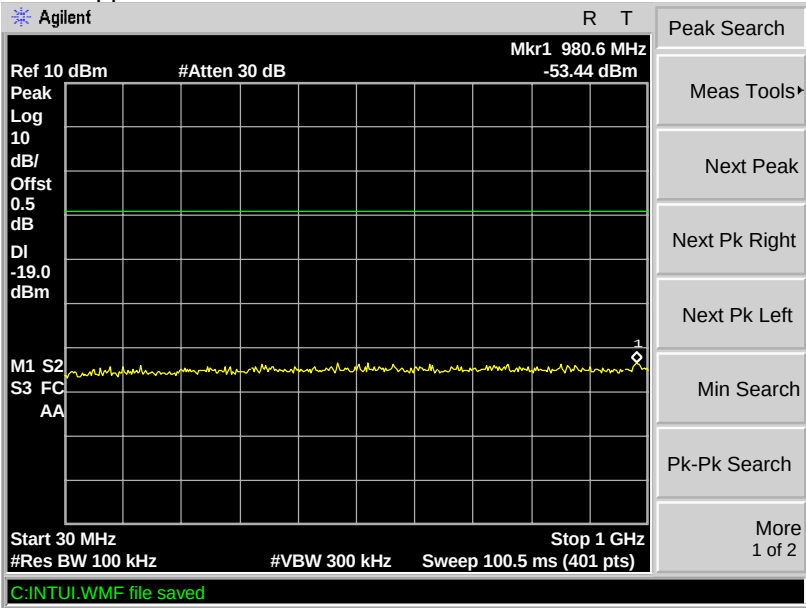


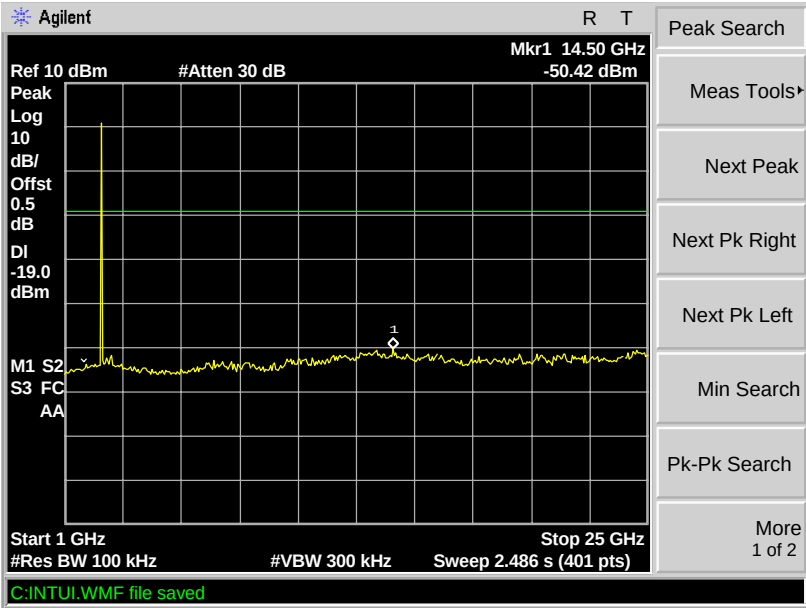
Test mode : TX 11n HT40 Middle channel





Test mode : TX 11n HT40 Upper channel





13 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 internal antenna, fulfill the requirement of this section.

14 RF Exposure

Test Requirement:	FCC Part 1.1307
Test Method	KDB 447498 D01 General RF Exposure Guidance v05
Test Mode:	The EUT work in test mode(Tx).

14.1 Requirments:

- 1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

$[(\text{max. power of channel, including tune-up tolerance, mW})/(\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

14.2 Test Result

Conducted Peak power(mW)	Source-based time-averaged maximum conducted output power(mW)	Minimum test separation distance required for the exposure conditions (mm)	SAR Test Exclusion Thresholds(mW)
7.362	7.362	5	10

Remark:Duty factor is 100%.

Calculation formula: Source-based time-averaged maximum conducted output power(mW)

=Conducted peak power(mW)*Duty factor

15 Photographs – Test Setup

15.1 Conducted Emission

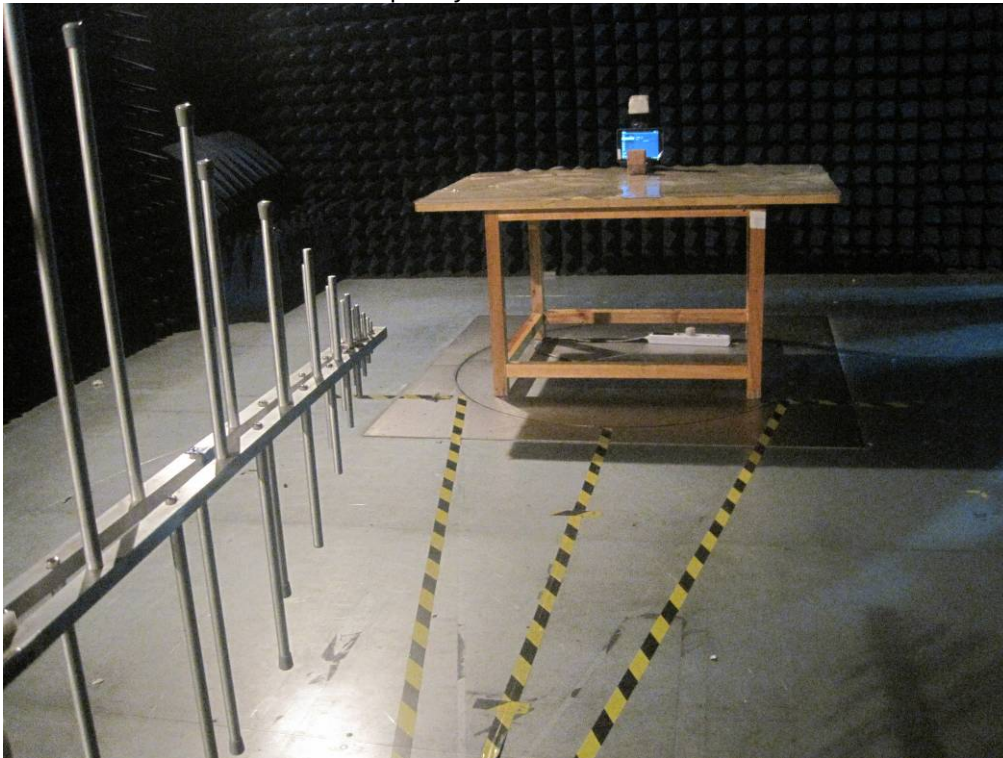


15.2 Radiated Emission

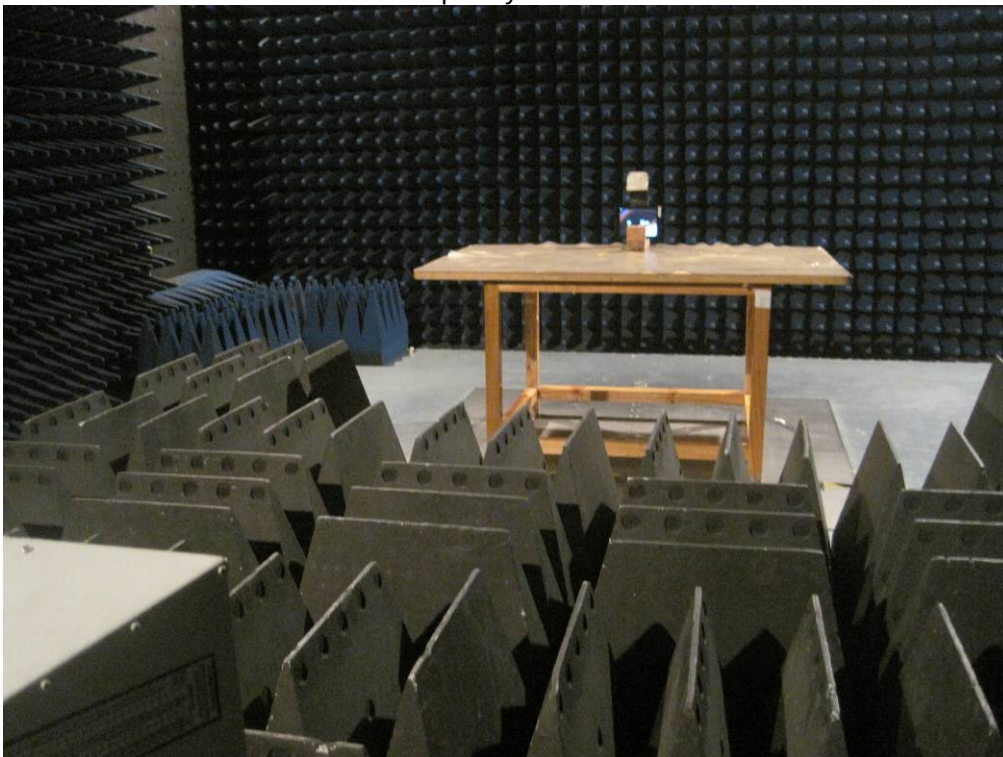
Test frequency below 30MHz



Test frequency from 30MHz to 1GHz



Test frequency above 1GHz



16 Photographs - Constructional Details

16.1 EUT – External View



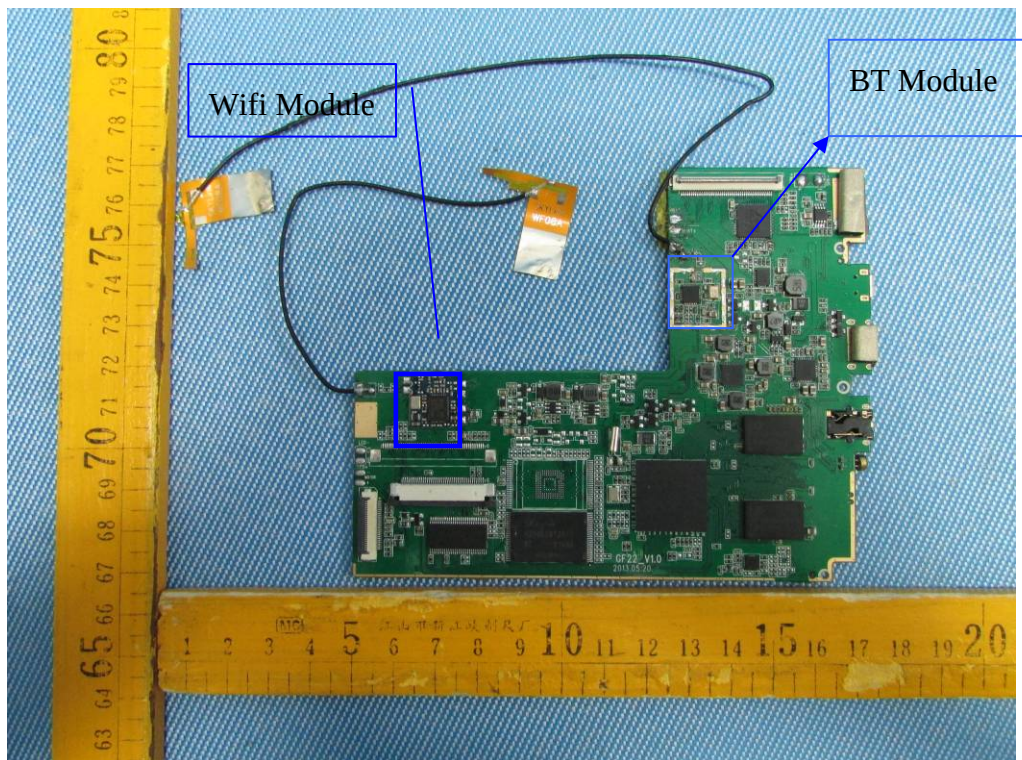


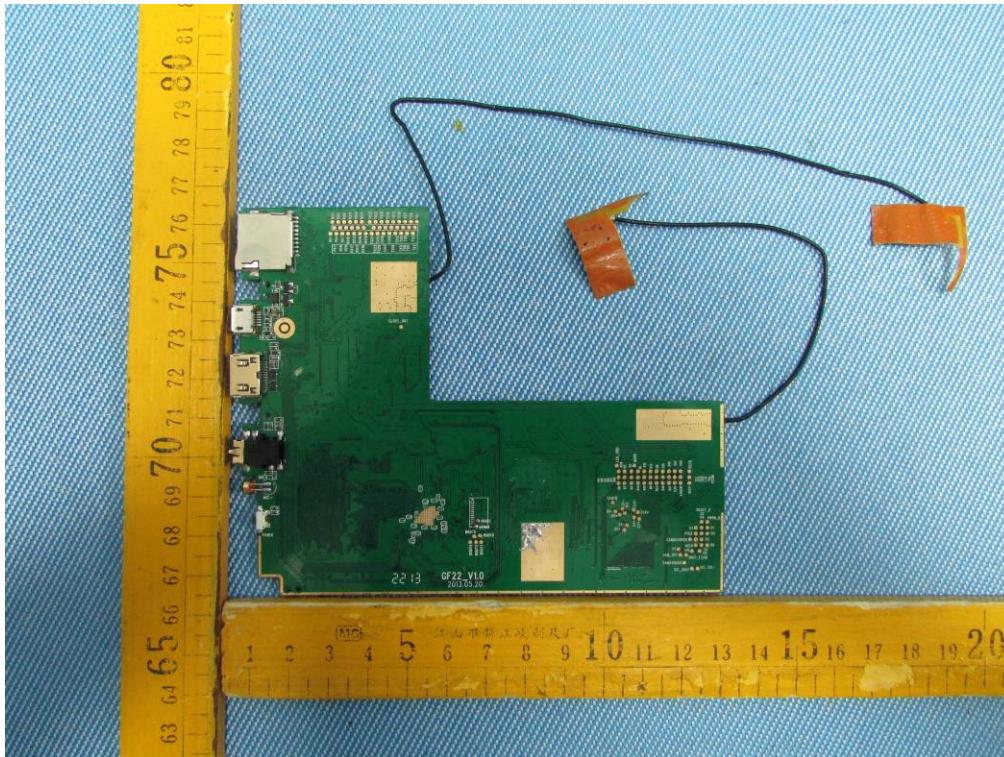




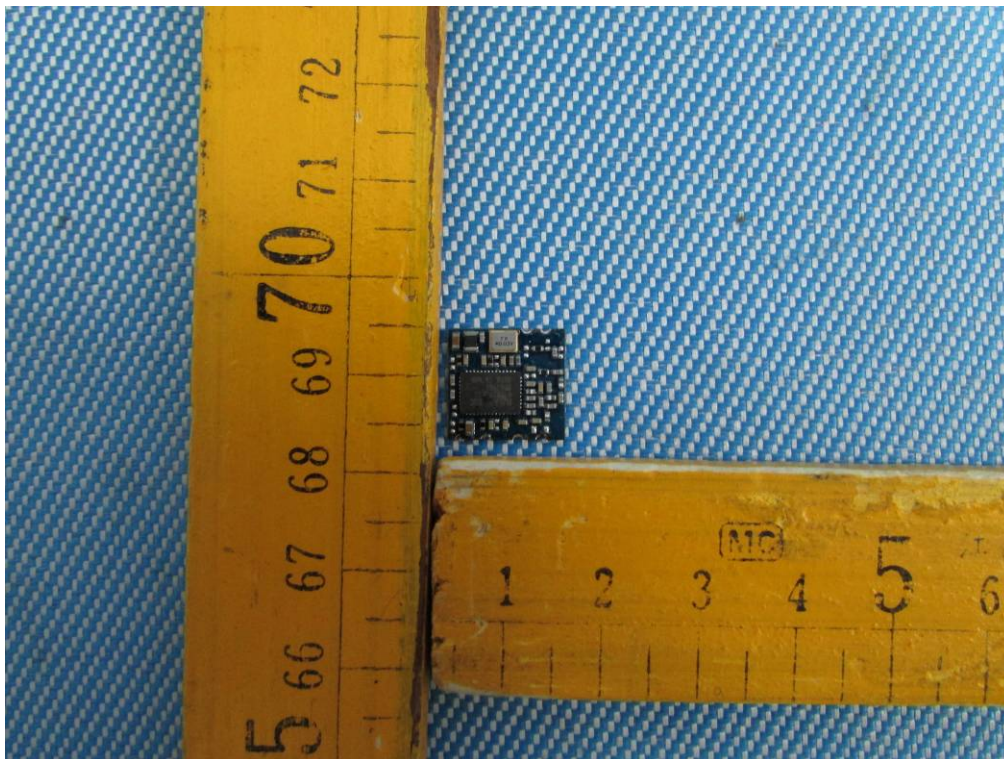
16.2 EUT – Internal View



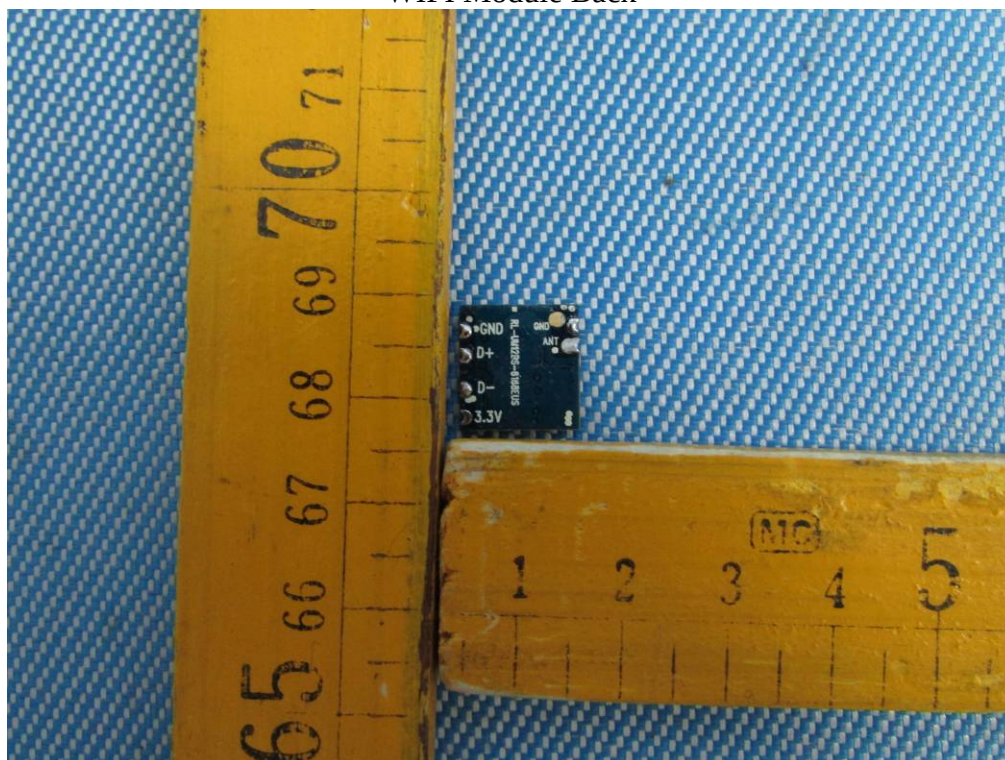




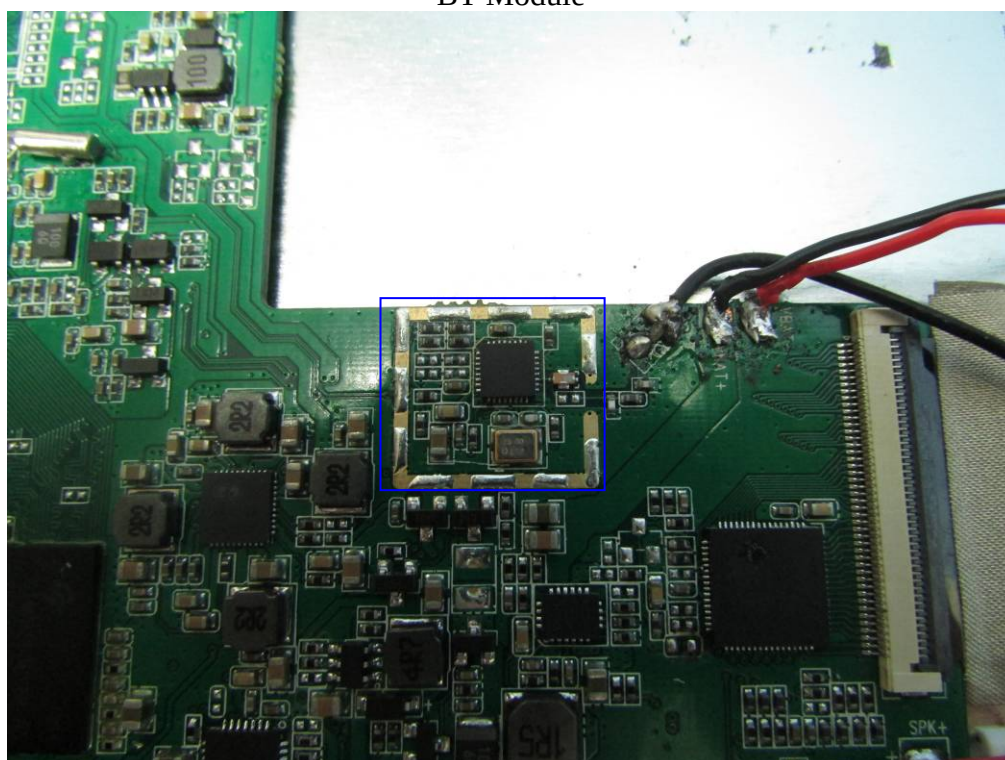
WIFI Module Front



WIFI Module Back



BT Module



==End of test report==