



TEST REPORT

Report Reference No...... : **TRE1607011701** R/C.....:16340

FCC ID..... : **S8J-R8801MS1**

Applicant's name..... : **Shenzhen Bilian Electronic Co., Ltd.**

Address..... : Building B1,Zhongxing Industrial Zone,Juling,Jutang Community,
Guanlan street,Bao'an, Shenzhen,Guangdong,P.R.China

Manufacturer..... : Shenzhen Bilian Electronic Co., Ltd.

Address..... : Building B1,Zhongxing Industrial Zone,Juling,Jutang Community,
Guanlan street,Bao'an, Shenzhen,Guangdong,P.R.China

Test item description : **IEEE 802.11b/g/n WLAN SDIO Module**

Trade Mark : LB-LINK

Model/Type reference..... : BL-R8801MS1

Listed Model(s) : -

Standard : **FCC CFR Title 47 Part 15 Subpart C Section 15.247**

Date of receipt of test sample..... : Jul.15, 2016

Date of testing..... : Jul.16, 2016-Sep.12, 2016

Date of issue..... : Sep.13, 2016

Result..... : **PASS**

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Candy Liu

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Jeff Sun

Approved by
(position+printedname+signature)..... : RF Manager Hans Hu

Hans Hu

Testing Laboratory Name : **Shenzhen Huatongwei International Inspection Co., Ltd.**

Address..... : 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao,
Gongming, Shenzhen, China

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1. APPLICABLE STANDARDS AND TEST DESCRIPTION

1.1. Applicable Standards

The tests were performed according to following standards:

[FCC Rules Part 15.247](#): Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

[ANSI C63.10-2013](#): American National Standard for Testing Unlicensed Wireless Devices

[KDB558074 D01 DTS Meas Guidance v03r05](#): Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating under § 15.247

1.2. Test Description

Test Item	Section in CFR 47	Result
Antenna requirement	15.203/15.247 (c)	Pass
Line Conducted Emission (AC Main)	15.207	Pass
Conducted Peak Output Power	15.247 (b)(3)	Pass
Power Spectral Density	15.247 (e)	Pass
6dB Bandwidth	15.247 (a)(2)	Pass
Restricted band	15.247(d)/15.205	Pass
Spurious Emission	15.247(d)/15.209	Pass

Remark: The measurement uncertainty is not included in the test result.

2. SUMMARY

2.1. Client Information

Applicant:	Shenzhen Bilian Electronic Co., Ltd.
Address:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,Bao'an, Shenzhen,Guangdong,P.R.China
Manufacturer:	Shenzhen Bilian Electronic Co., Ltd.
Address:	Building B1,Zhongxing Industrial Zone,Juling,Jutang Community, Guanlan street,Bao'an, Shenzhen,Guangdong,P.R.China

2.2. Product Description

Name of EUT	IEEE 802.11b/g/n WLAN SDIO Module
Trade Mark:	LB-LINK
Model No.:	BL-R8801MS1
Listed Model(s):	-
Power supply:	AC 120V/60Hz
Adapter information:	-
WIFI	
Supported type:	802.11b/802.11g/802.11n(H20)
Modulation:	802.11b: DSSS 802.11g/802.11n(H20):OFDM
Operation frequency:	802.11b/802.11g/802.11n(H20): 2412MHz~2462MHz
Channel number:	802.11b/802.11g/802.11n(H20): 11
Channel separation:	5MHz
Antenna type:	External antenna
Antenna gain:	2.11dBi

2.3. Operation state

◆ Test frequency list

According to section 15.31(m), regards to the operating frequency range over 10 MHz, must select three channel which were tested. the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, please see the above gray bottom.

Channel	Frequency (MHz)
01	2412
02	2417
03	2422
04	2427
05	2432
06	2437
07	2442
08	2447
09	2452
10	2457
11	2462

◆ Test mode

For RF test items:

the engineering test program was provided and enabled to make EUT continuous transmit/receive.

For AC power line conducted emissions:

the EUT was set to connect with the WLAN AP under large package sizes transmission.

2.4. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

- - supplied by the manufacturer
- - supplied by the lab

●	computer motherboard	Manufacturer:ASUS Model:H81M-K
●	POWER SUPPLY	Manufacturer:Great wall Model:GW-3600A-KF
○	DISPLAY	Manufacturer:DELL Model:E178WFPC

2.5. Modifications

No modifications were implemented to meet testing criteria.

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Laboratory:Shenzhen Huatongwei International Inspection Co., Ltd.

Address: 1/F, Bldg 3, Hongfa Hi-tech Industrial Park, Genyu Road, Tianliao, Gongming, Shenzhen, China

Phone: 86-755-26748019 Fax: 86-755-26748089

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

CNAS-Lab Code: L1225

Shenzhen Huatongwei International Inspection Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories, Date of Registration: February 28, 2015. Valid time is until February 27, 2018.

A2LA-Lab Cert. No. 3902.01

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing. Valid time is until December 31, 2016.

FCC-Registration No.: 317478

Shenzhen Huatongwei International Inspection 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 317478, Renewal date Jul. 18, 2014, valid time is until Jul. 18, 2017.

IC-Registration No.: 5377A&5377B

The 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377A on Dec. 31, 2013, valid time is until Dec. 31, 2016.

Two 3m Alternate Test Site of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for the performance of radiated measurements with Registration No. 5377B on Dec.03, 2014, valid time is until Dec.03, 2017.

ACA

Shenzhen Huatongwei International Inspection Co., Ltd. EMC Laboratory can also perform testing for the Australian C-Tick mark as a result of our A2LA accreditation.

VCCI

Radiated disturbance above 1GHz measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-292. Date of Registration: Dec. 24, 2013. Valid time is until Dec. 23, 2016.

Telecommunication Ports Conducted Interference Measurement of Shenzhen Huatongwei International Inspection Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: T-1837. Date of Registration: May 07, 2013. Valid time is until May 06, 2016.

DNV

Shenzhen Huatongwei International Inspection Co., Ltd. has been found to comply with the requirements of DNV towards subcontractor of EMC and safety testing services in conjunction with the EMC and Low voltage Directives and in the voluntary field. The acceptance is based on a formal quality Audit and follow-ups according to relevant parts of ISO/IEC Guide 17025 (2005), in accordance with the requirements of the DNV Laboratory Quality Manual towards subcontractors. Valid time is until Aug. 24, 2016.

3.3. Equipments Used during the Test

Maximum Peak Output Power / Power Spectral Density / 6dB Bandwidth / Band Edge Compliance of RF Emission / Spurious RF Conducted Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal
1	Spectrum Analyzer	Rohde&Schwarz	FSP	1164.4391.40	2015/11/02
2	Climate Chamber	ESPEC	EL-10KA	05107008	2015/11/02
3	Test cable	Junkosha Inc.	J12J102248	JUL-06-14-016	2015/12/05
4	Temporary antenna connector	/	/	/	/

NOTE: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emission					
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.
1	EMI TEST RECEIVER	Rohde&Schwarz	ESI 26	100009	2015/11/02
2	RF TEST PANEL	Rohde&Schwarz	TS / RSP	335015/0017	N/A
3	EMI TEST SOFTWARE	Rohde&Schwarz	ESK1	N/A	N/A
4	Ultra-Broadband Antenna	ShwarzBeck	VULB9163	538	2015/11/08
5	HORNANTENNA	ShwarzBeck	9120D	1011	2015/11/08
6	Loop Antenna	Rohde&Schwarz	HZ-9	838622\013	2015/11/08
7	Pre-amplifier	SCHWARZBECK	BBV 9743	9743-0022	2015/11/02
8	TURNTABLE	MATURO	TT2.0	----	N/A
9	ANTENNA MAST	MATURO	TAM-4.0-P	----	N/A
10	EMI TEST SOFTWARE	Audix	E3	N/A	N/A
11	Test cable	Siva Cables Italy	RG 58A/U	W14.02	2015/12/05

The Cal.Interval was one year

3.4. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35°C
Relative Humidity:	30~60 %
Air Pressure:	950~1050mba

3.5. Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report according to TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen Huatongwei International Inspection Co., Ltd quality system according to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Huatongwei laboratory is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.57 dB	(1)
Transmitter power Radiated	2.20 dB	(1)
Conducted spurious emission 9KHz-40 GHz	1.60 dB	(1)
Radiated spurious emission 9KHz-40 GHz	2.20 dB	(1)
Conducted Emission 9KHz-30MHz	3.39 dB	(1)
Radiated Emission 30~1000MHz	4.24 dB	(1)
Radiated Emission 1~18GHz	5.16 dB	(1)
Radiated Emission 18-40GHz	5.54 dB	(1)
Occupied Bandwidth	-----	(1)

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

4. TEST CONDITIONS AND RESULTS

4.1. Antenna requirement

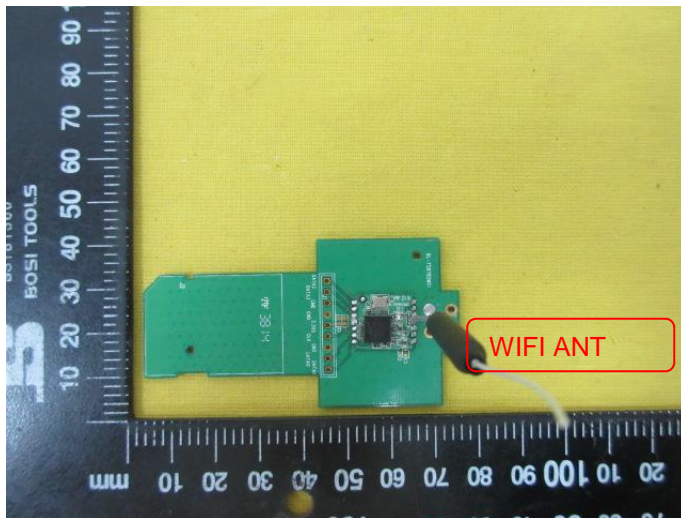
Requirement

FCC CFR Title 47 Part 15 Subpart C 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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.

Test Result:

The antenna is internal antenna, the best case gain of the antenna is 2.11dBi.



4.2. Conducted Emission (AC Main)

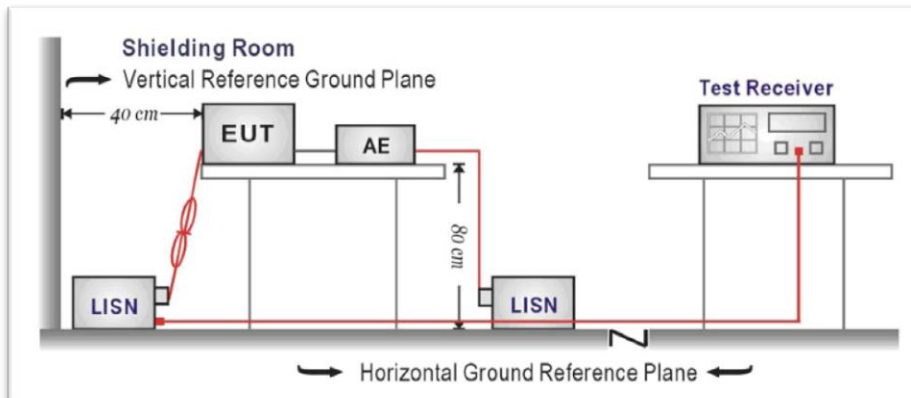
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.207:

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

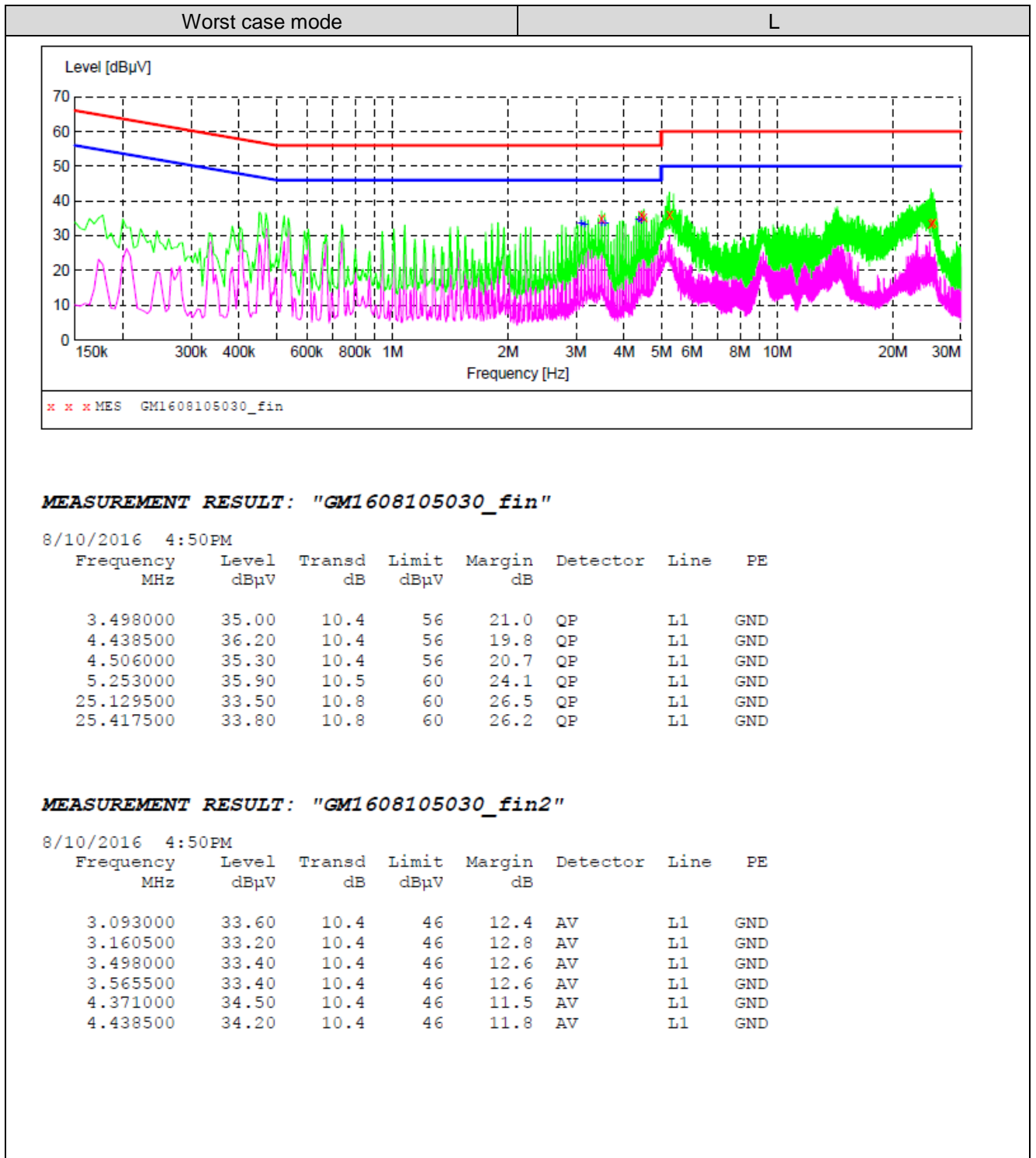
TEST CONFIGURATION

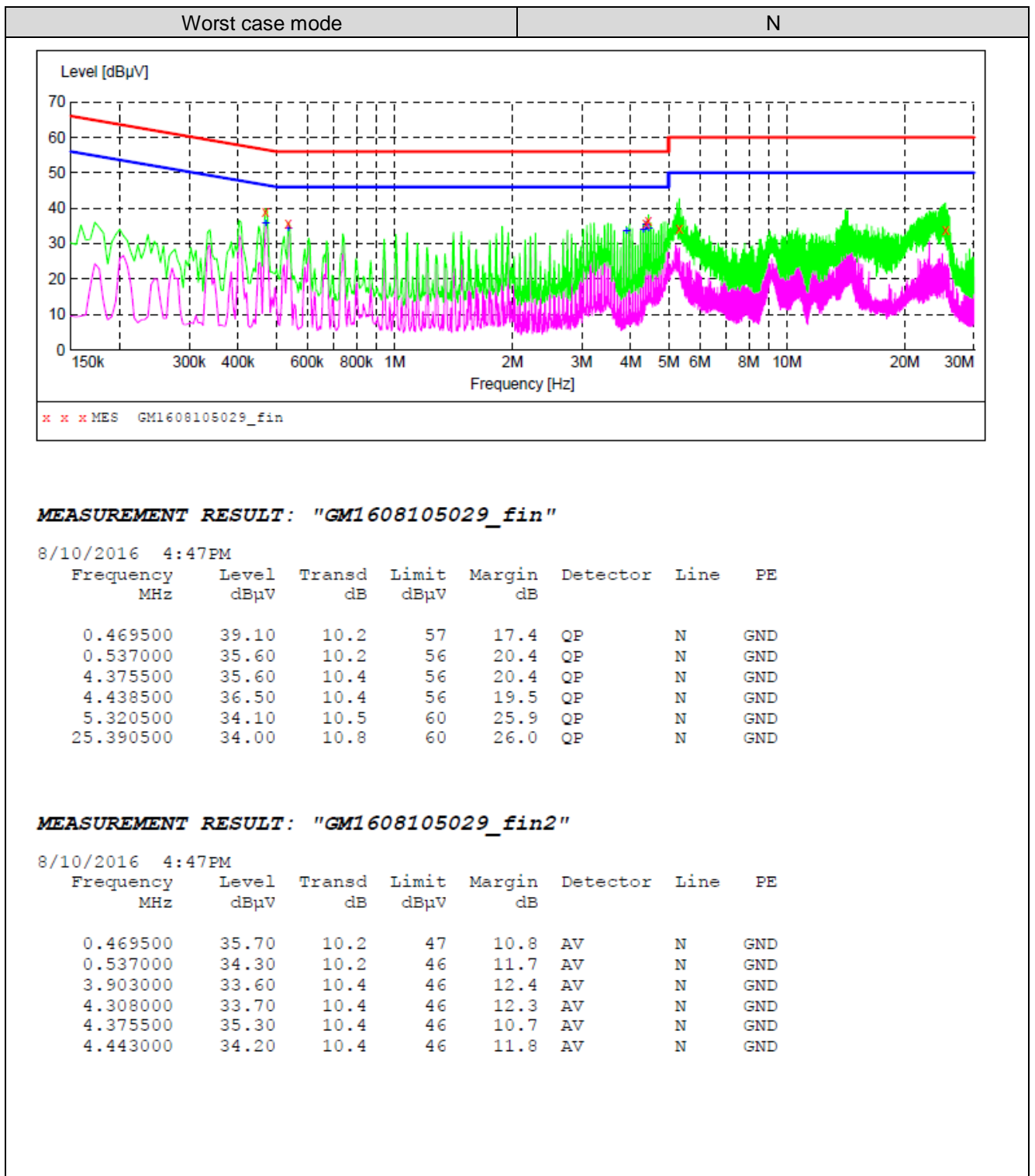


TEST PROCEDURE

1. The EUT was setup according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment.
4. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
5. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
6. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
7. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
8. During the above scans, the emissions were maximized by cable manipulation.

TEST RESULTS



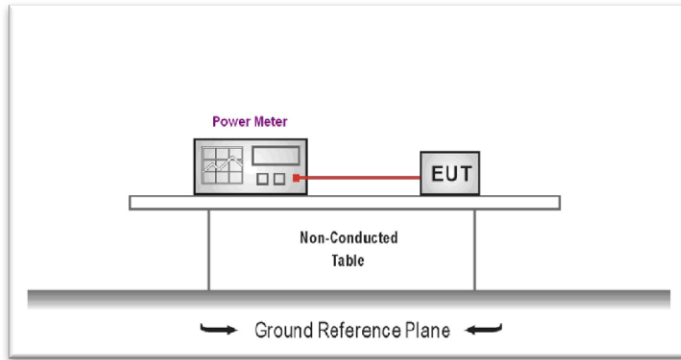


4.3. Conducted Peak Output Power

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(3): **30dBm**:

TEST CONFIGURATION



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10: 2013 and KDB 558074 D01 for compliance to FCC 47CFR 15.247 requirements.
2. The maximum peak conducted output power may be measured using a broadband peak RF power meter.
3. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector
4. Record the measurement data.

TEST RESULTS

Type	Channel	Output power (dBm)	Limit (dBm)	Result
802.11b	01	14.46	30.00	Pass
	06	13.95		
	11	14.00		
802.11g	01	14.95	30.00	Pass
	06	14.29		
	11	14.30		
802.11n(H20)	01	14.76	30.00	Pass
	06	14.36		
	11	13.98		

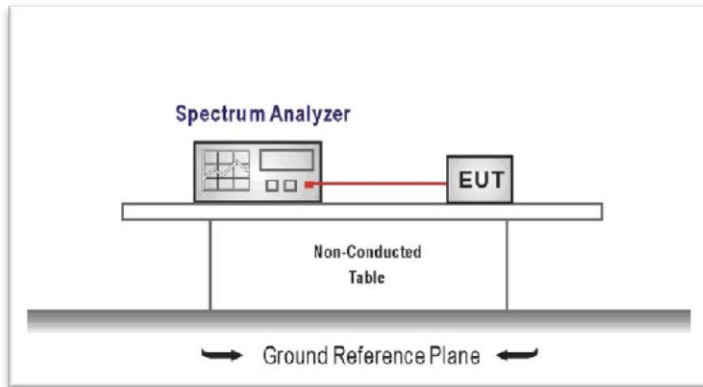
4.4. Power Spectral Density

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (e):

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST CONFIGURATION



TEST PROCEDURE

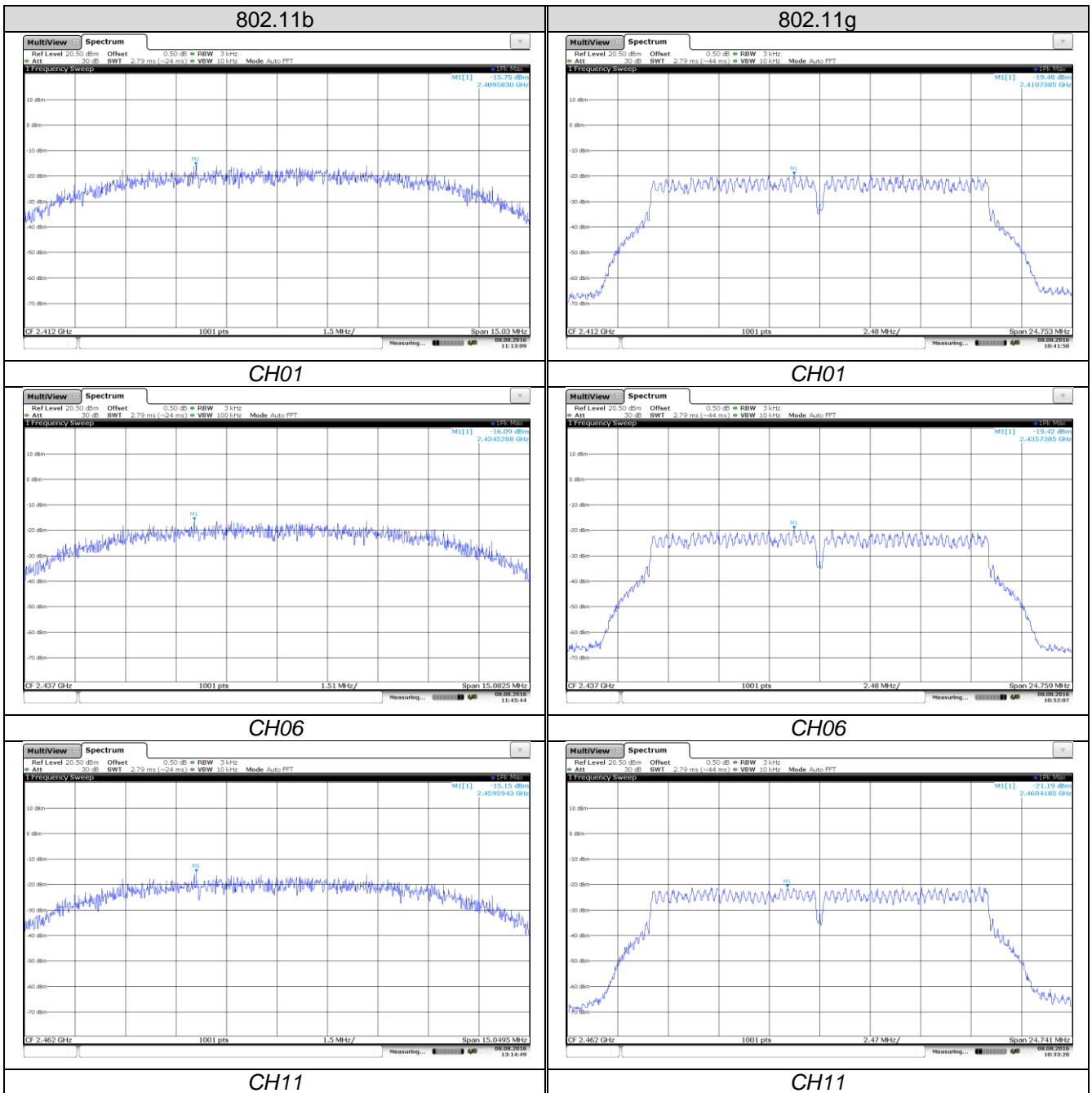
KDB558074 D01 DTS Meas Guidance v03r05 clause 10.2

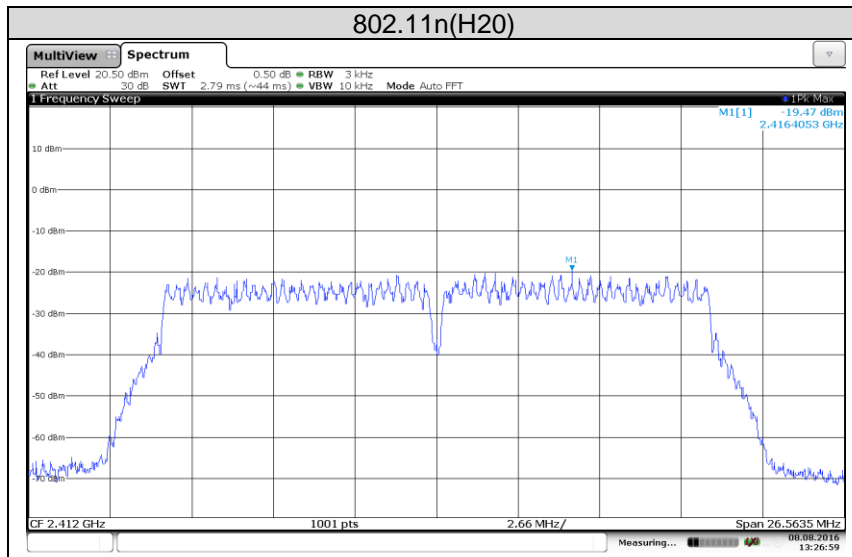
1. Connect the antenna port(s) to the spectrum analyzer input,
2. Configure the spectrum analyzer as shown below:
Center frequency=DTS channel center frequency
Span =1.5 times the DTS bandwidth
RBW = 3 kHz ≤ RBW ≤ 100 kHz, VBW ≥ 3 × RBW
Sweep time = auto couple
Detector = peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

TEST RESULTS

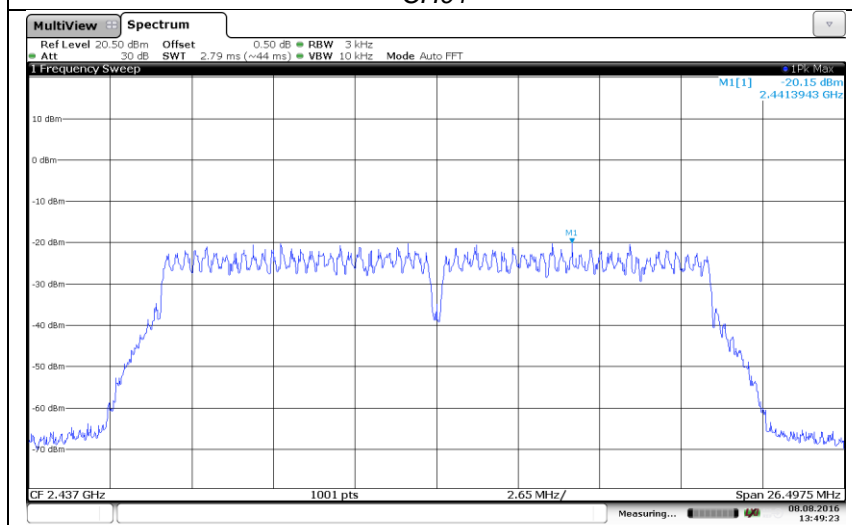
Type	Channel	Power Spectral Density(dBm/3KHz)	Limit (dBm/3KHz)	Result
802.11b	01	-15.75	8.00	Pass
	06	-16.09		
	11	-15.15		
802.11g	01	-19.48	8.00	Pass
	06	-19.42		
	11	-21.19		
802.11n(H20)	01	-19.47	8.00	Pass
	06	-20.15		
	11	-20.67		

Test plot as follows:

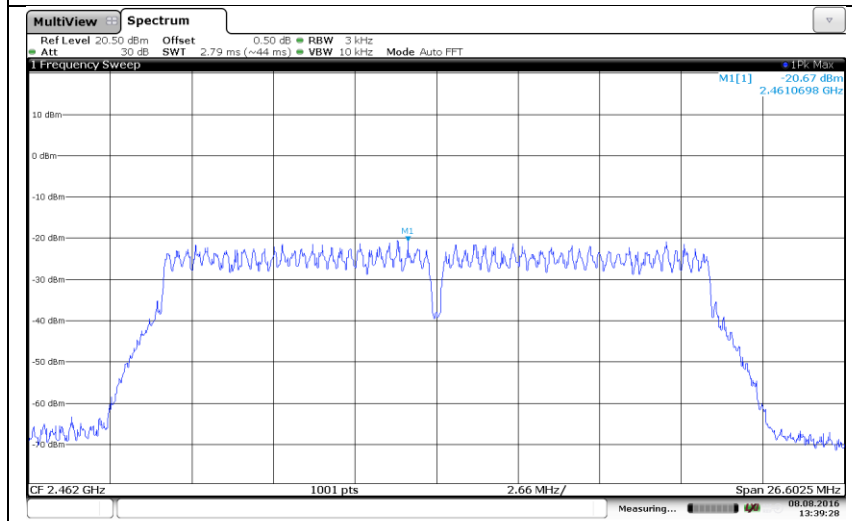




CH01



CH06



CH11

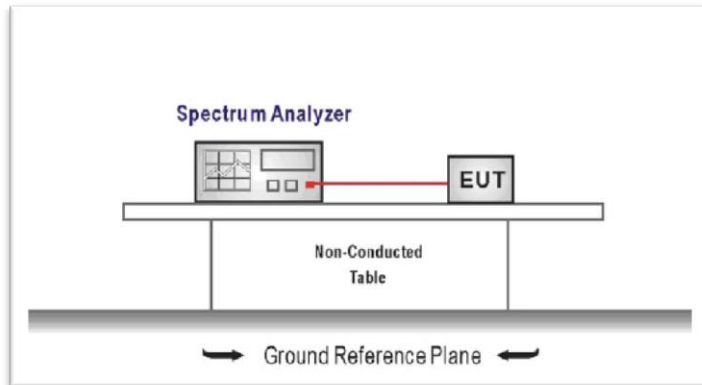
4.5. 6dB bandwidth

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(2):

For digital modulation systems, the minimum 6 dB bandwidth shall be at least 500 kHz.

TEST CONFIGURATION



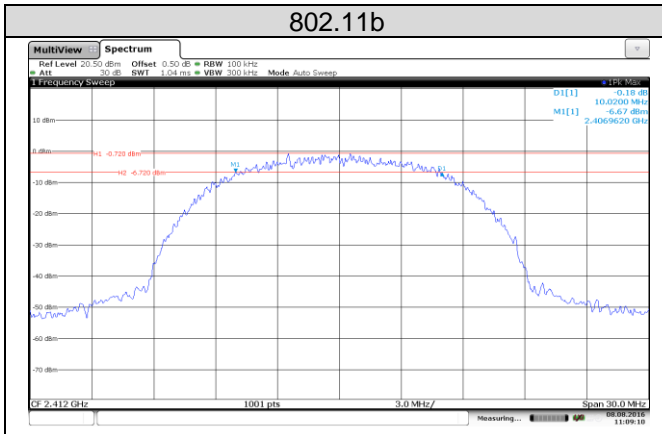
TEST PROCEDURE

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below (enter all losses between the transmitter output and the spectrum analyzer).
Center Frequency = DTS channel center frequency
Span = 2 x DTS bandwidth
RBW = 100 kHz, VBW ≥ 3 x RBW
Sweep time = auto couple
Detector = Peak
Trace mode = max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission, and record the pertinent measurements.

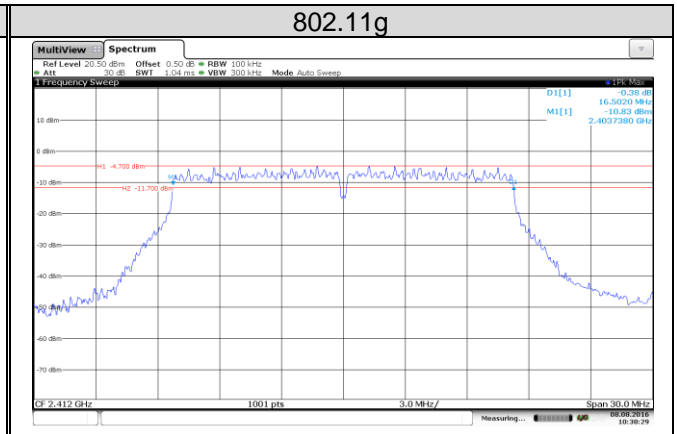
TEST RESULTS

Type	Channel	6dB Bandwidth (MHz)	Limit (KHz)	Result
802.11b	01	10.02	≥ 500	Pass
	06	10.06		
	11	10.03		
802.11g	01	16.50	≥ 500	Pass
	06	16.51		
	11	16.49		
802.11n(H20)	01	17.71	≥ 500	Pass
	06	17.67		
	11	17.74		

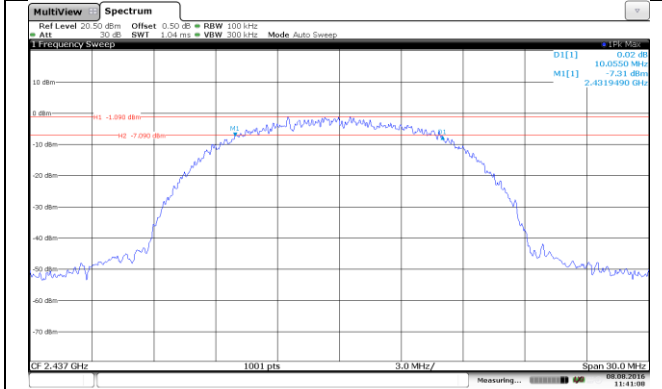
Test plot as follows:



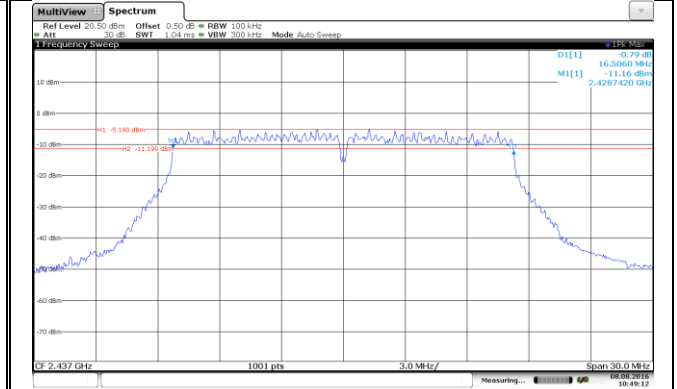
CH01



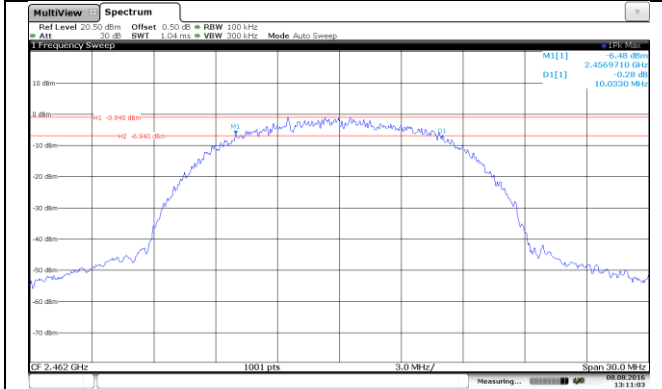
CH01



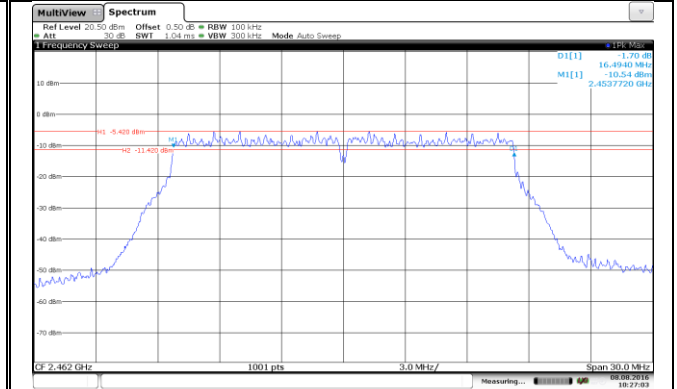
CH06



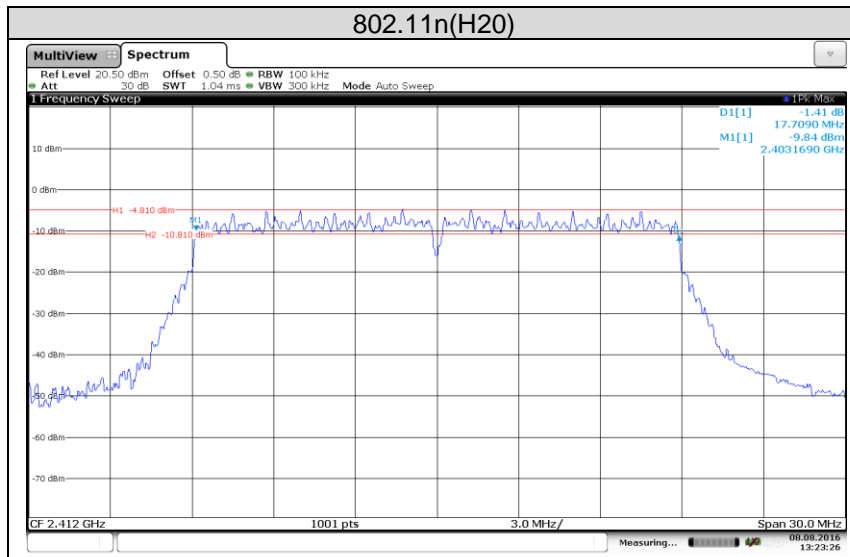
CH06



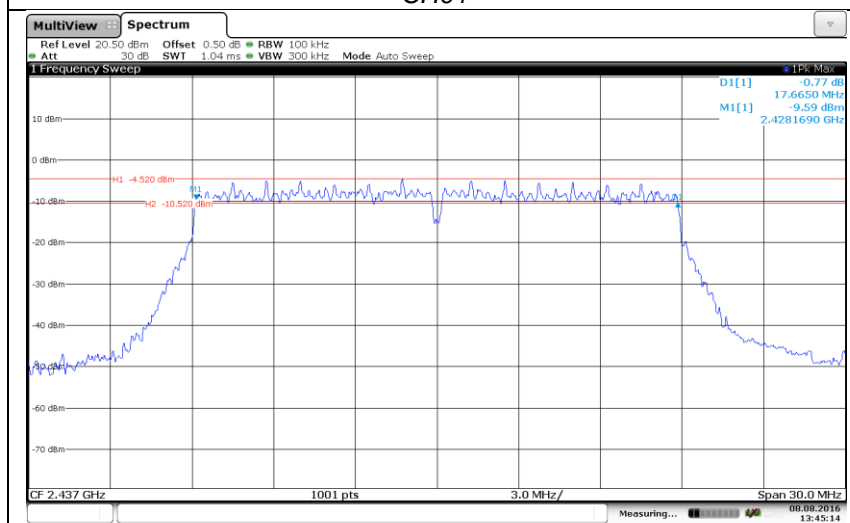
CH11



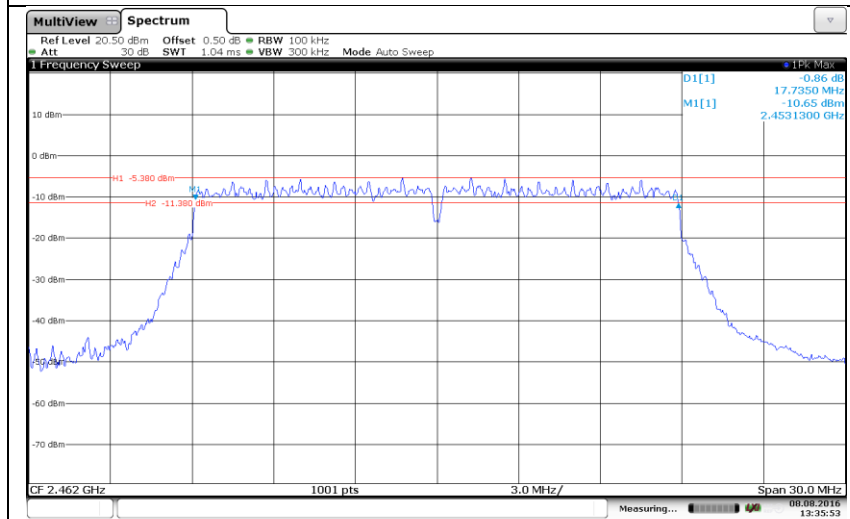
CH11



CH01



CH06



CH11

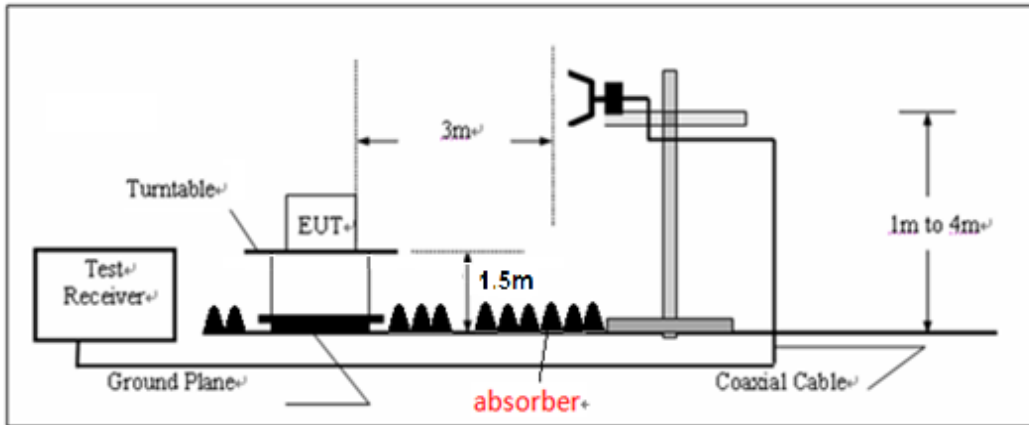
4.6. Restricted band

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d)::

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, 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 CONFIGURATION



TEST PROCEDURE

1. The EUT was setup and tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. If transmitting on 2412MHz channel, the scan frequency range is 2310MHz~2390MHz restricted band; If transmitting on 2462MHz channel, the scan frequency range is 2483.5MHz~2500MHz restricted band.
6. The receiver set as follow:
 RBW=1MHz, VBW=3MHz for Peak value
 RBW=1MHz, VBW=10Hz for Average value.

TEST RESULTS

Note:

1. $Level = Read + Antenna\ Factor + Cable\ Loss - Preamp\ Factor$
2. *Haved scanned the 2310MHz ~ 2390MHz frequency range, only show the frequency of the maximum radiated level on the report.*
3. *Haved scanned the 2483.5MHz ~ 2500MHz frequency range, only show the frequency of the maximum radiated level on the report.*

CH01 for 802.11b									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2388.66	54.42	27.53	6.81	37.45	51.31	74	-22.69	Vertical	Peak
2388.48	53.74	27.53	6.81	37.45	50.63	74	-23.37	Horizontal	
2389.45	45.56	27.53	6.81	37.45	42.45	54	-11.55	Vertical	Average
2389.53	44.34	27.53	6.81	37.45	41.23	54	-12.77	Horizontal	

CH11 for 802.11b									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2484.42	57.24	27.85	6.96	37.57	54.48	74	-19.52	Vertical	Peak
2484.58	56.54	27.85	6.96	37.57	53.78	74	-20.22	Horizontal	
2484.58	46.36	27.85	6.96	37.57	43.6	54	-10.4	Vertical	Average
2484.76	46.15	27.85	6.96	37.57	43.39	54	-10.61	Horizontal	

CH01 for 802.11g									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2386.74	52.56	27.53	6.81	37.92	48.98	74	-25.02	Vertical	Peak
2386.73	53.25	27.53	6.81	37.92	49.67	74	-24.33	Horizontal	
2386.46	45.16	27.53	6.81	37.92	41.58	54	-12.42	Vertical	Average
2386.25	42.56	27.53	6.81	37.99	38.91	54	-15.09	Horizontal	

CH11 for 802.11g									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2484.66	54.26	27.85	6.96	37.6	51.47	74	-22.53	Vertical	Peak
2484.47	53.54	27.85	6.96	37.6	50.75	74	-23.25	Horizontal	
2484.84	44.56	27.85	6.96	37.6	41.77	54	-12.23	Vertical	Average
2484.36	44.12	27.85	6.96	37.6	41.33	54	-12.67	Horizontal	

CH01 for 802.11n(HT20)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2389.26	51.64	27.53	6.81	37.58	48.4	74	-25.6	Vertical	Peak
2389.31	50.52	27.53	6.81	37.58	47.28	74	-26.72	Horizontal	
2389.26	43.01	27.53	6.81	37.58	39.77	54	-14.23	Vertical	Average
2389.47	42.25	27.53	6.81	37.58	39.01	54	-14.99	Horizontal	

CH11 for 802.11n(HT20)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2484.64	53.15	27.85	6.96	37.67	50.29	74	-23.71	Vertical	Peak
2484.63	52.25	27.85	6.96	37.67	49.39	74	-24.61	Horizontal	
2484.58	44.65	27.85	6.96	37.67	41.79	54	-12.21	Vertical	Average
2484.67	42.99	27.85	6.96	37.67	40.13	54	-13.87	Horizontal	

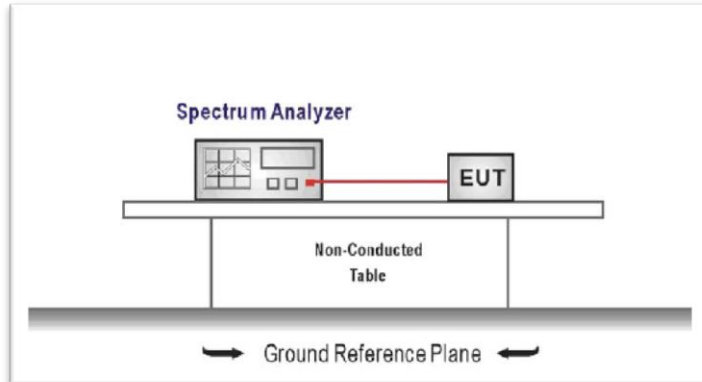
4.7. Band edge and Spurious Emission (conducted)

LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.

TEST CONFIGURATION



TEST PROCEDURE

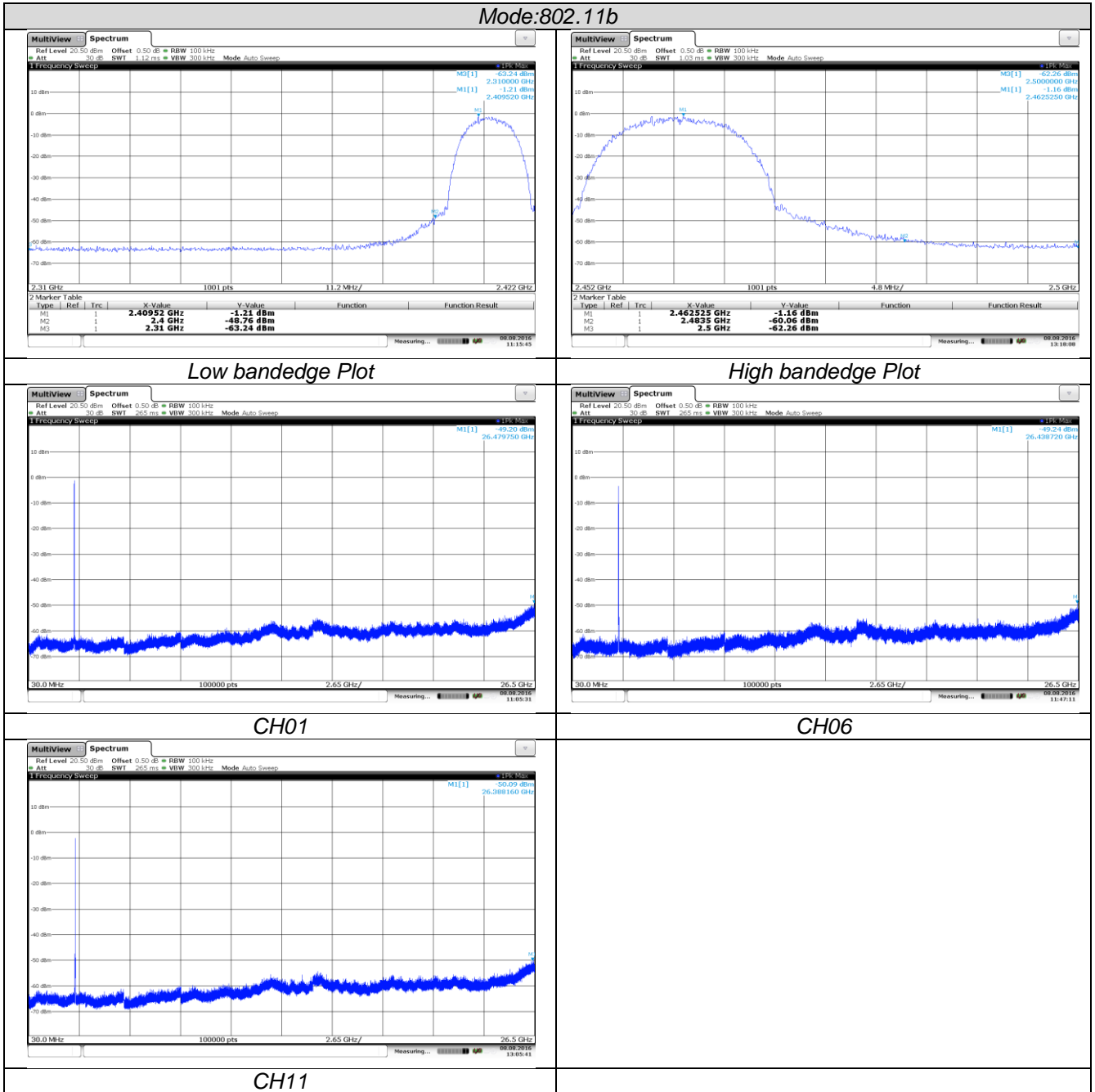
1. Connect the antenna port(s) to the spectrum analyzer input.
2. **Establish a reference level by using the following procedure**
Center frequency=DTS channel center frequency
The span = 1.5 times the DTS bandwidth.
RBW = 100 kHz, VBW ≥ 3 x RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum PSD level

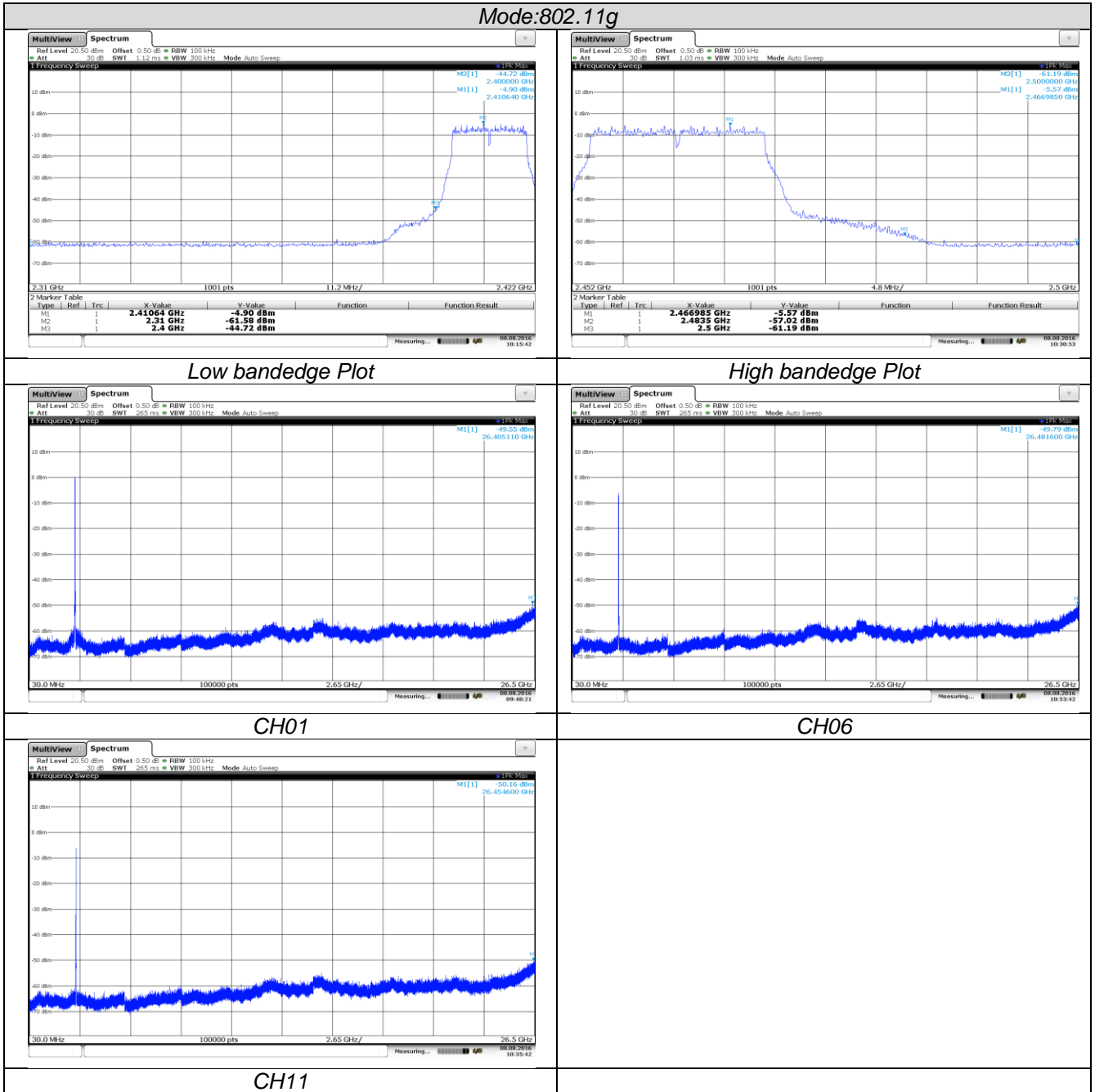
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

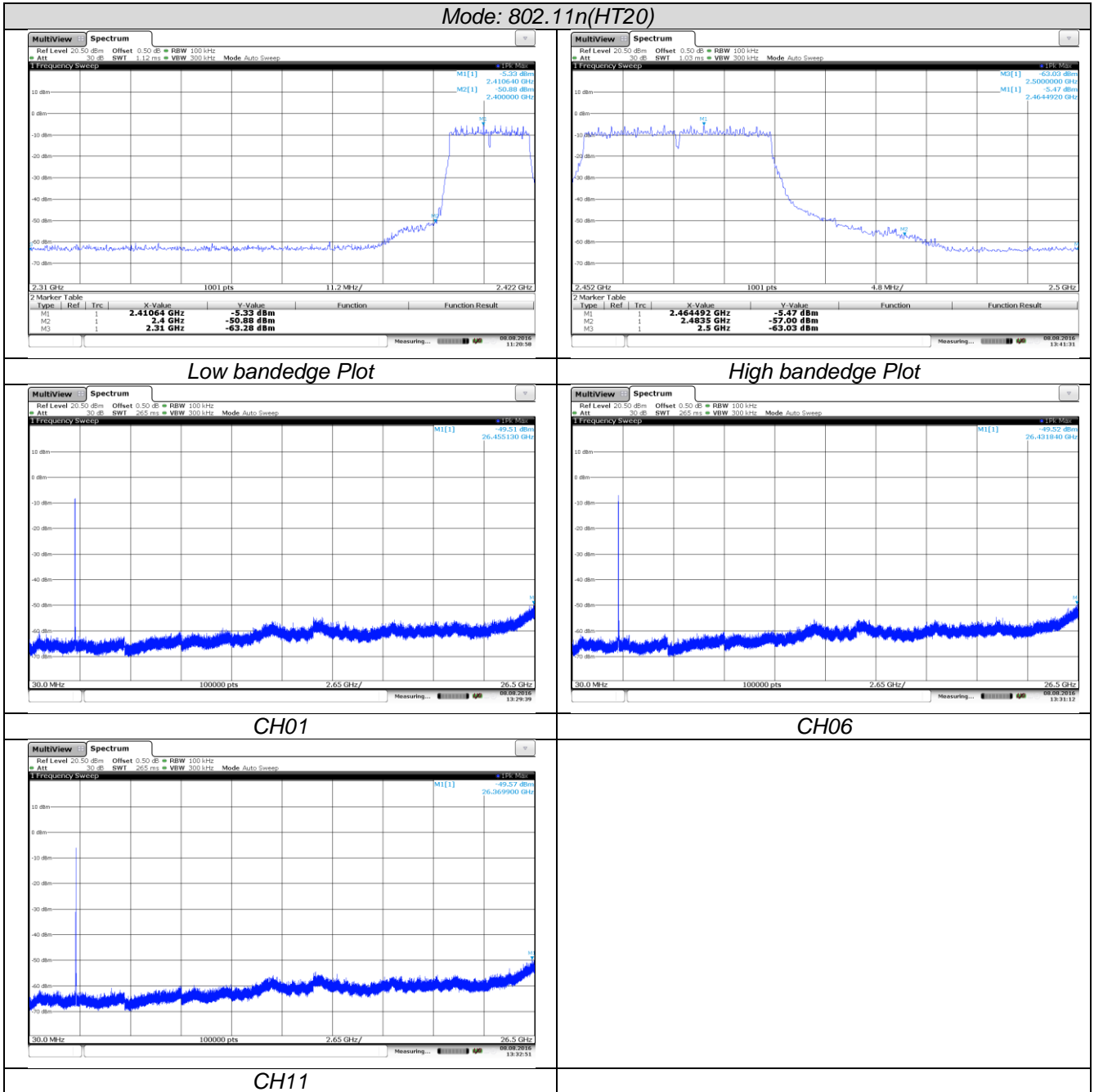
3. **Emission level measurement**
Set the center frequency and span to encompass frequency range to be measured
RBW = 100 kHz, VBW ≥ 3 x RBW
Detector = peak, Sweep time = auto couple, Trace mode = max hold
Allow trace to fully stabilize
Use the peak marker function to determine the maximum amplitude level.
4. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter waveform on the spectrum analyzer.
5. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band excluding restricted frequency bands) are attenuated by at least the minimum requirements specified (at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz). Report the three highest emissions relative to the limit.

TEST RESULTS

Test plot as follows:







4.8. Spurious Emission (radiated)

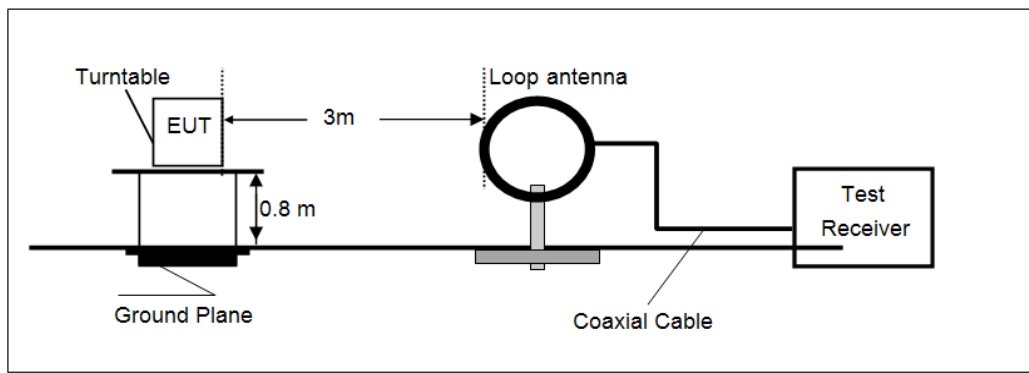
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

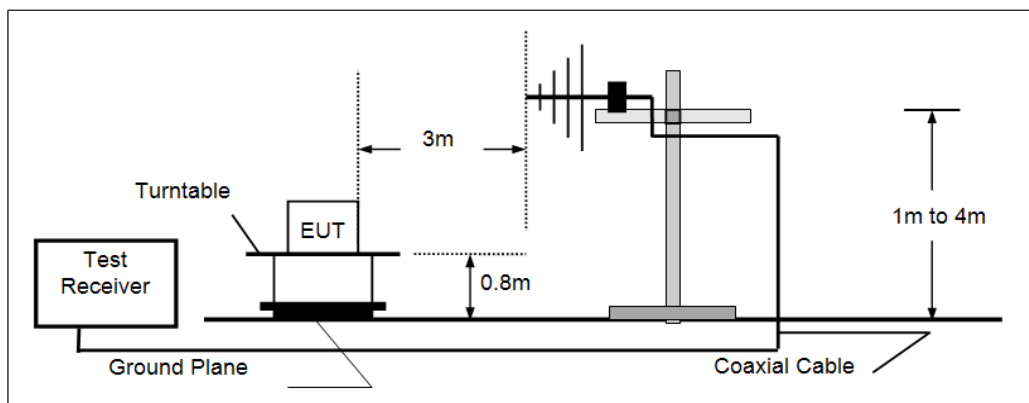
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

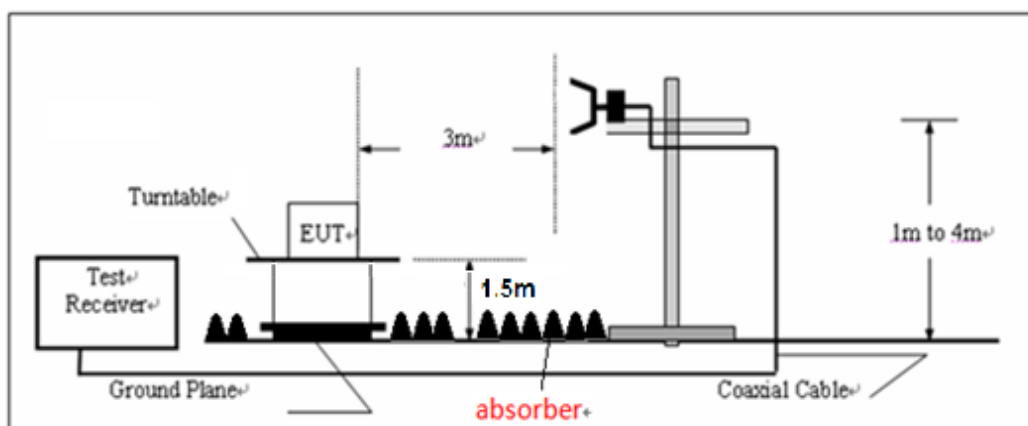
- 9KHz ~30MHz



- 30MHz ~ 1GHz



- Above 1GHz



TEST PROCEDURE

1. The EUT was tested according to ANSI C63.10:2013 for compliance to FCC 47CFR 15.247 requirements.
2. The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna.
5. Use the following spectrum analyzer settings
 - (1) Span shall be wide enough to fully capture the emission being measured;
 - (2) Below 1GHz, RBW=120KHz, VBW=300KHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
 - (3) Above 1GHz, RBW=1MHz, VBW=3MHz for Peak value
RBW=1MHz, VBW=10Hz for Average value.

TEST RESULTS

Measurement data:

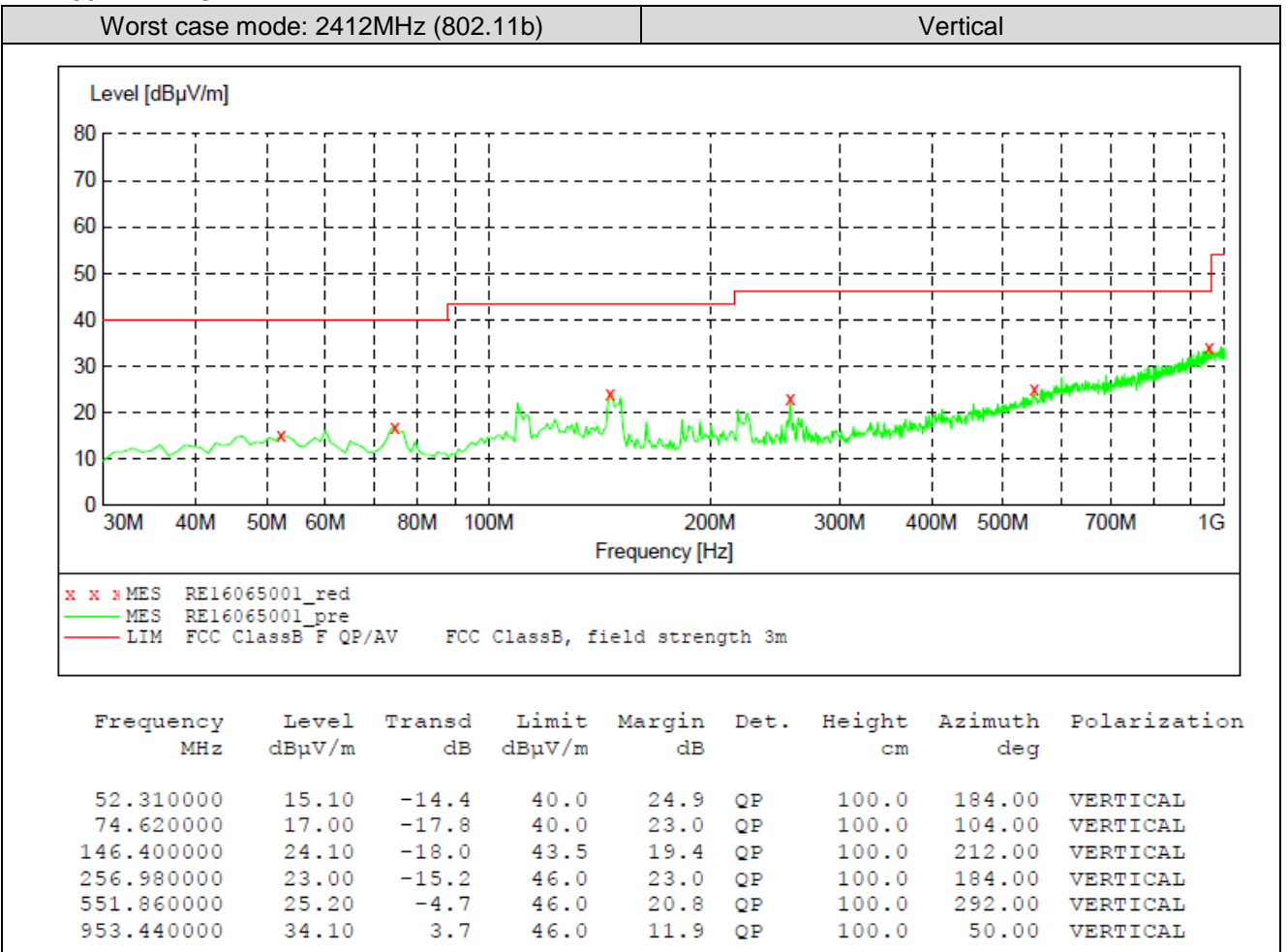
Remark:

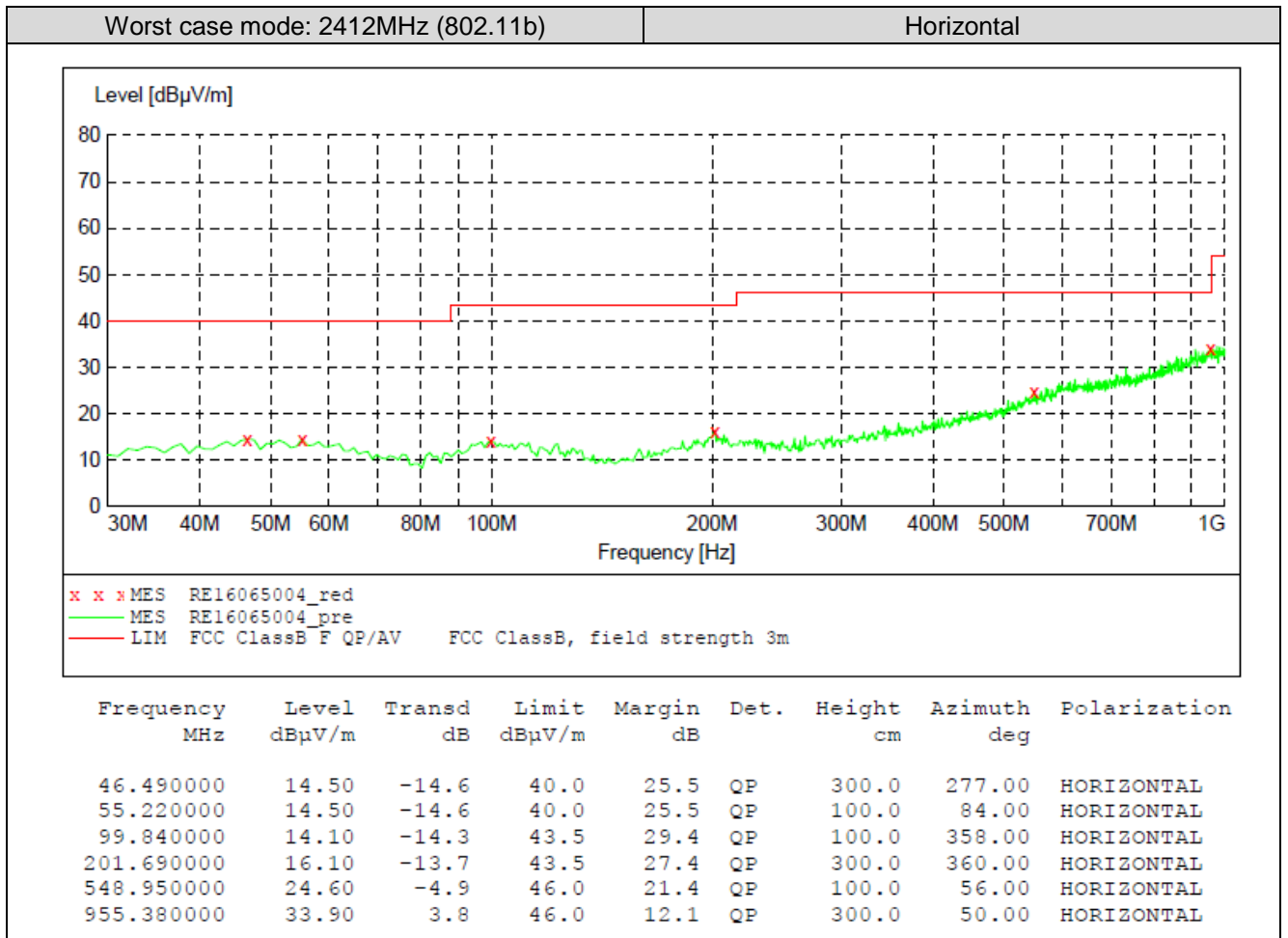
1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor*
2. *“*”*, means this data is too weak instrument of signal is unable to test.
3. *The emission levels of other frequencies are very lower than the limit and not show in test report.*

■ 9kHz ~ 30MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not show.

■ 30MHz ~ 1GHz





Note: have scanned all modes, and found the 802.11b mode which it is worst case, so only show worst case data on the report.

■ Above 1GHz

CH01 for 802.11b									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1182.343	36.39	24.41	4.49	36.49	28.8	74	-45.2	Vertical	Peak
1746.828	36.19	25.44	5.69	37.05	30.27	74	-43.73	Vertical	
2595.573	36.48	28.02	7.21	37.73	33.98	74	-40.02	Vertical	
3024.636	40.57	28.51	8.21	37.99	39.3	74	-34.7	Vertical	
4986.688	38.95	31.19	9.33	38.64	40.83	74	-33.17	Vertical	
8342.258	31.99	37.06	11.25	38.14	42.16	74	-31.84	Vertical	
1770.787	36.39	25.51	5.75	37.08	30.57	74	-43.43	Horizontal	
2997.627	42.59	28.5	8.17	37.99	41.27	74	-32.73	Horizontal	
3504.489	41.58	28.72	8.8	37.99	41.11	74	-32.89	Horizontal	
3991.611	43.75	29.48	8.61	37.99	43.85	74	-30.15	Horizontal	
4986.448	40	31.19	9.33	38.64	41.88	74	-32.12	Horizontal	
5983.355	34.99	33.17	9.76	37.91	40.01	74	-33.99	Horizontal	

CH06 for 802.11b									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1175.557	36.39	24.4	4.47	36.48	28.78	74	-45.22	Vertical	Peak
1569.221	36.38	24.92	5.33	36.9	29.73	74	-44.27	Vertical	
2130.822	35.96	26.61	6.39	37.37	31.59	74	-42.41	Vertical	
2998.767	45.03	28.5	8.17	37.99	43.71	74	-30.29	Vertical	
3991.801	43.96	29.48	8.61	37.99	44.06	74	-29.94	Vertical	
6000.756	36.11	33.2	9.76	37.9	41.17	74	-32.83	Vertical	
1278.082	36.87	24.5	4.71	36.6	29.48	74	-44.52	Horizontal	
2998.997	41.67	28.5	8.17	37.99	40.35	74	-33.65	Horizontal	
3484.961	41.79	28.7	8.79	37.99	41.29	74	-32.71	Horizontal	
4002.909	40.15	29.5	8.61	37.99	40.27	74	-33.73	Horizontal	
5001.837	38.92	31.2	9.34	38.65	40.81	74	-33.19	Horizontal	
5983.875	36	33.17	9.76	37.91	41.02	74	-32.98	Horizontal	

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The peak level is lower than average limit (54 dBuV/m), this data is too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

CH11 for 802.11b									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1198.086	37.64	24.43	4.53	36.51	30.09	74	-43.91	Vertical	Peak
1817.256	36.29	25.64	5.83	37.11	30.65	74	-43.35	Vertical	
2107.62	36.63	26.52	6.35	37.35	32.15	74	-41.85	Vertical	
3504.209	38.76	28.72	8.8	37.99	38.29	74	-35.71	Vertical	
3990.791	41.36	29.48	8.61	37.99	41.46	74	-32.54	Vertical	
5002.047	37.72	31.2	9.34	38.65	39.61	74	-34.39	Vertical	
1426.646	36.86	24.64	5.03	36.76	29.77	74	-44.23	Horizontal	
1710.789	37.76	25.34	5.63	37.03	31.7	74	-42.3	Horizontal	
2998.667	42.42	28.5	8.17	37.99	41.1	74	-32.9	Horizontal	
4003.179	44.64	29.5	8.61	37.99	44.76	74	-29.24	Horizontal	
4987.588	37.94	31.19	9.33	38.64	39.82	74	-34.18	Horizontal	
5999.816	36.29	33.2	9.76	37.9	41.35	74	-32.65	Horizontal	

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit (54 dBuV/m), this data is too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

CH01 for 802.11g									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1520.278	35.66	24.77	5.22	36.85	28.8	74	-45.2	Vertical	Peak
1817.406	36.54	25.64	5.83	37.11	30.9	74	-43.1	Vertical	
2997.907	43.22	28.5	8.17	37.99	41.9	74	-32.1	Vertical	
4986.578	37.43	31.19	9.33	38.64	39.31	74	-34.69	Vertical	
5983.695	34.16	33.17	9.76	37.91	39.18	74	-34.82	Vertical	
8687.71	32.74	37.48	11.42	38.04	43.6	74	-30.4	Vertical	
1330.498	36.05	24.55	4.83	36.66	28.77	74	-45.23	Horizontal	
1751.365	37.47	25.46	5.7	37.06	31.57	74	-42.43	Horizontal	
2150.234	36.24	26.68	6.42	37.38	31.96	74	-42.04	Horizontal	
3024.986	42.53	28.51	8.21	37.99	41.26	74	-32.74	Horizontal	
4987.658	38.45	31.19	9.33	38.64	40.33	74	-33.67	Horizontal	
9231.067	32.9	37.99	11.84	38	44.73	74	-29.27	Horizontal	

CH06 for 802.11g									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1141.781	35.67	24.36	4.38	36.44	27.97	74	-46.03	Vertical	Peak
1813.506	35.38	25.62	5.82	37.11	29.71	74	-44.29	Vertical	
3991.231	39.04	29.48	8.61	37.99	39.14	74	-34.86	Vertical	
6736.467	31.79	35.44	10.55	38.02	39.76	74	-34.24	Vertical	
9071.71	31.55	37.93	11.73	37.97	43.24	74	-30.76	Vertical	
13677.2	32.16	40.49	14.09	37.95	48.79	74	-25.21	Vertical	
1360.7	36.17	24.58	4.9	36.7	28.95	74	-45.05	Horizontal	
2082.769	34.6	26.43	6.3	37.32	30.01	74	-43.99	Horizontal	
3176.072	39.26	28.58	8.41	37.99	38.26	74	-35.74	Horizontal	
3980.827	41.6	29.47	8.62	37.99	41.7	74	-32.3	Horizontal	
4987.098	38.36	31.19	9.33	38.64	40.24	74	-33.76	Horizontal	
5966.633	35.14	33.15	9.75	37.92	40.12	74	-33.88	Horizontal	

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Pre-amplifier Factor
2. The peak level is lower than average limit (54 dBuV/m), this data is too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

CH11 for 802.11g									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1292.889	35.64	24.52	4.75	36.62	28.29	74	-45.71	Vertical	Peak
1726.468	36.93	25.39	5.66	37.04	30.94	74	-43.06	Vertical	
3659.729	37.46	28.97	8.74	37.99	37.18	74	-36.82	Vertical	
5002.487	38.36	31.2	9.34	38.65	40.25	74	-33.75	Vertical	
7717.178	30.33	36.43	11.09	38.2	39.65	74	-34.35	Vertical	
10948.7	29.45	39.14	13.19	38.14	43.64	74	-30.36	Vertical	
1278.392	36.3	24.5	4.71	36.6	28.91	74	-45.09	Horizontal	
1681.877	36.91	25.26	5.57	37	30.74	74	-43.26	Horizontal	
3167.03	39.64	28.57	8.39	37.99	38.61	74	-35.39	Horizontal	
5000.897	37.62	31.2	9.34	38.65	39.51	74	-34.49	Horizontal	
8082.454	31.06	36.8	11.24	38.22	40.88	74	-33.12	Horizontal	
12396.78	28.41	39.18	13.87	37.85	43.61	74	-30.39	Horizontal	

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit(54dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

CH01 for 802.11n(H20)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1144.137	38.11	24.37	4.39	36.45	30.42	74	-43.58	Vertical	Peak
1342.792	36.69	24.56	4.86	36.67	29.44	74	-44.56	Vertical	
3086.38	41.68	28.54	8.29	37.99	40.52	74	-33.48	Vertical	
3980.447	39.61	29.47	8.62	37.99	39.71	74	-34.29	Vertical	
4987.698	36.46	31.19	9.33	38.64	38.34	74	-35.66	Vertical	
9641.137	31.35	38.18	12.14	38.07	43.6	74	-30.4	Vertical	
1643.739	35.86	25.15	5.49	36.97	29.53	74	-44.47	Horizontal	
2997.417	43.16	28.5	8.17	37.99	41.84	74	-32.16	Horizontal	
3713.953	43.55	29.06	8.71	37.99	43.33	74	-30.67	Horizontal	
3992.261	44.55	29.48	8.61	37.99	44.65	74	-29.35	Horizontal	
5002.287	36.72	31.2	9.34	38.65	38.61	74	-35.39	Horizontal	
5965.183	37.28	33.15	9.75	37.92	42.26	74	-31.74	Horizontal	

CH06 for 802.11n(H20)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
1361.98	35.55	24.58	4.9	36.7	28.33	74	-45.67	Vertical	Peak
2997.357	45.49	28.5	8.17	37.99	44.17	74	-29.83	Vertical	
3991.591	44.69	29.48	8.61	37.99	44.79	74	-29.21	Vertical	
4973.452	37.06	31.18	9.32	38.63	38.93	74	-35.07	Vertical	
5982.985	35.88	33.17	9.76	37.91	40.9	74	-33.1	Vertical	
8562.908	32.74	37.31	11.3	38.07	43.28	74	-30.72	Vertical	
2119.621	34.91	26.57	6.36	37.36	30.48	74	-43.52	Horizontal	
2997.907	41.71	28.5	8.17	37.99	40.39	74	-33.61	Horizontal	
3980.187	44.52	29.47	8.62	37.99	44.62	74	-29.38	Horizontal	
5002.017	36.81	31.2	9.34	38.65	38.7	74	-35.3	Horizontal	
5999.846	36.22	33.2	9.76	37.9	41.28	74	-32.72	Horizontal	
8994.603	30.61	37.9	11.67	37.95	42.23	74	-31.77	Horizontal	

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit (54 dBuV/m), this data is too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

CH11 for 802.11n(H20)									
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Margin Limit (dB)	Polarization	Test value
2132.042	38.99	26.61	6.39	37.37	34.62	74	-39.38	Vertical	Peak
3990.961	44.03	29.48	8.61	37.99	44.13	74	-29.87	Vertical	
5001.107	38.45	31.2	9.34	38.65	40.34	74	-33.66	Vertical	
6000.236	35.57	33.2	9.76	37.9	40.63	74	-33.37	Vertical	
9613.34	32.26	38.17	12.11	38.07	44.47	74	-29.53	Vertical	
10822.45	33.31	39.01	13.11	38.14	47.29	74	-26.71	Vertical	
1194.784	36.61	24.42	4.52	36.51	29.04	74	-44.96	Horizontal	
1721.574	35.98	25.37	5.65	37.03	29.97	74	-44.03	Horizontal	
2449.702	40.07	27.74	6.9	37.62	37.09	74	-36.91	Horizontal	
4986.188	38.39	31.19	9.33	38.64	40.27	74	-33.73	Horizontal	
7519.019	31.91	36.22	10.98	38.16	40.95	74	-33.05	Horizontal	
9836.602	31.59	38.3	12.33	38.11	44.11	74	-29.89	Horizontal	

Remark:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. The peak level is lower than average limit(54dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

.....End of Report.....