



TEST REPORT

Report Reference No. : CHTEW20040205 Report verification: 

Project No. : SHT2004008001EW

FCC ID. : 2AUSV-ETERAE980

Applicant's name : SINOTECH R&D GROUP LIMITED

Address : Room 2203, 22/F, WAH HING COMMERCIAL BUILDING, 283 LOCKHART ROAD, WAN CHAI, HONG KONG.

Manufacturer : SINOTECH R&D GROUP LIMITED

Address : Room 2203, 22/F, WAH HING COMMERCIAL BUILDING, 283 LOCKHART ROAD, WAN CHAI, HONG KONG.

Test item description : Smart Phone

Trade Mark : eTera

Model/Type reference : E980

Listed Model(s) : -

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

Date of receipt of test sample : Sep. 25, 2019

Date of testing : Sep. 26, 2019- Apr. 26, 2020

Date of issue : Apr. 27, 2020

Result : PASS

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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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The test report merely correspond to the test sample.

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1. TEST STANDARDS AND REPORT VERSION

1.1. Test 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

[KDB 558074 D01 15.247 Meas Guidance v05r02](#): Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating under Section 15.247 of The FCC Rules

1.2. Report version

Revision No.	Date of issue	Description
N/A	2020-04-27	Original

2. TEST DESCRIPTION

Test Item	FCC Rule	Result	Test Engineer
Antenna requirement	15.203/15.247(c)	PASS	Kang Yang
Line Conducted Emissions (AC Main)	15.207	PASS	Kang Yang
Conducted Peak Output Power	15.247(b)(3)	PASS	Jesse He
Power Spectral Density	15.247(e)	PASS	Jesse He
6dB Bandwidth	15.247(a)(2)	PASS	Jesse He
Restricted band	15.247(d)/15.205	PASS	Xu Yang
Spurious Emissions	15.247(d)/15.209	PASS	Xu Yang

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

3. SUMMARY

3.1. Client Information

Applicant:	SINOTECH R&D GROUP LIMITED
Address:	Room 2203, 22/F, WAH HING COMMERCIAL BUILDING, 283 LOCKHART ROAD, WAN CHAI, HONG KONG.
Manufacturer:	SINOTECH R&D GROUP LIMITED
Address:	Room 2203, 22/F, WAH HING COMMERCIAL BUILDING, 283 LOCKHART ROAD, WAN CHAI, HONG KONG.

3.2. Product Description

Name of EUT:	Smart Phone
Trade Mark:	eTera
Model No.:	E980
Listed Model(s):	-
IMEI:	Conducted: 352164110004109 Radiated: 359612090258426
Power supply:	DC 3.8V
Adapter information:	Model:MR-0502000US Input:100-240Va.c., 50/60Hz, 0.3A Output:5.0Vd.c., 2.0A
Hardware version:	K920_MB_P3_V03
Software version:	E980_US_GMS_V005_20180925
WIFI	
Supported type:	802.11b/802.11g/802.11n(HT20)/802.11n(HT40)
Modulation:	DSSS for 802.11b OFDM for 802.11g/802.11n(HT20)/802.11n(HT40)
Operation frequency:	2412MHz~2462MHz for 802.11b/802.11g/802.11n(HT20) 2422MHz~2452MHz for 802.11n(HT40)
Channel number:	11 for 802.11b/802.11g/802.11n(HT20) 7 for 802.11n(HT40)
Channel separation:	5MHz
Antenna type:	FPC Antenna
Antenna gain:	-2.34 dBi

3.3. 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.

802.11b/g/n(HT20)		802.11n(HT40)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
01	2412	01	-
02	2417	02	-
03	2422	03	2422
04	2427	04	2427
05	2432	05	2432
06	2437	06	2437
07	2442	07	2442
08	2447	08	2447
09	2452	09	2452
10	2457	10	-
11	2462	11	-

➤ Test mode

For RF test items
The engineering test program was provided and enabled to make EUT continuous transmit (duty cycle>98%).
For AC power line conducted emissions:
The EUT was set to connect with the WLAN AP under large package sizes transmission.
For Radiated suprious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit(duty cycle>98%). The EUT in each of three orthogonal axis emissions had been tested ,but only the worst case (X axis) data Recorded in the report.

3.4. EUT configuration

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

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

○	/	Manufacturer:	/
		Model No.:	/
○	/	Manufacturer:	/
		Model No.:	/

3.5. Modifications

No modifications were implemented to meet testing criteria.

4. TEST ENVIRONMENT

4.1. 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

4.2. Test Facility

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.

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.

FCC-Registration No.: 762235

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.

IC-Registration No.:5377A

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.: 5377A.

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.

4.3. 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

4.4. 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 in 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 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.

Here after the best measurement capability for Shenzhen Huatongwei International Inspection Co., Ltd. is reported:

Test Items	Measurement Uncertainty	Notes
Transmitter power conducted	0.51 dB	(1)
Conducted spurious emissions 9kHz~40GHz	0.51 dB	(1)
Conducted Disturbance 150kHz~30MHz	3.02 dB	(1)
Radiated Emissions below 1GHz	4.90 dB	(1)
Radiated Emissions above 1GHz	4.96 dB	(1)
Occupied Bandwidth	70 Hz	(1)

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

4.5. Equipments Used during the Test

● Conducted Emission							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Shielded Room	Albatross projects	HTWE0114	N/A	N/A	2018/09/28	2023/09/27
●	EMI Test Receiver	R&S	HTWE0111	ESCI	101247	2019/10/26	2020/10/25
●	Artificial Mains	SCHWARZBECK	HTWE0113	NNLK 8121	573	2019/10/23	2020/10/22
●	Pulse Limiter	R&S	HTWE0033	ESH3-Z2	100499	2019/10/23	2020/10/22
●	RF Connection Cable	HUBER+SUHNER	HTWE0113-02	ENVIROFLEX 142	EF-NM-BNCM-2M	2019/10/23	2020/10/22
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-6th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0127	SAC-3m-02	C11121	2018/09/30	2021/09/29
●	EMI Test Receiver	R&S	HTWE0099	ESCI	100900	2019/10/26	2020/10/25
●	Loop Antenna	R&S	HTWE0170	HFH2-Z2	100020	2018/04/02	2021/04/01
●	Ultra-Broadband Antenna	SCHWARZBECK	HTWE0119	VULB9163	538	2018/04/04	2021/04/03
●	Pre-Amplifier	SCHWARZBECK	HTWE0295	BBV 9742	N/A	2019/11/14	2020/11/13
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-01	N/A	N/A	2019/08/21	2020/08/20
●	RF Connection Cable	HUBER+SUHNER	HTWE0062-02	SUCOFLEX 104	501184/4	2019/05/27	2020/05/26
●	Test Software	R&S	N/A	ES-K1	N/A	N/A	N/A

● Radiated emission-7th test site							
Used	Test Equipment	Manufacturer	Equipment No.	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Semi-Anechoic Chamber	Albatross projects	HTWE0122	SAC-3m-01	N/A	2018/09/27	2021/09/26
●	Spectrum Analyzer	R&S	HTWE0098	FSP40	100597	2019/10/26	2020/10/25
●	Horn Antenna	SCHWARZBECK	HTWE0126	9120D	1011	2020/04/01	2023/03/31
●	Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	25841	2018/10/11	2021/10/10
●	Broadband Horn Antenna	SCHWARZBECK	HTWE0103	BBHA9170	BBHA9170472	2018/10/11	2021/10/11
●	Pre-amplifier	CD	HTWE0071	PAP-0102	12004	2019/11/14	2020/11/13
●	Broadband Pre-amplifier	SCHWARZBECK	HTWE0201	BBV 9718	9718-248	2019/05/23	2020/05/22
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-01	6m 18GHz S Serisa	N/A	2019/05/10	2020/05/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-02	6m 3GHz RG Serisa	N/A	2019/05/10	2020/05/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-03	6m 3GHz RG Serisa	N/A	2019/05/10	2020/05/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0120-04	6m 3GHz RG Serisa	N/A	2019/05/10	2020/05/09
●	RF Connection Cable	HUBER+SUHNER	HTWE0121-01	6m 18GHz S Serisa	N/A	2019/05/10	2020/05/09
●	Test Software	Audix	N/A	E3	N/A	N/A	N/A

● RF Conducted Method						
Used	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal. Date (YY-MM-DD)	Next Cal. Date (YY-MM-DD)
●	Signal and spectrum Analyzer	R&S	FSV40	100048	2019/10/26	2020/10/25
●	Spectrum Analyzer	Agilent	N9020A	MY50510187	2019/10/26	2020/10/25
○	Radio communication tester	R&S	CMW500	137688-Lv	2019/10/26	2020/10/25

5. TEST CONDITIONS AND RESULTS

5.1. 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.

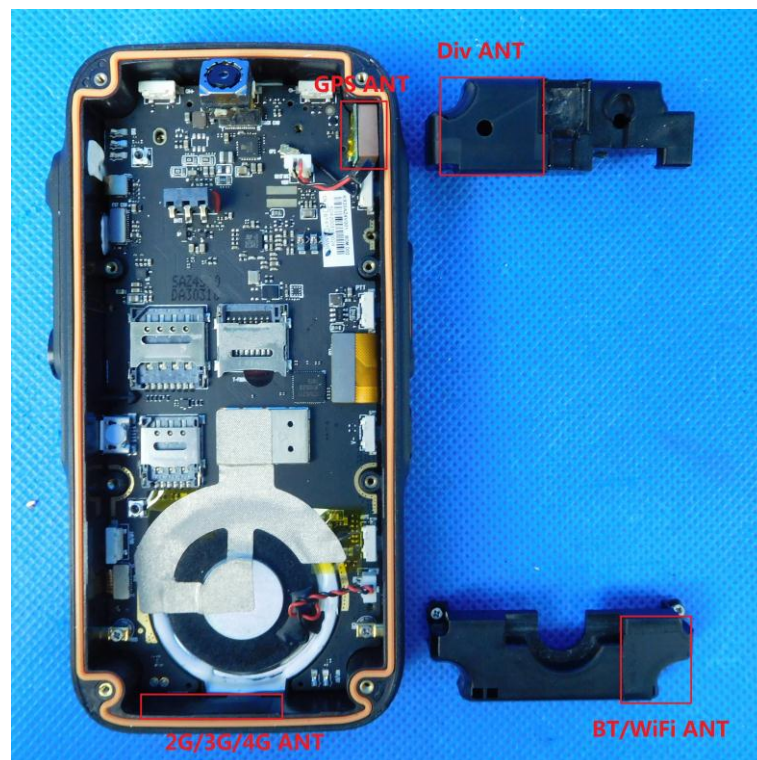
FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(i) Systems operating in the 2400~2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

TEST RESULTS

☒ Passed ☐ Not Applicable

The directional gain of the antenna less than 6 dBi, please refer to the below antenna photo.



5.2. Conducted Emissions (AC Main)

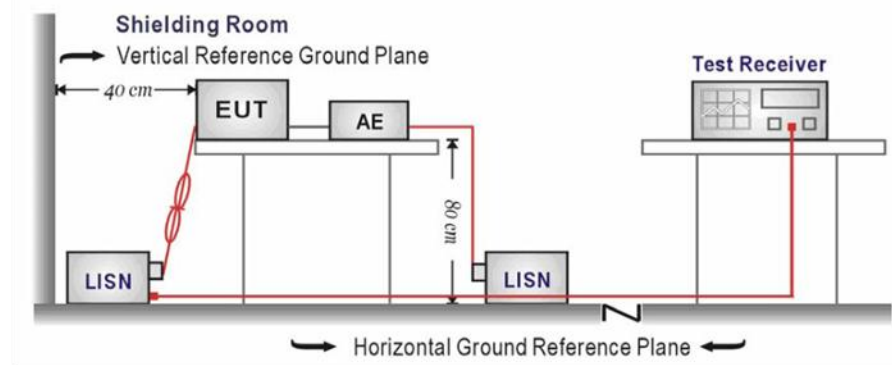
LIMIT

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 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 impedances 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 MODE:

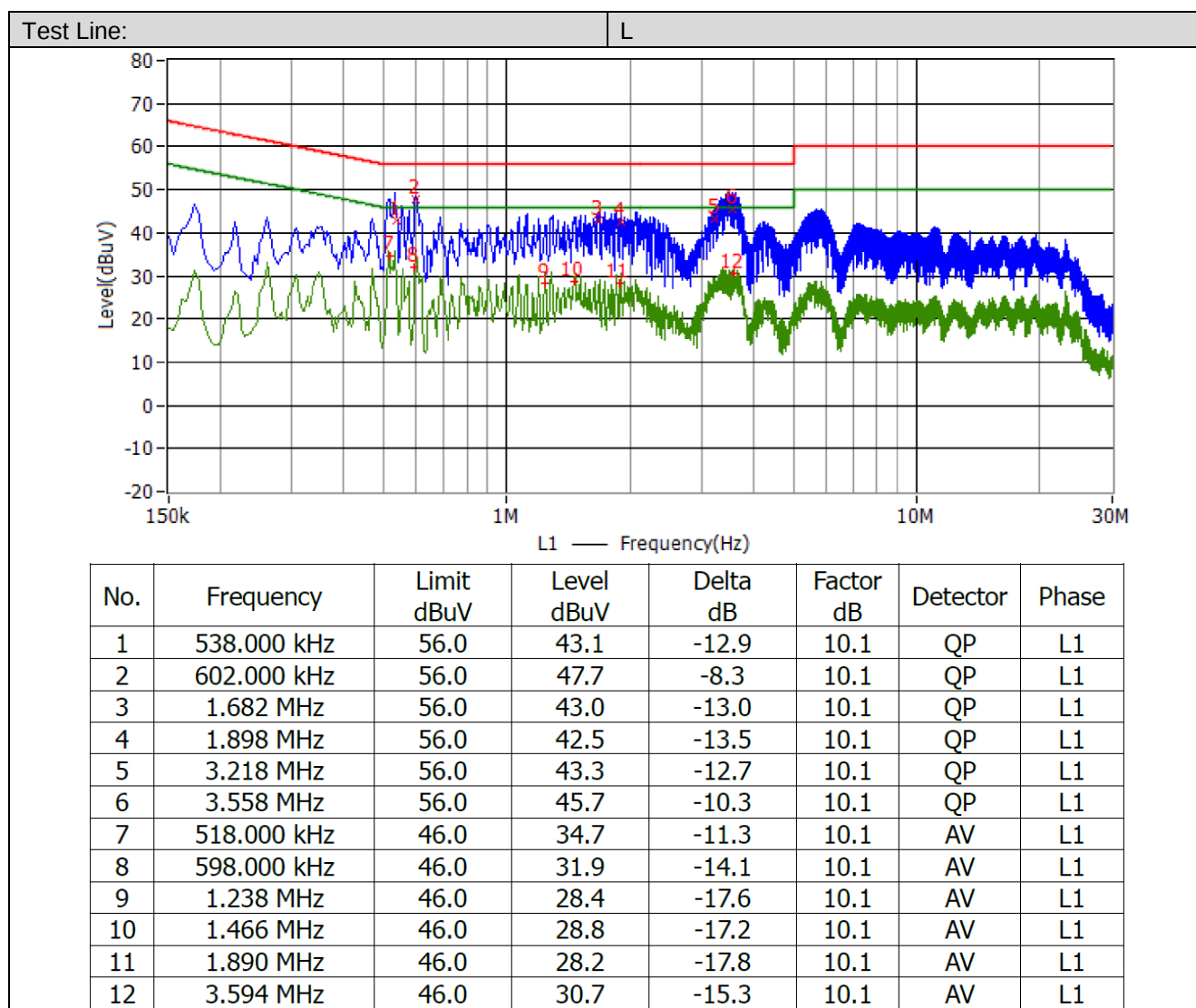
Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

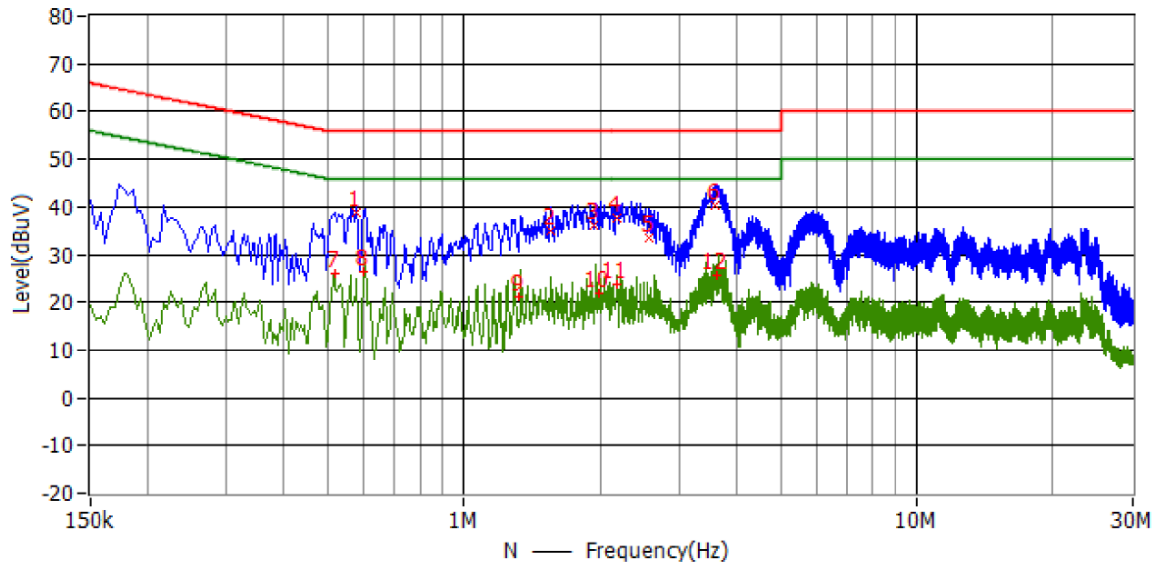
Note:

- 1) Transd=Cable lose+ Pulse Limiter Factor + Artificial Mains Factor
- 2) Margin= Limit -Level



Test Line:

N



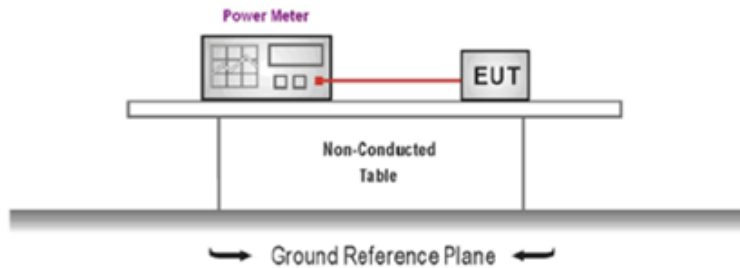
No.	Frequency	Limit dBuV	Level dBuV	Delta dB	Factor dB	Detector	Phase
1	578.000 kHz	56.0	38.7	-17.3	9.9	QP	N
2	1.558 MHz	56.0	35.1	-20.9	9.9	QP	N
3	1.946 MHz	56.0	36.2	-19.8	9.9	QP	N
4	2.178 MHz	56.0	37.6	-18.4	9.9	QP	N
5	2.574 MHz	56.0	33.5	-22.5	10.0	QP	N
6	3.606 MHz	56.0	40.4	-15.6	10.0	QP	N
7	518.000 kHz	46.0	26.2	-19.8	9.9	AV	N
8	602.000 kHz	46.0	26.6	-19.4	9.9	AV	N
9	1.326 MHz	46.0	21.1	-24.9	9.9	AV	N
10	1.982 MHz	46.0	21.9	-24.1	9.9	AV	N
11	2.182 MHz	46.0	23.8	-22.2	9.9	AV	N
12	3.634 MHz	46.0	25.7	-20.3	10.0	AV	N

5.3. 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 47 CFR 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 MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

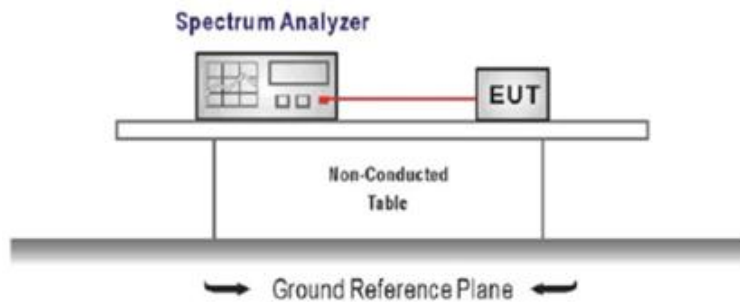
Type	Channel	Peak Output power (dBm)	Average Output power (dBm)	Limit (dBm)	Result
802.11b	01	20.89	18.59	≤30.00	Pass
	06	20.59	18.06		
	11	21.20	18.63		
802.11g	01	22.67	19.55	≤30.00	Pass
	06	22.02	19.01		
	11	22.24	19.17		
802.11n(HT20)	01	22.15	19.18	≤30.00	Pass
	06	22.43	19.08		
	11	22.41	19.27		
802.11n(HT40)	03	21.92	18.82	≤30.00	Pass
	06	21.68	18.57		
	09	22.36	19.28		

5.4. 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

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
 $RBW = 3 \text{ kHz} \leq RBW \leq 100 \text{ kHz}$, $VBW \geq 3 \times RBW$
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 wave form 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 MODE:

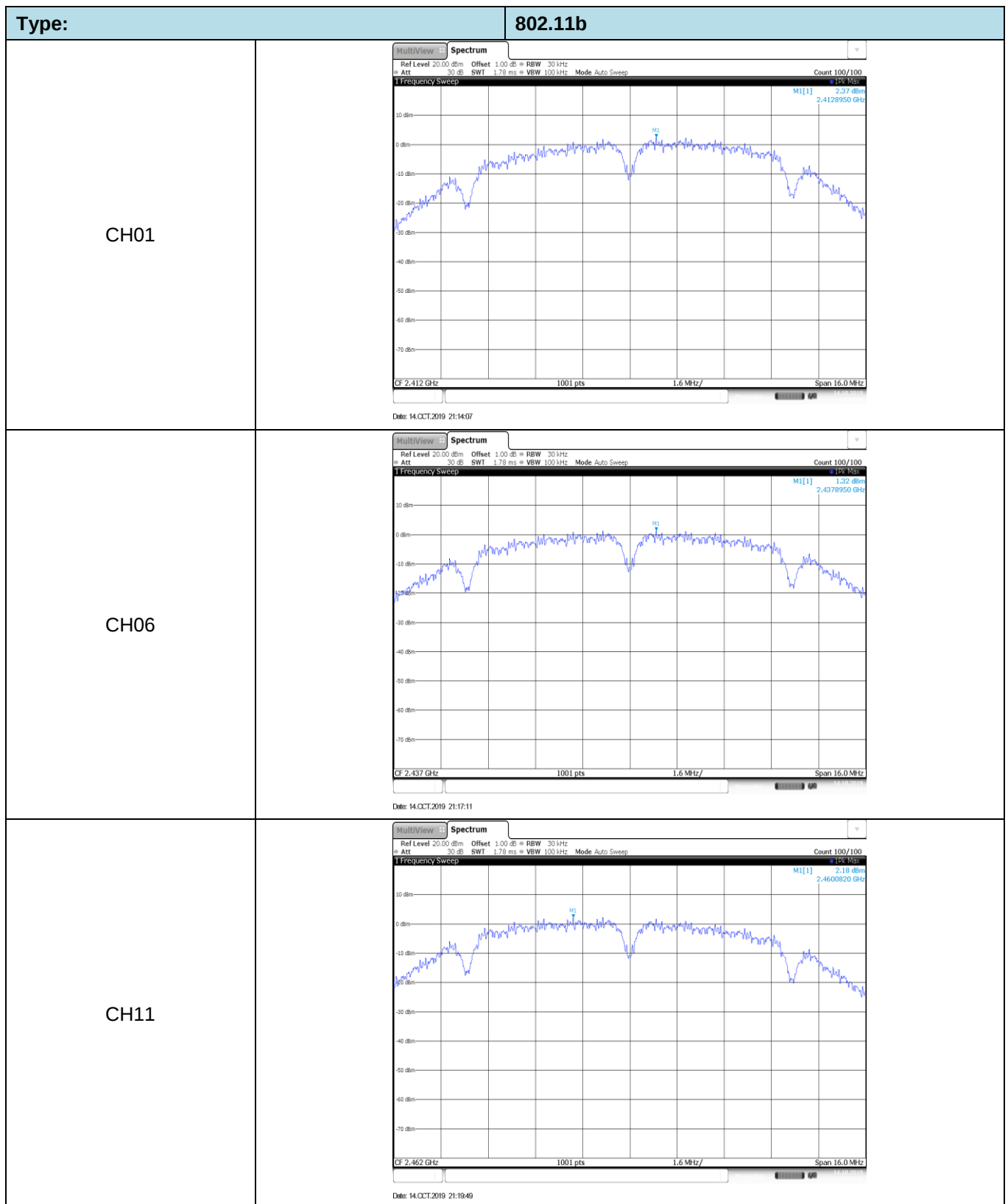
Please refer to the clause 3.3

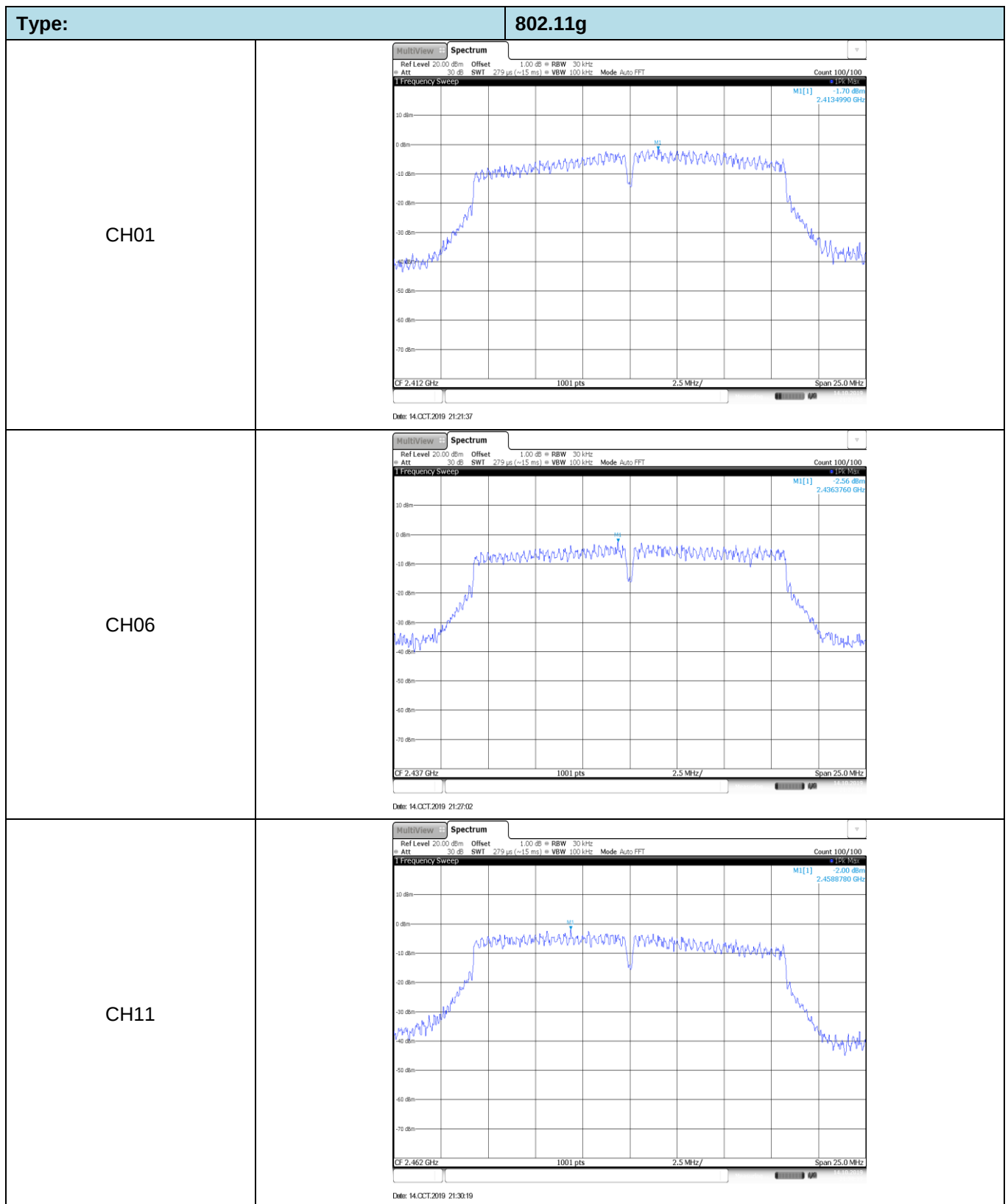
TEST RESULTS

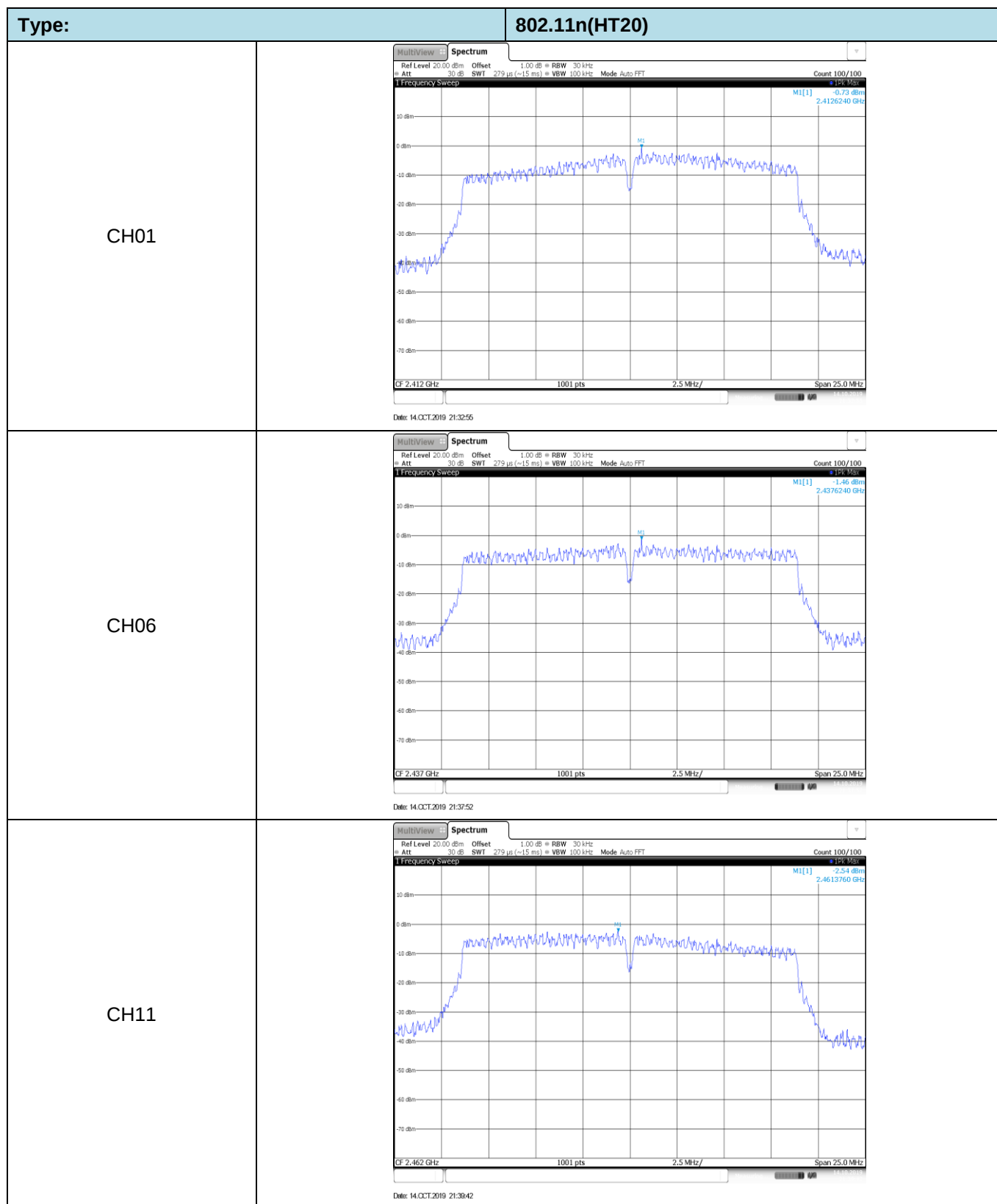
☒ Passed ☐ Not Applicable

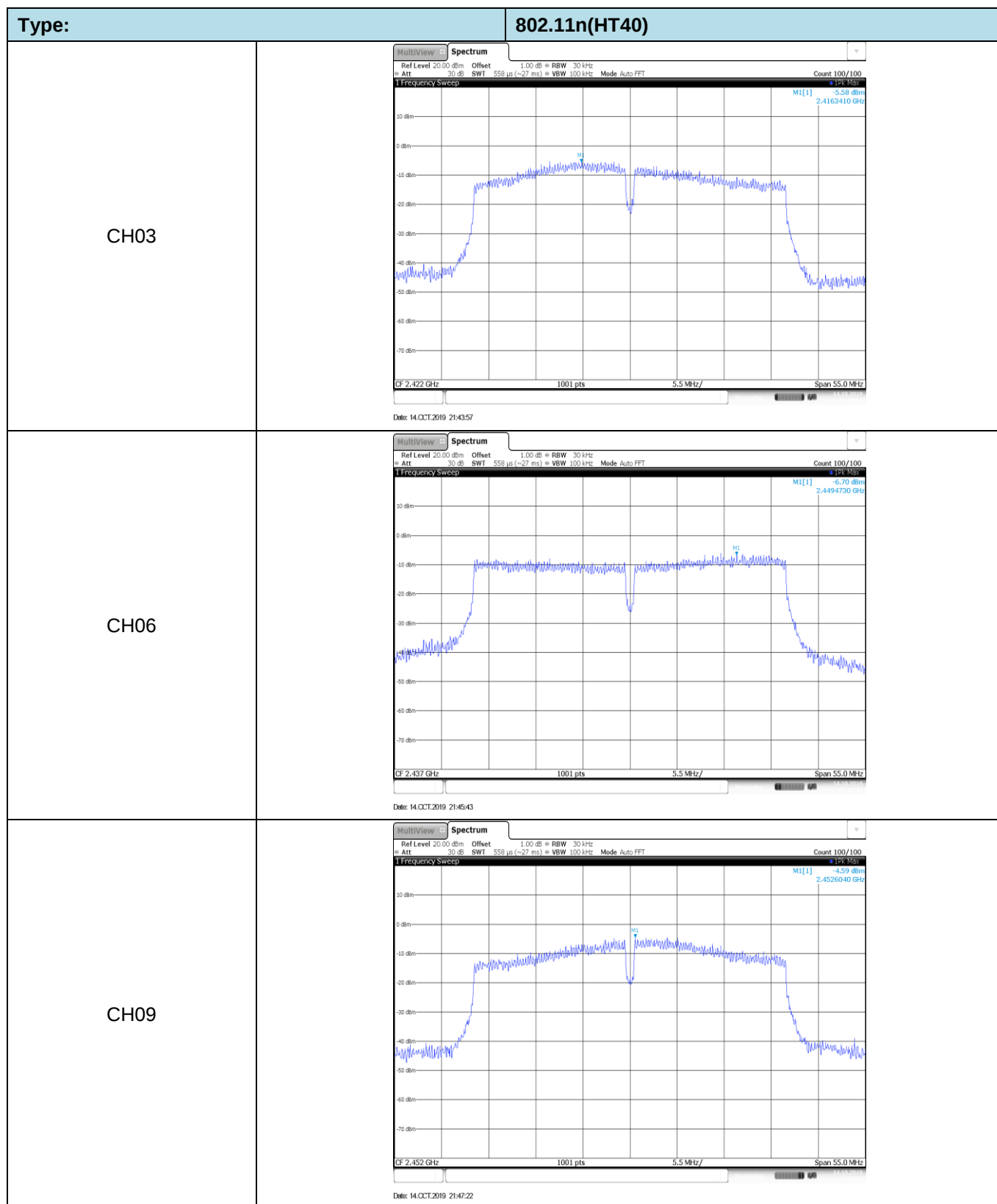
Type	Channel	Power Spectral Density (dBm/30KHz)	Limit (dBm/3KHz)	Result
802.11b	01	2.37	≤8.00	Pass
	06	1.32		
	11	2.18		
802.11g	01	-1.70	≤8.00	Pass
	06	-2.56		
	11	-2.00		
802.11n(HT20)	01	-0.73	≤8.00	Pass
	06	-1.46		
	11	-2.54		
802.11n(HT40)	03	-5.58	≤8.00	Pass
	06	-6.70		
	09	-4.59		

Test plot as follows:









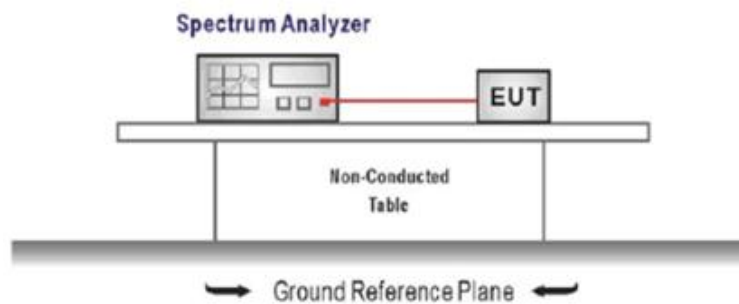
5.5. 6dB bandwidth

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 $\geq$ 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 wave form 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 MODE:

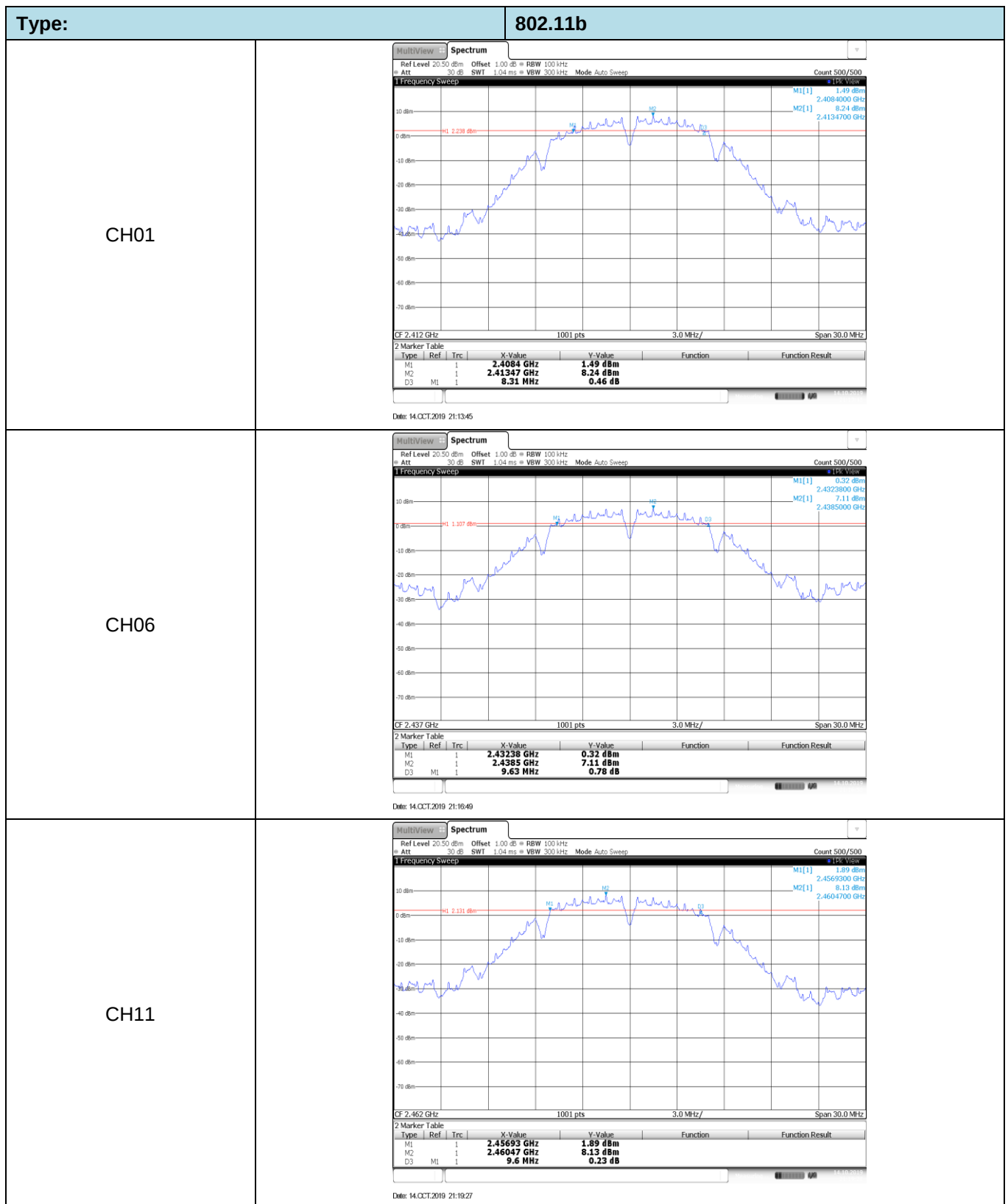
Please refer to the clause 3.3

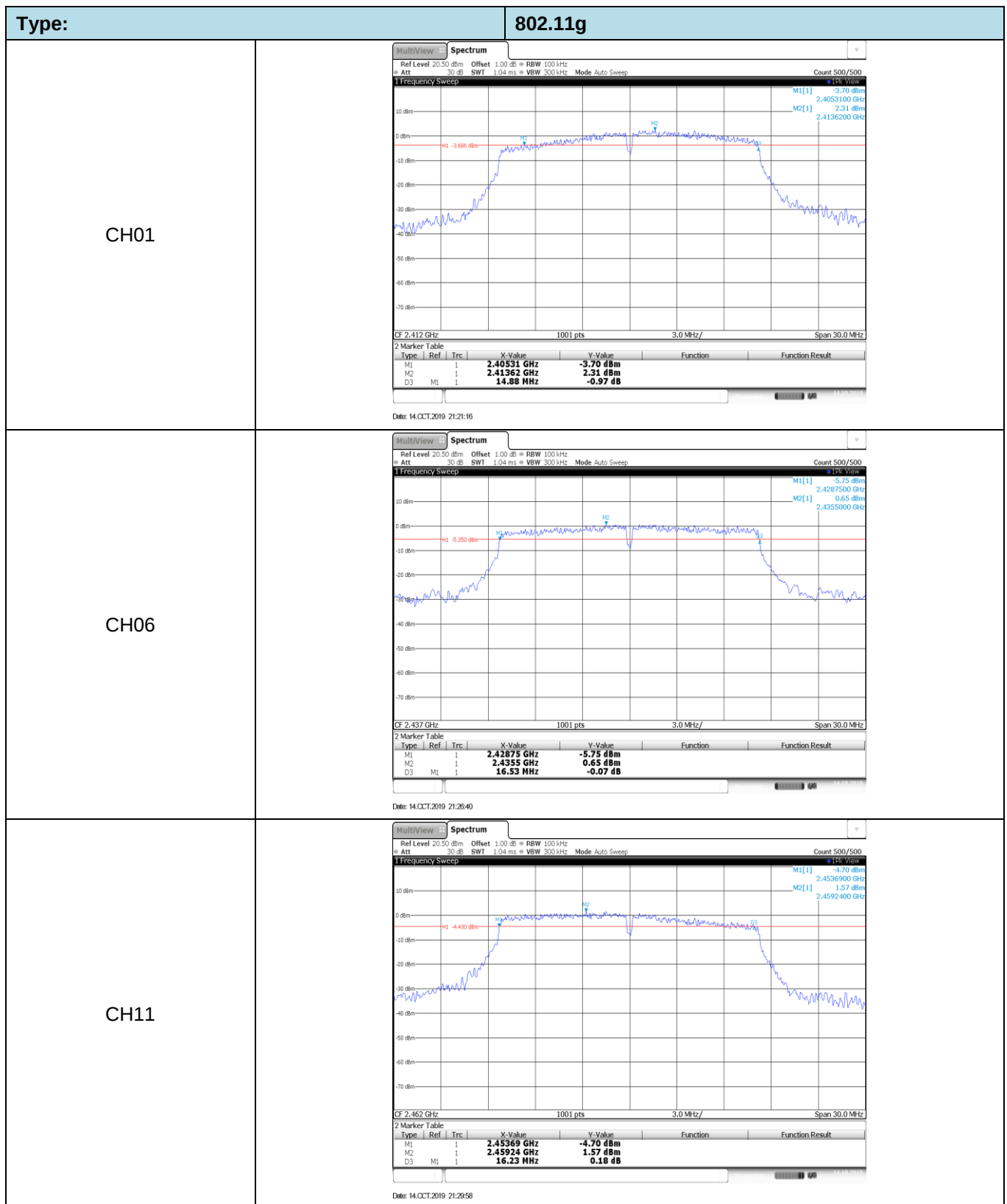
TEST RESULTS

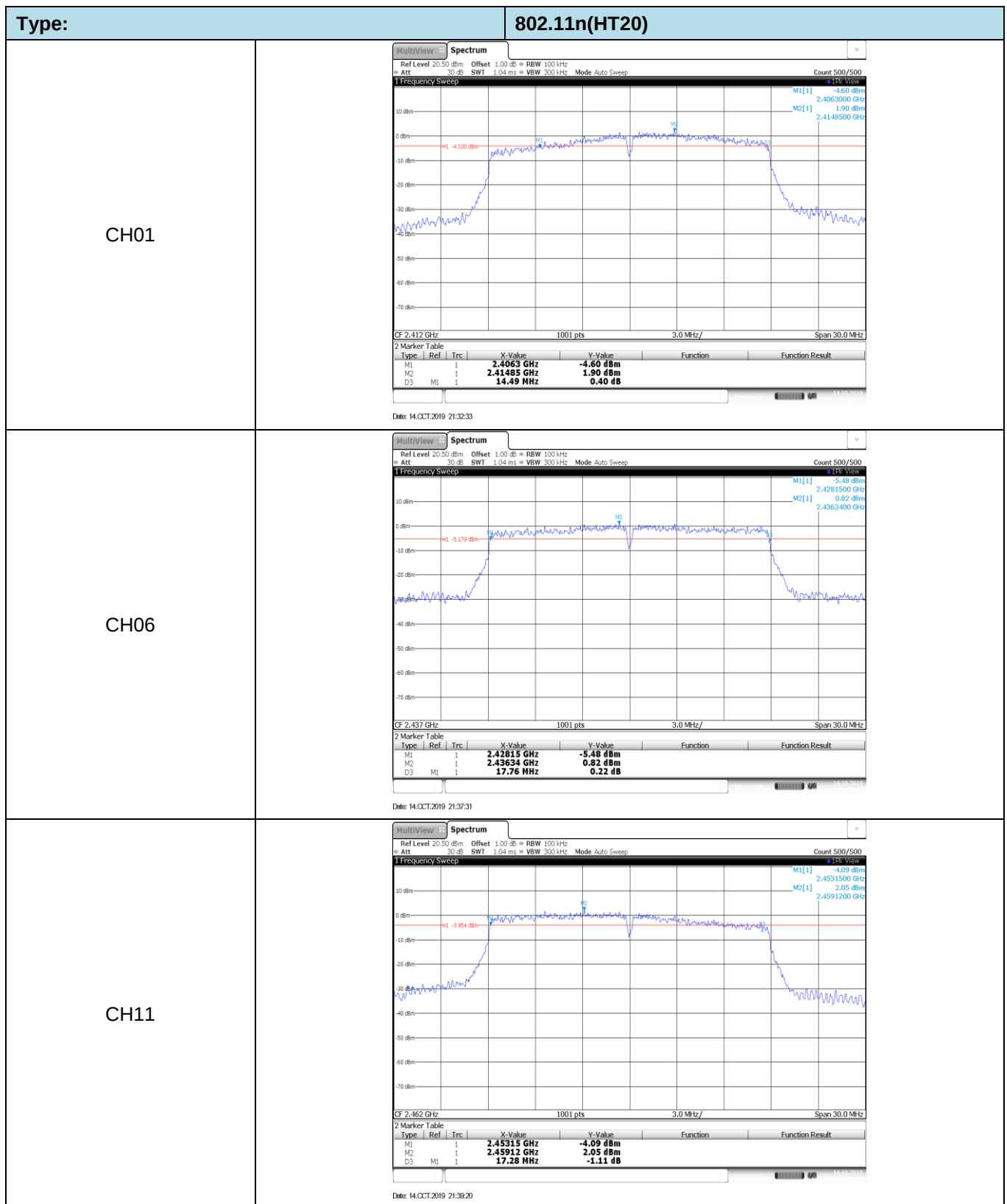
☒ Passed ☐ Not Applicable

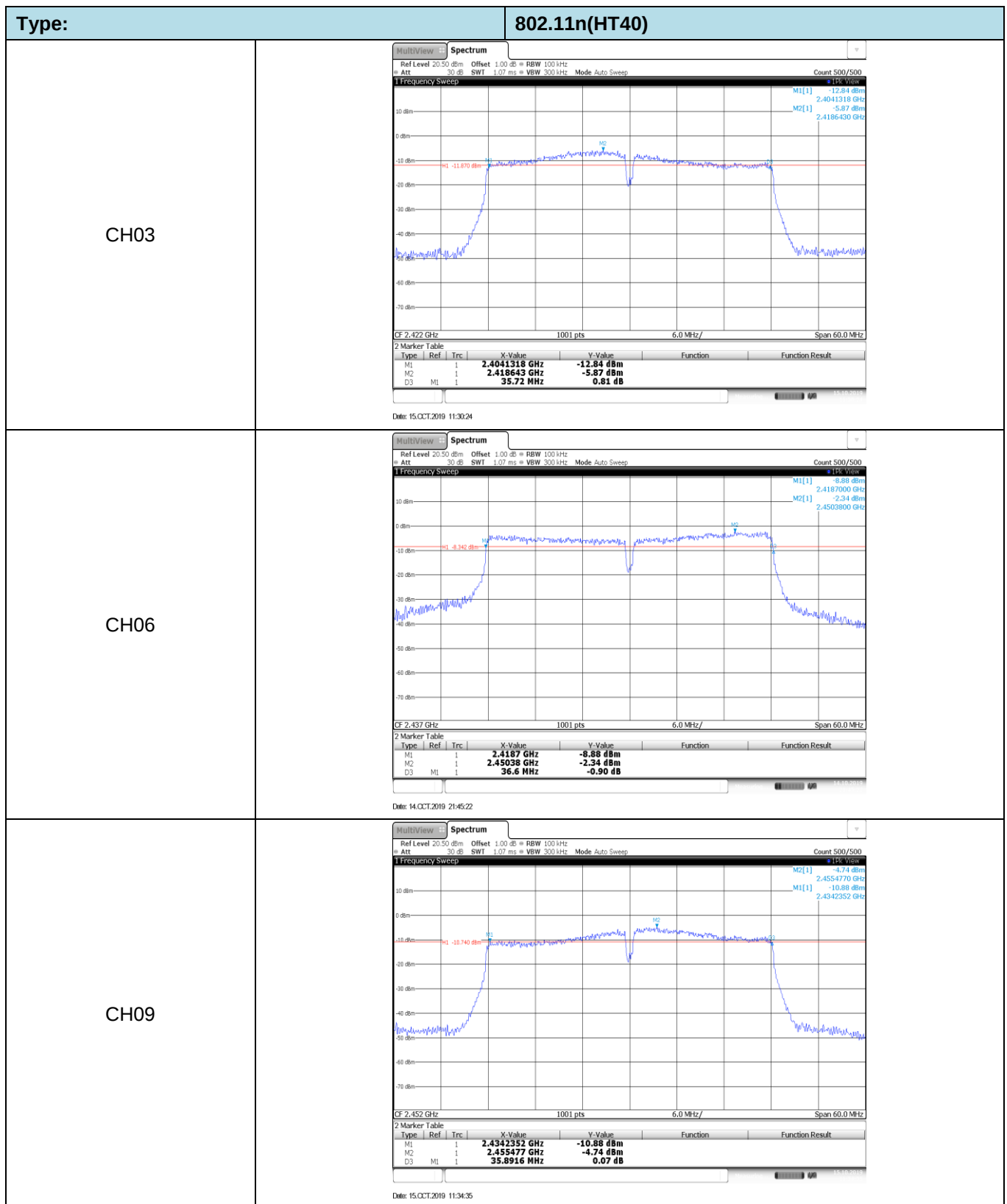
Type	Channel	6dB Bandwidth (MHz)	Limit (kHz)	Result
802.11b	01	8.31	≥500	Pass
	06	9.63		
	11	9.60		
802.11g	01	14.88	≥500	Pass
	06	16.53		
	11	16.23		
802.11n(HT20)	01	14.49	≥500	Pass
	06	17.76		
	11	17.28		
802.11n(HT40)	03	35.72	≥500	Pass
	06	36.60		
	09	35.89		

Test plot as follows:









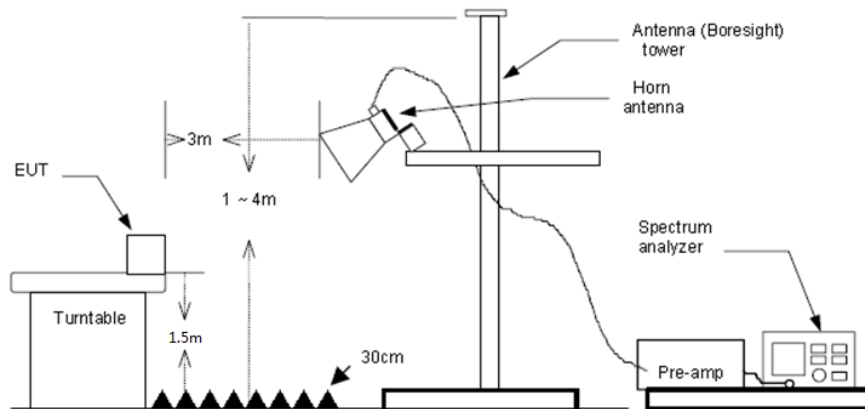
5.6. Restricted band

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 Emissions 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) The receiver set as follow:
RBW=1MHz, VBW=3MHz PEAK detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ Passed ☐ Not Applicable

Note:

- 1) Final level= Read level + Factor

802.11b				CH01			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	29.81	17.66	47.47	74.00	26.53	Horizontal	PK
2390.009	30.55	17.59	48.14	74.00	25.86	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	20.14	17.66	37.80	54.00	16.20	Horizontal	AV
2390.009	19.79	17.59	37.38	54.00	16.62	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	32.42	17.66	50.08	74.00	23.92	Vertical	PK
2390.009	32.20	17.59	49.79	74.00	24.21	Vertical	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	20.77	17.66	38.43	54.00	15.57	Vertical	AV
2390.009	20.19	17.59	37.78	54.00	16.22	Vertical	AV
802.11b				CH11			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	30.63	17.85	48.48	74.00	25.52	Horizontal	PK
2500.000	30.81	17.90	48.71	74.00	25.29	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	20.22	17.85	38.07	54.00	15.93	Horizontal	AV
2500.000	19.76	17.90	37.66	54.00	16.34	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	32.12	17.85	49.97	74.00	24.03	Vertical	PK
2500.000	31.77	17.90	49.67	74.00	24.33	Vertical	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	21.20	17.85	39.05	54.00	14.95	Vertical	AV
2500.000	20.66	17.90	38.56	54.00	15.44	Vertical	AV

802.11g				CH01			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	19.69	17.66	37.35	54.00	16.65	Horizontal	AV
2390.009	19.96	17.59	37.55	54.00	16.45	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	30.07	17.66	47.73	74.00	26.27	Horizontal	PK
2390.009	30.66	17.59	48.25	74.00	25.75	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	20.78	17.66	38.44	54.00	15.56	Vertical	AV
2390.009	20.39	17.59	37.98	54.00	16.02	Vertical	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	31.23	17.66	48.89	74.00	25.11	Vertical	PK
2390.009	31.36	17.59	48.95	74.00	25.05	Vertical	PK
802.11g				CH11			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	33.09	17.85	50.94	74.00	23.06	Horizontal	PK
2500.000	29.70	17.90	47.60	74.00	26.40	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	22.52	17.85	40.37	54.00	13.63	Horizontal	AV
2500.000	19.41	17.90	37.31	54.00	16.69	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	31.27	17.85	49.12	74.00	24.88	Vertical	PK
2500.000	30.93	17.90	48.83	74.00	25.17	Vertical	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	20.97	17.85	38.82	54.00	15.18	Vertical	AV
2500.000	19.72	17.90	37.62	54.00	16.38	Vertical	AV

802.11n(HT20)				CH01			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	30.93	17.66	48.59	74.00	25.41	Horizontal	PK
2390.009	33.57	17.59	51.16	74.00	22.84	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	19.39	17.66	37.05	54.00	16.95	Horizontal	AV
2390.009	19.93	17.59	37.52	54.00	16.48	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	30.51	17.66	48.17	74.00	25.83	Vertical	PK
2390.009	32.02	17.59	49.61	74.00	24.39	Vertical	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	19.92	17.66	37.58	54.00	16.42	Vertical	AV
2390.009	19.79	17.59	37.38	54.00	16.62	Vertical	AV
802.11n(HT20)				CH11			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	24.10	17.85	41.95	54.00	12.05	Horizontal	AV
2500.000	19.01	17.90	36.91	54.00	17.09	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	37.19	17.85	55.04	74.00	18.96	Horizontal	PK
2500.000	29.74	17.90	47.64	74.00	26.36	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	22.49	17.85	40.34	54.00	13.66	Vertical	AV
2500.000	20.35	17.90	38.25	54.00	15.75	Vertical	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.514	32.67	17.85	50.52	74.00	23.48	Vertical	PK
2500.000	30.58	17.90	48.48	74.00	25.52	Vertical	PK

802.11n(HT40)				CH03			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	19.50	17.66	37.16	54.00	16.84	Horizontal	AV
2390.108	21.63	17.59	39.22	54.00	14.78	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	30.30	17.66	47.96	74.00	26.04	Horizontal	PK
2390.108	32.90	17.59	50.49	74.00	23.51	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	20.14	17.66	37.80	54.00	16.20	Vertical	AV
2390.108	21.87	17.59	39.46	54.00	14.54	Vertical	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2310.000	30.56	17.66	48.22	74.00	25.78	Vertical	PK
2390.108	31.09	17.59	48.68	74.00	25.32	Vertical	PK
802.11n(HT40)				CH09			
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.500	34.54	17.85	52.39	74.00	21.61	Horizontal	PK
2500.000	29.58	17.90	47.48	74.00	26.52	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.500	24.78	17.85	42.63	54.00	11.37	Horizontal	AV
2500.000	19.18	17.90	37.08	54.00	16.92	Horizontal	AV
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.500	33.58	17.85	51.43	74.00	22.57	Vertical	PK
2500.000	31.15	17.90	49.05	74.00	24.95	Vertical	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
2483.500	22.65	17.85	40.50	54.00	13.50	Vertical	AV
2500.000	19.49	17.90	37.39	54.00	16.61	Vertical	AV

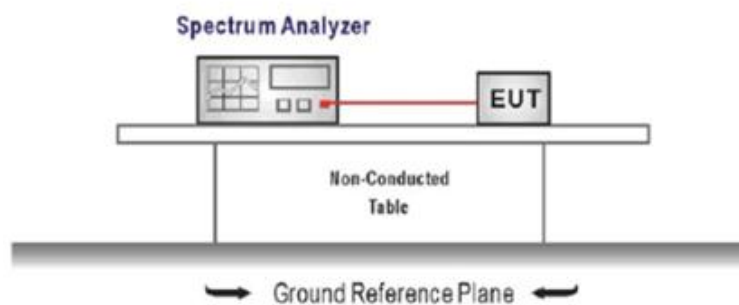
5.7. Band edge and Spurious Emissions (conducted)

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 $\geq 3 \times$ 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

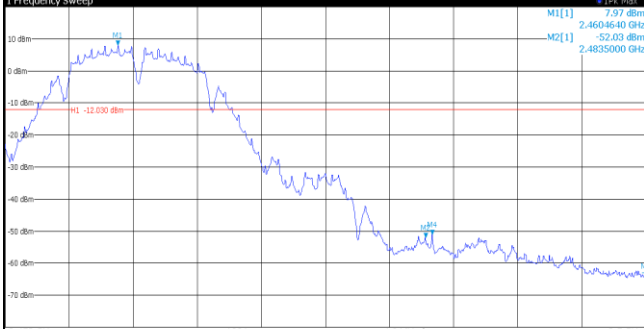
Note: the channel found to contain the maximum PSD level can be used to establish the reference level.
3. Emission level measurement
Set the center frequency and span to encompass frequency range to be measured
RBW = 100 kHz, VBW $\geq 3 \times$ RBW
Detector = peak, Sweep time = auto couple, Trace mode = 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 emission 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 emission relative to the limit.

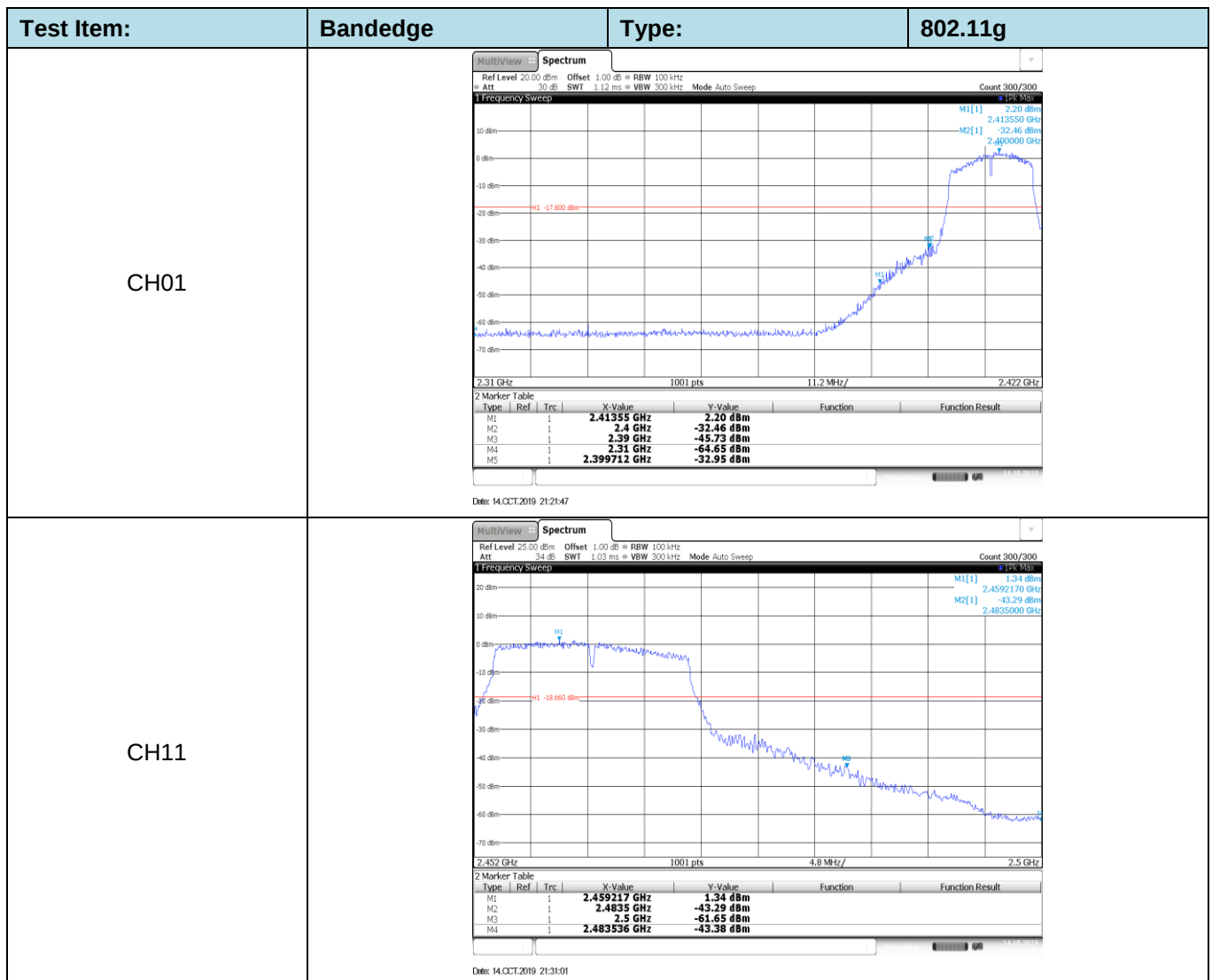
TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

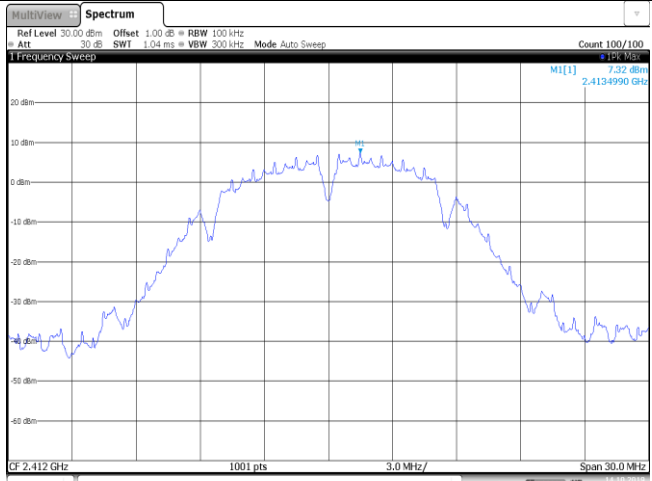
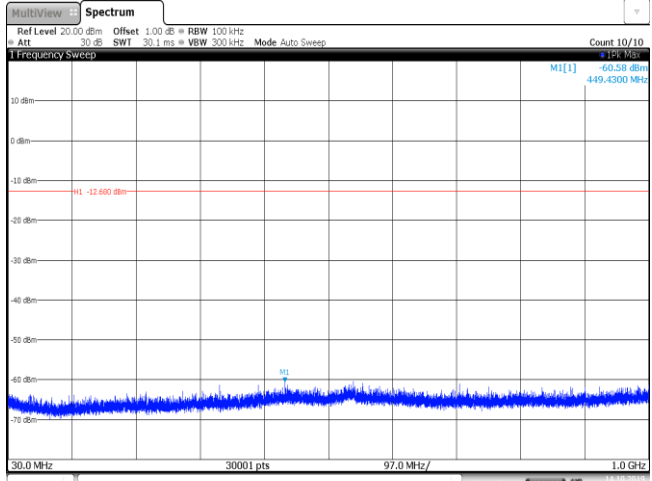
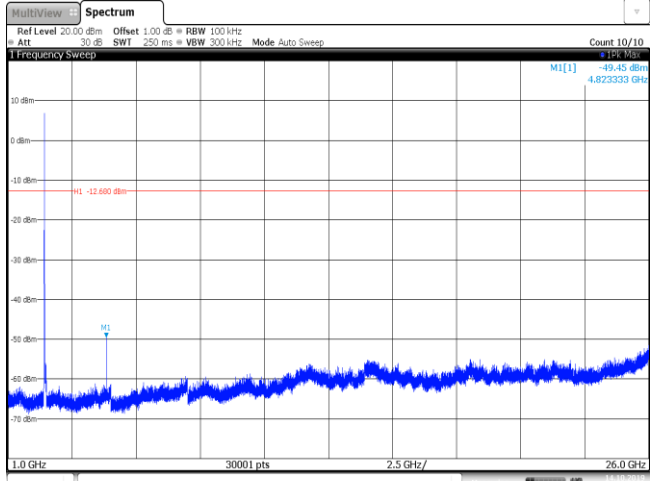
☒ Passed ☐ Not Applicable

Test Item:	Bandedge	Type:	802.11b																																										
CH01	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 1.12 ms VBW 300 kHz Mode Auto Sweep Count 200/200 1 Frequency Sweep  M1[1] 8.09 dBm 2.413440 GHz M2[1] -11.91 dBm 2.400000 GHz 2.31 GHz 1001 pts 11.2 MHz/ 2.422 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.41344 GHz</td><td>8.09 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-42.11 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-54.98 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.40 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399488 GHz</td><td>-35.86 dBm</td><td></td><td></td></tr></table> Date: 14.OCT.2019 21:14:17			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.41344 GHz	8.09 dBm			M2	1		2.4 GHz	-42.11 dBm			M3	1		2.39 GHz	-54.98 dBm			M4	1		2.31 GHz	-64.40 dBm			M5	1		2.399488 GHz	-35.86 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.41344 GHz	8.09 dBm																																									
M2	1		2.4 GHz	-42.11 dBm																																									
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M4	1		2.31 GHz	-64.40 dBm																																									
M5	1		2.399488 GHz	-35.86 dBm																																									
CH11	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWT 1.03 ms VBW 300 kHz Mode Auto Sweep Count 300/300 1 Frequency Sweep  M1[1] 7.97 dBm 2.460464 GHz M2[1] -52.03 dBm 2.4835000 GHz 2.452 GHz 1001 pts 4.8 MHz/ 2.5 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.460464 GHz</td><td>7.97 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-52.03 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-62.98 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.484016 GHz</td><td>-51.04 dBm</td><td></td><td></td></tr></table> Date: 15.OCT.2019 11:21:39			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.460464 GHz	7.97 dBm			M2	1		2.4835 GHz	-52.03 dBm			M3	1		2.5 GHz	-62.98 dBm			M4	1		2.484016 GHz	-51.04 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.460464 GHz	7.97 dBm																																									
M2	1		2.4835 GHz	-52.03 dBm																																									
M3	1		2.5 GHz	-62.98 dBm																																									
M4	1		2.484016 GHz	-51.04 dBm																																									

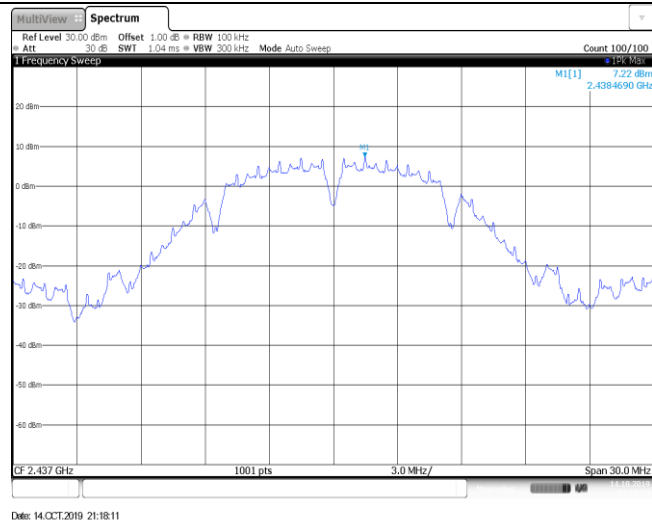


Test Item:	Bandedge	Type:	802.11n(HT20)																																										
CH01	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 1.12 ms VSW 300 kHz Mode Auto Sweep Count 300/300 1 Frequency Sweep 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] 1.82 dBm M2[1] 2.414780 GHz M2[1] -33.35 dBm M2[1] 2.400000 GHz 2.31 GHz 1001 pts 11.2 MHz/ 2.422 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.41478 GHz</td><td>1.82 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-33.35 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-44.77 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-64.85 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.399152 GHz</td><td>-33.54 dBm</td><td></td><td></td></tr></table> Date: 14.OCT.2019 21:33:48			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.41478 GHz	1.82 dBm			M2	1		2.4 GHz	-33.35 dBm			M3	1		2.39 GHz	-44.77 dBm			M4	1		2.31 GHz	-64.85 dBm			M5	1		2.399152 GHz	-33.54 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.41478 GHz	1.82 dBm																																									
M2	1		2.4 GHz	-33.35 dBm																																									
M3	1		2.39 GHz	-44.77 dBm																																									
M4	1		2.31 GHz	-64.85 dBm																																									
M5	1		2.399152 GHz	-33.54 dBm																																									
CH11	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att -30 dB SWF 1.03 ms VSW 300 kHz Mode Auto Sweep Count 300/300 1 Frequency Sweep 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm M1[1] 1.83 dBm M2[1] 2.4591210 GHz M2[1] -44.00 dBm M2[1] 2.4835000 GHz 2.452 GHz 1001 pts 4.8 MHz/ 2.5 GHz 2 Marker Table <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.459121 GHz</td><td>1.83 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-44.00 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-61.56 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.484208 GHz</td><td>-43.91 dBm</td><td></td><td></td></tr></table> Date: 14.OCT.2019 21:40:05			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.459121 GHz	1.83 dBm			M2	1		2.4835 GHz	-44.00 dBm			M3	1		2.5 GHz	-61.56 dBm			M4	1		2.484208 GHz	-43.91 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.459121 GHz	1.83 dBm																																									
M2	1		2.4835 GHz	-44.00 dBm																																									
M3	1		2.5 GHz	-61.56 dBm																																									
M4	1		2.484208 GHz	-43.91 dBm																																									

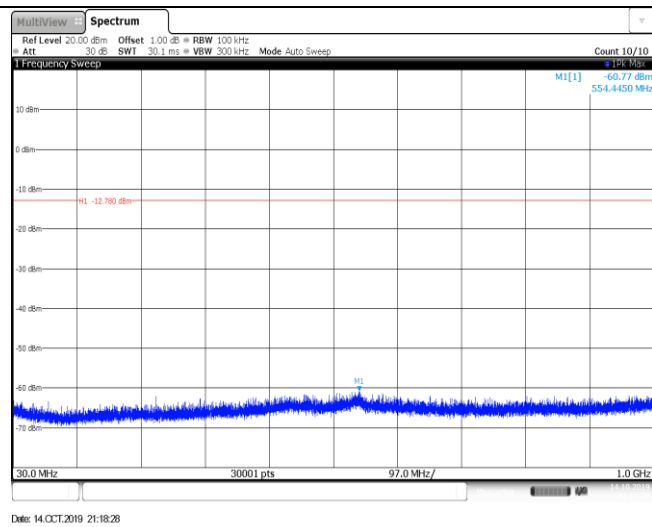
Test Item:	Bandedge	Type:	802.11n(HT40)																																										
CH03	MultiView Spectrum Ref Level 20.00 dBm Offset 1.00 dB BW 100 kHz Att 34 dB SWF 1.52 ms VBW 300 kHz Mode Auto Sweep Count 300/300 1 Frequency Sweep 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 2.31 GHz 1001 pts 13.2 MHz/ 2.442 GHz M1[1] -0.86 dBm M2[1] 2.417140 GHz M3[1] -36.12 dBm M4[1] 2.400000 GHz M1 M2 M3 M4 <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.41714 GHz</td><td>-0.86 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4 GHz</td><td>-36.12 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.39 GHz</td><td>-38.85 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.31 GHz</td><td>-63.03 dBm</td><td></td><td></td></tr><tr><td>M5</td><td>1</td><td></td><td>2.394084 GHz</td><td>-33.98 dBm</td><td></td><td></td></tr></table> Date: 14.OCT.2019 21:44:07			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.41714 GHz	-0.86 dBm			M2	1		2.4 GHz	-36.12 dBm			M3	1		2.39 GHz	-38.85 dBm			M4	1		2.31 GHz	-63.03 dBm			M5	1		2.394084 GHz	-33.98 dBm		
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.41714 GHz	-0.86 dBm																																									
M2	1		2.4 GHz	-36.12 dBm																																									
M3	1		2.39 GHz	-38.85 dBm																																									
M4	1		2.31 GHz	-63.03 dBm																																									
M5	1		2.394084 GHz	-33.98 dBm																																									
CH09	MultiView Spectrum Ref Level 25.00 dBm Offset 1.00 dB BW 100 kHz Att 34 dB SWF 1.1 ms VBW 300 kHz Mode Auto Sweep Count 300/300 1 Frequency Sweep 20 dBm 10 dBm 0 dBm -10 dBm -20 dBm -30 dBm -40 dBm -50 dBm -60 dBm -70 dBm 2.432 GHz 1001 pts 6.8 MHz/ 2.5 GHz M1[1] -0.72 dBm M2[1] 2.4541120 GHz M3[1] -41.23 dBm M4[1] 2.4835000 GHz M1 M2 M3 M4 <table><tr><th>Type</th><th>Ref</th><th>Trc</th><th>X-Value</th><th>Y-Value</th><th>Function</th><th>Function Result</th></tr><tr><td>M1</td><td>1</td><td></td><td>2.454112 GHz</td><td>-0.72 dBm</td><td></td><td></td></tr><tr><td>M2</td><td>1</td><td></td><td>2.4835 GHz</td><td>-41.23 dBm</td><td></td><td></td></tr><tr><td>M3</td><td>1</td><td></td><td>2.5 GHz</td><td>-61.77 dBm</td><td></td><td></td></tr><tr><td>M4</td><td>1</td><td></td><td>2.484496 GHz</td><td>-39.31 dBm</td><td></td><td></td></tr></table> Date: 14.OCT.2019 21:50:18			Type	Ref	Trc	X-Value	Y-Value	Function	Function Result	M1	1		2.454112 GHz	-0.72 dBm			M2	1		2.4835 GHz	-41.23 dBm			M3	1		2.5 GHz	-61.77 dBm			M4	1		2.484496 GHz	-39.31 dBm									
Type	Ref	Trc	X-Value	Y-Value	Function	Function Result																																							
M1	1		2.454112 GHz	-0.72 dBm																																									
M2	1		2.4835 GHz	-41.23 dBm																																									
M3	1		2.5 GHz	-61.77 dBm																																									
M4	1		2.484496 GHz	-39.31 dBm																																									

Test Item:	SE	Type:	802.11b
CH01 Reference level	 Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 1.04 ms VSW 300 kHz Mode Auto Sweep Count 100/100 MI[1] 7.32 dBm 2.4134990 GHz CF 2.412 GHz 1001 pts 3.0 MHz/ Span 30.0 MHz Date: 14.OCT.2019 21:15:23		
CH01 30MHz~1000MHz	 Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 30.1 ms VSW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -60.58 dBm 449.4300 MHz 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 14.OCT.2019 21:15:39		
CH01 1GHz~26GHz	 Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 250 ms VSW 300 kHz Mode Auto Sweep Count 10/10 MI[1] -49.45 dBm 4.823333 GHz 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 14.OCT.2019 21:15:55		

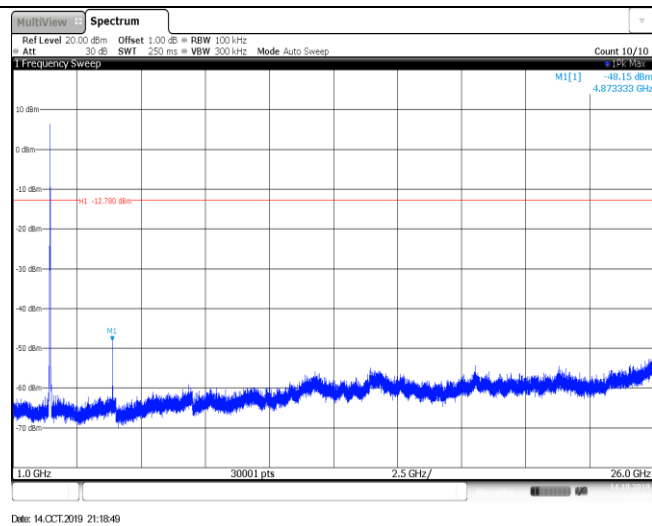
CH06
Reference level



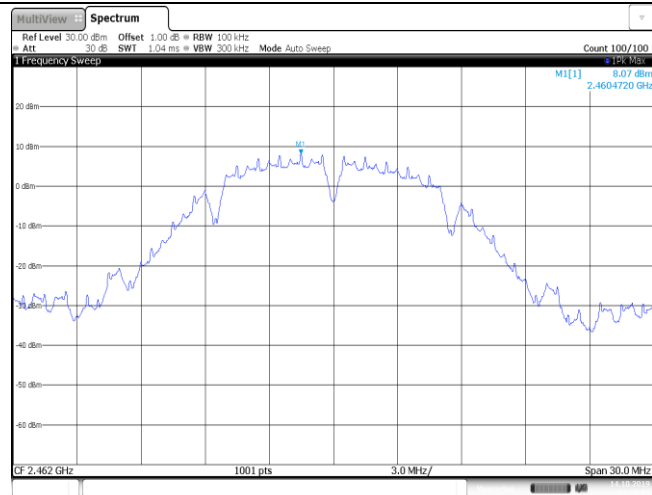
CH06
30MHz~1000MHz



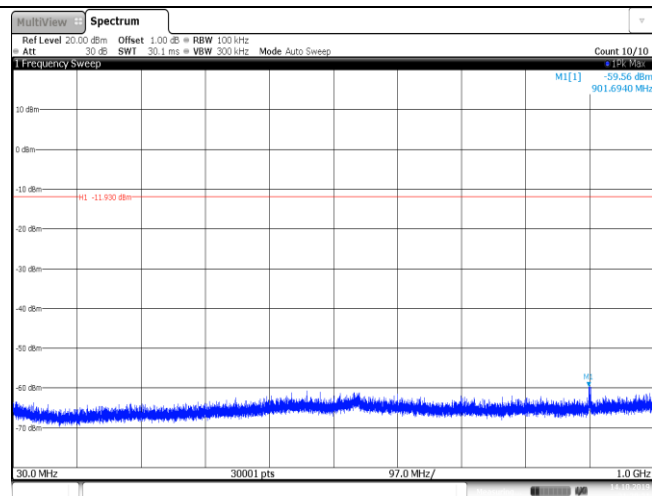
CH06
1GHz~26GHz



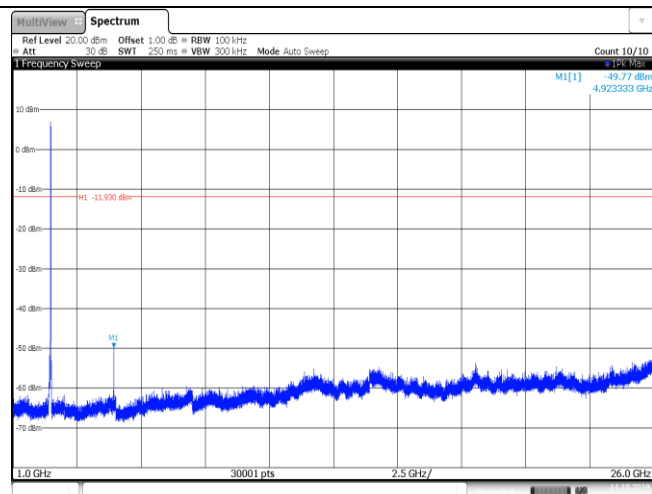
CH11
Reference level

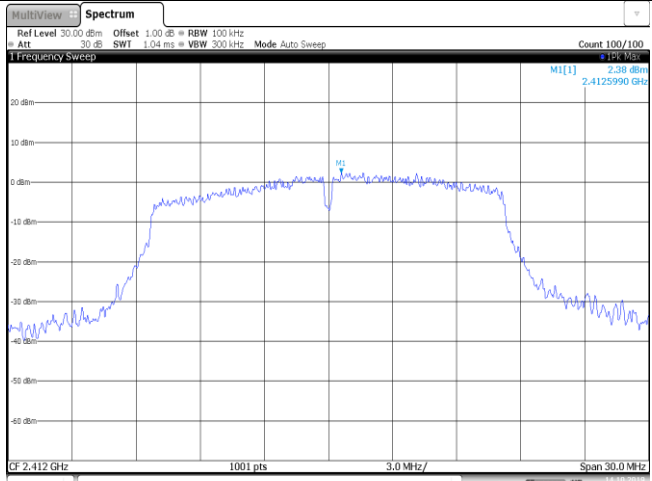
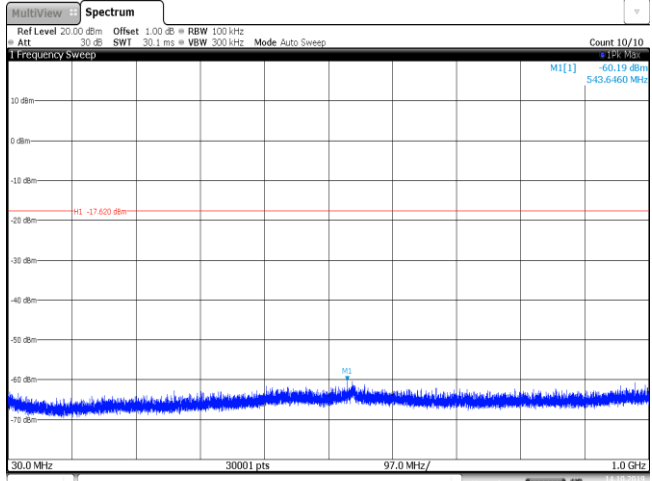
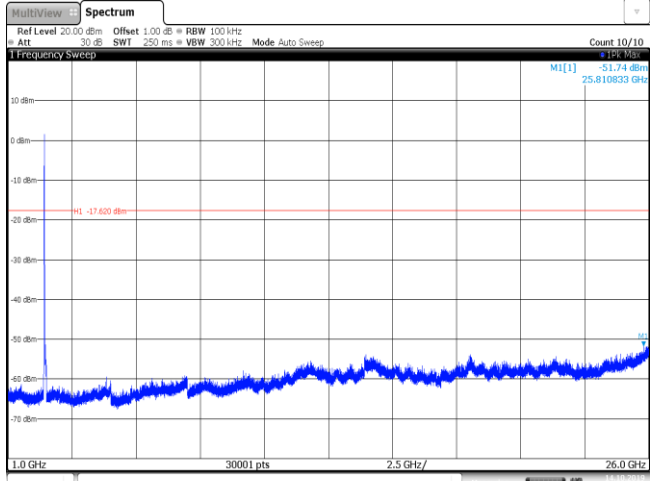


CH11
30MHz~1000MHz

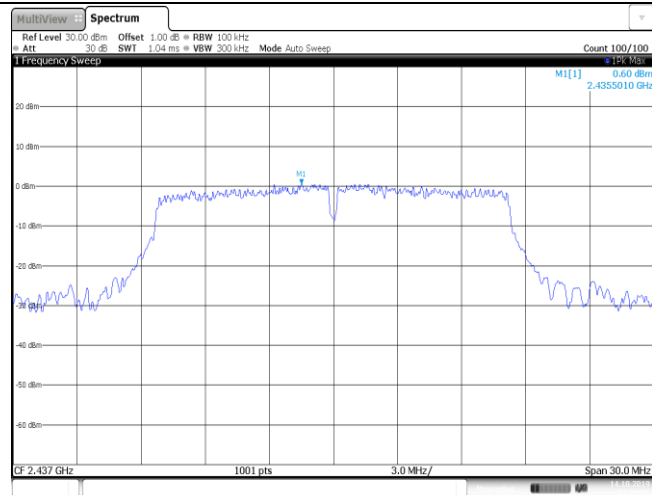


CH11
1GHz~26GHz

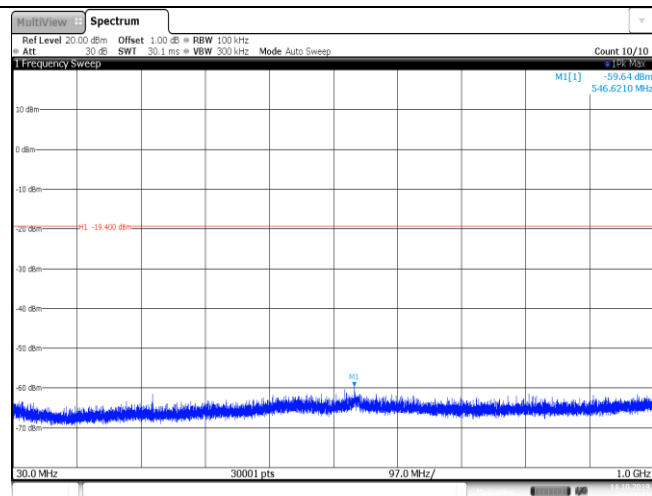


Test Item:	SE	Type:	802.11g
CH01 Reference level			
CH01 30MHz~1000MHz			
CH01 1GHz~26GHz			

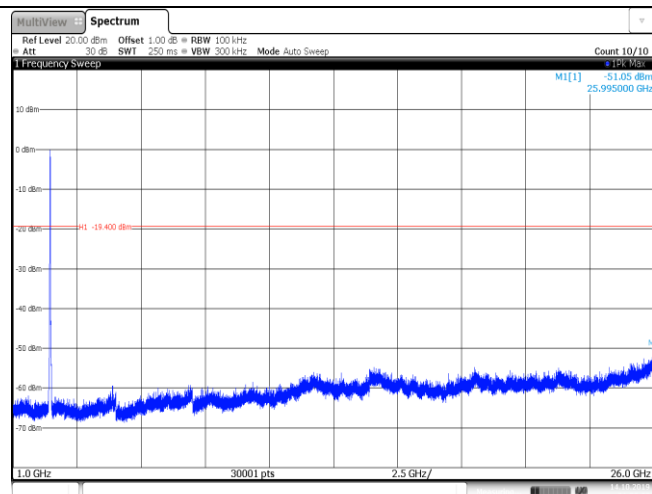
CH06
Reference level



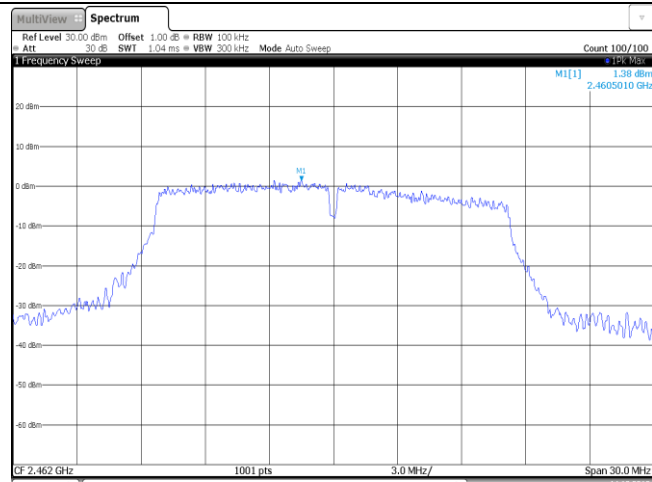
CH06
30MHz~1000MHz



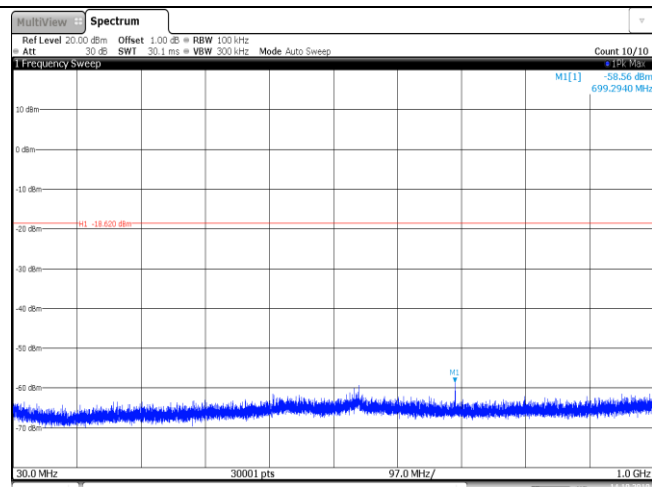
CH06
1GHz~26GHz



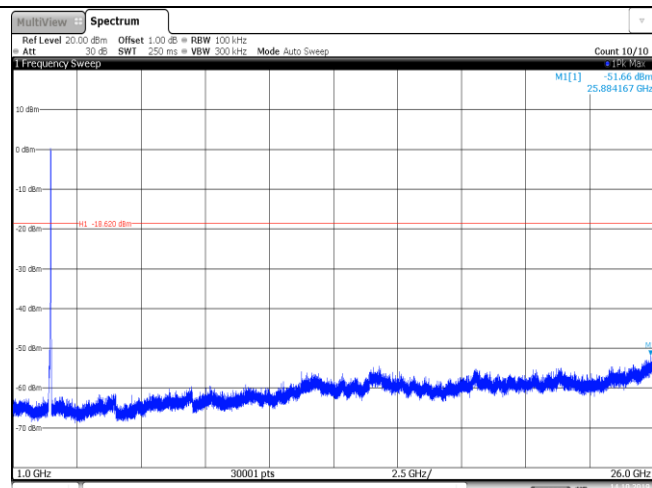
CH11
Reference level

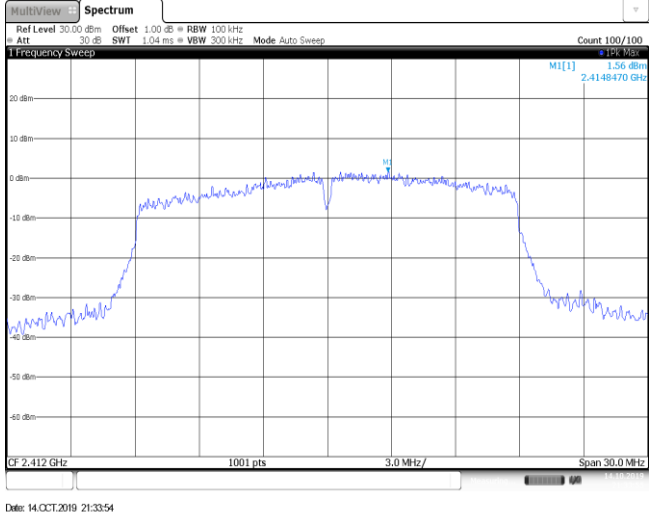
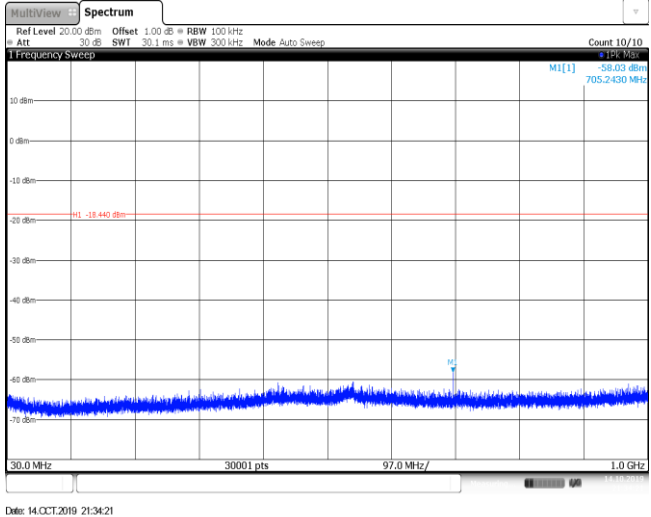
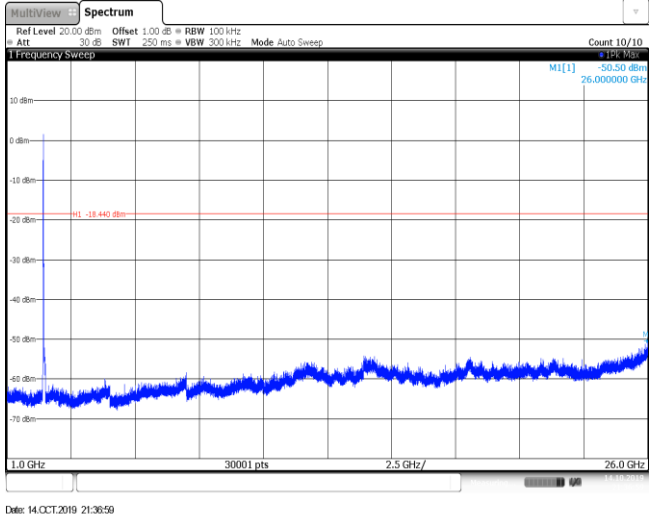


CH11
30MHz~1000MHz

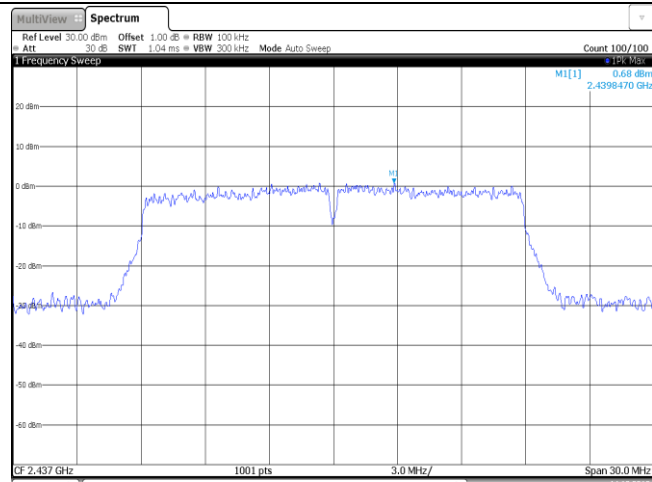


CH11
1GHz~26GHz



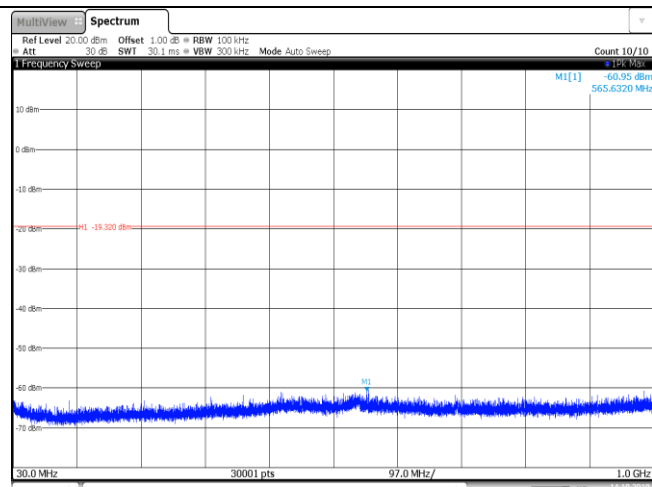
Test Item:	SE	Type:	802.11n(HT20)
CH01 Reference level			
CH01 30MHz~1000MHz			
CH01 1GHz~26GHz			

CH06
Reference level



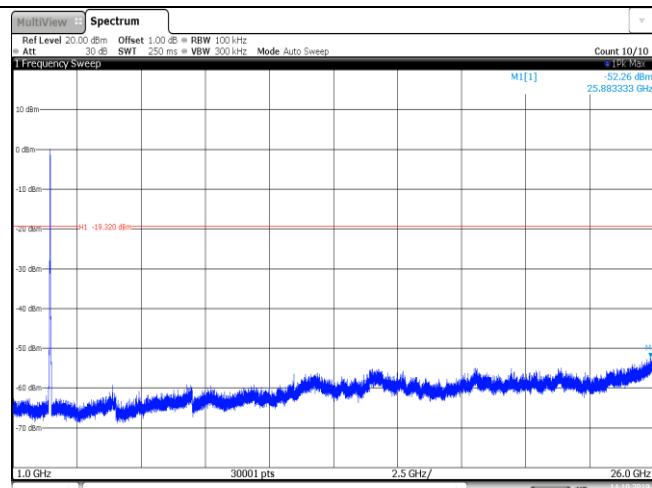
Date: 14.OCT.2019 21:37:59

CH06
30MHz~1000MHz



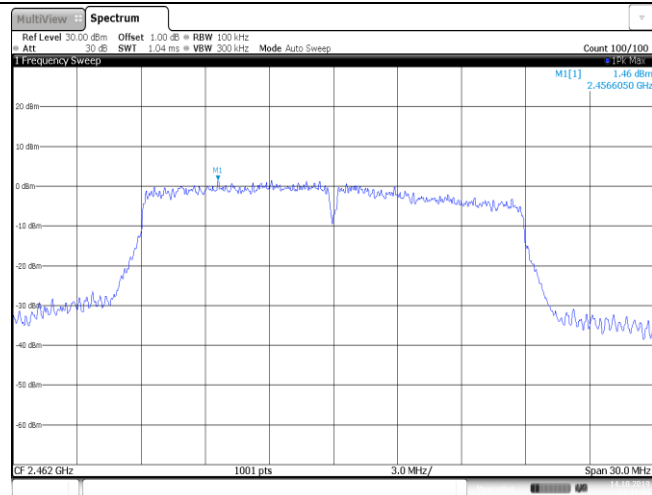
Date: 14.OCT.2019 21:38:15

CH06
1GHz~26GHz



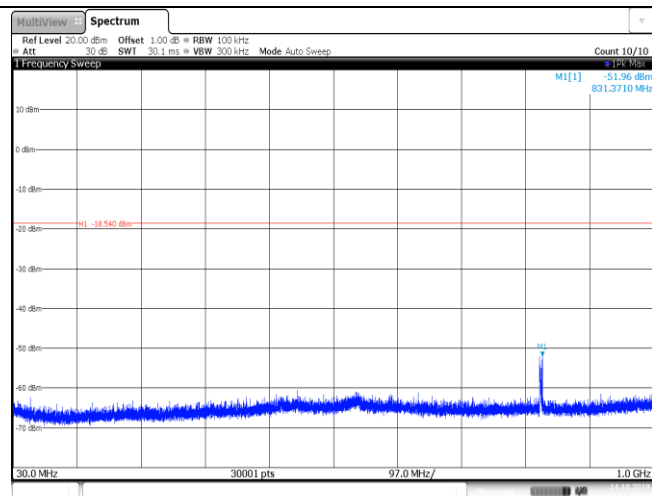
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CH11
Reference level



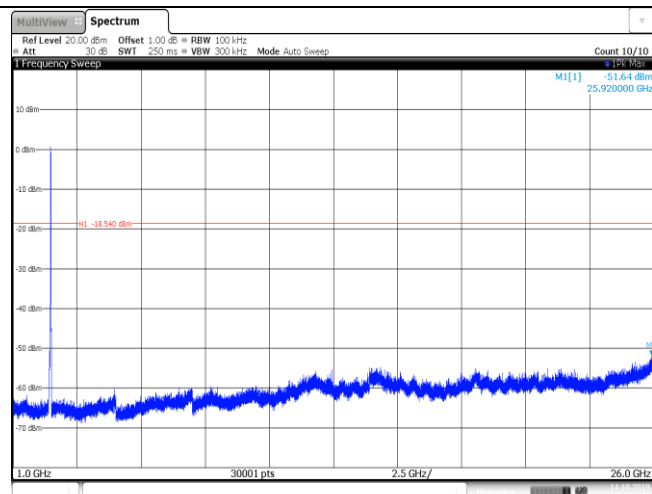
Date: 14.OCT.2019 21:41:44

CH11
30MHz~1000MHz

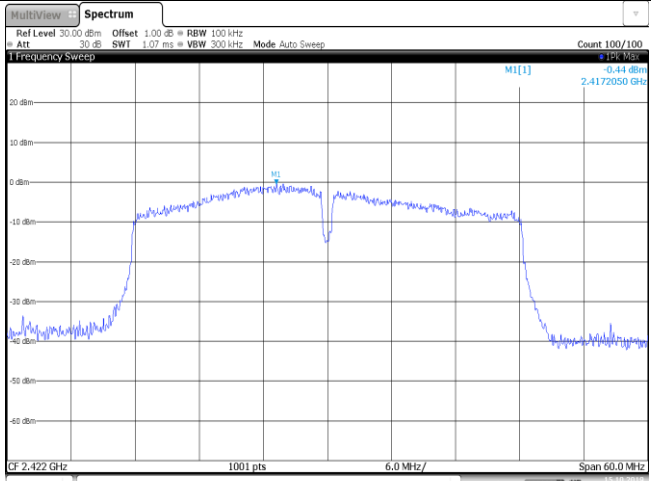
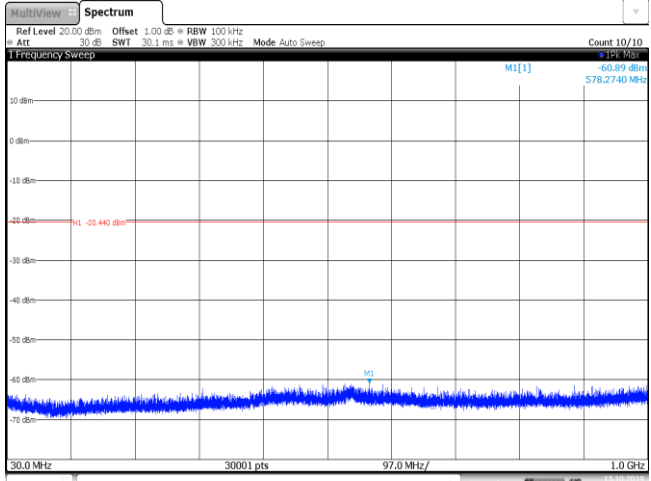
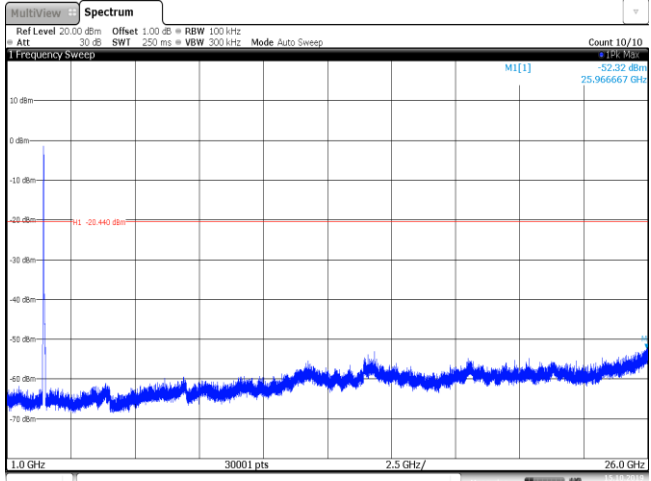


Date: 14.OCT.2019 21:42:00

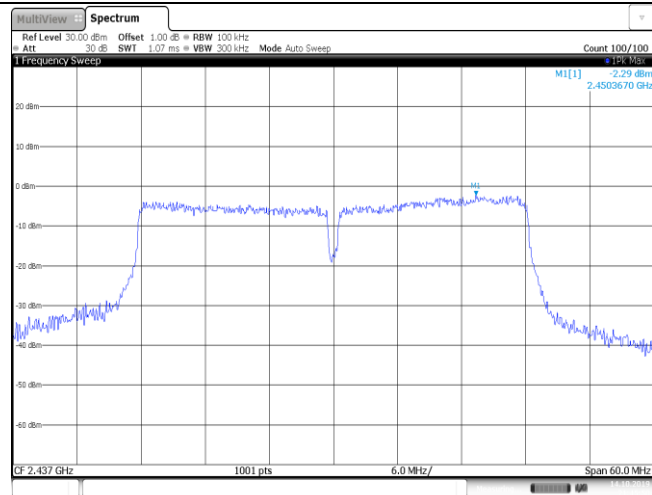
CH11
1GHz~26GHz



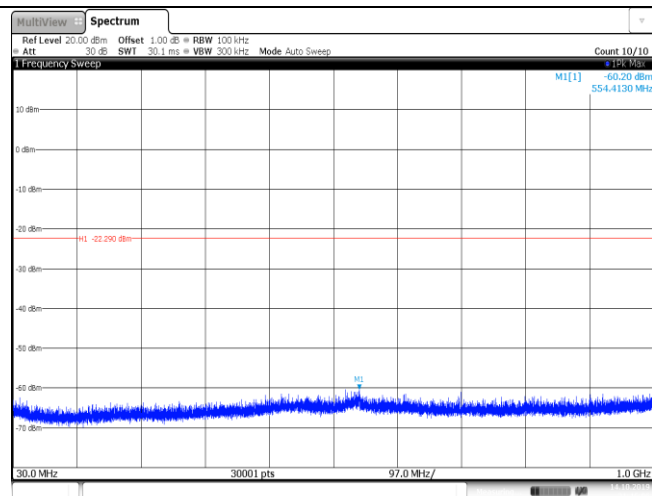
Date: 14.OCT.2019 21:42:17

Test Item:	SE	Type:	802.11n(HT40)
CH03 Reference level	 Ref Level 30.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 1.07 ms VBW 300 kHz Mode Auto Sweep Count 100/100 M1[1] -44.44 dBm 2.4172050 GHz CF 2.422 GHz 1001 pts 6.0 MHz/ Span 60.0 MHz Date: 15.OCT.2019 11:24:08		
CH03 30MHz~1000MHz	 Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 30.1 ms VBW 300 kHz Mode Auto Sweep Count 10/10 M1[1] -60.89 dBm 578.2740 MHz 30.0 MHz 30001 pts 97.0 MHz/ 1.0 GHz Date: 15.OCT.2019 11:24:24		
CH03 1GHz~26GHz	 Ref Level 20.00 dBm Offset 1.00 dB RBW 100 kHz Att 30 dB SWI 250 ms VBW 300 kHz Mode Auto Sweep Count 10/10 M1[1] -52.32 dBm 25.966667 GHz 1.0 GHz 30001 pts 2.5 GHz/ 26.0 GHz Date: 15.OCT.2019 11:24:40		

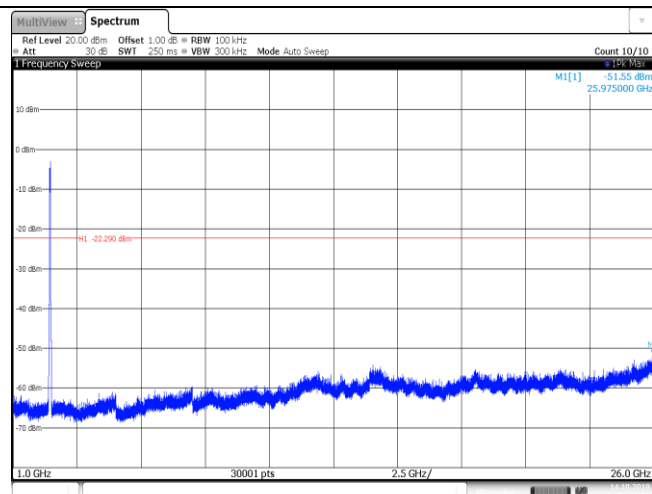
CH06
Reference level



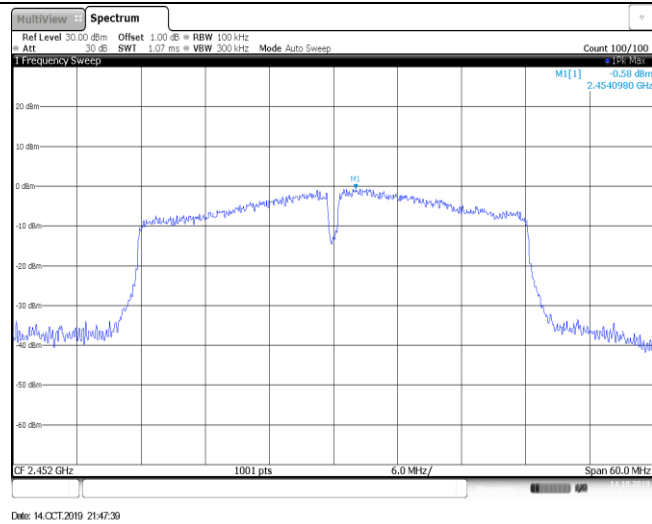
CH06
30MHz~1000MHz



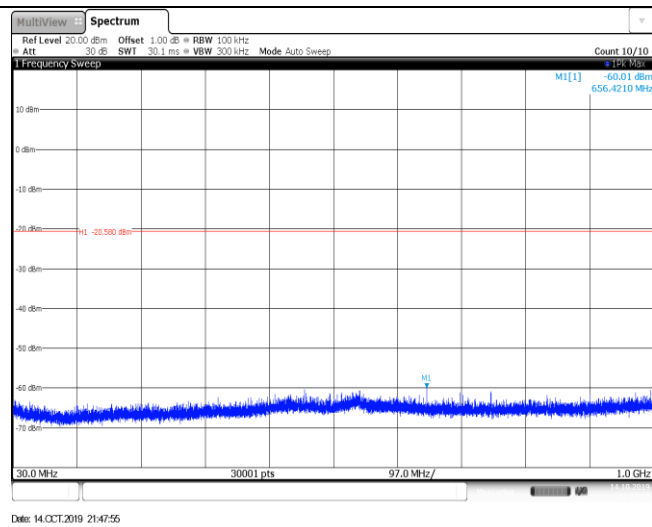
CH06
1GHz~26GHz



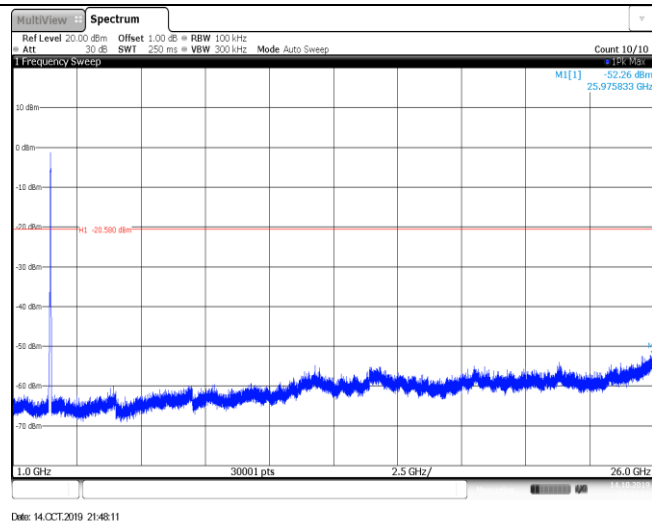
CH09
Reference level



CH09
30MHz~1000MHz



CH09
1GHz~26GHz



5.8. Spurious Emissions (radiated)

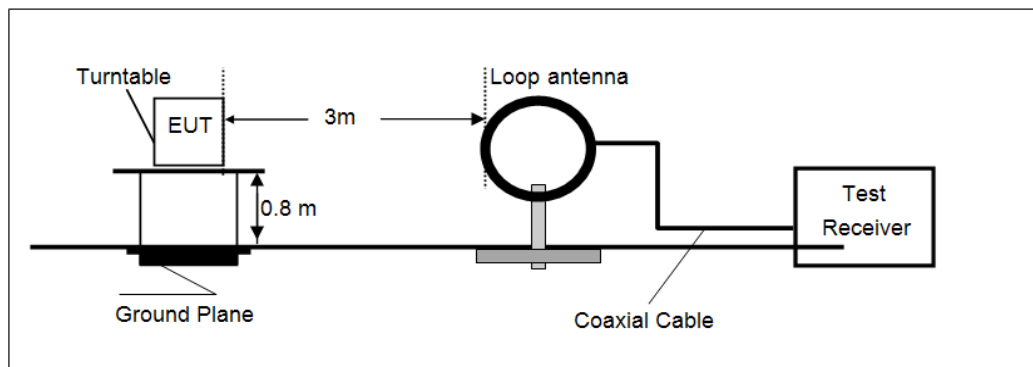
LIMIT

FCC CFR Title 47 Part 15 Subpart C Section 15.209

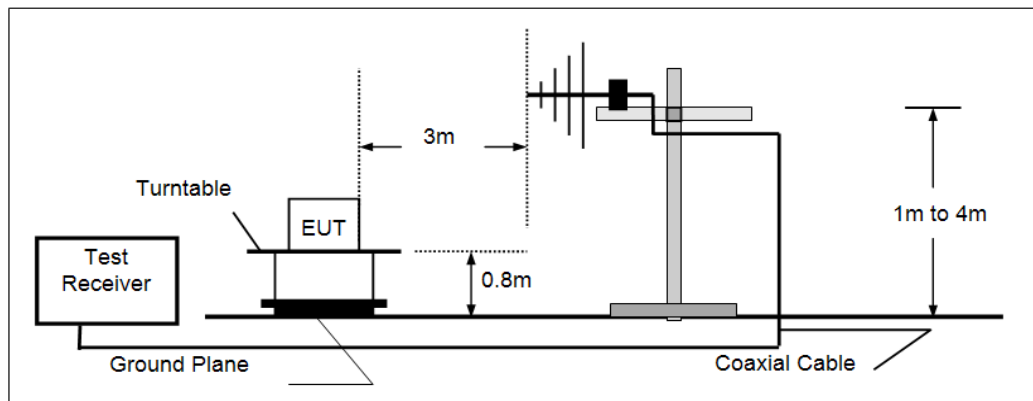
Frequency	Limit (dBuV/m @3m)	Value
30MHz-88MHz	40.00	Quasi-peak
88MHz-216MHz	43.50	Quasi-peak
216MHz-960MHz	46.00	Quasi-peak
960MHz-1GHz	54.00	Quasi-peak
Above 1GHz	54.00	Average
	74.00	Peak

TEST CONFIGURATION

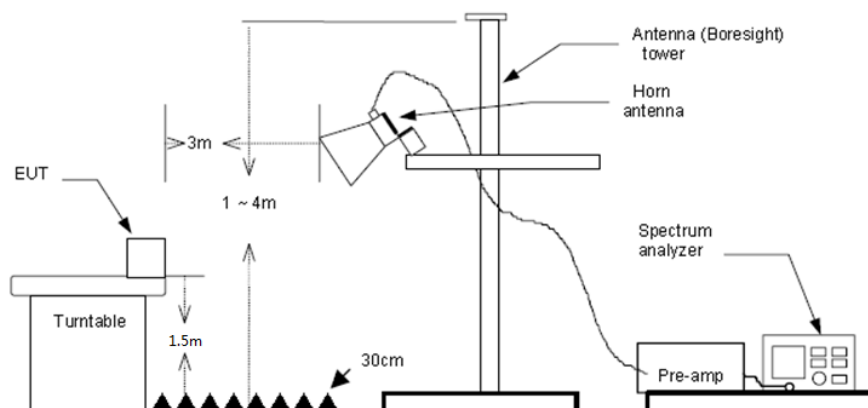
➤ 9kHz ~30MHz



➤ 30MHz ~ 1GHz



➤ Above 1GHz



TEST PROCEDURE

1. The EUT was 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 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Below 1 GHz:
RBW=120 kHz, VBW=300 kHz, 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) From 1 GHz to 10th harmonic:
RBW=1MHz, VBW=3MHz Peak detector for Peak value.
RBW=1MHz, VBW=3MHz RMS detector for Average value.

TEST MODE:

Please refer to the clause 3.3

TEST RESULTS

☒ **Passed** ☐ **Not Applicable**

Note:

- 1) Final Level =Receiver Read level + Factor
- 2) The emission levels of other frequencies are very lower than the limit and not show in test report.

➤ **9kHz ~ 30MHz**

The EUT was pre-scanned the frequency band (9kHz~30MHz), found the radiated level lower than the limit, so don't show on the report.

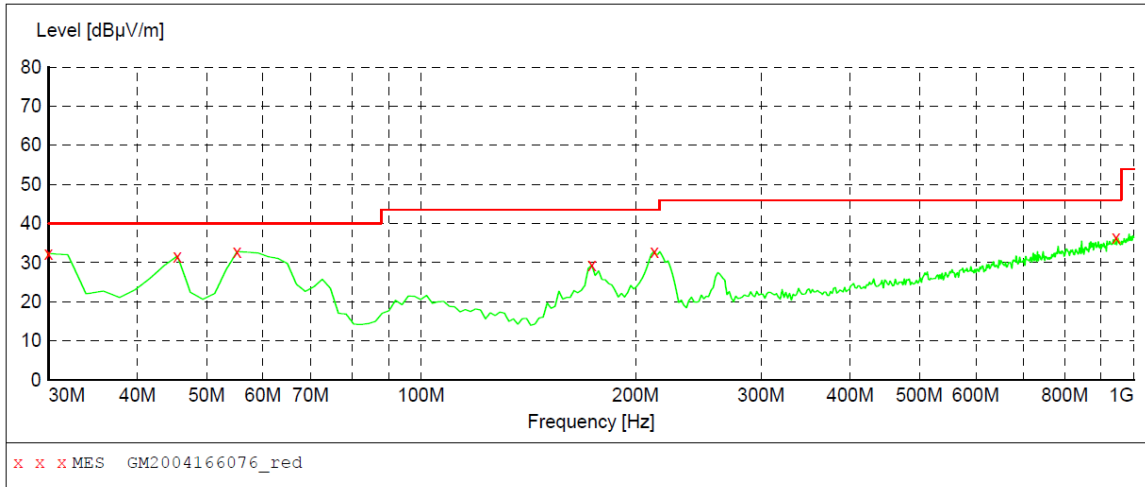
➤ **30MHz ~1000MHz**

Have pre-scan all modulation mode, found the 802.11b mode CH01 which it was worst case, so only the worst case's data on the test report.

➤ 30MHz ~ 1GHz

Polarization:

Vertical

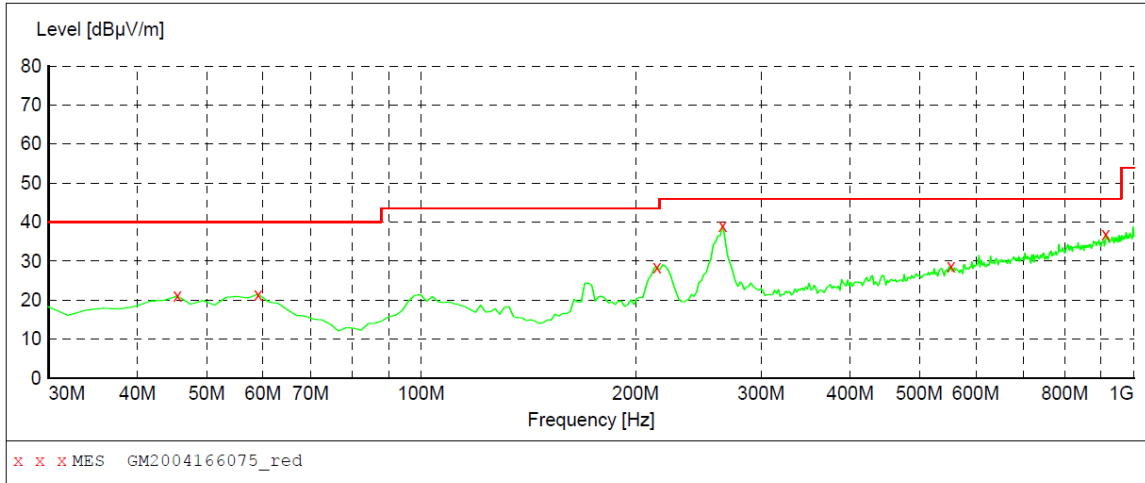
**MEASUREMENT RESULT: "GM2004166076_red"**

4/16/2020 7:46PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
30.000000	32.30	-10.7	40.0	7.7	QP	100.0	226.00	VERTICAL
45.520000	31.70	-7.6	40.0	8.3	QP	100.0	210.00	VERTICAL
55.220000	32.80	-7.1	40.0	7.2	QP	100.0	346.00	VERTICAL
173.560000	29.30	-11.9	43.5	14.2	QP	100.0	226.00	VERTICAL
212.360000	32.90	-9.0	43.5	10.6	QP	100.0	250.00	VERTICAL
943.740000	36.40	9.0	46.0	9.6	QP	100.0	0.00	VERTICAL

Polarization:

Horizontal

**MEASUREMENT RESULT: "GM2004166075_red"**

4/16/2020 7:43PM

Frequency MHz	Level dBμV/m	Transd dB	Limit dBμV/m	Margin dB	Det.	Height cm	Azimuth deg	Polarization
45.520000	21.10	-7.6	40.0	18.9	QP	300.0	206.00	HORIZONTAL
59.100000	21.50	-8.0	40.0	18.5	QP	300.0	194.00	HORIZONTAL
214.300000	28.50	-8.9	43.5	15.0	QP	100.0	348.00	HORIZONTAL
264.740000	39.00	-7.0	46.0	7.0	QP	100.0	134.00	HORIZONTAL
553.800000	28.60	1.1	46.0	17.4	QP	300.0	126.00	HORIZONTAL
912.700000	37.00	8.3	46.0	9.0	QP	100.0	268.00	HORIZONTAL

➤ 1 GHz ~ 25 GHz

802.11b CH01

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1123.375	33.87	-6.64	27.23	74.00	46.77	Horizontal	PK
3191.375	31.69	0.80	32.49	74.00	41.51	Horizontal	PK
4823.156	33.77	7.08	40.85	74.00	33.15	Horizontal	PK
7237.781	31.71	15.01	46.72	74.00	27.28	Horizontal	PK

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1171.843	33.60	-6.13	27.47	74.00	46.53	Vertical	PK
3182.562	32.46	0.75	33.21	74.00	40.79	Vertical	PK
4823.156	33.39	7.08	40.47	74.00	33.53	Vertical	PK
6913.187	29.24	14.11	43.35	74.00	30.65	Vertical	PK

802.11b CH06

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1182.125	34.15	-6.02	28.13	74.00	45.87	Horizontal	PK
3173.750	32.50	0.70	33.20	74.00	40.80	Horizontal	PK
4873.093	34.36	7.15	41.51	74.00	32.49	Horizontal	PK
7295.062	30.06	15.05	45.11	74.00	28.89	Horizontal	PK

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1183.593	34.13	-6.00	28.13	74.00	45.87	Vertical	PK
3178.156	31.96	0.73	32.69	74.00	41.31	Vertical	PK
4873.093	33.32	7.15	40.47	74.00	33.53	Vertical	PK
6595.937	30.23	13.12	43.35	74.00	30.65	Vertical	PK

802.11b CH11

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1248.218	33.93	-5.70	28.23	74.00	45.77	Horizontal	PK
3137.031	32.19	0.51	32.70	74.00	41.30	Horizontal	PK
4924.500	33.06	7.34	40.40	74.00	33.60	Horizontal	PK
6719.312	29.34	13.42	42.76	74.00	31.24	Horizontal	PK

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1199.750	33.95	-5.83	28.12	74.00	45.88	Vertical	PK
3126.750	33.20	0.46	33.66	74.00	40.34	Vertical	PK
4924.500	33.67	7.34	41.01	74.00	32.99	Vertical	PK
6769.250	30.45	13.28	43.73	74.00	30.27	Vertical	PK

802.11g CH01

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1174.781	33.57	-6.10	27.47	74.00	46.53	Horizontal	PK
3167.875	31.71	0.67	32.38	74.00	41.62	Horizontal	PK
4818.750	31.23	7.07	38.30	74.00	35.70	Horizontal	PK
6688.468	30.13	13.43	43.56	74.00	30.44	Horizontal	PK

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1163.031	33.91	-6.22	27.69	74.00	46.31	Vertical	PK
3195.781	31.80	0.82	32.62	74.00	41.38	Vertical	PK
4826.093	30.08	7.08	37.16	74.00	36.84	Vertical	PK
6666.437	29.86	13.36	43.22	74.00	30.78	Vertical	PK

802.11g CH06

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1204.156	33.27	-5.82	27.45	74.00	46.55	Horizontal	PK
3150.250	31.76	0.58	32.34	74.00	41.66	Horizontal	PK
4876.031	31.20	7.15	38.35	74.00	35.65	Horizontal	PK
6852.968	30.25	13.68	43.93	74.00	30.07	Horizontal	PK

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1149.812	34.21	-6.36	27.85	74.00	46.15	Vertical	PK
3120.875	32.27	0.43	32.70	74.00	41.30	Vertical	PK
4865.750	29.97	7.14	37.11	74.00	36.89	Vertical	PK
6682.593	30.65	13.41	44.06	74.00	29.94	Vertical	PK

802.11g CH11

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1252.625	33.32	-5.69	27.63	74.00	46.37	Horizontal	PK
3239.843	32.58	0.37	32.95	74.00	41.05	Horizontal	PK
4670.406	30.69	6.20	36.89	74.00	37.11	Horizontal	PK
6692.875	29.53	13.45	42.98	74.00	31.02	Horizontal	PK

Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1212.968	33.48	-5.80	27.68	74.00	46.32	Vertical	PK
3134.093	32.64	0.50	33.14	74.00	40.86	Vertical	PK
4928.906	29.91	7.37	37.28	74.00	36.72	Vertical	PK
6738.406	29.68	13.37	43.05	74.00	30.95	Vertical	PK

802.11n(HT20)					CH01		
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1240.875	33.10	-5.72	27.38	74.00	46.62	Horizontal	PK
3162.000	32.12	0.64	32.76	74.00	41.24	Horizontal	PK
4814.343	30.25	7.07	37.32	74.00	36.68	Horizontal	PK
6701.687	29.60	13.47	43.07	74.00	30.93	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1127.781	34.69	-6.60	28.09	74.00	45.91	Vertical	PK
3117.937	32.40	0.41	32.81	74.00	41.19	Vertical	PK
4767.343	30.57	6.83	37.40	74.00	36.60	Vertical	PK
6750.156	29.60	13.33	42.93	74.00	31.07	Vertical	PK
802.11n(HT20)					CH06		
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1145.406	34.78	-6.41	28.37	74.00	45.63	Horizontal	PK
3198.718	31.98	0.83	32.81	74.00	41.19	Horizontal	PK
4871.625	29.78	7.14	36.92	74.00	37.08	Horizontal	PK
6685.531	29.96	13.42	43.38	74.00	30.62	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1198.281	33.42	-5.85	27.57	74.00	46.43	Vertical	PK
3028.343	32.53	0.00	32.53	74.00	41.47	Vertical	PK
4874.562	30.37	7.15	37.52	74.00	36.48	Vertical	PK
6528.375	29.83	12.70	42.53	74.00	31.47	Vertical	PK
802.11n(HT20)					CH11		
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1221.781	32.80	-5.77	27.03	74.00	46.97	Horizontal	PK
3185.500	31.94	0.76	32.70	74.00	41.30	Horizontal	PK
4849.593	29.74	7.11	36.85	74.00	37.15	Horizontal	PK
7471.312	30.80	15.40	46.20	74.00	27.80	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1220.312	34.12	-5.78	28.34	74.00	45.66	Vertical	PK
3181.093	32.89	0.74	33.63	74.00	40.37	Vertical	PK
4774.687	29.35	6.88	36.23	74.00	37.77	Vertical	PK
6786.875	29.66	13.24	42.90	74.00	31.10	Vertical	PK

802.11n(HT40)					CH03		
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1258.500	33.30	-5.68	27.62	74.00	46.38	Horizontal	PK
3195.781	33.20	0.82	34.02	74.00	39.98	Horizontal	PK
4833.437	30.66	7.09	37.75	74.00	36.25	Horizontal	PK
6667.906	29.39	13.37	42.76	74.00	31.24	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1130.718	34.94	-6.56	28.38	74.00	45.62	Vertical	PK
3162.000	31.69	0.64	32.33	74.00	41.67	Vertical	PK
4920.093	29.96	7.31	37.27	74.00	36.73	Vertical	PK
6619.437	29.06	13.21	42.27	74.00	31.73	Vertical	PK
802.11n(HT40)					CH06		
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1224.718	33.32	-5.77	27.55	74.00	46.45	Horizontal	PK
3197.250	31.78	0.83	32.61	74.00	41.39	Horizontal	PK
4588.156	30.91	5.72	36.63	74.00	37.37	Horizontal	PK
6566.562	29.81	12.94	42.75	74.00	31.25	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1165.968	34.27	-6.19	28.08	74.00	45.92	Vertical	PK
3125.281	33.76	0.45	34.21	74.00	39.79	Vertical	PK
4871.625	30.31	7.14	37.45	74.00	36.55	Vertical	PK
6920.531	29.93	14.11	44.04	74.00	29.96	Vertical	PK
802.11n(HT40)					CH09		
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1309.906	33.21	-5.57	27.64	74.00	46.36	Horizontal	PK
3195.781	32.70	0.82	33.52	74.00	40.48	Horizontal	PK
4818.750	30.12	7.07	37.19	74.00	36.81	Horizontal	PK
7274.500	30.02	15.03	45.05	74.00	28.95	Horizontal	PK
Freq. [MHz]	Reading [dBμV/m]	Factor [dB]	Level [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Polarity	Detector
1195.343	33.06	-5.88	27.18	74.00	46.82	Vertical	PK
3167.875	32.26	0.67	32.93	74.00	41.07	Vertical	PK
4782.031	30.92	6.93	37.85	74.00	36.15	Vertical	PK
6844.156	30.05	13.60	43.65	74.00	30.35	Vertical	PK

Remark:

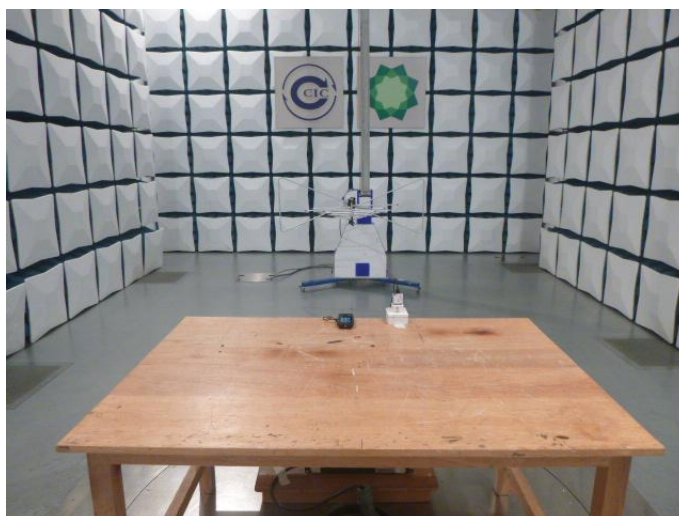
1. Final Level = Receiver Read level + Factor
2. The peak level is lower than average limit(54 dBuV/m), this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies(test frequency band is 1GHz to 25GHz) are very lower than the limit and not show in test report.

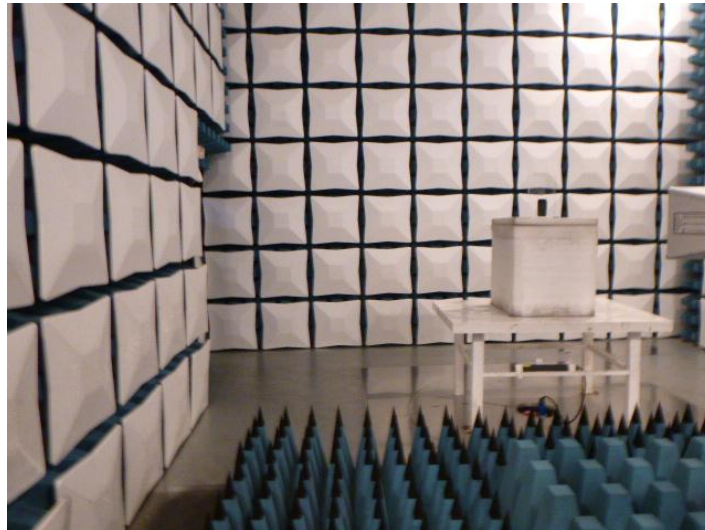
6. TEST SETUP PHOTOS

Conducted Emissions



Radiated Emissions





7. EXTERANAL AND INTERNAL PHOTOS

Reference to the test report No. CHTEW20040200

-----End of Report-----