



FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE Tablet
BRAND NAME : ZTE
MODEL NAME : K90U
FCC ID : SRQ-K90U
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jul. 19, 2016 and testing was completed on Aug. 29, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL (KUNSHAN) INC., the test report shall not be reproduced except in full.

Prepared by: James Huang / Manager

Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL (KUNSHAN) INC.
No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	2.1049 15.403(i)	26dB & 99% Bandwidth	-	Pass	-
3.2	15.407(a)	Maximum Conducted Output Power	FCC ≤24 dBm (depend on band)	Pass	-
3.3	15.407(a)	Power Spectral Density	FCC ≤11 dBm (depend on band)	Pass	-
3.4	15.407(b)	Unwanted Emissions	≤ -17, -27 dBm (depend on band)&15.209(a)	Pass	Under limit 3.08 dB at 5150.000 MHz
3.5	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 11.79 dB at 0.350 MHz
3.6	15.407(g)	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.2 Manufacturer

ZTE CORPORATION

ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R.China

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	LTE Tablet
Brand Name	ZTE
Model Name	K90U
FCC ID	SRQ-K90U
EUT supports Radios application	LTE/ WLAN2.4GHz 802.11b/g/n HT20/HT40 WLAN5GHz 802.11a/n HT20/HT40/ WLAN5GHz 802.11ac VHT20/VHT40/VHT80/ Bluetooth v3.0 + EDR/Bluetooth v4.1 LE
IMEI Code	Conducted: 990006081532821 Radiation: 99000608153138 Conduction: 99000608153015
HW Version	u1pA
SW Version	K90UV1.0.0B06
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.



1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Frequency Range	5180 MHz ~ 5240 MHz
Maximum Output Power to Antenna	802.11a : 8.29 dBm / 0.0067 W 802.11n HT20 : 8.09 dBm / 0.0064 W 802.11n HT40 : 7.81 dBm / 0.0060 W 802.11ac VHT20 : 8.03 dBm / 0.0064 W 802.11ac VHT40 : 7.91 dBm / 0.0062 W 802.11ac VHT80 : 7.98 dBm / 0.0063 W
99% Occupied Bandwidth	802.11a : 18.63 MHz 802.11n HT20 : 19.38 MHz 802.11n HT40 : 36.56 MHz 802.11ac VHT20: 19.13 MHz 802.11ac VHT40 : 36.56 MHz 802.11ac VHT80 : 74.81 MHz
Antenna Type	PIFA Antenna with gain 0.20 dBi
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)



1.5 Modification of EUT

No modifications are made to the EUT during all test items.

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.	
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958	
Test Site No.	Sporton Site No.	
	TH01-KS	CO01-KS

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.	
Test Site Location	No. 3 Building, the third floor of south, Shahe River west, Fengzeyuan warehouse, Nanshan District, Shenzhen, Guangdong, P. R. China TEL: +86-755- 3320-2398	
Test Site No.	Sporton Site No.	FCC Registration No.
	03CH03-SZ	565805

Note: The test site complies with ANSI C63.4 2014 requirement.

1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart E
- FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03
- FCC KDB 644545 D03 Guidance for IEEE 802 11ac New Rules v01
- ANSI C63.10-2013

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5180-5240 MHz Band 1 (U-NII-1)	36	5180	44	5220
	38*	5190	46*	5230
	40	5200	48	5240
	42#	5210		

Note:

1. The above Frequency and Channel in "*" were 802.11n HT40 and 802.11ac VHT40.
2. The above Frequency and Channel in "#n" were 802.11ac VHT80.



2.2 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

Modulation	Data Rate
802.11a	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0
802.11ac VHT20	MCS0
802.11ac VHT40	MCS0
802.11ac VHT80	MCS0

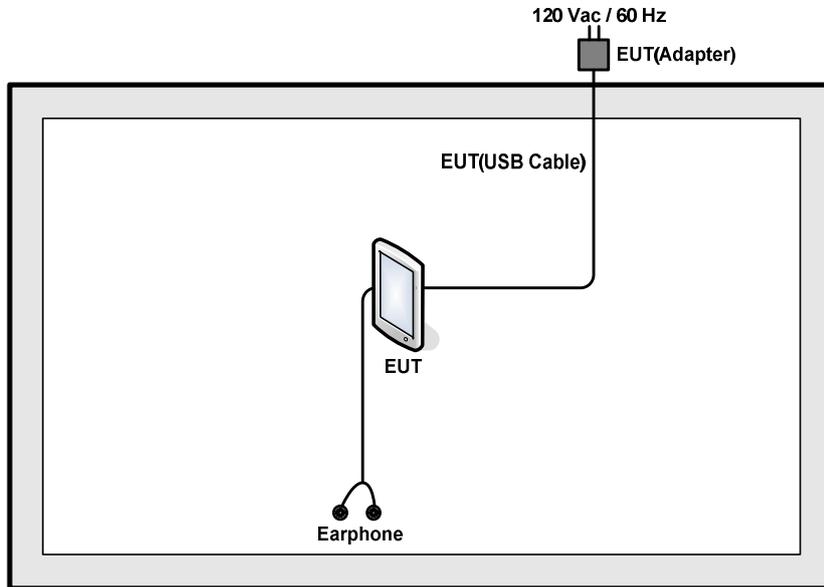
Test Cases	
AC Conducted Emission	Mode 1 : LTE Band 4 Idle + Bluetooth Link + WLAN (5G) Link + Earphone + USB Cable (Charging from Adapter)
Remark: For Radiated TCs, the tests were performed with adapter, earphone and USB cable.	

Ch. #		Band I : 5180-5240 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	36	36	38
M	Middle	44	44	-
H	High	48	48	46

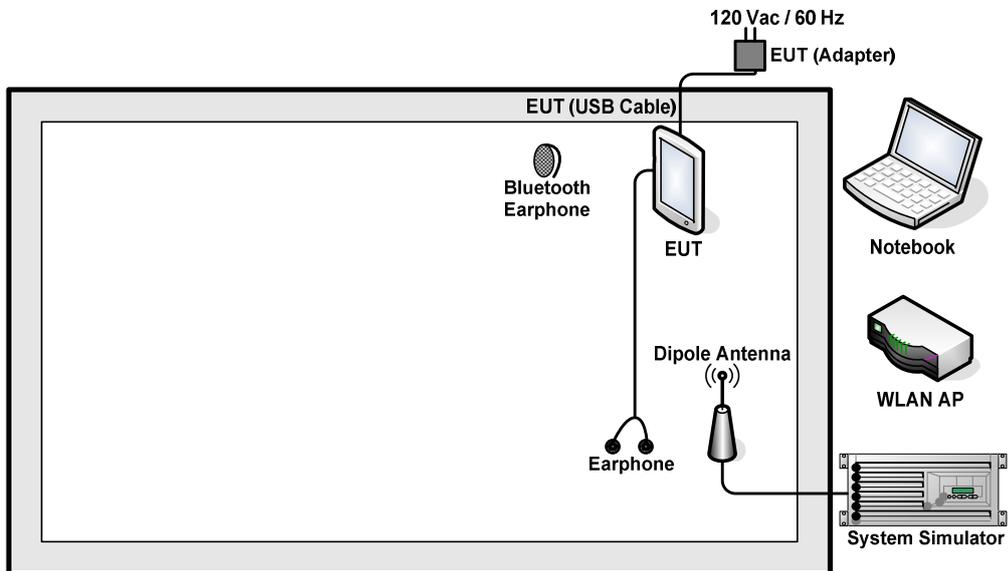
Ch. #		Band I : 5180-5240 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	36	38	-
M	Middle	44	-	42
H	High	48	46	-

2.3 Connection Diagram of Test System

<Radiated Emission Mode>



<AC Conducted Emission Mode>





2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-855	KA2DIR855A2	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A
5.	Earphone	Lenovo	LH102	N/A	Unshielded, 1.2m	N/A
6.	Earphone	Apple	N/A	N/A	Shielded, 1.0 m	N/A

2.5 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuously transmit/receive.

For AC power line conducted emissions, the EUT was set to connect with the Notebook under large package sizes transmission.



2.6 Measurement Results Explanation Example

For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss between EUT conducted output port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly the EUT RF output level.

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 7.0 dB.

Offset (dB) = RF cable loss(dB).
= 7.0 (dB)

3 Test Result

3.1 26dB & 99% Occupied Bandwidth Measurement

3.1.1 Description of 26dB & 99% Occupied Bandwidth

This section is for reporting purpose only.

There is no restriction limits for bandwidth.

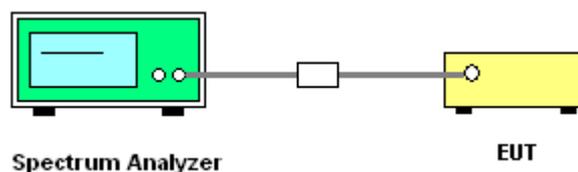
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.
Section C) Emission bandwidth
2. Set RBW = approximately 1% of the emission bandwidth.
3. Set the VBW > RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.
7. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1MHz and set the Video bandwidth (VBW) $\geq 3 * RBW$.
8. Measure and record the results in the test report.

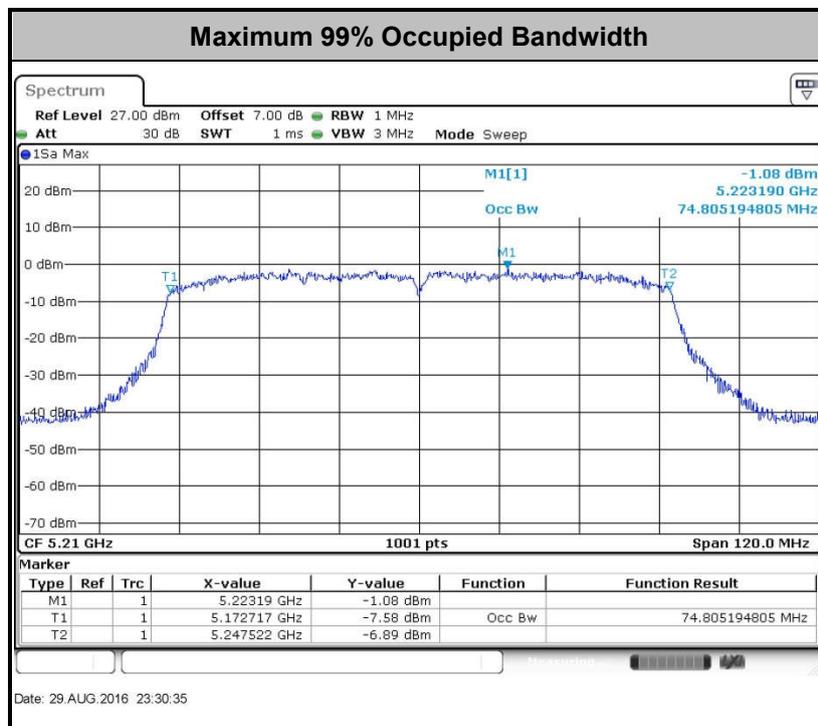
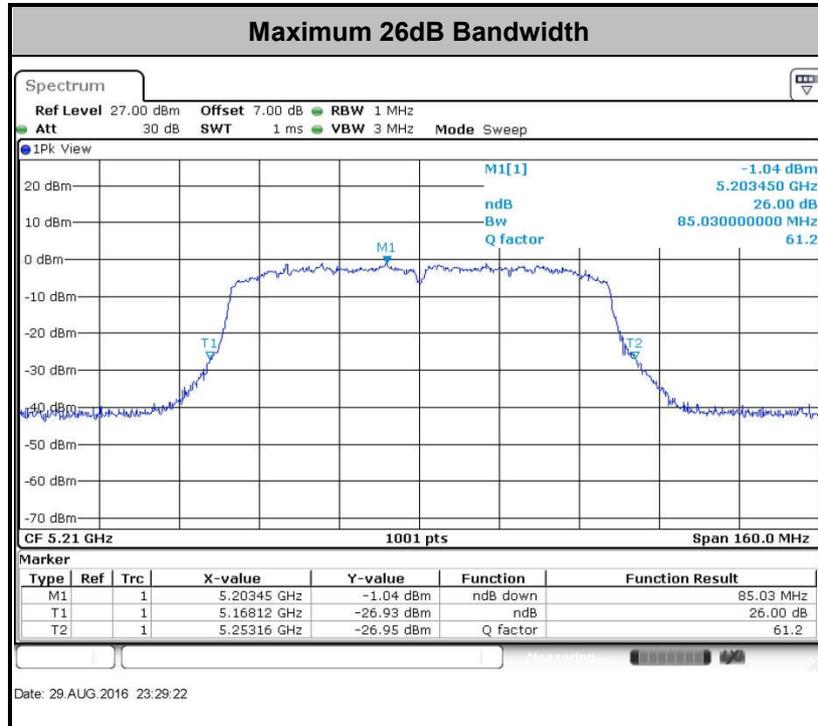
3.1.4 Test Setup





3.1.5 Test Result of 26dB & 99% Occupied Bandwidth

Please refer to Appendix A.



Note: The occupied channel bandwidth is maintained within the band of operation for all of the modulations.



3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

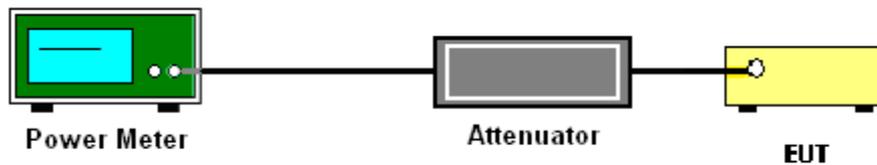
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.

Method PM (Measurement using an RF average power meter):

1. Measurement is performed using a wideband RF power meter.
2. The EUT is configured to transmit continuously with a consistent duty cycle at its maximum power control level.
3. Measure the average power of the transmitter, and the average power is corrected with duty factor, $10 \log(1/x)$, where x is the duty cycle.

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.



3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For mobile and portable client devices in the 5.15–5.25 GHz band, the maximum power spectral density shall not exceed 11dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.3.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.3.3 Test Procedures

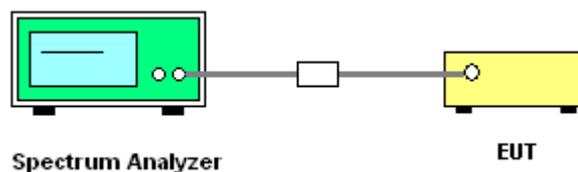
The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.
Section F) Maximum power spectral density.

Method SA-2

(trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).

1. The testing follows Method SA-2 of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 1 MHz.
 - Set VBW \geq 3 MHz.
 - Number of points in sweep \geq 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

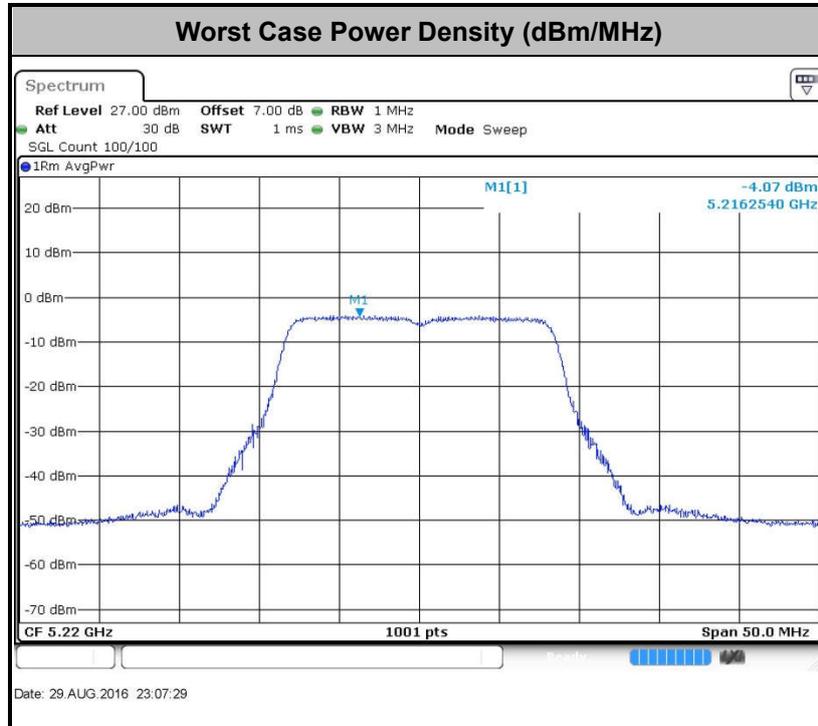
3.3.4 Test Setup





3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



Note: Average Power Density (dB) = Measured value + Duty Factor



3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part15.205.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5150-5250 MHz band: all emissions outside of the 5150-5350 MHz band shall not exceed an EIRP of -27dBm/MHz.
- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

Note: The following formula is used to convert the EIRP to field strength.

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts)}$$

EIRP (dBm)	Field Strength at 3m (dBμV/m)
-17	78.3
- 27	68.3

- (3) KDB789033 D02 v01r03 G)2)c) As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit.

3.4.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.



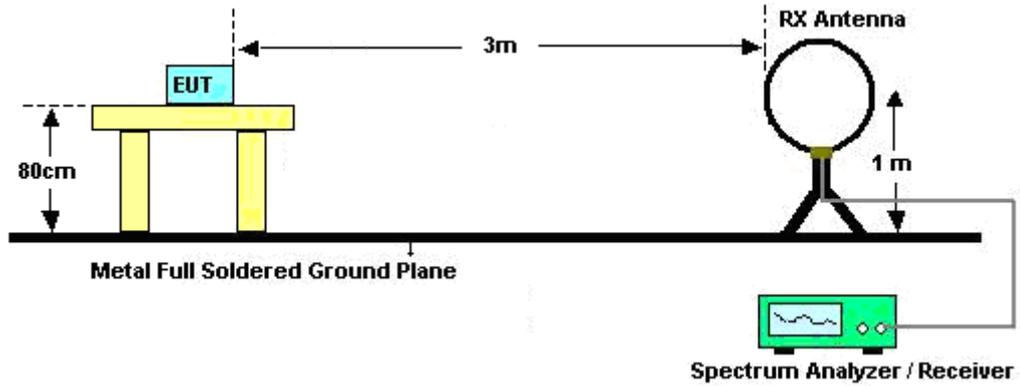
3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01r03. Section G) Unwanted emissions measurement.
 - (1) Procedure for Unwanted Emissions Measurements Below 1000MHz
 - RBW = 120 kHz
 - VBW = 300 kHz
 - Detector = Peak
 - Trace mode = max hold
 - (2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz
 - RBW = 1 MHz
 - VBW \geq 3 MHz
 - Detector = Peak
 - Sweep time = auto
 - Trace mode = max hold
 - (3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz
 - RBW = 1 MHz
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW \geq 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be

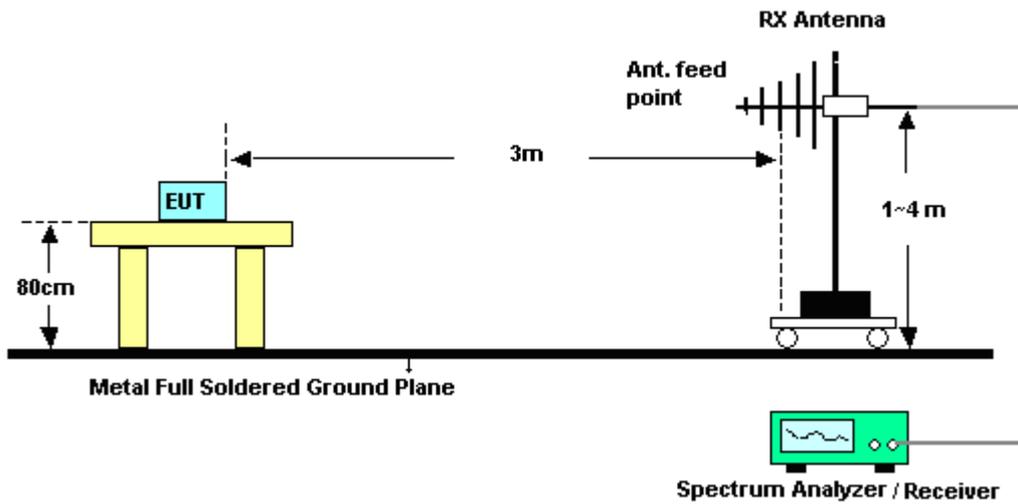
measured in average mode again and reported.

3.4.4 Test Setup

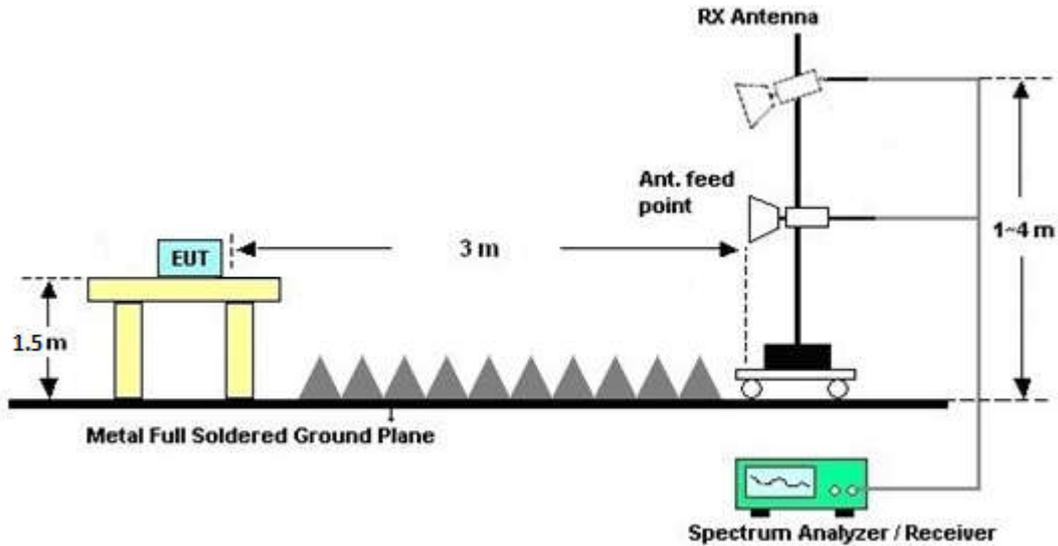
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.4.5 Test Results of Radiated Emissions (9 kHz ~ 30 MHz)

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 reported.

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix B.

3.4.7 Duty Cycle

Please refer to Appendix C.

3.4.8 Test Result of Unwanted Radiated Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.



3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	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.

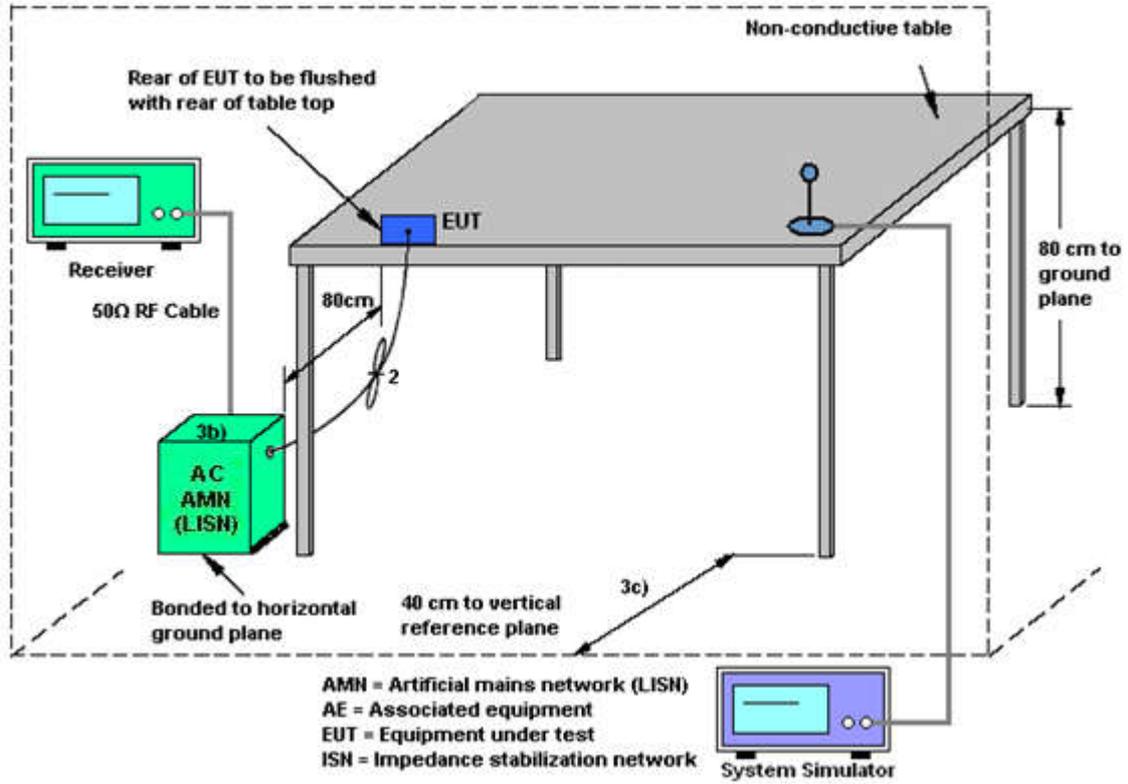
3.5.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

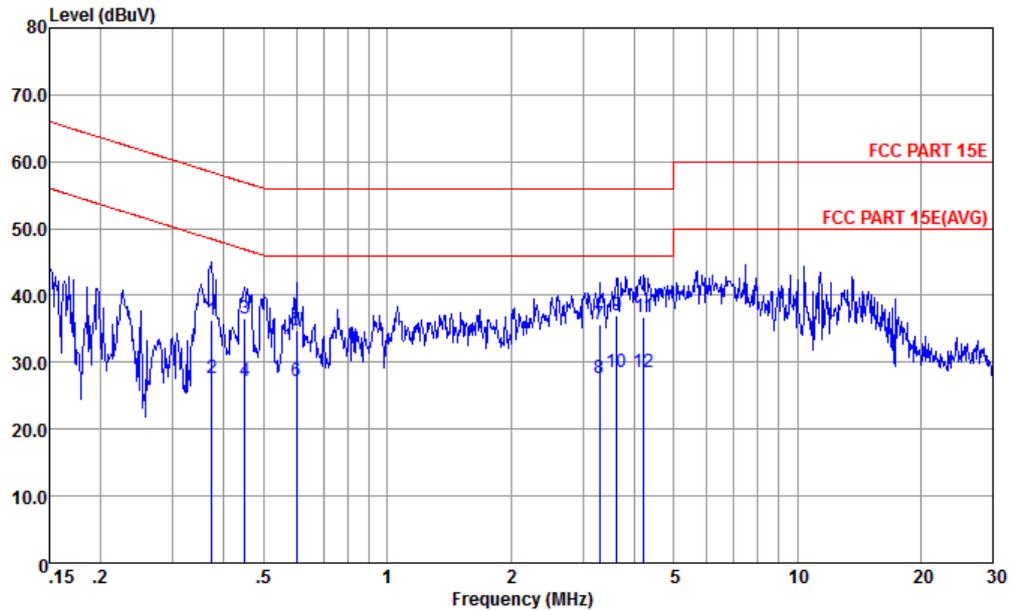
3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LTE Band 4 Idle + Bluetooth Link + WLAN (5G) Link + Earphone + USB Cable (Charging from Adapter)		



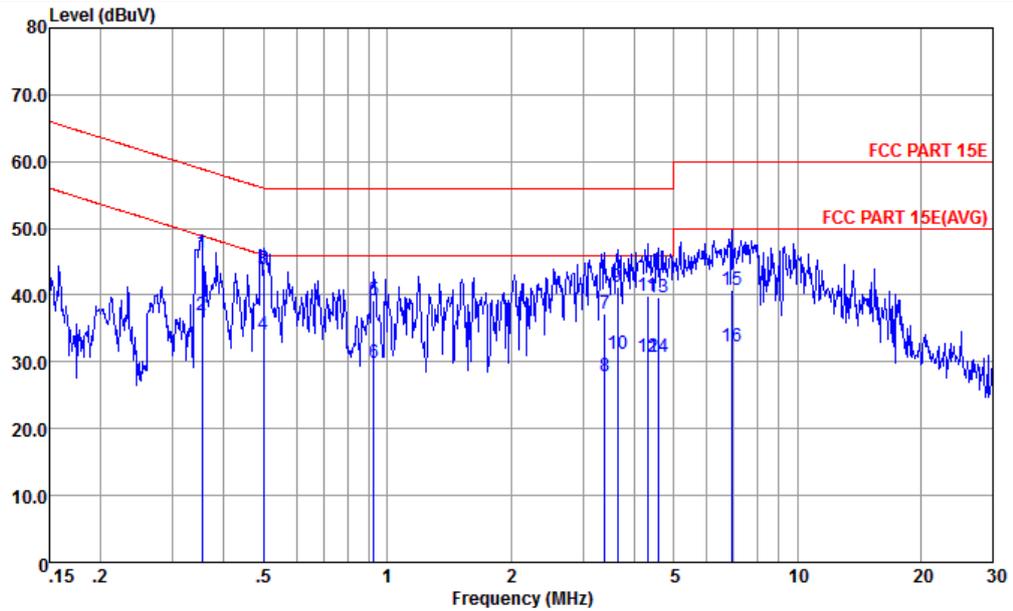
Site : CO01-KS
Condition : FCC PART 15E LISN-L-20151024 LINE

mode : Mode 1
: 99000608153015 #9

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.37	36.29	-22.14	58.43	25.90	0.23	10.16	QP
2	0.37	27.69	-20.74	48.43	17.30	0.23	10.16	Average
3	0.45	36.60	-20.29	56.89	26.20	0.23	10.17	QP
4	0.45	27.20	-19.69	46.89	16.80	0.23	10.17	Average
5	0.60	34.69	-21.31	56.00	24.29	0.24	10.16	QP
6	0.60	27.19	-18.81	46.00	16.79	0.24	10.16	Average
7	3.29	35.64	-20.36	56.00	25.29	0.19	10.16	QP
8	3.29	27.54	-18.46	46.00	17.19	0.19	10.16	Average
9	3.62	36.95	-19.05	56.00	26.60	0.19	10.16	QP
10	3.62	28.55	-17.45	46.00	18.20	0.19	10.16	Average
11	4.22	36.66	-19.34	56.00	26.30	0.19	10.17	QP
12 *	4.22	28.56	-17.44	46.00	18.20	0.19	10.17	Average



Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Amos Zhang	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LTE Band 4 Idle + Bluetooth Link + WLAN (5G) Link + Earphone + USB Cable (Charging from Adapter)		



Site : CO01-KS
Condition : FCC PART 15E LISN-N-20151024 NEUTRAL

mode : Mode 1
: 99000608153015 #9

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.35	46.28	-12.59	58.87	35.80	0.32	10.16	QP
2 *	0.35	37.08	-11.79	48.87	26.60	0.32	10.16	Average
3	0.50	43.98	-12.03	56.01	33.50	0.32	10.16	QP
4	0.50	34.08	-11.93	46.01	23.60	0.32	10.16	Average
5	0.93	39.30	-16.70	56.00	28.80	0.36	10.14	QP
6	0.93	29.80	-16.20	46.00	19.30	0.36	10.14	Average
7	3.40	37.13	-18.87	56.00	26.60	0.37	10.16	QP
8	3.40	27.83	-18.17	46.00	17.30	0.37	10.16	Average
9	3.64	41.13	-14.87	56.00	30.60	0.37	10.16	QP
10	3.64	31.13	-14.87	46.00	20.60	0.37	10.16	Average
11	4.31	39.83	-16.17	56.00	29.30	0.36	10.17	QP
12	4.31	30.73	-15.27	46.00	20.20	0.36	10.17	Average
13	4.57	39.74	-16.26	56.00	29.20	0.36	10.18	QP
14	4.57	30.84	-15.16	46.00	20.30	0.36	10.18	Average
15	6.95	40.81	-19.19	60.00	30.30	0.29	10.22	QP
16	6.95	32.41	-17.59	50.00	21.90	0.29	10.22	Average

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

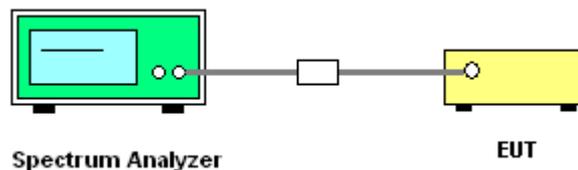
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
2. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10dB lower than the measured peak value.
3. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.



3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization to describe how this requirement is met.

3.7.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.7.3 Test Result of Automatically Discontinue Transmission

While the EUT is not transmitting any information, the EUT can automatically discontinue transmission and become standby mode for power saving. The EUT can detect the controlling signal of ACK message transmitting from remote device and verify whether it shall resend or discontinue transmission.



3.8 Antenna Requirements

3.8.1 Standard Applicable

According to FCC 47 CFR Section 15.407(a)(1)(2) ,if transmitting antenna directional gain is greater than 6 dBi, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

The antenna gain is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Sep. 10, 2015	Jul. 31, 2016~ Aug. 29, 2016	Sep. 09, 2016	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Jul. 31, 2016~ Aug. 29, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Jul. 31, 2016~ Aug. 29, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 24, 2015	Jul. 31, 2016~ Aug. 29, 2016	Oct. 23, 2016	Conducted (TH01-KS)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	May 07, 2016	Jul. 31, 2016~ Aug. 13, 2016	May 06, 2017	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz	May 07, 2016	Jul. 31, 2016~ Aug. 13, 2016	May 06, 2017	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 07, 2016	Jul. 31, 2016~ Aug. 13, 2016	May 06, 2017	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz~2GHz	May 21, 2016	Jul. 31, 2016~ Aug. 13, 2016	May 20, 2017	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	May 07, 2016	Jul. 31, 2016~ Aug. 13, 2016	May 06, 2017	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz~40GHz	Aug. 19, 2015	Jul. 31, 2016~ Aug. 13, 2016	Aug. 18, 2016	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz~3000MHz	Oct. 20, 2015	Jul. 31, 2016~ Aug. 13, 2016	Oct. 19, 2016	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Jan. 12, 2016	Jul. 31, 2016~ Aug. 13, 2016	Jan. 11, 2017	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 16, 2016	Jul. 31, 2016~ Aug. 13, 2016	Jul. 15, 2017	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Jul. 31, 2016~ Aug. 13, 2016	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jul. 31, 2016~ Aug. 13, 2016	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jul. 31, 2016~ Aug. 13, 2016	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 29, 2016	Jul. 26, 2016	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 24, 2015	Jul. 26, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 24, 2015	Jul. 26, 2016	Oct. 23, 2016	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 24, 2015	Jul. 26, 2016	Oct. 23, 2016	Conduction (CO01-KS)

NCR: No Calibration Required



5 Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.3dB
-------------------------------------------------------------------------	-------

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.1dB
-------------------------------------------------------------------------	-------

Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
-------------------------------------------------------------------------	-------

Uncertainty of Radiated Emission Measurement (18GHz ~ 40GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
-------------------------------------------------------------------------	-------



Appendix A. Conducted Test Results

Test Engineer:	Ivan Chen	Temperature:	24~25	°C
Test Date:	2016/7/31~2016/8/29	Relative Humidity:	54~55	%

TEST RESULTS DATA
26dB and 99% OBW

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)	IC 99% Bandwidth Power Limit (dBm)	IC 99% Bandwidth EIRP Limit (dBm)		
11a	6Mbps	1	36	5180	18.58	23.33	-	22.69		
11a	6Mbps	1	44	5220	18.63	23.38	-	22.70		
11a	6Mbps	1	48	5240	18.23	23.48	-	22.61		
HT20	MCS0	1	36	5180	19.18	23.48	-	22.83		
HT20	MCS0	1	44	5220	19.13	23.93	-	22.82		
HT20	MCS0	1	48	5240	19.38	23.93	-	22.87		
HT40	MCS0	1	38	5190	36.56	44.87	-	23.01		
HT40	MCS0	1	46	5230	36.46	44.33	-	23.01		
VHT20	MCS0	1	36	5180	19.08	23.78	-	22.81		
VHT20	MCS0	1	44	5220	19.13	24.08	-	22.82		
VHT20	MCS0	1	48	5240	19.08	23.88	-	22.81		
VHT40	MCS0	1	38	5190	36.56	44.51	-	23.01		
VHT40	MCS0	1	46	5230	36.56	44.42	-	23.01		
VHT80	MCS0	1	42	5210	74.81	85.03	-	23.01		

TEST RESULTS DATA
Average Power Table

FCC Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	36	5180	0.58	8.29	24.00	0.20		Pass
11a	6Mbps	1	44	5220	0.58	8.20	24.00	0.20		Pass
11a	6Mbps	1	48	5240	0.58	8.09	24.00	0.20		Pass
HT20	MCS0	1	36	5180	0.62	8.09	24.00	0.20		Pass
HT20	MCS0	1	44	5220	0.62	7.88	24.00	0.20		Pass
HT20	MCS0	1	48	5240	0.62	7.65	24.00	0.20		Pass
HT40	MCS0	1	38	5190	1.49	7.81	24.00	0.20		Pass
HT40	MCS0	1	46	5230	1.49	7.22	24.00	0.20		Pass
VHT20	MCS0	1	36	5180	0.79	8.03	24.00	0.20		Pass
VHT20	MCS0	1	44	5220	0.79	7.83	24.00	0.20		Pass
VHT20	MCS0	1	48	5240	0.79	7.58	24.00	0.20		Pass
VHT40	MCS0	1	38	5190	1.48	7.91	24.00	0.20		Pass
VHT40	MCS0	1	46	5230	1.48	7.42	24.00	0.20		Pass
VHT80	MCS0	1	42	5210	2.57	7.98	24.00	0.20		Pass

TEST RESULTS DATA
Power Spectral Density

FCC Band I										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Power Density (dBm/MHz)	Average PSD Limit (dBm/MHz)	DG (dBi)	-	Pass/Fail
11a	6Mbps	1	36	5180	0.58	-3.95	11.00	0.20		Pass
11a	6Mbps	1	44	5220	0.58	-3.49	11.00	0.20		Pass
11a	6Mbps	1	48	5240	0.58	-3.90	11.00	0.20		Pass
HT20	MCS0	1	36	5180	0.62	-3.83	11.00	0.20		Pass
HT20	MCS0	1	44	5220	0.62	-3.64	11.00	0.20		Pass
HT20	MCS0	1	48	5240	0.62	-3.92	11.00	0.20		Pass
HT40	MCS0	1	38	5190	1.49	-6.93	11.00	0.20		Pass
HT40	MCS0	1	46	5230	1.49	-7.12	11.00	0.20		Pass
VHT20	MCS0	1	36	5180	0.79	-3.89	11.00	0.20		Pass
VHT20	MCS0	1	44	5220	0.79	-3.62	11.00	0.20		Pass
VHT20	MCS0	1	48	5240	0.79	-3.53	11.00	0.20		Pass
VHT40	MCS0	1	38	5190	1.48	-6.67	11.00	0.20		Pass
VHT40	MCS0	1	46	5230	1.48	-6.80	11.00	0.20		Pass
VHT80	MCS0	1	42	5210	2.57	-8.40	11.00	0.20		Pass

TEST RESULTS DATA
Frequency Stability

Band I										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	36	5180	5180.025	0.025	4.83	50	3.8	
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	-30	3.8	
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	20	4.35	
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	20	3.4	
11a	6Mbps	1	36	5180	5180.050	0.050	9.65	20	3.8	



Appendix B. Radiated Spurious Emission

Band 1 - 5150~5250MHz WIFI 802.11a (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		5150	60.21	-13.79	74	53.69	32.93	7.26	33.67	153	109	P	H
		5148.72	47.51	-6.49	54	40.99	32.93	7.26	33.67	153	109	A	H
	*	5180	107.25	-	-	100.59	32.94	7.37	33.65	153	109	P	H
	*	5180	100.52	-	-	93.86	32.94	7.37	33.65	153	109	A	H
		5150	60.41	-13.59	74	53.89	32.93	7.26	33.67	150	251	P	V
		5150	50.92	-3.08	54	44.4	32.93	7.26	33.67	150	251	A	V
	*	5180	107.73	-	-	101.07	32.94	7.37	33.65	150	251	P	V
	*	5180	101.23	-	-	94.57	32.94	7.37	33.65	150	251	A	V
802.11a CH 44 5220MHz		5097.5	48.38	-25.62	74	42	32.92	7.16	33.7	150	109	P	H
		5145.86	38.53	-15.47	54	32.01	32.93	7.26	33.67	150	109	A	H
	*	5220	108.26	-	-	101.59	32.94	7.37	33.64	150	109	P	H
	*	5220	101.49	-	-	94.82	32.94	7.37	33.64	150	109	A	H
		5432.16	46.78	-27.22	74	39.84	32.99	7.43	33.48	150	109	P	H
		5409.84	38.69	-15.31	54	31.78	32.98	7.43	33.5	150	109	A	H
		5103.22	47.56	-26.44	74	41.18	32.92	7.16	33.7	169	198	P	V
		5125.84	38.5	-15.50	54	32.1	32.93	7.16	33.69	169	198	A	V
	*	5220	106.44	-	-	99.77	32.94	7.37	33.64	169	198	P	V
	*	5220	100.26	-	-	93.59	32.94	7.37	33.64	169	198	A	V
		5459.28	47.91	-26.09	74	40.92	32.99	7.47	33.47	169	198	P	V
	5415.12	38.09	-15.91	54	31.18	32.98	7.43	33.5	169	198	A	V	



802.11a CH 48 5240MHz		5021.32	47.85	-26.15	74	41.54	32.91	7.15	33.75	150	171	P	H
		5145.34	38.63	-15.37	54	32.11	32.93	7.26	33.67	150	171	A	H
	*	5240	109.72	-	-	103.02	32.95	7.37	33.62	150	171	P	H
	*	5240	102.07	-	-	95.37	32.95	7.37	33.62	150	171	A	H
		5454.48	46.44	-27.56	74	39.45	32.99	7.47	33.47	150	171	P	H
		5427.84	38.16	-15.84	54	31.23	32.98	7.43	33.48	150	171	A	H
		5053.82	47.77	-26.23	74	41.45	32.91	7.15	33.74	250	196	P	V
		5122.98	38.51	-15.49	54	32.11	32.93	7.16	33.69	250	196	A	V
	*	5240	106.75	-	-	100.05	32.95	7.37	33.62	250	196	P	V
	*	5240	99.92	-	-	93.22	32.95	7.37	33.62	250	196	A	V
		5362.08	46.25	-27.75	74	39.42	32.97	7.39	33.53	250	196	P	V
		5439.12	38.26	-15.74	54	31.32	32.99	7.43	33.48	250	196	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz

WIFI 802.11a (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 36 5180MHz		10360	51.4	-22.60	74	60.11	39.71	10.58	59	152	260	P	H
		10360	42.11	-11.89	54	50.82	39.71	10.58	59	152	260	A	H
		15540	49.08	-24.92	74	57.76	37.97	13.04	59.69	189	238	P	H
		10360	50.93	-23.07	74	59.64	39.71	10.58	59	152	260	P	V
		15540	48.57	-25.43	74	57.25	37.97	13.04	59.69	189	238	P	V
802.11a CH 44 5220MHz		10440	50.66	-23.34	74	59.25	39.85	10.58	59.02	125	230	P	H
		15660	50.46	-23.54	74	59.18	37.88	13.15	59.75	110	225	P	H
		10440	50.71	-23.29	74	59.3	39.85	10.58	59.02	125	230	P	V
		15660	49.8	-24.20	74	58.52	37.88	13.15	59.75	110	225	P	V
802.11a CH 48 5240MHz		10480	50.17	-23.83	74	58.65	39.96	10.59	59.03	149	289	P	H
		15720	49.56	-24.44	74	58.3	37.82	13.23	59.79	139	291	P	H
		10480	50.24	-23.76	74	58.72	39.96	10.59	59.03	149	289	P	V
		15720	49.91	-24.09	74	58.65	37.82	13.23	59.79	139	291	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		5145.6	55.92	-18.08	74	49.4	32.93	7.26	33.67	150	110	P	H
		5150	47.35	-6.65	54	40.83	32.93	7.26	33.67	150	110	A	H
	*	5180	106.36	-	-	99.7	32.94	7.37	33.65	150	110	P	H
	*	5180	99.1	-	-	92.44	32.94	7.37	33.65	150	110	A	H
		5150	63.15	-10.85	74	56.63	32.93	7.26	33.67	150	247	P	V
		5150	50.68	-3.32	54	44.16	32.93	7.26	33.67	150	247	A	V
	*	5180	107.5	-	-	100.84	32.94	7.37	33.65	150	247	P	V
	*	5180	100.17	-	-	93.51	32.94	7.37	33.65	150	247	A	V
802.11n HT20 CH 44 5220MHz		5067.34	48.67	-25.33	74	42.33	32.91	7.15	33.72	162	104	P	H
		5145.34	38.83	-15.17	54	32.31	32.93	7.26	33.67	162	104	A	H
	*	5220	107.85	-	-	101.18	32.94	7.37	33.64	162	104	P	H
	*	5220	100.99	-	-	94.32	32.94	7.37	33.64	162	104	A	H
		5399.52	47.55	-26.45	74	40.68	32.98	7.39	33.5	162	104	P	H
		5408.4	38.73	-15.27	54	31.82	32.98	7.43	33.5	162	104	A	H
		5126.88	47.34	-26.66	74	40.84	32.93	7.26	33.69	150	266	P	V
		5140.66	38.81	-15.19	54	32.31	32.93	7.26	33.69	150	266	A	V
	*	5220	106.51	-	-	99.84	32.94	7.37	33.64	150	266	P	V
	*	5220	99.05	-	-	92.38	32.94	7.37	33.64	150	266	A	V
		5431.92	47.18	-26.82	74	40.24	32.99	7.43	33.48	150	266	P	V
	5455.44	37.88	-16.12	54	30.89	32.99	7.47	33.47	150	266	A	V	



802.11n HT20 CH 48 5240MHz		5026	47.02	-26.98	74	40.71	32.91	7.15	33.75	150	105	P	H
		5148.2	38.41	-15.59	54	31.89	32.93	7.26	33.67	150	105	A	H
	*	5240	108.82	-	-	102.12	32.95	7.37	33.62	150	105	P	H
	*	5240	101.76	-	-	95.06	32.95	7.37	33.62	150	105	A	H
		5425.2	47.68	-26.32	74	40.75	32.98	7.43	33.48	150	105	P	H
		5431.44	38.71	-15.29	54	31.77	32.99	7.43	33.48	150	105	A	H
		5029.64	47.43	-26.57	74	41.12	32.91	7.15	33.75	181	192	P	V
		5148.72	38.52	-15.48	54	32	32.93	7.26	33.67	181	192	A	V
	*	5240	107.99	-	-	101.29	32.95	7.37	33.62	181	192	P	V
	*	5240	101.09	-	-	94.39	32.95	7.37	33.62	181	192	A	V
		5429.28	46.39	-27.61	74	39.45	32.99	7.43	33.48	181	192	P	V
		5438.4	38.44	-15.56	54	31.5	32.99	7.43	33.48	181	192	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 36 5180MHz		10360	50.94	-23.06	74	59.65	39.71	10.58	59	152	260	P	H
		15540	49.27	-24.73	74	57.95	37.97	13.04	59.69	189	238	P	H
		10360	51.55	-22.45	74	60.26	39.71	10.58	59	152	260	P	V
		10360	42.79	-11.21	54	51.5	39.71	10.58	59	152	260	A	V
		15540	48.83	-25.17	74	57.51	37.97	13.04	59.69	189	238	P	V
802.11n HT20 CH 44 5220MHz		10440	51.1	-22.9	74	59.69	39.85	10.58	59.02	125	230	P	H
		10440	41.43	-12.57	54	50.02	39.85	10.58	59.02	125	230	A	H
		15660	49.95	-24.05	74	58.67	37.88	13.15	59.75	110	225	P	H
		10440	50.28	-23.72	74	58.87	39.85	10.58	59.02	125	230	P	V
		15660	49.87	-24.13	74	58.59	37.88	13.15	59.75	110	225	P	V
802.11n HT20 CH 48 5240MHz		10480	50.76	-23.24	74	59.24	39.96	10.59	59.03	149	289	P	H
		15720	49.99	-24.01	74	58.73	37.82	13.23	59.79	139	291	P	H
		10480	50.05	-23.95	74	58.53	39.96	10.59	59.03	149	289	P	V
		15720	49.89	-24.11	74	58.63	37.82	13.23	59.79	139	291	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		5148.46	59.75	-14.25	74	53.23	32.93	7.26	33.67	166	177	P	H
		5150	50.54	-3.46	54	44.02	32.93	7.26	33.67	166	177	A	H
	*	5190	103.29	-	-	96.63	32.94	7.37	33.65	166	177	P	H
	*	5190	92.62	-	-	85.96	32.94	7.37	33.65	166	177	A	H
		5381.28	46.9	-27.1	74	40.05	32.98	7.39	33.52	166	177	P	H
		5458.8	38.97	-15.03	54	31.98	32.99	7.47	33.47	166	177	A	H
		5145.6	64.9	-9.1	74	58.38	32.93	7.26	33.67	150	235	P	V
		5149.76	50.09	-3.91	54	43.57	32.93	7.26	33.67	150	235	A	V
	*	5190	99.28	-	-	92.62	32.94	7.37	33.65	150	235	P	V
	*	5190	92.76	-	-	86.1	32.94	7.37	33.65	150	235	A	V
		5419.68	46.81	-27.19	74	39.9	32.98	7.43	33.5	150	235	P	V
		5442.72	38.49	-15.51	54	31.55	32.99	7.43	33.48	150	235	A	V
802.11n HT40 CH 46 5230MHz		5125.32	47.05	-26.95	74	40.65	32.93	7.16	33.69	150	106	P	H
		5127.14	39.74	-14.26	54	33.24	32.93	7.26	33.69	150	106	A	H
	*	5230	102.1	-	-	95.4	32.95	7.37	33.62	150	106	P	H
	*	5230	93.68	-	-	86.98	32.95	7.37	33.62	150	106	A	H
		5407.44	46.85	-27.15	74	39.94	32.98	7.43	33.5	150	106	P	H
		5366.4	38.51	-15.49	54	31.68	32.97	7.39	33.53	150	106	A	H
		5047.32	47.15	-26.85	74	40.83	32.91	7.15	33.74	165	193	P	V
		5127.66	39.85	-14.15	54	33.35	32.93	7.26	33.69	165	193	A	V
	*	5230	101.98	-	-	95.28	32.95	7.37	33.62	165	193	P	V
	*	5230	93.31	-	-	86.61	32.95	7.37	33.62	165	193	A	V
	5422.8	46.19	-27.81	74	39.28	32.98	7.43	33.5	165	193	P	V	
	5436	38.42	-15.58	54	31.48	32.99	7.43	33.48	165	193	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 38 5190MHz		10380	51.58	-22.42	74	60.27	39.74	10.58	59.01	150	360	P	H
		10380	41.8	-12.2	54	50.49	39.74	10.58	59.01	150	360	A	H
		15570	49.11	-24.89	74	57.8	37.94	13.08	59.71	100	360	P	H
		10380	51.07	-22.93	74	59.76	39.74	10.58	59.01	150	360	P	V
		10380	41.35	-12.65	54	50.04	39.74	10.58	59.01	150	360	A	V
		15570	49.46	-24.54	74	58.15	37.94	13.08	59.71	100	360	P	V
802.11n HT40 CH 46 5230MHz		10460	49.97	-24.03	74	58.52	39.89	10.59	59.03	100	360	P	H
		15690	49.99	-24.01	74	58.72	37.85	13.19	59.77	100	225	P	H
		10460	50.7	-23.3	74	59.25	39.89	10.59	59.03	100	360	P	V
		15690	50.59	-23.41	74	59.32	37.85	13.19	59.77	100	225	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 36 5180MHz		5150	61.02	-12.98	74	54.5	32.93	7.26	33.67	154	174	P	H
		5150	50.73	-3.27	54	44.21	32.93	7.26	33.67	154	174	A	H
	*	5180	106.52	-	-	99.86	32.94	7.37	33.65	154	174	P	H
	*	5180	98.23	-	-	91.57	32.94	7.37	33.65	154	174	A	H
		5146.64	61.16	-12.84	74	54.64	32.93	7.26	33.67	154	257	P	V
		5150	50.82	-3.18	54	44.3	32.93	7.26	33.67	154	257	A	V
	*	5180	106.84	-	-	100.18	32.94	7.37	33.65	154	257	P	V
	*	5180	98.26	-	-	91.6	32.94	7.37	33.65	154	257	A	V
802.11ac VHT20 CH 44 5220MHz		5055.38	47.14	-26.86	74	40.82	32.91	7.15	33.74	150	104	P	H
		5067.6	38.36	-15.64	54	32.02	32.91	7.15	33.72	150	104	A	H
	*	5220	106.79	-	-	100.12	32.94	7.37	33.64	150	104	P	H
	*	5220	99.52	-	-	92.85	32.94	7.37	33.64	150	104	A	H
		5393.76	45.89	-28.11	74	39.04	32.98	7.39	33.52	150	104	P	H
		5409.84	38.13	-15.87	54	31.22	32.98	7.43	33.5	150	104	A	H
		5025.22	47.2	-26.8	74	40.89	32.91	7.15	33.75	171	195	P	V
		5117	38.52	-15.48	54	32.14	32.92	7.16	33.7	171	195	A	V
	*	5220	106.33	-	-	99.66	32.94	7.37	33.64	171	195	P	V
	*	5220	97.86	-	-	91.19	32.94	7.37	33.64	171	195	A	V
		5376.72	46.51	-27.49	74	39.67	32.97	7.39	33.52	171	195	P	V
	5410.8	37.89	-16.11	54	30.98	32.98	7.43	33.5	171	195	A	V	



802.11ac VHT20 CH 48 5240MHz		5094.12	47.24	-26.76	74	40.86	32.92	7.16	33.7	175	179	P	H
		5065.52	38.54	-15.46	54	32.22	32.91	7.15	33.74	175	179	A	H
	*	5240	105.63	-	-	98.93	32.95	7.37	33.62	175	179	P	H
	*	5240	97.49	-	-	90.79	32.95	7.37	33.62	175	179	A	H
		5436.72	47.97	-26.03	74	41.03	32.99	7.43	33.48	175	179	P	H
		5436.24	37.87	-16.13	54	30.93	32.99	7.43	33.48	175	179	A	H
		5140.66	47.8	-26.2	74	41.3	32.93	7.26	33.69	166	193	P	V
		5028.34	38.36	-15.64	54	32.05	32.91	7.15	33.75	166	193	A	V
	*	5240	105.78	-	-	99.08	32.95	7.37	33.62	166	193	P	V
	*	5240	98.5	-	-	91.8	32.95	7.37	33.62	166	193	A	V
		5451.36	47.68	-26.32	74	40.69	32.99	7.47	33.47	166	193	P	V
		5439.36	38.18	-15.82	54	31.24	32.99	7.43	33.48	166	193	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. All results are PASS against Peak and Average limit line. 												



Band 1 5150~5250MHz
WIFI 802.11ac VHT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 36 5180MHz		10360	50.74	-23.26	74	59.45	39.71	10.58	59	152	260	P	H
		15540	48.49	-25.51	74	57.17	37.97	13.04	59.69	189	238	P	H
		10360	51.05	-22.95	74	59.76	39.71	10.58	59	152	260	P	V
		10360	42.31	-11.69	54	51.02	39.71	10.58	59	152	260	A	V
		15540	48.54	-25.46	74	57.22	37.97	13.04	59.69	189	238	P	V
802.11ac VHT20 CH 44 5220MHz		10440	50.76	-23.24	74	59.35	39.85	10.58	59.02	125	230	P	H
		15660	49.39	-24.61	74	58.11	37.88	13.15	59.75	110	225	P	H
		10440	51	-23	74	59.59	39.85	10.58	59.02	125	230	P	V
		10440	41.4	-12.6	54	49.99	39.85	10.58	59.02	125	230	A	V
		15660	49.59	-24.41	74	58.31	37.88	13.15	59.75	110	225	P	V
802.11ac VHT20 CH 48 5240MHz		10480	49.79	-24.21	74	58.27	39.96	10.59	59.03	149	289	P	H
		15720	49.8	-24.2	74	58.54	37.82	13.23	59.79	139	291	P	H
		10480	50.22	-23.78	74	58.7	39.96	10.59	59.03	149	289	P	V
		15720	49.34	-24.66	74	58.08	37.82	13.23	59.79	139	291	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 38 5190MHz		5148.98	61.05	-12.95	74	54.53	32.93	7.26	33.67	153	174	P	H
		5149.76	47.76	-6.24	54	41.24	32.93	7.26	33.67	153	174	A	H
	*	5190	102.93	-	-	96.27	32.94	7.37	33.65	153	174	P	H
	*	5190	93.34	-	-	86.68	32.94	7.37	33.65	153	174	A	H
		5400.96	47.24	-26.76	74	40.37	32.98	7.39	33.5	153	174	P	H
		5375.04	38.72	-15.28	54	31.88	32.97	7.39	33.52	153	174	A	H
		5148.72	62.08	-11.92	74	55.56	32.93	7.26	33.67	156	253	P	V
		5150	50.58	-3.42	54	44.06	32.93	7.26	33.67	156	253	A	V
	*	5190	102.67	-	-	96.01	32.94	7.37	33.65	156	253	P	V
	*	5190	93.15	-	-	86.49	32.94	7.37	33.65	156	253	A	V
		5444.4	47.27	-26.73	74	40.33	32.99	7.43	33.48	156	253	P	V
		5450.88	38.49	-15.51	54	31.5	32.99	7.47	33.47	156	253	A	V
802.11ac VHT40 CH 46 5230MHz		5070.98	47.32	-26.68	74	40.98	32.91	7.15	33.72	158	106	P	H
		5126.36	39.52	-14.48	54	33.02	32.93	7.26	33.69	158	106	A	H
	*	5230	102.85	-	-	96.15	32.95	7.37	33.62	158	106	P	H
	*	5230	94.09	-	-	87.39	32.95	7.37	33.62	158	106	A	H
		5459.52	46.53	-27.47	74	39.54	32.99	7.47	33.47	158	106	P	H
		5365.68	38.4	-15.6	54	31.57	32.97	7.39	33.53	158	106	A	H
		5058.24	47.38	-26.62	74	41.06	32.91	7.15	33.74	171	192	P	V
		5126.1	40.4	-13.6	54	34	32.93	7.16	33.69	171	192	A	V
	*	5230	101.94	-	-	95.24	32.95	7.37	33.62	171	192	P	V
	*	5230	93.87	-	-	87.17	32.95	7.37	33.62	171	192	A	V
	5410.56	47.03	-26.97	74	40.12	32.98	7.43	33.5	171	192	P	V	
	5437.92	38.42	-15.58	54	31.48	32.99	7.43	33.48	171	192	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11ac VHT40 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11ac VHT40 CH 38 (5190MHz) and 802.11ac VHT40 CH 46 (5230MHz).

Remark

- 1. No other spurious found.
2. All results are PASS against Peak and Average limit line.



Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 42 5210MHz		5145.08	58.22	-15.78	74	51.7	32.93	7.26	33.67	166	152	P	H
		5147.16	49.66	-4.34	54	43.14	32.93	7.26	33.67	166	152	A	H
	*	5210	99.28	-	-	92.61	32.94	7.37	33.64	166	152	P	H
	*	5210	90.02	-	-	83.35	32.94	7.37	33.64	166	152	A	H
		5376.24	46.88	-27.12	74	40.04	32.97	7.39	33.52	166	152	P	H
		5434.8	39.79	-14.21	54	32.85	32.99	7.43	33.48	166	152	A	H
		5138.84	56.58	-17.42	74	50.08	32.93	7.26	33.69	154	242	P	V
		5150	50.54	-3.46	54	44.02	32.93	7.26	33.67	154	242	A	V
	*	5210	97.59	-	-	90.92	32.94	7.37	33.64	154	242	P	V
	*	5210	89.01	-	-	82.34	32.94	7.37	33.64	154	242	A	V
		5434.56	47.6	-26.4	74	40.66	32.99	7.43	33.48	154	242	P	V
	5426.64	39.7	-14.3	54	32.77	32.98	7.43	33.48	154	242	A	V	
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 1 5150~5250MHz
WIFI 802.11ac VHT80 (Harmonic @ 3m)

Table with 14 columns: WIFI Ant. 1, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include 802.11ac, VHT80, CH 42, 5210MHz and a Remark section.



Emission below 1GHz

WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a LF		32.91	27.55	-12.45	40	34.87	25.44	0.62	33.38	174	130	P	H
		96.93	26.28	-17.22	43.5	40.16	18.5	0.99	33.37	-	-	P	H
		181.32	23.24	-20.26	43.5	38.73	16.42	1.28	33.19	-	-	P	H
		239.52	26.2	-19.8	46	40.42	17.49	1.4	33.11	-	-	P	H
		478.14	29.05	-16.95	46	35.94	23.67	1.99	32.55	-	-	P	H
		871.96	32.24	-13.76	46	32.6	28.28	2.71	31.35	-	-	P	H
		33.88	36.51	-3.49	40	44.25	25.02	0.62	33.38	100	267	P	V
		93.05	26.08	-17.42	43.5	40.37	18.1	0.99	33.38	-	-	P	V
		239.52	26.17	-19.83	46	40.39	17.49	1.4	33.11	-	-	P	V
		469.41	26.52	-19.48	46	33.05	24.05	1.99	32.57	-	-	P	V
		727.43	29.44	-16.56	46	31.33	27.48	2.44	31.81	-	-	P	V
		946.65	34.2	-11.8	46	33.05	29.35	2.88	31.08	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	Peak or Average
H/V	Horizontal or Vertical



A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

- Level(dBμV/m) =
Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
- Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

- Level(dBμV/m)
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)
= 55.45 (dBμV/m)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 55.45(dBμV/m) – 74(dBμV/m)
= -18.55(dB)

For Average Limit @ 2390MHz:

- Level(dBμV/m)
= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)
= 43.54 (dBμV/m)
- Over Limit(dB)
= Level(dBμV/m) – Limit Line(dBμV/m)
= 43.54(dBμV/m) – 54(dBμV/m)
= -10.46(dB)

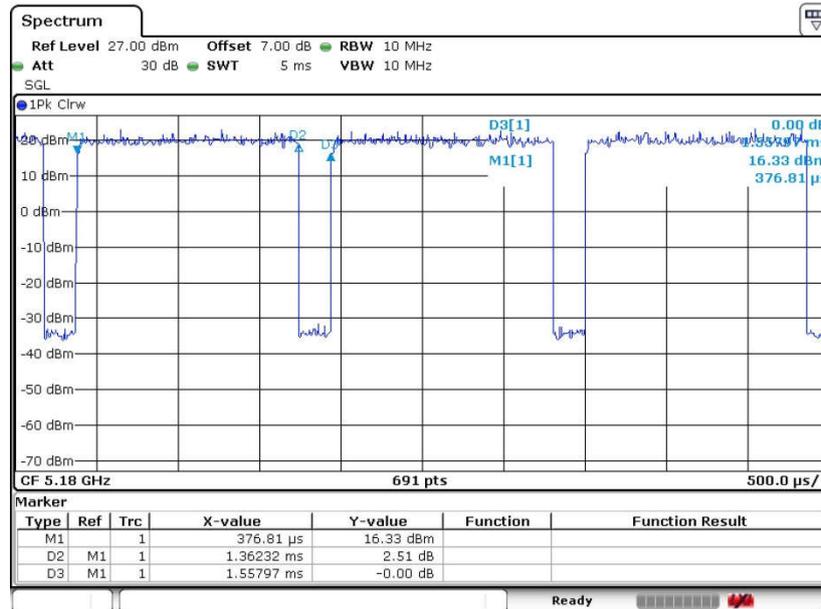
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.44	1.36	0.73	1kHz
802.11n HT20	86.70	1.28	0.78	1kHz
802.11n HT40	71.01	0.49	2.04	3kHz
802.11ac VHT20	83.33	0.98	1.02	3kHz
802.11ac VHT40	71.13	0.49	2.03	3kHz
802.11ac VHT80	55.34	0.25	4.04	10kHz

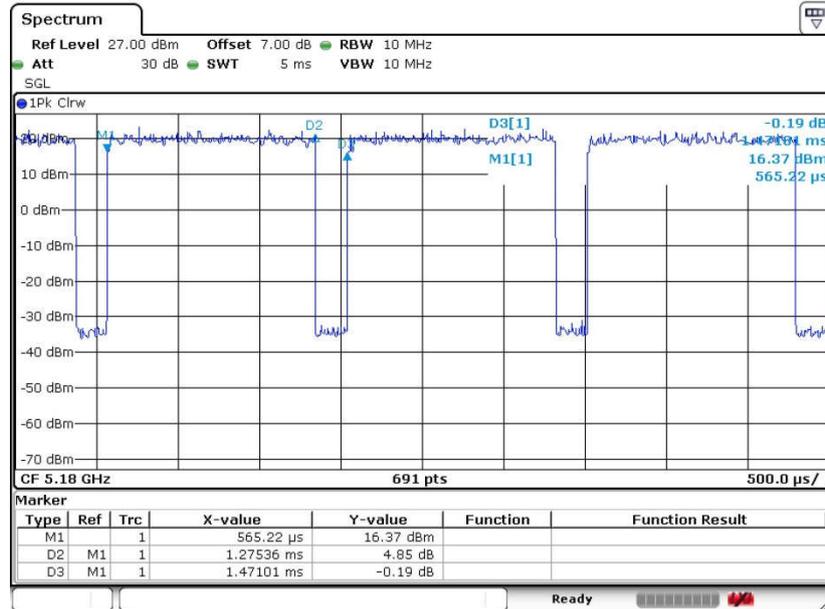
802.11a



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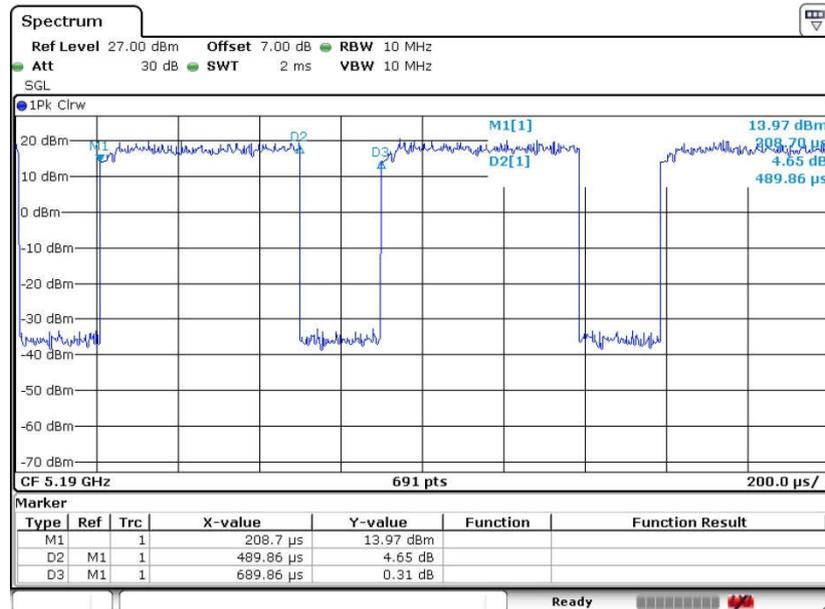


802.11n HT20



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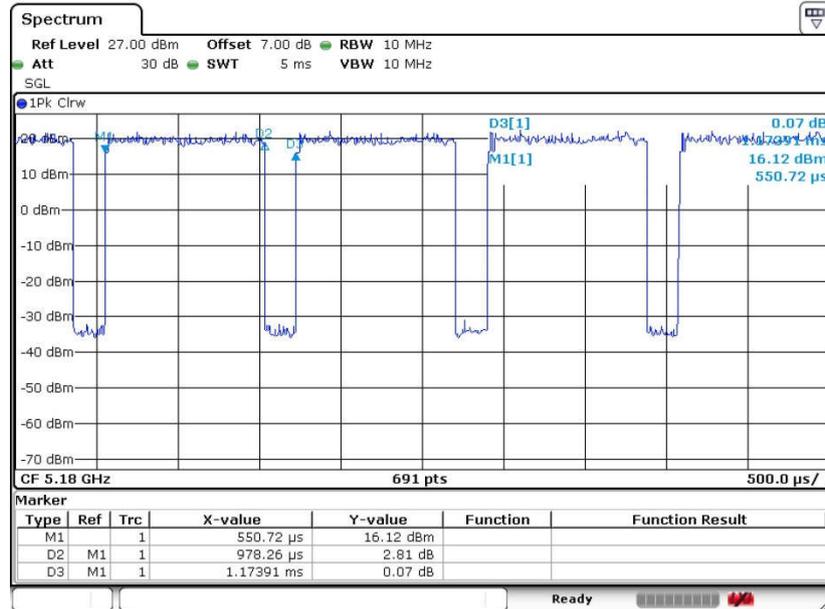
802.11n HT40



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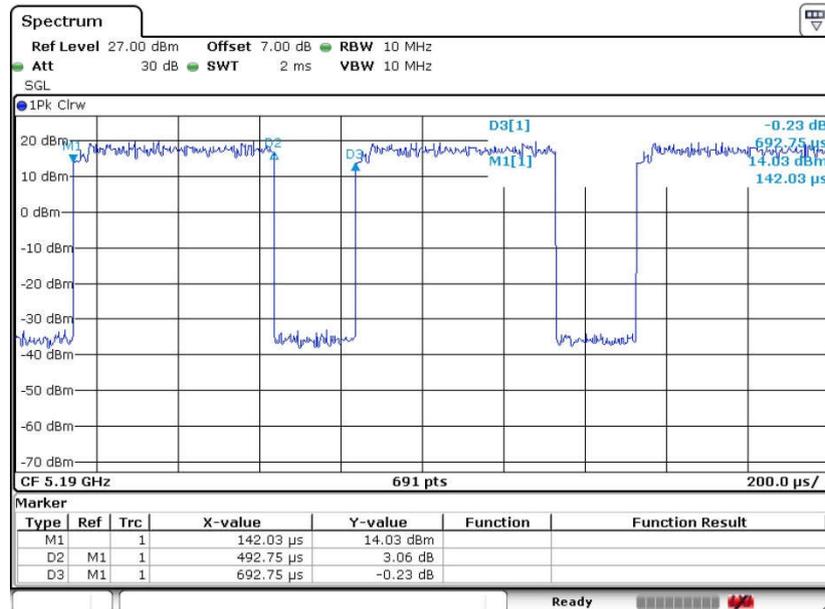


802.11ac VHT20



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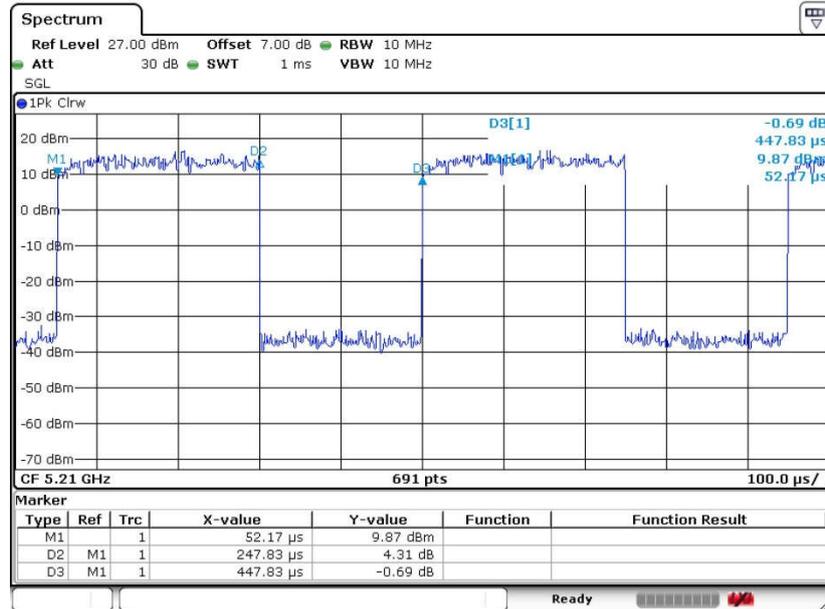
802.11ac VH40



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802.11ac VHT80



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