Test Lab
Cert 2951.01

FCC TEST REPORT

(WIFI 5G)

Product: LTE Cellular Router

Model No.: CDS-9070

FCC ID: 2AJLF-CDS-9070

Applicant: DataRemote Incorporated

Address: 17755 Homestead Avenue, Miami, FL 33157

Manufacturer: DataRemote Incorporated

Address: 17755 Homestead Avenue, Miami, FL 33157

Prepared by: Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch

Lab Location: No. 34, Chenwulu Section, Guantai Rd., Houjie Town, Dongguan City, Guangdong 523942, China

TEL: +86 769 8593 5656

FAX: +86 769 8593 1080

E-MAIL: customerservice.dg@cn.bureauveritas.com

Report No.: RE160830W002-5

Received Date: Sep. 10, 2016

Test Date: Sep. 11, 2016 ~ Nov. 07, 2016

Issued Date: Nov. 08, 2016

This report should not be used by the client to claim product certification, approval, or endorsement by A2LA or any government agencies.

Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

TABLE OF CONTENTS

RELEASE CONTROL RECORD 4

1 CERTIFICATION 5

2 SUMMARY OF TEST RESULTS 6

2.1 MEASUREMENT UNCERTAINTY 6

3 GENERAL INFORMATION 7

3.1 GENERAL DESCRIPTION OF EUT 7

3.2 DESCRIPTION OF TEST MODES 9

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL 10

3.3 DUTY CYCLE OF TEST SIGNAL 13

3.4 DESCRIPTION OF SUPPORT UNITS 13

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST 16

3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS 16

4 TEST TYPES AND RESULTS 17

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT 17

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT 17

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS 17

4.1.3 TEST INSTRUMENTS 18

4.1.4 TEST PROCEDURES 19

4.1.5 DEVIATION FROM TEST STANDARD 19

4.1.6 TEST SETUP 20

4.1.7 EUT OPERATING CONDITION 21

4.1.8 TEST RESULTS 22

4.2 CONDUCTED EMISSION MEASUREMENT 51

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT 51

4.2.2 TEST INSTRUMENTS 51

4.2.3 TEST PROCEDURES 51

4.2.4 DEVIATION FROM TEST STANDARD 52

4.2.5 TEST SETUP 52

4.2.6 EUT OPERATING CONDITIONS 52

4.2.7 TEST RESULTS 53

4.3 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT 55
4.3.1 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT 55
4.3.2 TEST SETUP 55
4.3.3 TEST INSTRUMENTS 56
4.3.4 TEST PROCEDURE 56
4.3.5 DEVIATION FROM TEST STANDARD 57
4.3.6 EUT OPERATING CONDITIONS 57
4.3.7 TEST RESULTS 58
4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT 67
4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT 67
4.4.2 TEST SETUP 67
4.4.3 TEST INSTRUMENTS 67
4.4.4 TEST PROCEDURES 68
4.4.5 DEVIATION FROM TEST STANDARD 68
4.4.6 EUT OPERATING CONDITIONS 68
4.4.7 TEST RESULTS 69
4.5 FREQUENCY STABILITY 70
4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT 73
4.5.2 TEST SETUP 73
4.5.3 TEST INSTRUMENTS 73
4.5.4 TEST PROCEDURE 74
4.5.5 DEVIATION FROM TEST STANDARD 74
4.5.6 EUT OPERATING CONDITION 74
4.5.7 TEST RESULTS 75

5 PHOTOGRAPHS OF THE TEST CONFIGURATION 77

6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB 78

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RE160830W002-5	Original release	Nov. 08, 2016

1 CERTIFICATION

PRODUCT:	LTE Cellular Router
BRAND NAME:	DataRemote
MODEL NO.:	CDS-9070
APPLICANT:	DataRemote Incorporated
TESTED:	Sep. 11, 2016 ~ Nov. 07, 2016
TEST SAMPLE:	Identical Prototype
STANDARDS:	**FCC Part 15, Subpart E (15.407), Section 15.407** ANSI C63.10-2013

The above equipment has been tested by **Bureau Veritas Shenzhen Co., Ltd. Dongguan Branch** and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : _____ , **DATE:** Nov. 08, 2016
(Yuqiang Yin / Engineer)

APPROVED BY : _____ , **DATE:** Nov. 08, 2016
(Bill Yao / Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	**TEST TYPE AND LIMIT**	**RESULT**	**REMARK**
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -6.50dB at 0.15000MHz.
15.407(b) (1/2/3/4/6)	Radiated Emission & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -3.14dB at 301.60MHz.
15.407(a/1/2/3)	Maximum conducted output Power	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	PASS	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	No antenna connector is used.

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.66dB
Radiated emissions	9KHz ~ 30MHz	2.74dB
	30MHz ~ 1GMHz	3.55dB
	1GHz ~ 18GHz	4.84dB
	18GHz ~ 40GHz	1.94dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	LTE Cellular Router
MODEL NO.	CDS-9070
POWER SUPPLY	15.0Vdc (adapter or host equipment) 7.2Vdc (lion, battery)
MODULATION TYPE	64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7 802.11ac: up to v9
OPERATING FREQUENCY	5180 ~ 5240MHz, 5745 ~ 5825MHz
NUMBER OF CHANNEL	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
AVERAGE POWER	27.832mW for 5180 ~ 5240MHz 28.275mW for 5745 ~ 5825MHz
ANTENNA TYPE	5180 ~ 5240MHz: PCB Antenna with 4.18dBi gain 5745 ~ 5825MHz: PCB Antenna with 4.28dBi gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11a	1TX/1RX
802.11n (20MHz)	2TX/2RX
802.11n (40MHz)	2TX/2RX
802.11ac (80MHz)	2TX/2RX

3. The EUT was powered by the following adapter:

ADAPTER	
BRAND:	Shenzhen Mass Power Electronic Limited
MODEL:	NBS40C150200B3
INPUT:	AC 100-240V, 1.0A
OUTPUT:	DC 15V, 2A

4. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

3.2 DESCRIPTION OF TEST MODES

FOR 5150 ~ 5250MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
42	5210 MHz		

FOR 5725 ~ 5825MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745 MHz	161	5805 MHz
153	5765 MHz	165	5825 MHz
157	5785 MHz		

2 channels are provided for 802.11n (40MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755 MHz	159	5795 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
155	5775 MHz		

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
A	√	√	√	**-**	**Powered by Adapter with wifi(5G) link**
B	-	-	-	√	Powered by Battery with wifi(5G) link
C	-	-	-	-	Powered by USB with wifi(5G) link

Where **RE≥1G:** Radiated Emission above 1GHz **RE<1G:** Radiated Emission below 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE:
The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-plane.**
NOTE: "-"means no effect.

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 44, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)		36 to 48	36, 44, 48	OFDM	BPSK	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
A	802.11ac (80MHz)		42	42	OFDM	BPSK	V0
A	802.11a	5725-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0
A	802.11ac (80MHz)		155	155	OFDM	BPSK	V0

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11ac (80MHz)	5180-5320	42	42	OFDM	BPSK	V0

POWER LINE CONDUCTED EMISSION TEST:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11ac (80MHz)	5180-5320	42	42	OFDM	BPSK	V0

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11a	5180-5240	36 to 48	36, 48	OFDM	BPSK	6.0
A	802.11n (20MHz)		36 to 48	36, 48	OFDM	BPSK	MCS0
A	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
A	802.11ac (80MHz)		42	42	OFDM	BPSK	V0
A	802.11a	5725-5825	149 to 165	149, 165	OFDM	BPSK	6.0
A	802.11n (20MHz)		149 to 165	149, 165	OFDM	BPSK	MCS0
A	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0
A	802.11ac (80MHz)		155	155	OFDM	BPSK	V0

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
B	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
B	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	MCS0
B	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	MCS0
B	802.11ac (80MHz)		42	42	OFDM	BPSK	V0
B	802.11a	5725-5825	149 to 165	149, 165	OFDM	BPSK	6.0
B	802.11n (20MHz)		149 to 165	149, 165	OFDM	BPSK	MCS0
B	802.11n (40MHz)		151 to 159	151, 159	OFDM	BPSK	MCS0
B	802.11ac (80MHz)		155	155	OFDM	BPSK	V0

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	23deg. C, 62%RH	DC 15V By Adapter	Tony
RE≥1G	23deg. C, 62%RH	DC 15V By Adapter	Tony
PLC	24deg. C, 61%RH	DC 15V By Adapter	Yuqiang Yin
APCM	23.5deg. C, 60%RH	DC 7.2V By battery	Yuqiang Yin

3.3 DUTY CYCLE OF TEST SIGNAL

Duty cycle of test signal is < 98%, duty factor shall be considered.

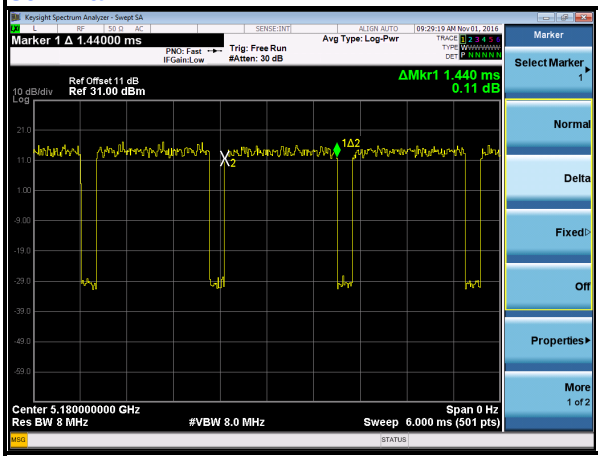
802.11a: Duty cycle = 1.440/1.632 = 0.882, Duty factor = 10 * log(1/0.882) = 0.54

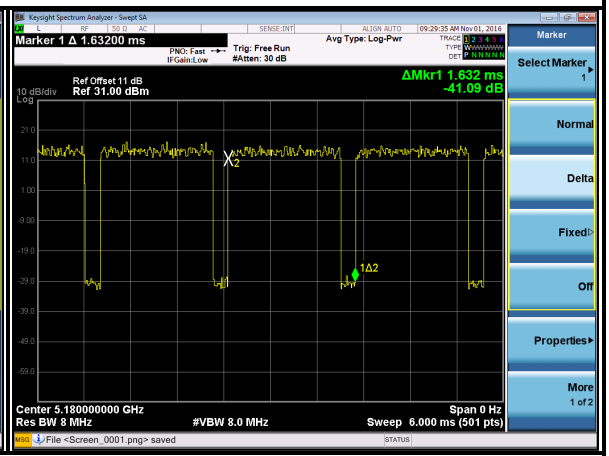
802.11n (20MHz): Duty cycle = 0.690/0.894 = 0.772, Duty factor = 10 * log(1/0.772) = 1.13

802.11n (40MHz): Duty cycle = 0.356/0.548 = 0.650, Duty factor = 10 * log(1/0.650) = 1.87

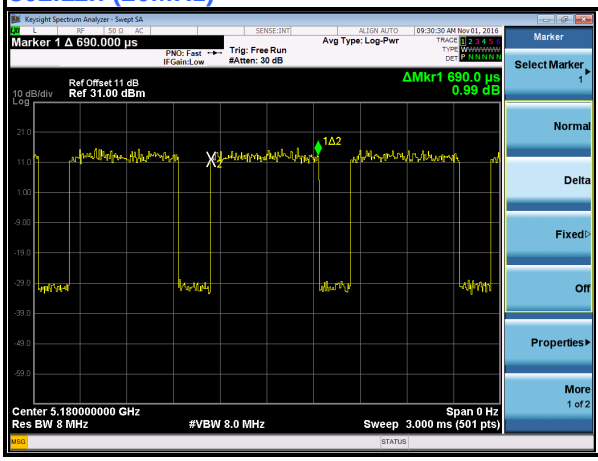
802.11ac (80MHz): Duty cycle = 0.696/0.888 = 0.784, Duty factor = 10 * log(1/0.784) = 1.06

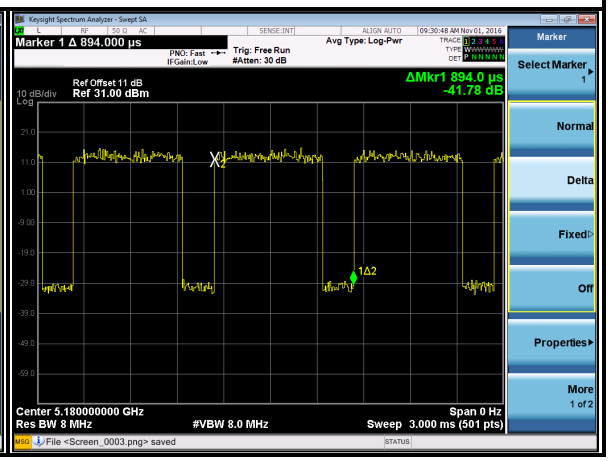
802.11a



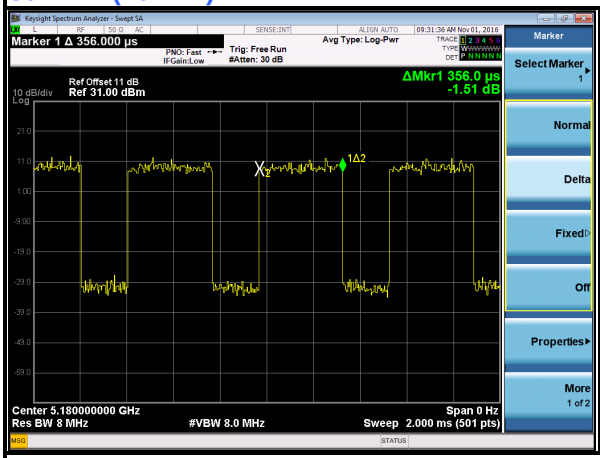


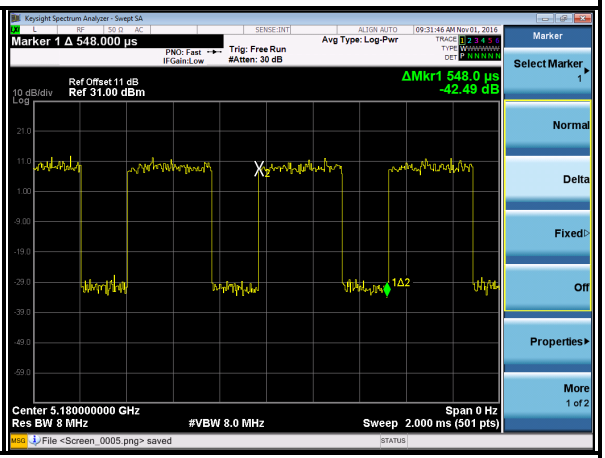
802.11n (20MHz)



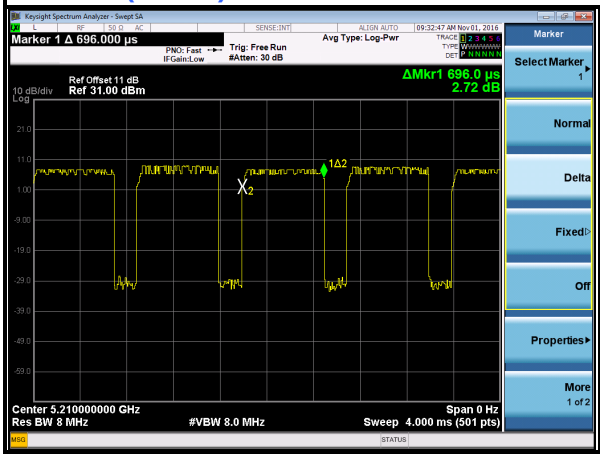


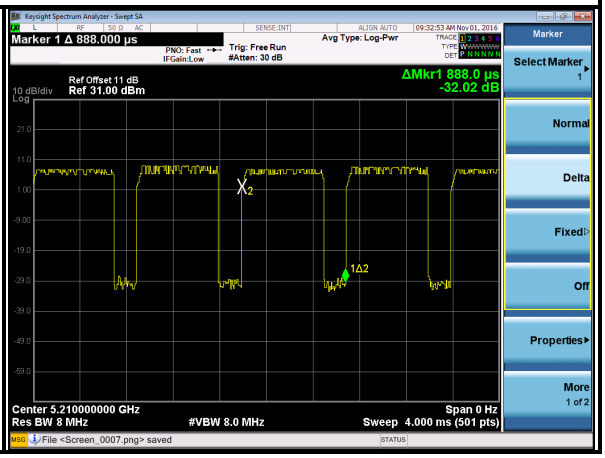
802.11n (40MHz)





802.11ac (80MHz)





3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

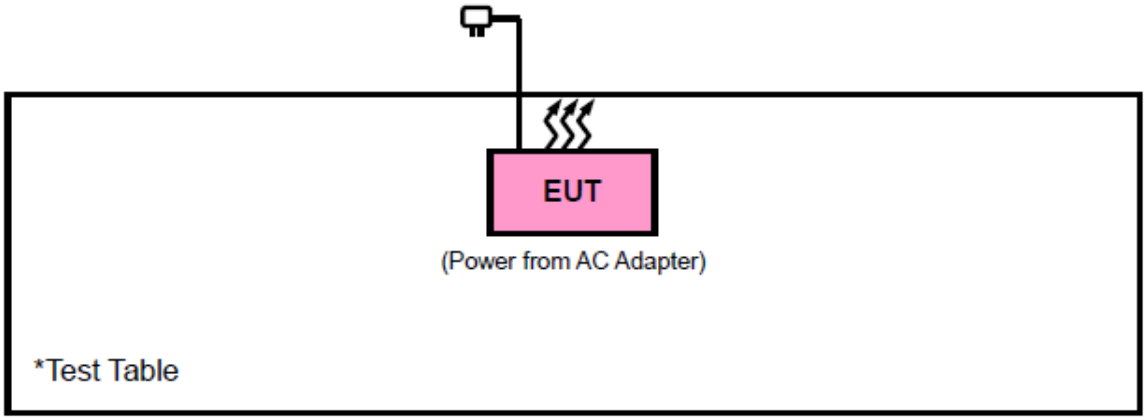
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	DC source	LONG WEI	PS-6403D	010934269	N/A
2	PC	HP	A6608CN	3CR83825X3	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	DC Line: Unshielded, Detachable 1.0m
2	AC Line: Unshielded, Detachable 1.5m

NOTE:

1. All power cords of the above support units are non shielded (1.8m).

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart E (15.407)
KDB 662911 D01 Multiple Transmitter Output v02r01
KDB 789033 D02 General U-NII Test Procedures New Rules v01r02
ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DOC). The test report has been issued separately.

4 TEST TYPES AND RESULTS

4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

FREQUENCIES (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:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01r02	FIELD STRENGTH AT 3m (dBµV/m)	
	PK : 74	AV : 54
APPLICABLE TO	**EIRP LIMIT (dBm/MHz)**	**EQUIVALENT FIELD STRENGTH AT 3m (dBµV/m)**
15.407(b)(1)	PK : -27	PK : 68.3
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	See note 2 (FCC 16-24)	

NOTE: The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

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

2. All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

4.1.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Apr. 05,16	Apr. 04,17
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	Nov. 04,16	Nov. 03,17
Bilog Antenna	Teseq	CBL 6111D	30643	Jul. 14, 16	Jul. 13, 17
Loop antenna	Daze	ZN30900A	0708	Dec. 30, 15	Dec. 29, 16
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 18,16	May 17,17
GPS Generator+ Antenna	TOJOIN	GNSS-5000A	E1-010119	Aug. 02, 15	Aug. 01, 17
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	Mar. 12,16	Mar. 11,18
Test Software	ADT	ADT_Radiated _V7.6.15.9.2	N/A	N/A	N/A
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170242	Mar. 12,16	Mar. 11,17
Amplifier (9kHz-1GHz)	SONOMA	310D	186955	Mar. 04,16	Mar. 03, 17
Pre-Amplifier(1-18G)	HP	8449B	3008A00409	Apr. 25,16	Apr. 24,17
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Nov. 04,16	Nov. 03,17
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	Aug. 08,16	Aug. 07,17

NOTE:

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.
2. The test was performed in 966 Chamber.
3. The FCC Site Registration No. is 502831.

4.1.4 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

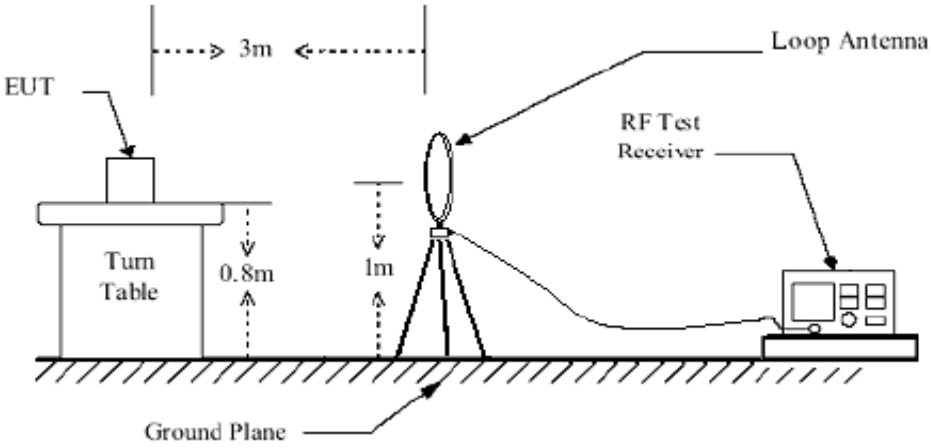
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 DEVIATION FROM TEST STANDARD

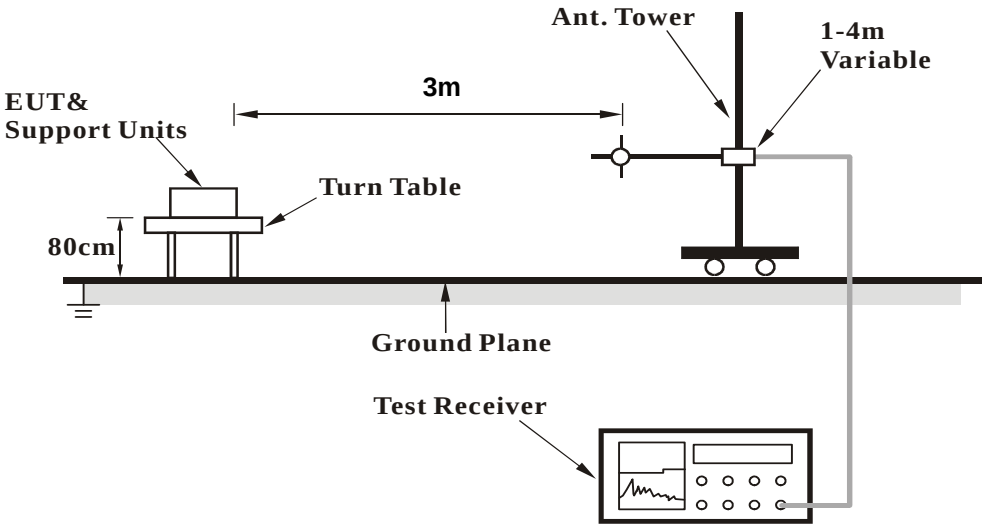
No deviation.

4.1.6 TEST SETUP

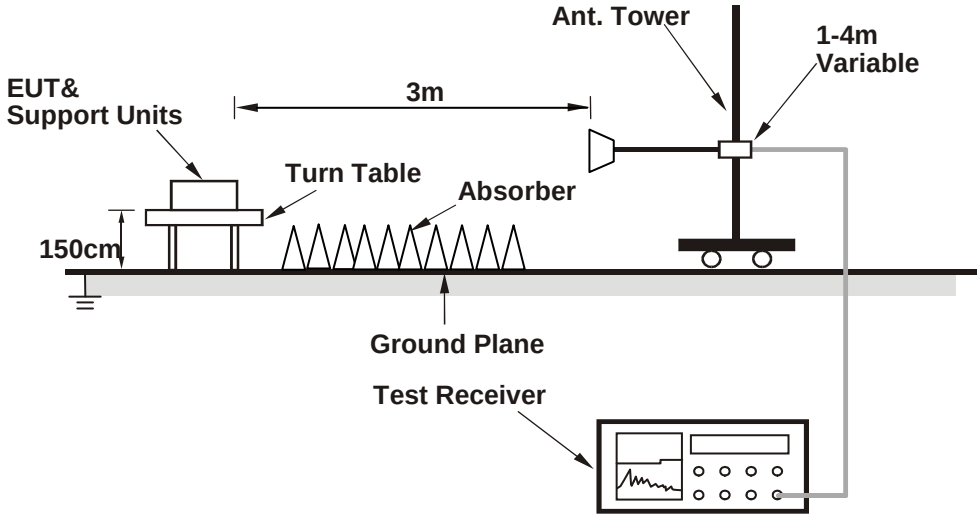
< Frequency Range below 30MHz>



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.1.7 EUT OPERATING CONDITION

a. Set the EUT under full load condition and placed them on a testing table.

b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

4.1.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

9 KHz – 30 MHz data: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required in the report.

30 MHz – 1GHz data:

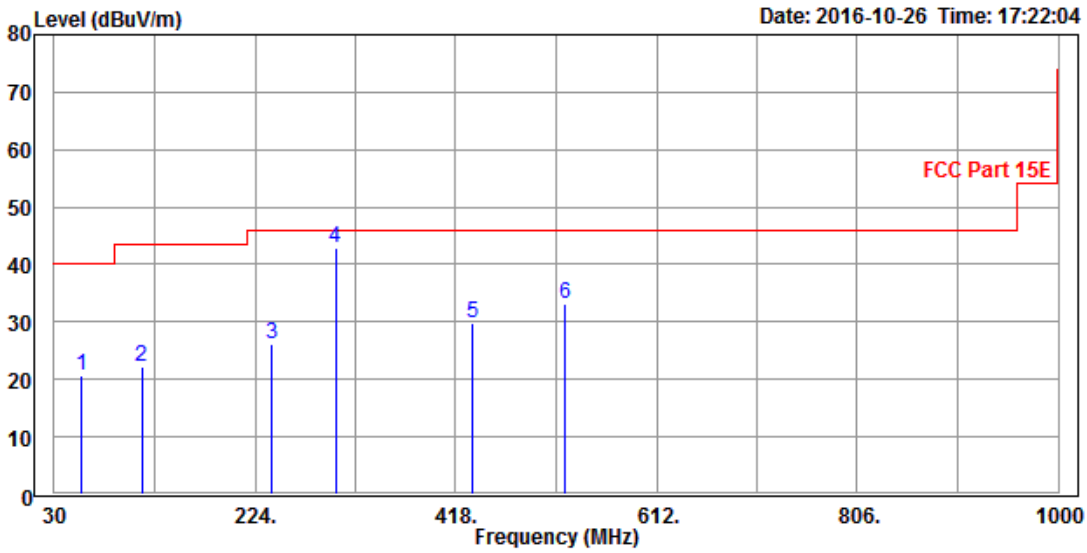
802.11ac (80MHz)

CHANNEL	TX Channel 42	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
56.19	20.79	50.55	40.00	-19.21	6.44	1.14	37.34	100	56	QP
114.39	22.30	50.11	43.50	-21.20	7.50	1.64	36.95	100	40	QP
240.49	26.17	48.33	46.00	-19.83	11.96	2.40	36.52	100	72	QP
301.60	**42.86**	**63.56**	**46.00**	**-3.14**	**13.07**	**2.73**	**36.50**	**100**	**38**	**QP**
434.49	29.73	45.66	46.00	-16.27	17.61	3.26	36.80	100	150	QP
523.73	33.16	47.75	46.00	-12.84	18.85	3.59	37.03	100	210	QP

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.

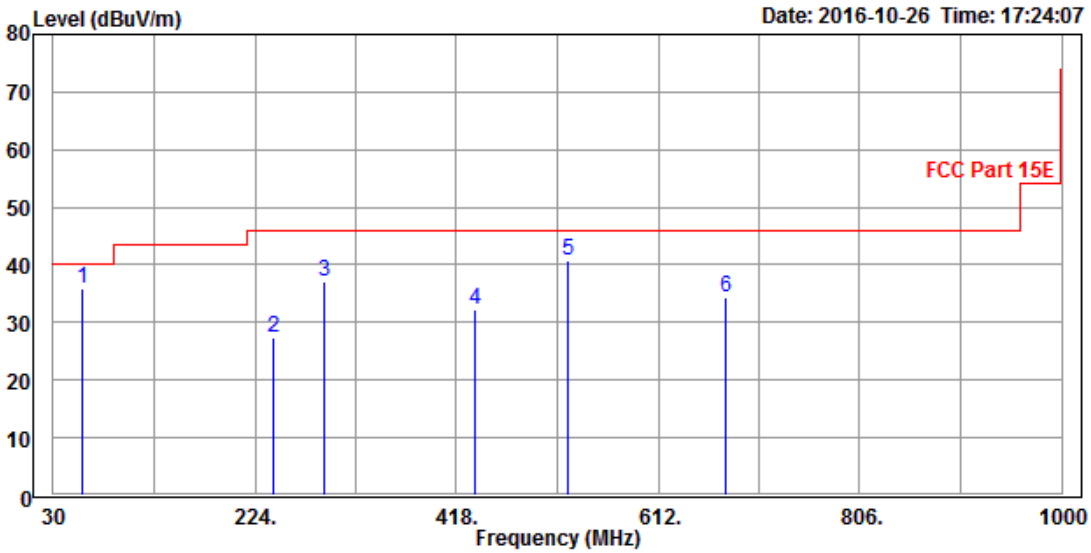


CHANNEL	Channel 42	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
57.16	36.01	65.77	40.00	-3.99	6.43	1.15	37.34	100	15	QP
241.46	27.42	49.53	46.00	-18.58	12.01	2.40	36.52	100	240	QP
289.96	37.03	57.98	46.00	-8.97	12.88	2.67	36.50	100	63	QP
435.46	32.25	48.17	46.00	-13.75	17.63	3.26	36.81	100	180	QP
524.70	40.84	55.40	46.00	-5.16	18.87	3.60	37.03	100	96	QP
676.99	34.28	44.93	46.00	-11.72	22.46	4.22	37.33	100	112	QP

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The other emission levels were very low against the limit.
4. Margin value = Emission level – Limit value.



ABOVE 1GHz WORST-CASE DATA: Band 1

802.11a

CHANNEL	TX Channel 36	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5149	42.00	42.82	54.00	-12.00	34.48	13.71	49.01	100	40	Average
5149	52.13	52.95	74.00	-21.87	34.48	13.71	49.01	100	40	Peak
5180	86.34	87.05			34.52	13.79	49.02	100	40	Average
5180	94.58	95.29			34.52	13.79	49.02	100	40	Peak
5350	42.16	42.24	54.00	-11.84	34.72	14.28	49.08	100	40	Average
5350	52.05	52.13	74.00	-21.95	34.72	14.28	49.08	100	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	45.62	46.44	54.00	-8.38	34.48	13.71	49.01	240	200	Average
5150	55.20	56.02	74.00	-18.80	34.48	13.71	49.01	240	200	Peak
5180	102.52	103.23			34.52	13.79	49.02	240	200	Average
5180	110.07	110.78			34.52	13.79	49.02	240	200	Peak
5350	41.77	41.85	54.00	-12.23	34.72	14.28	49.08	240	200	Average
5350	51.77	51.85	74.00	-22.23	34.72	14.28	49.08	240	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5180MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

CHANNEL	TX Channel 44	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	42.04	42.86	54.00	-11.96	34.48	13.71	49.01	100	40	Average
5150	52.55	53.37	74.00	-21.45	34.48	13.71	49.01	100	40	Peak
5220	85.53	86.10			34.56	13.91	49.04	100	40	Average
5220	93.82	94.39			34.56	13.91	49.04	100	40	Peak
5350	42.22	42.30	54.00	-11.78	34.72	14.28	49.08	100	40	Average
5350	52.97	53.05	74.00	-21.03	34.72	14.28	49.08	100	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5147	42.96	43.79	54.00	-11.04	34.48	13.70	49.01	240	200	Average
5147	53.42	54.25	74.00	-20.58	34.48	13.70	49.01	240	200	Peak
5220	101.96	102.53			34.56	13.91	49.04	240	200	Average
5220	109.13	109.70			34.56	13.91	49.04	240	200	Peak
5350	42.11	42.19	54.00	-11.89	34.72	14.28	49.08	240	200	Average
5350	53.65	53.73	74.00	-20.35	34.72	14.28	49.08	240	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5220MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

CHANNEL	TX Channel 48	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	42.07	42.89	54.00	-11.93	34.48	13.71	49.01	240	40	Average
5150	52.67	53.49	74.00	-21.33	34.48	13.71	49.01	240	40	Peak
5240	87.91	88.39			34.59	13.97	49.04	240	40	Average
5240	95.08	95.56			34.59	13.97	49.04	240	40	Peak
5350	42.26	42.34	54.00	-11.74	34.72	14.28	49.08	240	40	Average
5350	53.16	53.24	74.00	-20.84	34.72	14.28	49.08	240	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5147	42.71	43.54	54.00	-11.29	34.48	13.70	49.01	239	200	Average
5147	53.47	54.30	74.00	-20.53	34.48	13.70	49.01	239	200	Peak
5240	102.62	103.10			34.59	13.97	49.04	239	200	Average
5240	109.86	110.34			34.59	13.97	49.04	239	200	Peak
5350	42.34	42.42	54.00	-11.66	34.72	14.28	49.08	239	200	Average
5350	52.57	52.65	74.00	-21.43	34.72	14.28	49.08	239	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5240MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

802.11n (20MHz)

CHANNEL	TX Channel 36	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	41.92	42.74	54.00	-12.08	34.48	13.71	49.01	220	40	Average
5150	52.84	53.66	74.00	-21.16	34.48	13.71	49.01	220	40	Peak
5180	85.97	86.68			34.52	13.79	49.02	220	40	Average
5180	94.00	94.71			34.52	13.79	49.02	220	40	Peak
5350	42.02	42.10	54.00	-11.98	34.72	14.28	49.08	220	40	Average
5350	52.64	52.72	74.00	-21.36	34.72	14.28	49.08	220	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	45.19	46.01	54.00	-8.81	34.48	13.71	49.01	250	200	Average
5150	54.09	54.91	74.00	-19.91	34.48	13.71	49.01	250	200	Peak
5180	101.61	102.32			34.52	13.79	49.02	250	200	Average
5180	109.43	110.14			34.52	13.79	49.02	250	200	Peak
5350	41.68	41.76	54.00	-12.32	34.72	14.28	49.08	250	200	Average
5350	51.90	51.98	74.00	-22.10	34.72	14.28	49.08	250	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5180MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

CHANNEL	TX Channel 44	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	41.70	42.52	54.00	-12.30	34.48	13.71	49.01	100	40	Average
5150	52.88	53.70	74.00	-21.12	34.48	13.71	49.01	100	40	Peak
5220	81.18	81.75			34.56	13.91	49.04	100	40	Average
5220	90.67	91.24			34.56	13.91	49.04	100	40	Peak
5350	41.96	42.04	54.00	-12.04	34.72	14.28	49.08	100	40	Average
5350	53.15	53.23	74.00	-20.85	34.72	14.28	49.08	100	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	42.50	43.32	54.00	-11.50	34.48	13.71	49.01	140	186	Average
5150	53.42	54.24	74.00	-20.58	34.48	13.71	49.01	140	186	Peak
5220	100.74	101.31			34.56	13.91	49.04	140	186	Average
5220	108.54	109.11			34.56	13.91	49.04	140	186	Peak
5350	41.74	41.82	54.00	-12.26	34.72	14.28	49.08	140	186	Average
5350	52.37	52.45	74.00	-21.63	34.72	14.28	49.08	140	186	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5220MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

CHANNEL	TX Channel 48	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	42.13	42.95	54.00	-11.87	34.48	13.71	49.01	230	40	Average
5150	51.68	52.50	74.00	-22.32	34.48	13.71	49.01	230	40	Peak
5240	86.81	87.29			34.59	13.97	49.04	230	40	Average
5240	94.23	94.71			34.59	13.97	49.04	230	40	Peak
5350	41.99	42.07	54.00	-12.01	34.72	14.28	49.08	230	40	Average
5350	52.50	52.58	74.00	-21.50	34.72	14.28	49.08	230	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5147	42.28	43.11	54.00	-11.72	34.48	13.70	49.01	240	200	Average
5147	52.84	53.67	74.00	-21.16	34.48	13.70	49.01	240	200	Peak
5240	101.79	102.27			34.59	13.97	49.04	240	200	Average
5240	109.27	109.75			34.59	13.97	49.04	240	200	Peak
5350	41.97	42.05	54.00	-12.03	34.72	14.28	49.08	240	200	Average
5350	52.90	52.98	74.00	-21.10	34.72	14.28	49.08	240	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5240MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

802.11n (40MHz)

CHANNEL	TX Channel 38	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	41.72	42.54	54.00	-12.28	34.48	13.71	49.01	240	40	Average
5150	51.88	52.70	74.00	-22.12	34.48	13.71	49.01	240	40	Peak
5190	80.33	81.01			34.53	13.82	49.03	240	40	Average
5190	88.28	88.96			34.53	13.82	49.03	240	40	Peak
5350	41.65	41.73	54.00	-12.35	34.72	14.28	49.08	240	40	Average
5350	52.44	52.52	74.00	-21.56	34.72	14.28	49.08	240	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	49.65	50.47	54.00	-4.35	34.48	13.71	49.01	240	200	Average
5150	60.42	61.24	74.00	-13.58	34.48	13.71	49.01	240	200	Peak
5190	94.53	95.21			34.53	13.82	49.03	240	200	Average
5190	103.15	103.83			34.53	13.82	49.03	240	200	Peak
5350	41.77	41.85	54.00	-12.23	34.72	14.28	49.08	240	200	Average
5350	51.62	51.70	74.00	-22.38	34.72	14.28	49.08	240	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5190MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

CHANNEL	TX Channel 46	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	41.16	41.98	54.00	-12.84	34.48	13.71	49.01	238	39	Average
5150	52.18	53.00	74.00	-21.82	34.48	13.71	49.01	238	39	Peak
5230	83.13	83.65			34.58	13.94	49.04	238	39	Average
5230	91.33	91.85			34.58	13.94	49.04	238	39	Peak
5350	41.27	41.35	54.00	-12.73	34.72	14.28	49.08	238	39	Average
5350	51.98	52.06	74.00	-22.02	34.72	14.28	49.08	238	39	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5150	43.19	44.01	54.00	-10.81	34.48	13.71	49.01	230	20	Average
5150	53.99	54.81	74.00	-20.01	34.48	13.71	49.01	230	20	Peak
5230	96.13	96.65			34.58	13.94	49.04	230	20	Average
5230	106.19	106.71			34.58	13.94	49.04	230	20	Peak
5350	41.92	42.00	54.00	-12.08	34.72	14.28	49.08	230	20	Average
5350	51.15	51.23	74.00	-22.85	34.72	14.28	49.08	230	20	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5230MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

802.11ac (80MHz)

CHANNEL	TX Channel 42	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5150	41.38	42.20	54.00	-12.62	34.48	13.71	49.01	100	345	Average
5150	51.33	52.15	74.00	-22.67	34.48	13.71	49.01	100	345	Peak
5210	78.73	79.33			34.55	13.88	49.03	100	345	Average
5210	86.91	87.51			34.55	13.88	49.03	100	345	Peak
5350	41.28	41.36	54.00	-12.72	34.72	14.28	49.08	100	345	Average
5350	51.71	51.79	74.00	-22.29	34.72	14.28	49.08	100	345	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5148	50.65	51.48	54.00	-3.35	34.48	13.70	49.01	230	200	Average
5148	60.40	61.23	74.00	-13.60	34.48	13.70	49.01	230	200	Peak
5210	95.06	95.66			34.55	13.88	49.03	230	200	Average
5210	101.25	101.85			34.55	13.88	49.03	230	200	Peak
5350	41.95	42.03	54.00	-12.05	34.72	14.28	49.08	230	200	Average
5350	52.90	52.98	74.00	-21.10	34.72	14.28	49.08	230	200	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5210MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

ABOVE 1GHz WORST-CASE DATA: Band 4

802.11a

CHANNEL	TX Channel 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5745	95.53	93.17			35.19	16.31	49.14	180	10	Average
5745	104.34	101.98			35.19	16.31	49.14	180	10	Peak
11490	49.66	39.64	54.00	-4.34	39.10	19.08	48.16	100	15	Average
11490	59.76	49.74	74.00	-14.24	39.10	19.08	48.16	100	15	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5745	104.31	101.95			35.19	16.31	49.14	100	18	Average
5745	112.50	110.14			35.19	16.31	49.14	100	18	Peak
11490	49.70	39.68	54.00	-4.30	39.10	19.08	48.16	100	25	Average
11490	60.38	50.36	74.00	-13.62	39.10	19.08	48.16	100	25	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5745MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

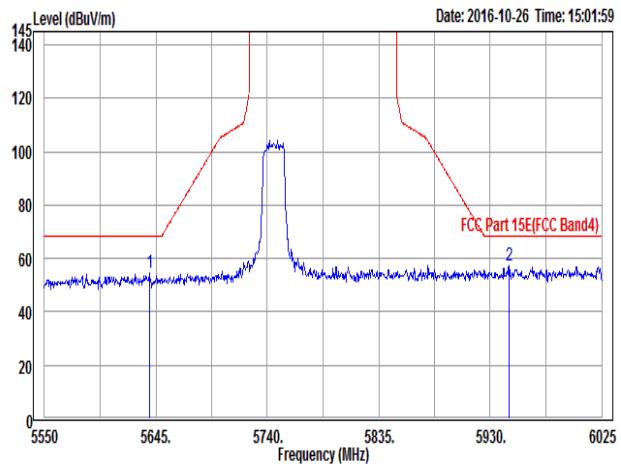
OOBE DATA

802.11a

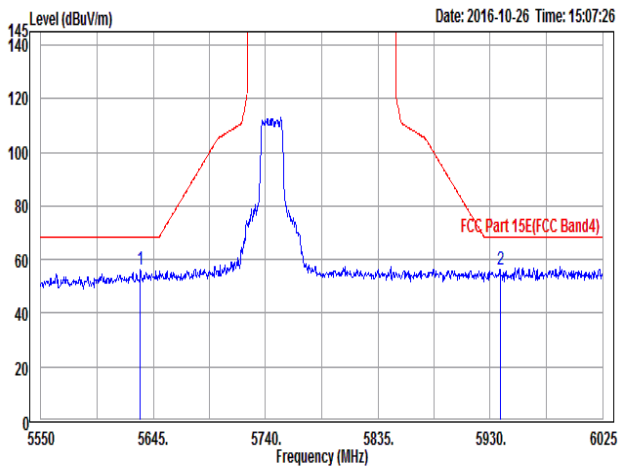
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5639.3	54.33	52.77	68.3	-13.97	35.07	15.62	49.13	180	20	Peak
5946.15	57.1	53.2	68.3	-11.2	35.44	17.62	49.16	180	20	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5634.08	56.05	54.54	68.3	-12.25	35.06	15.58	49.13	100	19	Peak
5938.55	56.45	52.61	68.3	-11.85	35.43	17.57	49.16	100	19	Peak

CH 149

Horiontal



Vertical



CHANNEL	TX Channel 157	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5785	96.74	94.08			35.24	16.57	49.15	160	18	Average
5785	103.25	100.59			35.24	16.57	49.15	160	18	Peak
11570	49.70	39.59	54.00	-4.30	39.16	19.12	48.17	100	45	Average
11570	60.32	50.21	74.00	-13.68	39.16	19.12	48.17	100	45	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5785	104.82	102.16			35.24	16.57	49.15	104	20	Average
5785	111.70	109.04			35.24	16.57	49.15	104	20	Peak
11570	49.83	39.72	54.00	-4.17	39.16	19.12	48.17	100	32	Average
11570	61.47	51.36	74.00	-12.53	39.16	19.12	48.17	100	32	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5785MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

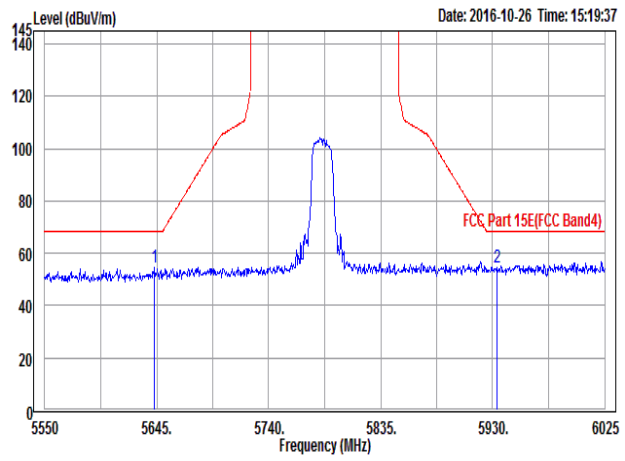
OOBE DATA

802.11a

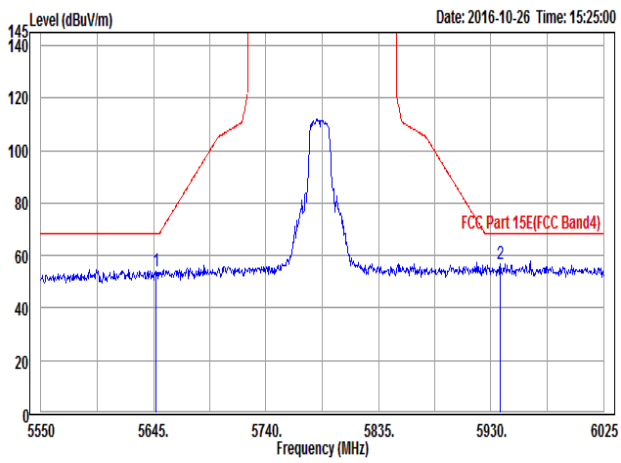
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5643.1	54.31	52.73	68.3	-13.99	35.07	15.64	49.13	160	21	Peak
5933.8	54.73	50.93	68.3	-13.57	35.42	17.54	49.16	160	21	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5646.9	54.06	52.44	68.3	-14.24	35.08	15.67	49.13	104	20	Peak
5937.6	56.75	52.92	68.3	-11.55	35.43	17.56	49.16	104	20	Peak

CH 157

Horiontal



Vertical



CHANNEL	TX Channel 165	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5825	93.94	90.97			35.29	16.83	49.15	160	50	Average
5825	101.37	98.40			35.29	16.83	49.15	160	50	Peak
11650	49.61	39.41	54.00	-4.39	39.22	19.16	48.18	100	60	Average
11650	61.56	51.36	74.00	-12.44	39.22	19.16	48.18	100	60	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5825	104.73	101.76			35.29	16.83	49.15	115	10	Average
5825	111.85	108.88			35.29	16.83	49.15	115	10	Peak
11650	50.03	39.83	54.00	-3.97	39.22	19.16	48.18	100	40	Average
11650	61.59	51.39	74.00	-12.41	39.22	19.16	48.18	100	40	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5825MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

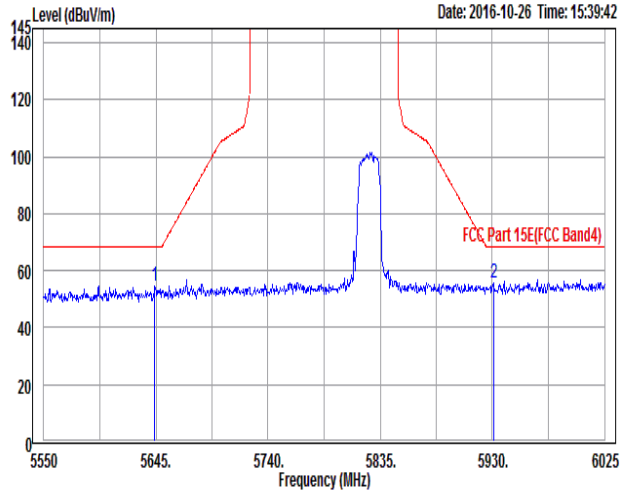
OOBE DATA

802.11a

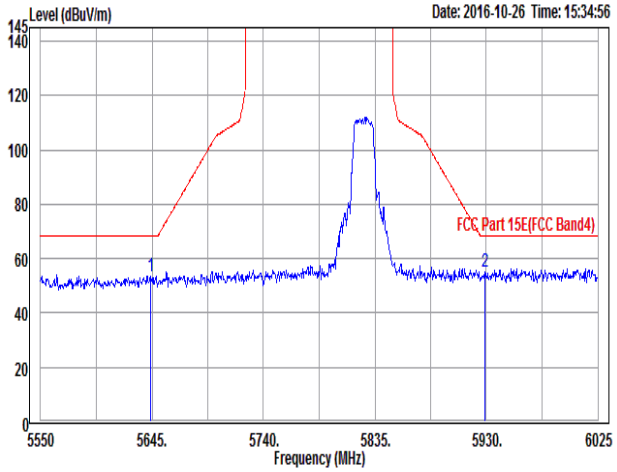
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5644.05	54.61	53.02	68.3	-13.69	35.07	15.65	49.13	160	50	Peak
5930.95	55.94	52.16	68.3	-12.36	35.42	17.52	49.16	160	50	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5643.58	53.65	52.06	68.3	-14.65	35.07	15.65	49.13	115	10	Peak
5928.58	54.88	51.13	68.3	-13.42	35.41	17.5	49.16	115	10	Peak

CH 165

Horiontal



Vertical



802.11n (20MHz)

CHANNEL	TX Channel 149	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5745	94.64	92.28			35.19	16.31	49.14	230	40	Average
5745	102.99	100.63			35.19	16.31	49.14	230	40	Peak
11490	48.38	38.36	54.00	-5.62	39.10	19.08	48.16	100	36	Average
11490	61.27	51.25	74.00	-12.73	39.10	19.08	48.16	100	36	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5745	104.55	102.19			35.19	16.31	49.14	110	12	Average
5745	112.83	110.47			35.19	16.31	49.14	110	12	Peak
11490	49.87	39.85	54.00	-4.13	39.10	19.08	48.16	100	30	Average
11490	61.70	51.68	74.00	-12.30	39.10	19.08	48.16	100	30	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5745MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

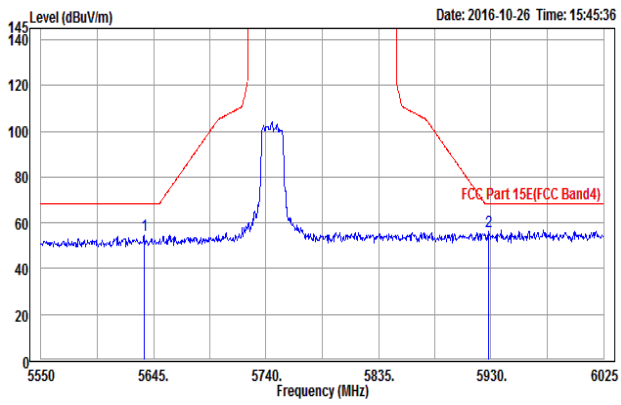
OOBE DATA

802.11n (20MHZ)

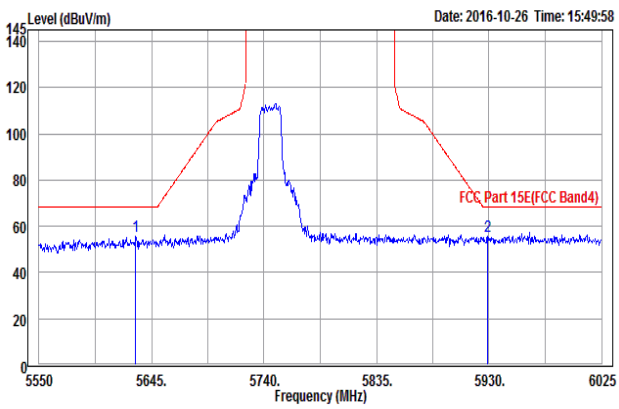
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5636.93	54.35	52.82	68.3	-13.95	35.06	15.6	49.13	230	40	Peak
5927.63	56.17	52.42	68.3	-12.13	35.41	17.5	49.16	230	40	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5631.7	55.45	53.95	68.3	-12.85	35.06	15.57	49.13	110	12	Peak
5928.58	55.54	51.79	68.3	-12.76	35.41	17.5	49.16	110	12	Peak

CH 149

Horiontal



Vertical



CHANNEL	TX Channel 157	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5785	94.43	91.77			35.24	16.57	49.15	180	20	Average
5785	101.71	99.05			35.24	16.57	49.15	180	20	Peak
11570	49.59	39.48	54.00	-4.41	39.16	19.12	48.17	100	10	Average
11570	61.73	51.62	74.00	-12.27	39.16	19.12	48.17	100	10	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5785	103.79	101.13			35.24	16.57	49.15	110	18	Average
5785	110.42	107.76			35.24	16.57	49.15	110	18	Peak
11570	49.76	39.65	54.00	-4.24	39.16	19.12	48.17	100	36	Average
11570	61.83	51.72	74.00	-12.17	39.16	19.12	48.17	100	36	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5785MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

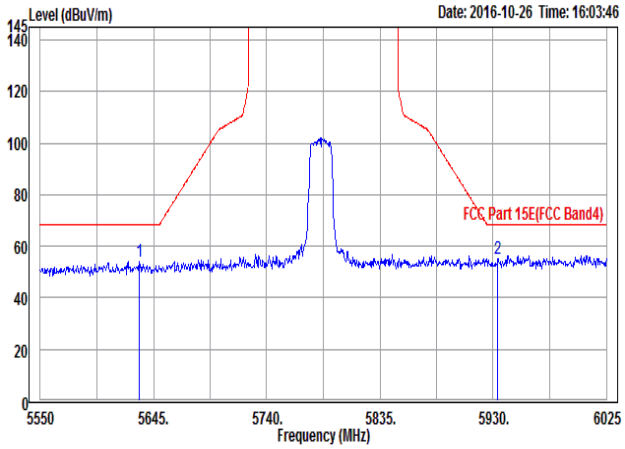
OOBE DATA

802.11n (20MHZ)

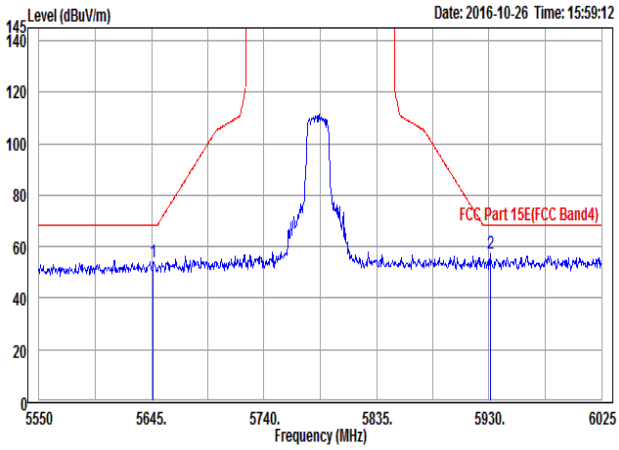
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5633.13	53.8	52.29	68.3	-14.5	35.06	15.58	49.13	180	15	Peak
5933.8	55.22	51.42	68.3	-13.08	35.42	17.54	49.16	180	15	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5646.43	54.27	52.66	68.3	-14.03	35.08	15.66	49.13	110	18	Peak
5930.95	57.14	53.36	68.3	-11.16	35.42	17.52	49.16	110	18	Peak

CH 157

Horiontal



Vertical



CHANNEL	TX Channel 165	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5825	93.63	90.66			35.29	16.83	49.15	100	11	Average
5825	101.05	98.08			35.29	16.83	49.15	100	11	Peak
11650	49.15	38.95	54.00	-4.85	39.22	19.16	48.18	100	24	Average
11650	61.06	50.86	74.00	-12.94	39.22	19.16	48.18	100	24	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5825	102.63	99.66			35.29	16.83	49.15	120	20	Average
5825	109.89	106.92			35.29	16.83	49.15	120	20	Peak
11650	50.06	39.86	54.00	-3.94	39.22	19.16	48.18	100	36	Average
11650	61.76	51.56	74.00	-12.24	39.22	19.16	48.18	100	36	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5825MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

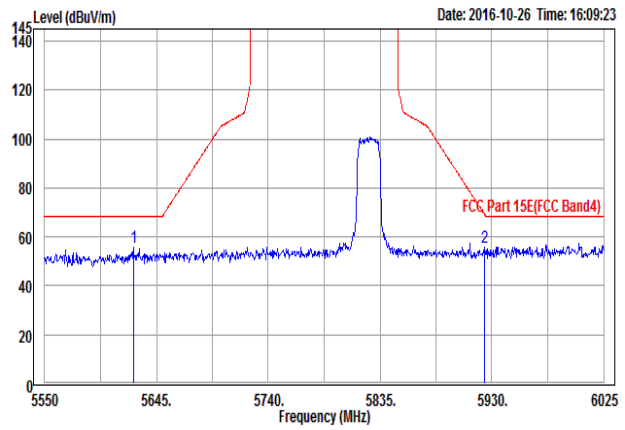
OOBE DATA

802.11n (20MHZ)

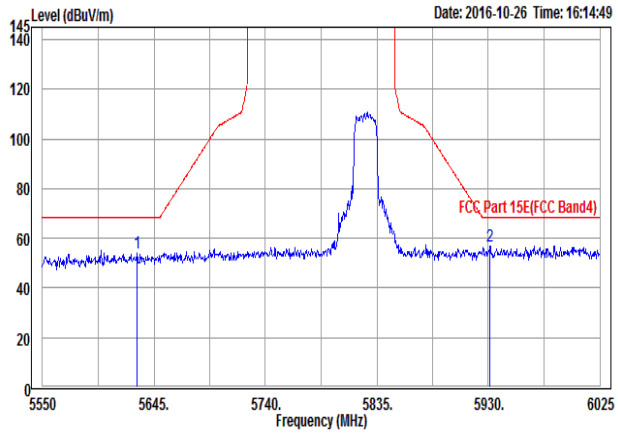
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5625.53	55.59	54.14	68.3	-12.71	35.05	15.53	49.13	100	12	Peak
5923.83	55.68	51.96	69.17	-13.49	35.41	17.47	49.16	100	12	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5630.75	54.01	52.52	68.3	-14.29	35.06	15.56	49.13	120	20	Peak
5931.43	56.82	53.04	68.3	-11.48	35.42	17.52	49.16	120	20	Peak

CH 165

Horiontal



Vertical



802.11n (40MHz)

CHANNEL	TX Channel 151	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5755	91.08	88.65			35.21	16.37	49.15	160	10	Average
5755	99.87	97.44			35.21	16.37	49.15	160	10	Peak
11510	48.36	38.32	54.00	-5.64	39.11	19.09	48.16	100	45	Average
11510	61.28	51.24	74.00	-12.72	39.11	19.09	48.16	100	45	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5755	98.50	96.07			35.21	16.37	49.15	100	20	Average
5755	107.36	104.93			35.21	16.37	49.15	100	20	Peak
11510	48.80	38.76	54.00	-5.20	39.11	19.09	48.16	100	15	Average
11510	61.42	51.38	74.00	-12.58	39.11	19.09	48.16	100	15	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5755MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

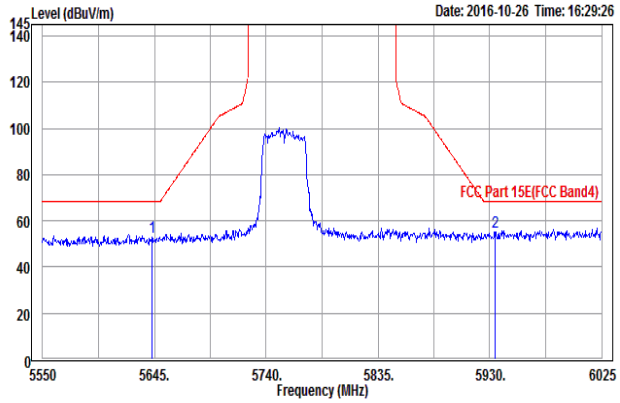
OOBE DATA

802.11n (40MHZ)

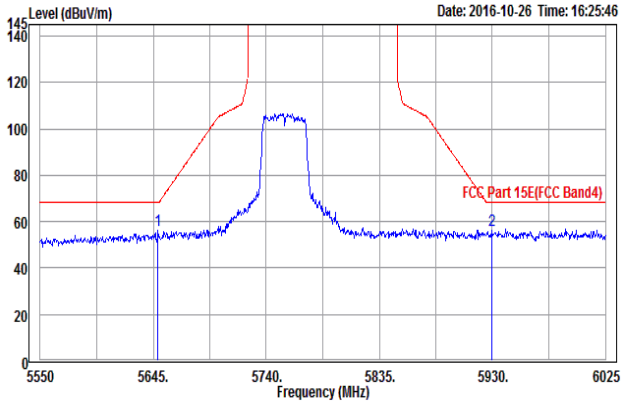
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5642.63	52.79	51.21	68.3	-15.51	35.07	15.64	49.13	160	15	Peak
5934.28	55.15	51.35	68.3	-13.15	35.42	17.54	49.16	160	15	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5648.8	55.99	54.36	68.3	-12.31	35.08	15.68	49.13	100	20	Peak
5929.53	56.01	52.24	68.3	-12.29	35.42	17.51	49.16	100	20	Peak

CH 151

Horiontal



Vertical



CHANNEL	TX Channel 159	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5795	90.82	88.09			35.25	16.63	49.15	158	7	Average
5795	100.35	97.62			35.25	16.63	49.15	158	7	Peak
11590	49.49	39.36	54.00	-4.51	39.17	19.13	48.17	100	12	Average
11590	61.98	51.85	74.00	-12.02	39.17	19.13	48.17	100	12	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5795	98.15	95.42			35.25	16.63	49.15	120	10	Average
5795	107.18	104.45			35.25	16.63	49.15	120	10	Peak
11590	49.15	39.02	54.00	-4.85	39.17	19.13	48.17	100	30	Average
11590	61.62	51.49	74.00	-12.38	39.17	19.13	48.17	100	30	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5795MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

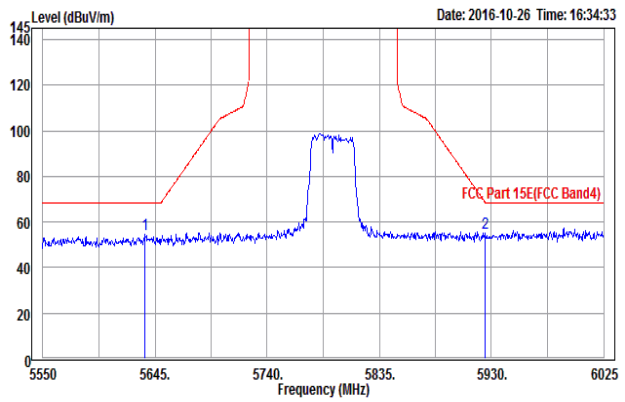
OOBE DATA

802.11n (40MHZ)

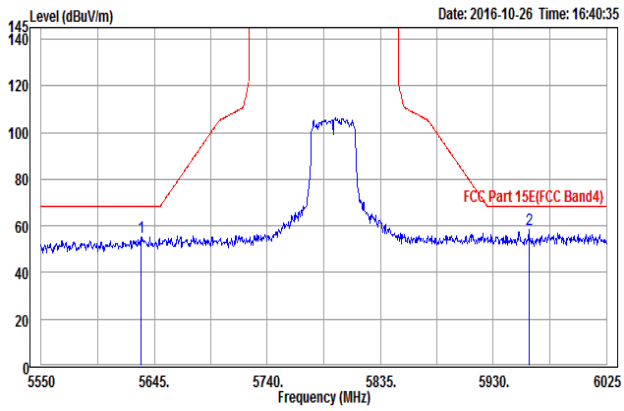
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5636.45	54.33	52.8	68.3	-13.97	35.06	15.6	49.13	160	15	Peak
5924.3	55.28	51.55	68.82	-13.54	35.41	17.48	49.16	160	15	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5634.08	55.28	53.77	68.3	-13.02	35.06	15.58	49.13	120	10	Peak
5959.93	58.27	54.28	68.3	-10.03	35.45	17.71	49.17	120	10	Peak

CH 159

Horiontal



Vertical



802.11ac (80MHz)

CHANNEL	TX Channel 155	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 40GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5775	90.34	87.76			35.23	16.50	49.15	160	20	Average
5775	96.91	94.33			35.23	16.50	49.15	160	20	Peak
11550	49.24	39.16	54.00	-4.76	39.14	19.11	48.17	100	45	Average
11550	61.29	51.21	74.00	-12.71	39.14	19.11	48.17	100	45	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	**EMISSION LEVEL (dBuV/m)**	**READ LEVEL (dBuV)**	**LIMIT (dBuV/m)**	**MARGIN (dB)**	**ANTENNA FACTOR (dB /m)**	**CABLE LOSS (dB)**	**PREAMP FACTOR (dB)**	**ANTENNA HEIGHT (cm)**	**TABLE ANGLE (Degree)**	**REMARK**
5775	97.95	95.37			35.23	16.50	49.15	120	15	Average
5775	104.68	102.10			35.23	16.50	49.15	120	15	Peak
11550	49.42	39.34	54.00	-4.58	39.14	19.11	48.17	100	36	Average
11550	62.01	51.93	74.00	-11.99	39.14	19.11	48.17	100	36	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 5775MHz: Fundamental frequency.
3. Other Emissions are too low to be detected.

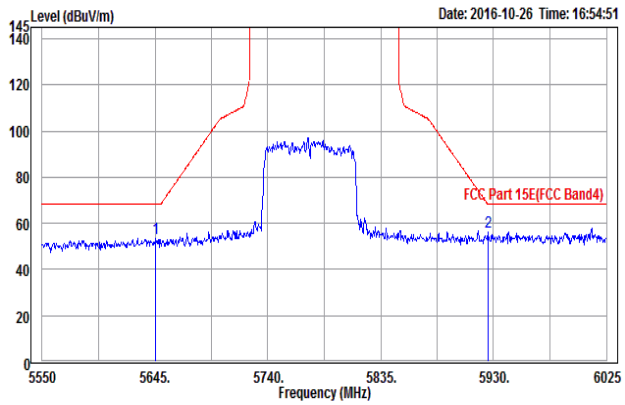
OOBE DATA

802.11ac (80MHZ)

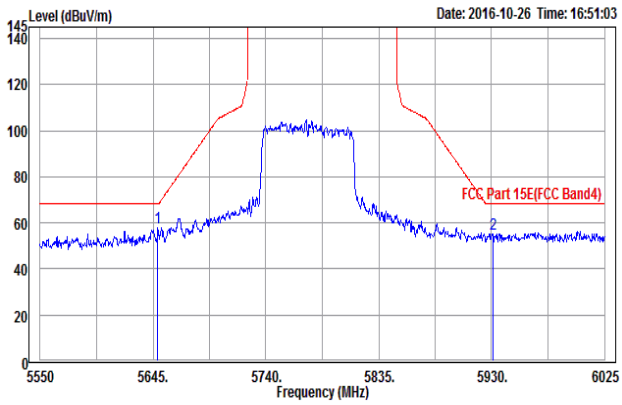
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5645.48	53.32	51.72	68.3	-14.98	35.07	15.66	49.13	160	18	Peak
5925.25	56.25	52.52	68.3	-12.05	35.41	17.48	49.16	160	18	Peak
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5648.8	57.99	56.36	68.3	-10.31	35.08	15.68	49.13	120	15	Peak
5930.95	55.11	51.33	68.3	-13.19	35.42	17.52	49.16	120	15	Peak

CH 155

Horiontal



Vertical



4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESCS30	100340	May 11,15	May 10,17
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 04,16	Mar. 03,17
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Apr. 05,16	Apr. 04,17
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Jan. 08,16	Jan. 07,17
Test software	ADT	ADT_Cond_V7.3.7	N/A	N/A	N/A

NOTE:

1. The test was performed in shielded room 553.
2. The calibration interval of the above test instruments is 12 months. And the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

4.2.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

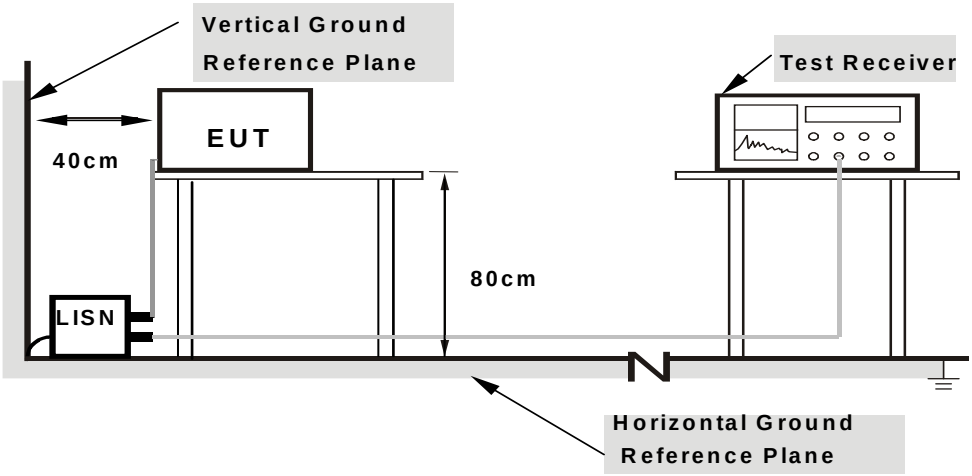
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

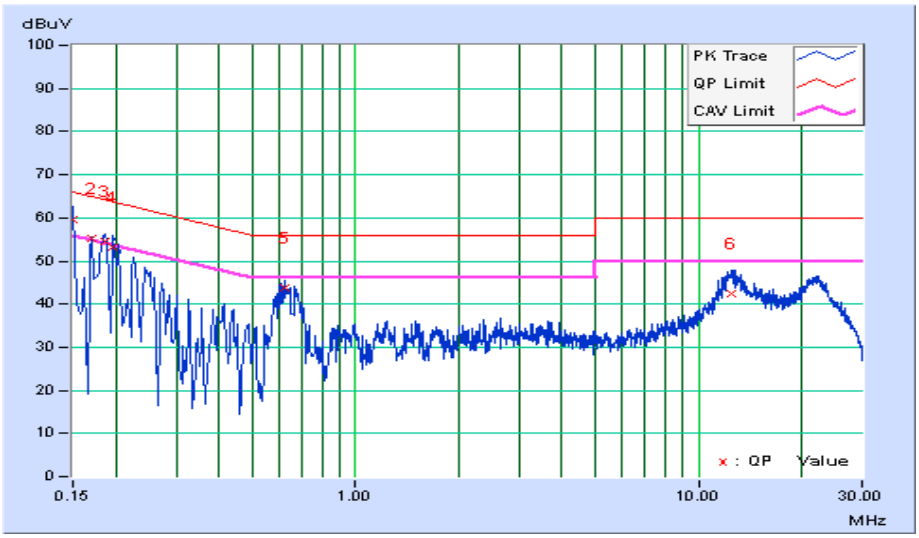
CONDUCTED WORST-CASE DATA：

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 65%RH
Tested by	Felix Chen	Test Date	2016/10/20
Test Mode	LTE Band 2 Idle+ WLAN(2.4G) Idle+ Adapter+ WLAN Link +LAN Link+ FXS Load		

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	**0.15000**	**10.01**	**49.49**	**29.06**	**59.50**	**39.07**	**66.00**	**56.00**	**-6.50**	**-16.93**
2	0.16967	10.02	45.27	24.31	55.29	34.33	64.98	54.98	-9.69	-20.65
3	0.18508	10.03	44.64	28.58	54.67	38.61	64.25	54.25	-9.58	-15.64
4	0.19692	10.03	43.15	24.62	53.18	34.65	63.74	53.74	-10.56	-19.09
5	0.61920	10.15	33.66	22.50	43.81	32.65	56.00	46.00	-12.19	-13.35
6	12.52515	10.87	31.61	23.70	42.48	34.57	60.00	50.00	-17.52	-15.43

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value.

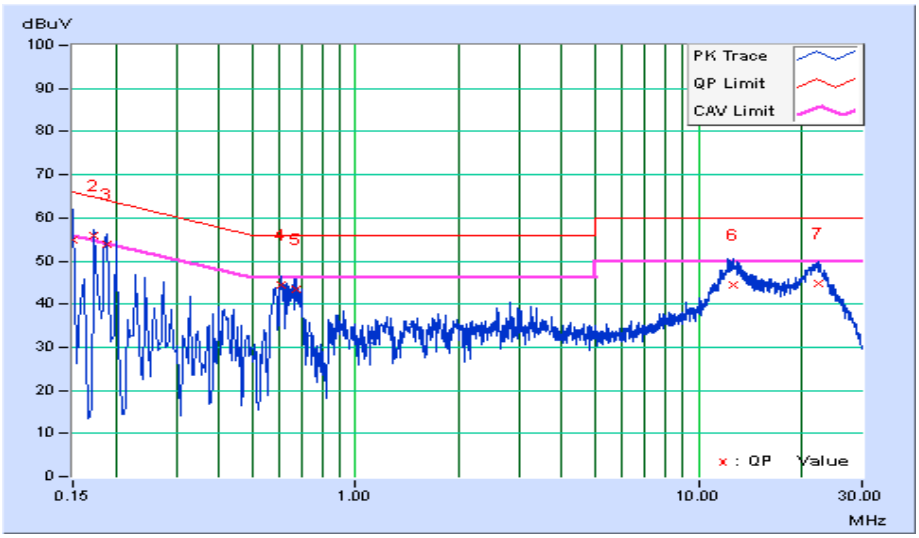


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	23℃, 65%RH
Tested by	Felix Chen	Test Date	2016/10/20
Test Mode	LTE Band 2 Idle+ WLAN(2.4G) Idle+ Adapter+ WLAN Link +LAN Link+ FXS Load		

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.03	44.75	22.99	54.78	33.02	66.00	56.00	-11.22	-22.98
2	0.17346	10.03	45.91	28.01	55.94	38.04	64.79	54.79	-8.85	-16.75
3	0.18903	10.04	43.87	28.20	53.91	38.24	64.08	54.08	-10.17	-15.84
4	0.60747	10.16	34.34	22.48	44.50	32.64	56.00	46.00	-11.50	-13.36
5	0.66781	10.17	33.43	22.63	43.60	32.80	56.00	46.00	-12.40	-13.20
6	12.59162	10.96	33.51	25.49	44.47	36.45	60.00	50.00	-15.53	-13.55
7	22.30797	11.64	32.98	27.02	44.62	38.66	60.00	50.00	-15.38	-11.34

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



4.3 MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

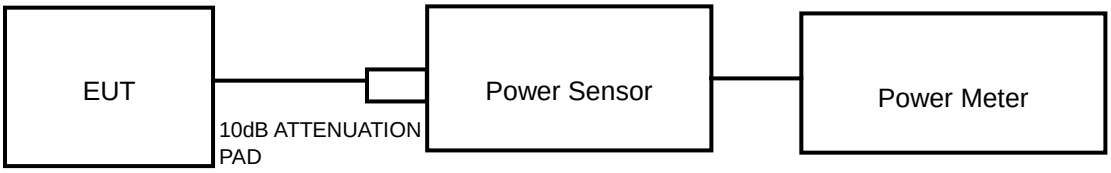
4.3.1 LIMITS OF MAXIMUM CONDUCTED OUTPUT POWER MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
		Fixed point-to-point Access Point	1 Watt (30 dBm)
		Indoor Access Point	1 Watt (30 dBm)
	√	Client devices	250mW (24 dBm)
U-NII-2A	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	√		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-3	√		1 Watt (30 dBm)

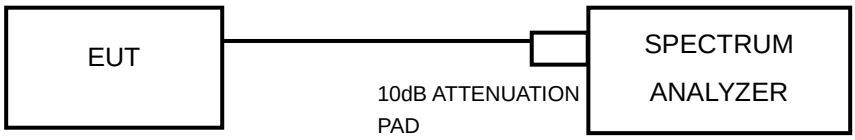
NOTE: Where B is the 26dB emission bandwidth in MHz.

4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT



FOR 26dB BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 99 PERCENT OCCUPIED BANDWIDTH

The following procedure shall be used for measuring (99 %) power bandwidth:

1. Set center frequency to the nominal EUT channel center frequency.
2. Set span = 1.5 times to 5.0 times the OBW.
3. Set RBW = 1 % to 5 % of the OBW
4. Set VBW ≥ 3 · RBW
5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used.
6. Use the 99 % power bandwidth function of the instrument (if available).
7. If the instrument does not have a 99 % power bandwidth function, the trace data points are recovered and directly summed in power units. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency. The 99% occupied bandwidth is the difference between these two frequencies.

FOR 26dB BANDWIDTH

1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) 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%.

FOR 6dB BANDWIDTH

1. Set RBW = 100 kHz.
2. Set the video bandwidth (VBW) ≥ 3 RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. 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.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.3.7 TEST RESULTS

OUTPUT POWER:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	13.836	11.41	24	PASS
40	5200	13.062	11.16	24	PASS
48	5240	15.959	12.03	24	PASS
149	5745	14.289	11.55	30	PASS
157	5785	13.583	11.33	30	PASS
165	5825	12.078	10.82	30	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
		CHAIN0	CHAIN1				
36	5180	12.445	11.695	24.140	13.83	24	PASS
44	5220	12.218	12.359	24.577	13.91	24	PASS
48	5240	13.964	13.868	27.832	14.45	24	PASS
149	5745	13.397	13.677	27.074	14.33	30	PASS
157	5785	12.134	12.274	24.408	13.88	30	PASS
165	5825	11.066	11.912	22.978	13.61	30	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
		CHAIN0	CHAIN1				
38	5190	8.630	8.730	17.360	12.40	24	PASS
46	5230	12.023	12.503	24.526	13.90	24	PASS
151	5755	13.002	14.191	27.193	14.34	30	PASS
159	5795	11.324	12.445	23.769	13.76	30	PASS

802.11ac (80MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
		CHAIN0	CHAIN1				
42	5210	8.453	7.031	15.484	11.90	24	PASS
155	5775	13.552	14.723	28.275	14.51	30	PASS

99% OCCUPIED BANDWIDTH & 26dB BANDWIDTH/6dB BANDWIDTH:

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
36	5180	18.84	21.45	PASS
40	5200	16.80	20.20	PASS
48	5240	16.74	20.12	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
149	5745	16.62	16.52	PASS
157	5785	16.62	16.49	PASS
165	5825	16.74	16.50	PASS

802.11n (20MHz)

CHAIN 0

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
36	5180	17.64	20.37	PASS
40	5200	17.70	20.44	PASS
48	5240	17.76	20.34	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
149	5745	17.64	17.62	PASS
157	5785	17.70	17.62	PASS
165	5825	17.64	17.62	PASS

CHAIN 1

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
36	5180	17.64	20.04	PASS
40	5200	17.64	20.09	PASS
48	5240	17.64	20.02	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
149	5745	17.64	17.61	PASS
157	5785	17.64	17.61	PASS
165	5825	17.64	17.61	PASS

802.11n (40MHz)

CHAIN 0

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
38	5190	36.24	41.80	PASS
46	5230	36.18	41.54	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
151	5755	36.12	36.36	PASS
159	5795	36.12	36.36	PASS

CHAIN 1

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
38	5190	36.18	41.23	PASS
46	5230	36.18	41.46	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
151	5755	36.18	35.91	PASS
159	5795	36.18	35.74	PASS

802.11ac (80MHz)

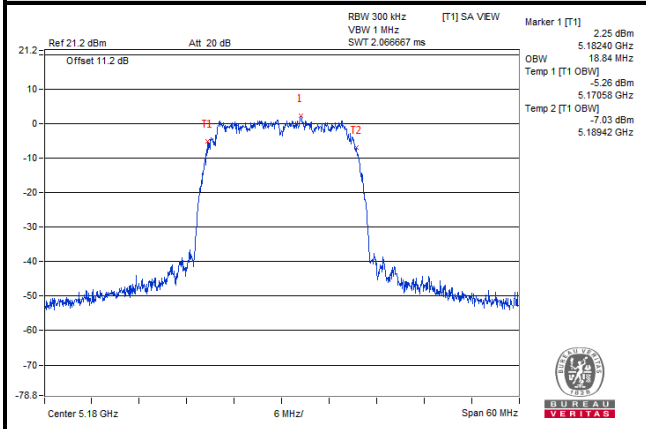
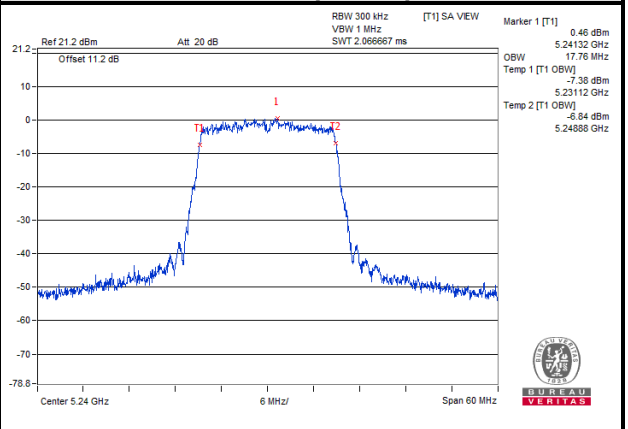
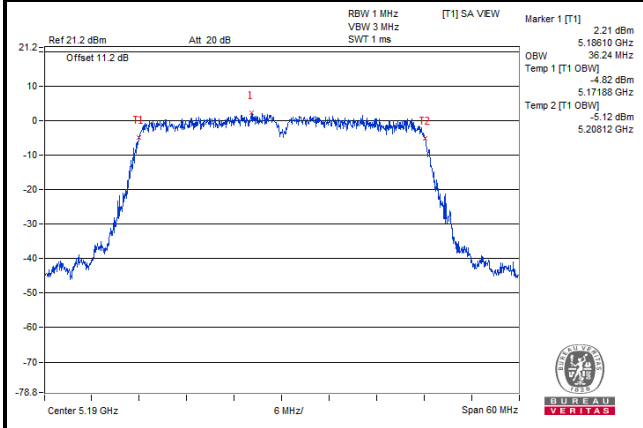
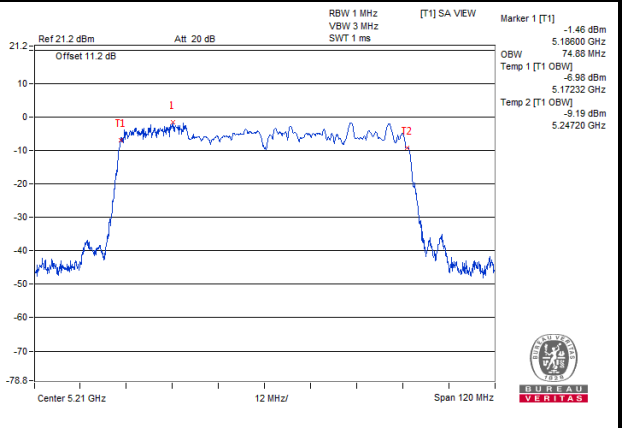
CHAIN 0

CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
42	5210	74.76	80.87	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
155	5775	74.64	75.76	PASS

CHAIN 1

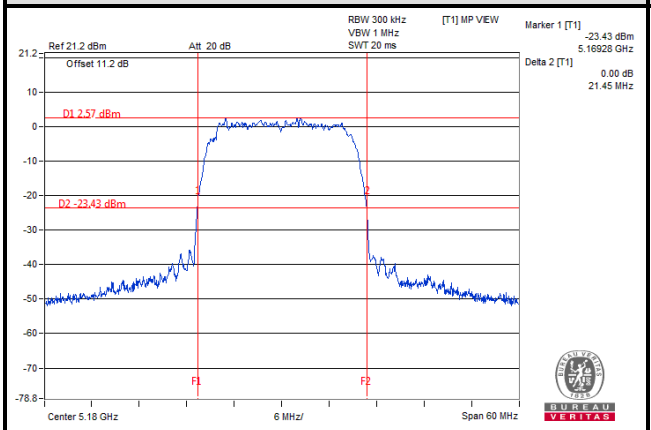
CHANNEL	CHANNEL FREQUENCY (MHz)	99% OCCUPIED BANDWIDTH	26dB BANDWIDTH (MHz)	PASS/FAIL
42	5210	74.88	80.69	PASS
CHANNEL	**CHANNEL FREQUENCY (MHz)**	**99% OCCUPIED BANDWIDTH**	**6dB BANDWIDTH (MHz)**	**PASS/FAIL**
155	5775	74.88	73.39	PASS

For U-NII-1:

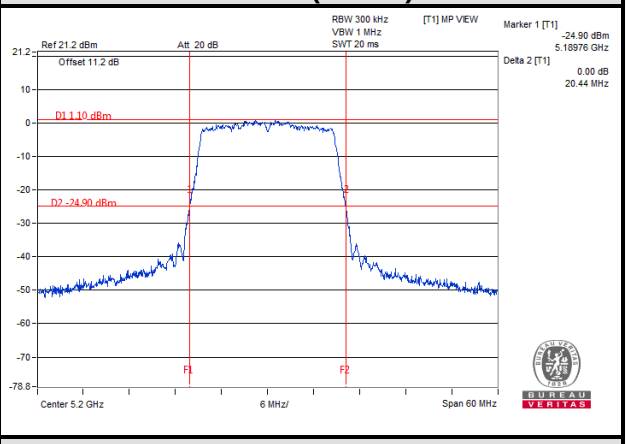
SPECTRUM PLOT OF WORST VALUE of 99% OCCUPIED BANDWIDTH	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

SPECTRUM PLOT OF WORST VALUE of 26dB Bandwidth

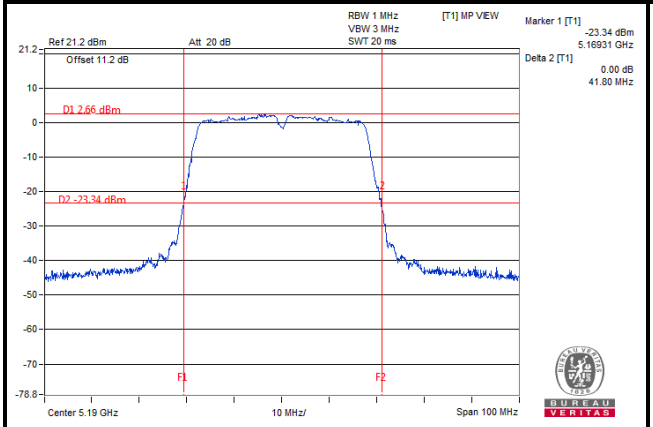
802.11a



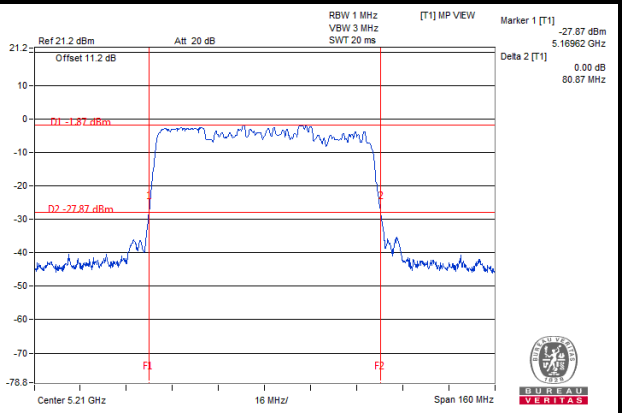
802.11n (20MHz)



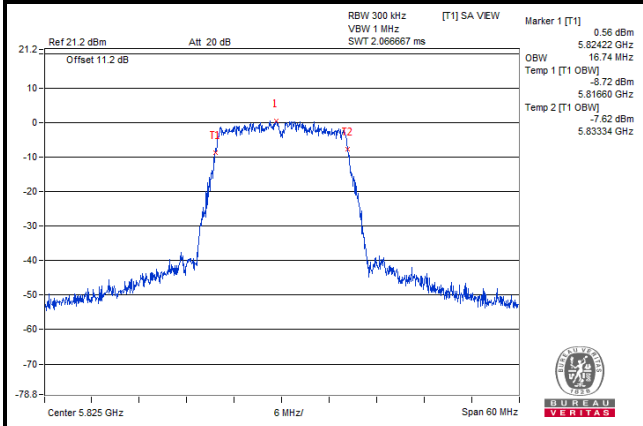
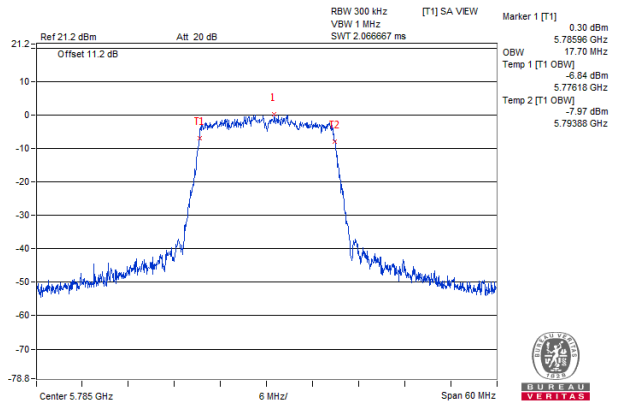
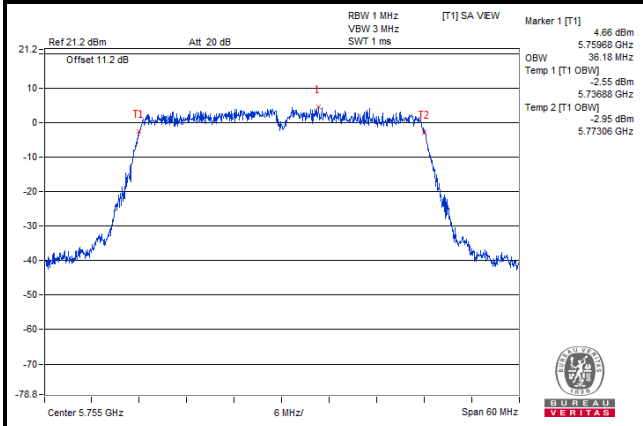
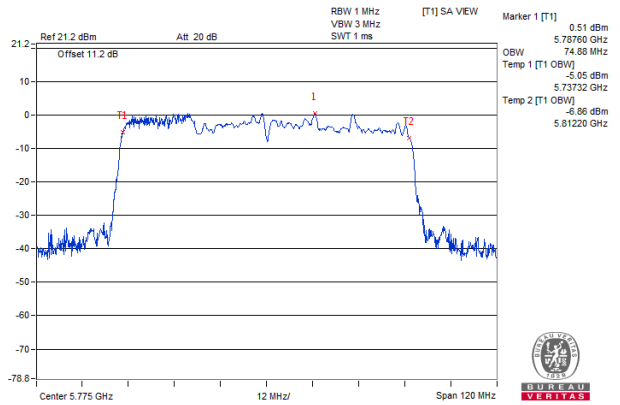
802.11n (40MHz)



802.11ac (80MHz)

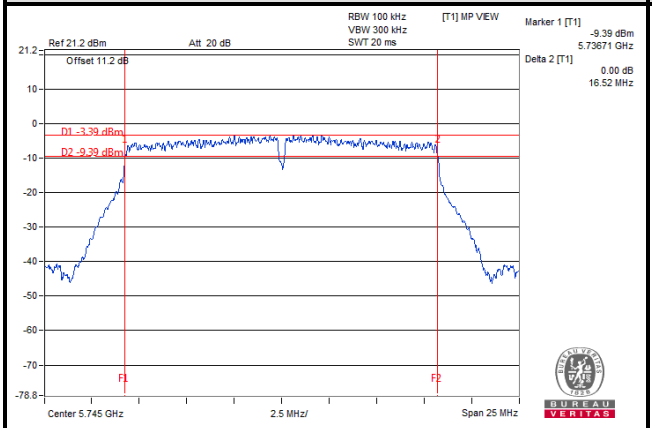


For U-NII-3:

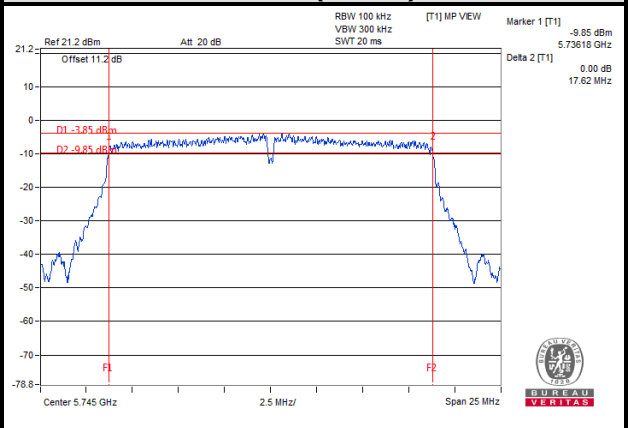
SPECTRUM PLOT OF WORST VALUE of 99% OCCUPIED BANDWIDTH	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

SPECTRUM PLOT OF WORST VALUE of 6dB Bandwidth

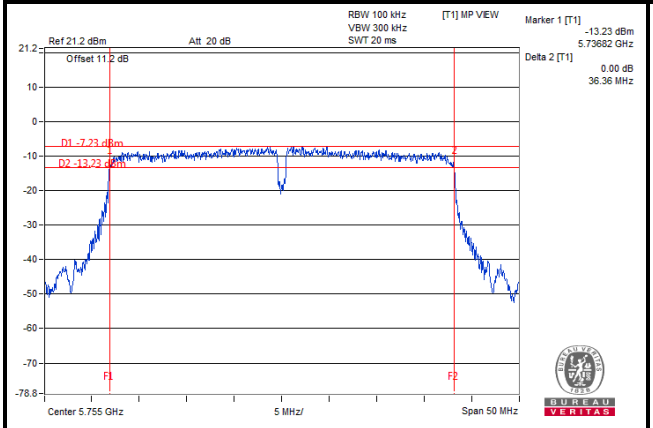
802.11a



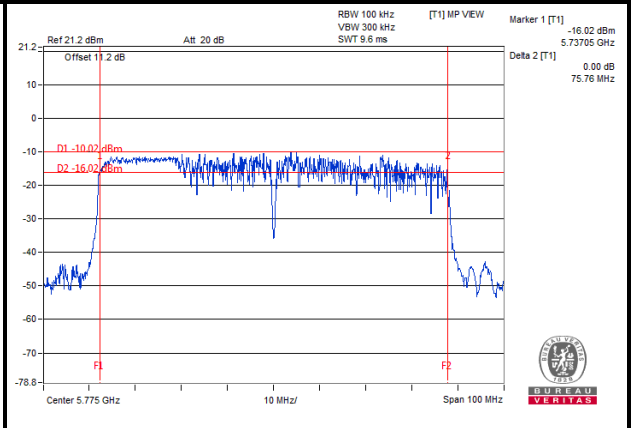
802.11n (20MHz)



802.11n (40MHz)



802.11ac (80MHz)

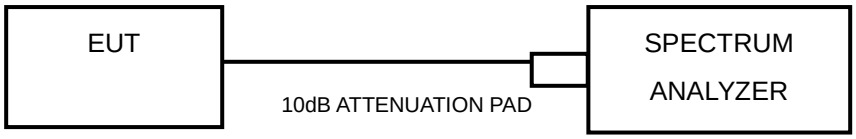


4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1		Outdoor Access Point	17dBm/ MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
	√	Client devices	11dBm/ MHz
U-NII-2A	√		11dBm/ MHz
U-NII-2C	√		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

4.4.2 TEST SETUP



4.4.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.4.4 TEST PROCEDURES

Using method SA-1

1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 30 KHz, Set VBW ≥ 1 MHz, Detector = RMS
3) Set Channel power measure = 1MHz
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.4.7 TEST RESULTS

For U-NII-1:

802.11a

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
36	5180	4.66	0.54	5.20	11	PASS
40	5200	3.77	0.54	4.31	11	PASS
48	5240	4.83	0.54	5.37	11	PASS

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
		CHAIN 0	CHAIN 1				
36	5180	3.07	5.17	1.13	8.26	9.81	PASS
44	5220	2.93	5.30	1.13	8.25	9.81	PASS
48	5240	2.92	4.74	1.13	7.97	9.81	PASS

Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.19dBi>6dBi, so the power density limit shall be reduced to 11-(7.19-6) = 9.81dBm

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
		CHAIN 0	CHAIN 1				
38	5190	-1.26	0.92	1.87	4.71	9.81	PASS
46	5230	0.61	2.45	1.87	6.41	9.81	PASS

Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.19dBi>6dBi, so the power density limit shall be reduced to 11-(7.19-6) = 9.81dBm

802.11ac (80MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/MHz)		Duty Factor	PSD with Duty Factor (dBm/MHz)	MAXIMUM LIMIT (dBm/MHz)	PASS/FAIL
		CHAIN 0	CHAIN 1				
42	5210	-4.46	-3.08	1.06	0.30	9.81	PASS

Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.19dBi>6dBi, so the power density limit shall be reduced to 11-(7.19-6) = 9.81dBm

For U-NII-3:

802.11a

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/500kHz)	Duty Factor	PSD with Duty Factor (dBm/500kHz)	LIMIT (dBm/500kHz)	PASS /FAIL
149	5745	4.51	0.54	5.05	28.71	PASS
157	5785	4.28	0.54	4.82	28.71	PASS
165	5825	3.84	0.54	4.38	28.71	PASS

Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.29dBi>6dBi, so the power density limit shall be reduced to 11-(7.29-6) = 28.71dBm

802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/500kHz)		Duty Factor	PSD with Duty Factor (dBm/500kHz)	MAXIMUM LIMIT (dBm/500kHz)	PASS/FAIL
		CHAIN 0	CHAIN 1				
149	5745	3.59	3.22	1.13	7.55	28.71	PASS
157	5785	3.30	4.29	1.13	7.94	28.71	PASS
165	5825	2.98	3.95	1.13	7.61	28.71	PASS

Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.29dBi>6dBi, so the power density limit shall be reduced to 11-(7.29-6) = 28.71dBm

802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/500kHz)		Duty Factor	PSD with Duty Factor (dBm/500kHz)	MAXIMUM LIMIT (dBm/500kHz)	PASS/FAIL
		CHAIN 0	CHAIN 1				
151	5755	1.09	2.12	1.87	6.49	28.71	PASS
159	5795	0.96	1.72	1.87	6.22	28.71	PASS

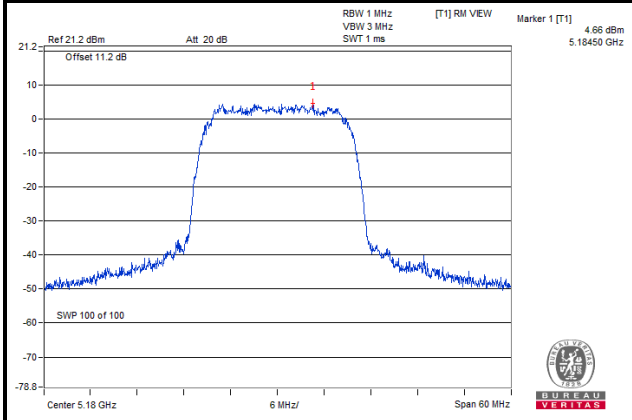
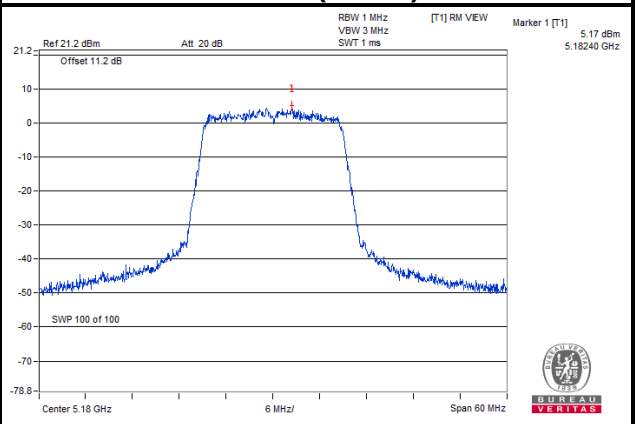
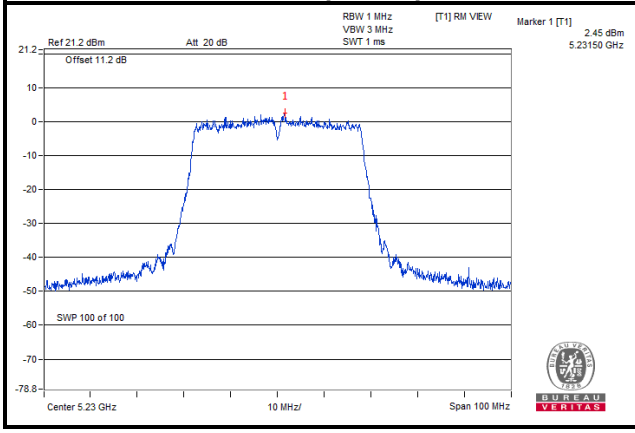
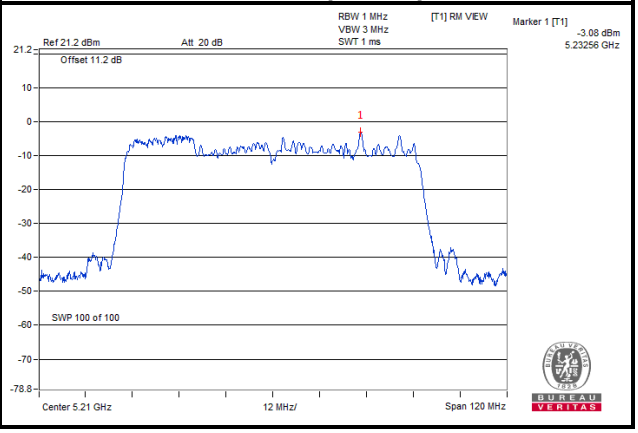
Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.29dBi>6dBi, so the power density limit shall be reduced to 11-(7.29-6) = 28.71dBm

802.11ac (80MHz)

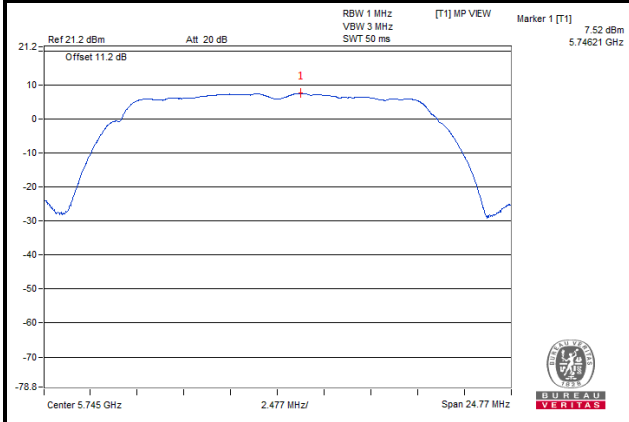
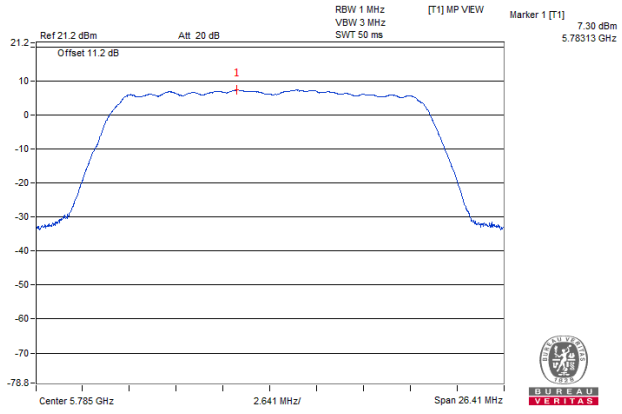
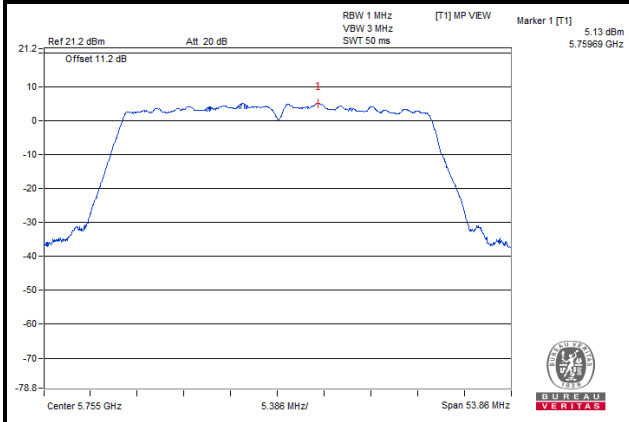
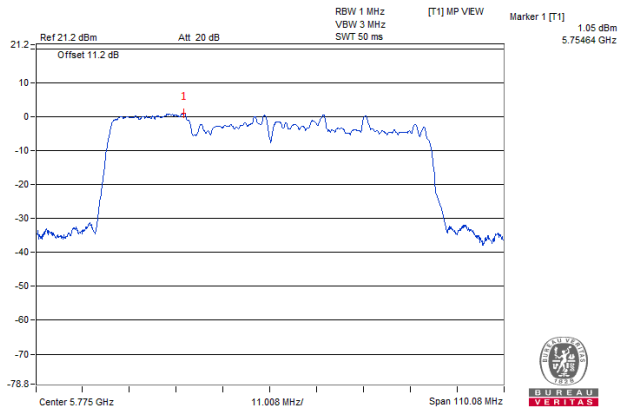
CHANNEL	FREQUENCY (MHz)	PSD w/o Duty Factor (dBm/500kHz)		Duty Factor	PSD with Duty Factor (dBm/500kHz)	MAXIMUM LIMIT (dBm/500kHz)	PASS/FAIL
		CHAIN 0	CHAIN 1				
155	5775	-2.64	0.21	1.06	2.86	28.71	PASS

Note: N_{ANT} = 2, Directional gain = G_{ANT} + 10 log(N_{ANT}) dBi=7.29dBi>6dBi, so the power density limit shall be reduced to 11-(7.29-6) = 28.71dBm

For 5180~5240MHz

PSD w/o Duty Factor	
802.11a	**802.11n (20MHz)**
	
802.11n (40MHz)	**802.11ac (80MHz)**
	

For 5745~5825MHz

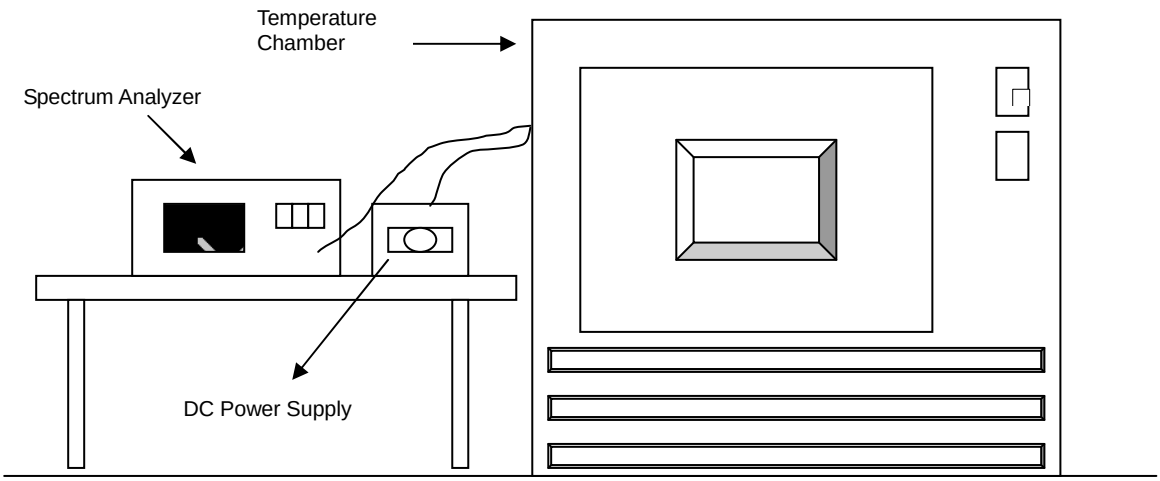
PSD w/o Duty Factor	
802.11a	**802.11n (20MHz)**
	
Note: The peak power spectral density is a "calculated" value derived from the conducted value: 7.52dBm/MHz=4.51dBm/500kHz	**Note: The peak power spectral density is a "calculated" value derived from the conducted value: 7.30dBm/MHz=4.29dBm/500kHz**
802.11n (40MHz)	**802.11ac (80MHz)**
	
Note: The peak power spectral density is a "calculated" value derived from the conducted value: 5.13dBm/MHz=2.12dBm/500kHz	**Note: The peak power spectral density is a "calculated" value derived from the conducted value: 1.05dBm/MHz=0.21dBm/500kHz**

4.5 FREQUENCY STABILITY

4.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation

4.5.2 TEST SETUP



4.5.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.5.4 TEST PROCEDURE

a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

4.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

4.5.7 TEST RESULTS

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTES		5 MINUTES		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	12	5179.9896	-2.008	5179.9848	-2.934	5179.9827	-3.340	5179.9868	-2.548
40	12	5179.9769	-4.459	5179.9726	-5.290	5179.9729	-5.232	5179.9782	-4.208
30	12	5179.9981	-0.367	5180.0017	0.328	5179.9992	-0.154	5179.995	-0.965
20	12	5179.9749	-4.846	5179.9819	-3.494	5179.9764	-4.556	5179.9749	-4.846
10	12	5179.9828	-3.320	5179.9862	-2.664	5179.9784	-4.170	5179.9786	-4.131
0	12	5179.9973	-0.521	5179.9991	-0.174	5180.0004	0.077	5180.0056	1.081
-10	12	5180.0095	1.834	5180.0042	0.811	5180.0106	2.046	5180.0132	2.548
-20	12	5180.0186	3.591	5180.0244	4.710	5180.0185	3.571	5180.0225	4.344
-30	12	5179.9868	-2.548	5179.9924	-1.467	5179.9942	-1.120	5179.9855	-2.799

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5180MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	30	5179.9744	-4.942	5179.9808	-3.707	5179.9769	-4.459	5179.9741	-5.000
	12	5179.9749	-4.846	5179.9819	-3.494	5179.9764	-4.556	5179.9749	-4.846
	7	5179.973	-5.212	5179.9824	-3.398	5179.9757	-4.691	5179.974	-5.019

FREQUEMCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5825MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTES		5 MINUTES		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	12	5824.9716	-4.876	5824.9753	-4.240	5824.9704	-5.082	5824.9755	-4.206
40	12	5825.0175	3.004	5825.0155	2.661	5825.0188	3.227	5825.0171	2.936
30	12	5824.9751	-4.275	5824.973	-4.635	5824.9744	-4.395	5824.9806	-3.330
20	12	5825.0031	0.532	5825.0077	1.322	5825.0062	1.064	5825.0011	0.189
10	12	5824.9889	-1.906	5824.9838	-2.781	5824.9923	-1.322	5824.9944	-0.961
0	12	5825.0036	0.618	5824.9953	-0.807	5824.9991	-0.155	5825.0039	0.670
-10	12	5824.9974	-0.446	5825.0011	0.189	5825.0013	0.223	5825.0065	1.116
-20	12	5825.0062	1.064	5825.004	0.687	5825.0038	0.652	5825.0071	1.219
-30	12	5825.0007	0.120	5824.9921	-1.356	5824.999	-0.172	5824.9956	-0.755

FREQUEMCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5825MHz									
TEMP. (℃)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	30	5825.0032	0.549	5825.0073	1.253	5825.0063	1.082	5825.0001	0.017
	12	5825.0031	0.532	5825.0077	1.322	5825.0062	1.064	5825.0011	0.189
	7	5825.0047	0.807	5825.0077	1.322	5825.0075	1.288	5825.0012	0.206

5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).

6 APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---