

FCC RF Test Report

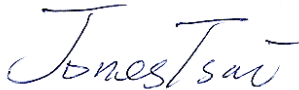
APPLICANT : SGP Technologies S.A.
EQUIPMENT : Mobile Phone
BRAND NAME : Silent Circle
MODEL NAME : BP2H001AM1
FCC ID : 2ACDKBP2B001AM1
STANDARD : FCC Part 15 Subpart E §15.407
CLASSIFICATION : (NII) Unlicensed National Information Infrastructure

The product was received on Jun. 11, 2015 and testing was completed on Aug. 11, 2015. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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



Reviewed by: Joseph Lin / Supervisor



Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR561105E	Rev. 01	Initial issue of report	Aug. 24, 2015

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.403(i)	RSS-247 Section 6	6dB Bandwidth	> 500kHz	Pass	-
3.2	15.407(a)	RSS-247 Section 6	Maximum Conducted Output Power	≤ 30 dBm	Pass	-
3.3	15.407(a)	RSS-247 Section 6	Power Spectral Density	≤ 30 dBm/500kHz	Pass	-
3.4	15.407(b)	RSS-247 Section 6	Unwanted Emissions	$\leq -17, -27$ dBm/MHz &15.209(a)	Pass	Under limit 2.25 dB at 5712.680 MHz
3.5	15.207	RSS-Gen 8.8	AC Conducted Emission	15.207(a)	Pass	Under limit 7.97 dB at 0.570 MHz
3.6	15.407(g)	-	Frequency Stability	Within Operation Band	Pass	-
3.7	15.407(c)	RSS-247 6.4(2)	Automatically Discontinue Transmission	Discontinue Transmission	Pass	-
3.8	15.203 & 15.407(a)	N/A	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

SGP Technologies S.A.

Rue François Peyrot 12, 1218 Le Grand Saconnex, (Le Lumion bldg) 3rd Floor, Geneva, Switzerland

1.2 Manufacturer

SGP Technologies S.A.

Rue François Peyrot 12, 1218 Le Grand Saconnex, (Le Lumion bldg) 3rd Floor, Geneva, Switzerland

1.3 Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	Silent Circle
Model Name	BP2H001AM1
FCC ID	2ACDKBP2B001AM1
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(Downlink Only)/DC-HSDPA/LTE WLAN2.4GHz 802.11b/g/n HT20 WLAN5GHz 802.11a/n HT20/HT40 WLAN5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0+EDR/Bluetooth v4.0 LE
HW Version	LLDM811
SW Version	LLDAX01
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx/Rx Channel Frequency Range	5725 MHz ~ 5850 MHz
Maximum Output Power	802.11a : 15.96 dBm / 0.0394 W 802.11n HT20 : 12.25 dBm / 0.0168 W 802.11n HT40 : 11.44 dBm / 0.0139 W 802.11ac VHT20: 10.47 dBm / 0.0111 W 802.11ac VHT40: 10.03 dBm / 0.0101 W 802.11ac VHT80: 10.23 dBm / 0.0105 W
Type of Modulation	802.11a/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac : OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Antenna Type / Gain	LDS Antenna with gain -6.00 dBi



1.5 Modification of EUT

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

1.6 Testing Location

Test Site	SPORTON INTERNATIONAL (KUNSHAN) INC.			
Test Site Location	No. 3-2, PingXiang Road, Kunshan, Jiangsu Province, P. R. China TEL: +86-0512-5790-0158 FAX: +86-0512-5790-0958			
Test Site No.	Sporton Site No.			FCC/IC Registration No.
	TH01-KS	03CH02-KS	CO01-KS	418269/4086E

Note: The test site complies with ANSI C63.4 2009 requirement.

1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart E
- ♦ FCC KDB 789033 D02 General UNII Test Procedures New Rules v01
- ♦ ANSI C63.10-2013
- ♦ IC RSS-247 Issue 1
- ♦ IC RSS-Gen Issue 4

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. FCC permits the use of the 1.5 meter table as an alternative in C63.10-2013 through inquiry tracking number 961829.
3. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.



2 Test Configuration of Equipment Under Test

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

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
5725-5850 MHz Band 4 (U-NII-3)	149	5745	157	5785
	151	5755	159	5795
	153	5765	161	5805
	155	5775	165	5825

Note: The above Frequency and Channel in boldface were 802.11n HT40.

2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test in the following tables. Final Output Power equals to Measured Output Power adds the duty factor.

WLAN 5GHz 802.11a Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate 6Mbps	Channel	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
CH 149	5745	15.49	CH 157	15.94	15.91	15.84	15.83	15.73	15.71	15.66
CH 157	5785	15.96								
CH 165	5825	15.82								

WLAN 5GHz 802.11n-HT20 Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 149	5745	11.57	CH 157	12.19	12.14	11.97	11.94	11.98	11.93	12.00
CH 157	5785	12.25								
CH 165	5825	12.10								

WLAN 5GHz 802.11n-HT40 Output Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 151	5755	10.96	CH 159	11.43	11.27	11.24	11.17	11.21	11.28	11.31
CH 159	5795	11.44								

WLAN 5GHz 802.11ac VHT20 Average Power (dBm)											
Power vs. Channel			Power vs. Data Rate								
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8
CH 149	5745	9.76	CH 157	10.44	10.38	10.41	10.43	10.40	10.45	10.46	10.39
CH 157	5785	10.47									
CH 165	5825	10.21									

WLAN 5GHz 802.11ac VHT40 Average Power (dBm)												
Power vs. Channel			Power vs. Data Rate									
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
CH 151	5755	9.45	CH 159	9.88	9.97	9.71	9.69	9.89	10.02	9.99	9.68	9.73
CH 159	5795	10.03										



WLAN 5GHz 802.11n-HT80 Average Power (dBm)												
Power vs. Channel			Power vs. Data Rate									
Channel	Frequency (MHz)	MCS Index	Channel	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7	MCS8	MCS9
		MCS0										
CH 155	5775	10.23	CH 155	10.00	10.06	10.19	10.17	10.07	9.94	10.02	10.16	10.22

2.3 Test Mode

Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates from the power table described in section 2.2.

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

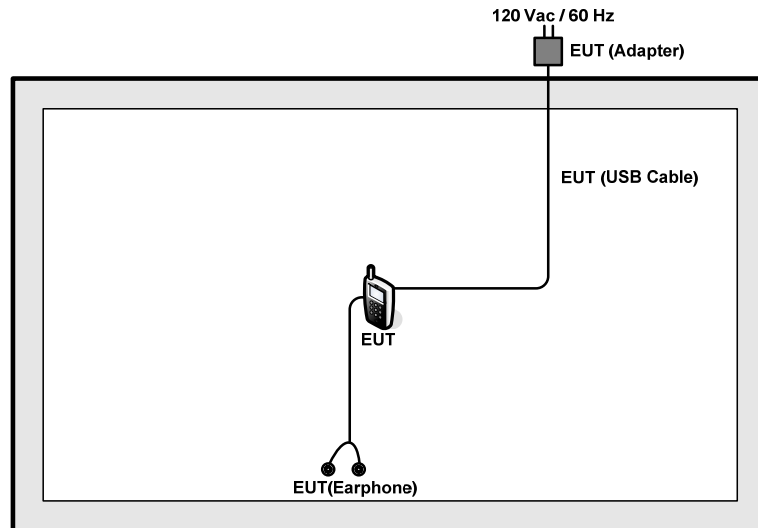
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter)
Remark: For Radiated TCs, the tests were performed with adapter, earphone and USB cable.	

Ch. #		Band IV : 5725-5850 MHz		
		802.11a	802.11n HT20	802.11n HT40
L	Low	149	149	151
M	Middle	157	157	-
H	High	165	165	159

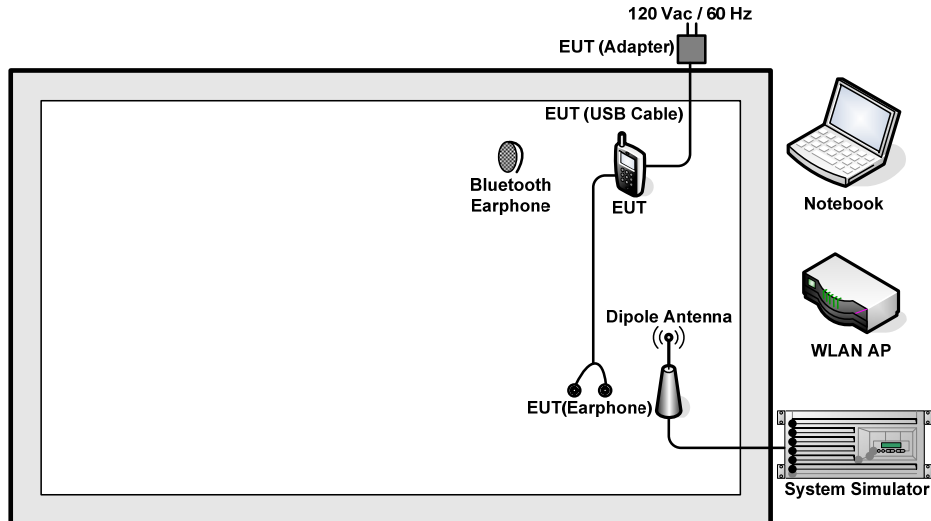
Ch. #		Band IV : 5725-5850 MHz		
		802.11ac VHT20	802.11ac VHT40	802.11ac VHT80
L	Low	149	151	-
M	Middle	157	-	155
H	High	165	159	-

2.4 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.5 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	PRC4	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	N/A

2.6 EUT Operation Test Setup

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

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

2.7 Measurement Results Explanation Example

For all conducted test items:

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

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

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

$$\begin{aligned} \text{Offset (dB)} &= \text{RF cable loss(dB)}. \\ &= 7.0 \text{ (dB)} \end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Description of 6dB Bandwidth

The minimum 6 dB bandwidth shall be at least 500 kHz.

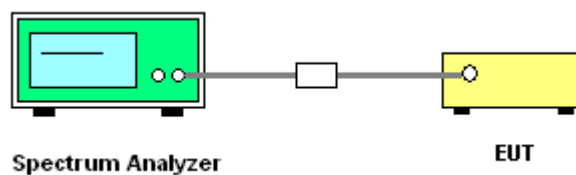
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
Section C) Emission bandwidth for the band 5.725-5.85GHz
2. Set RBW = 100kHz.
3. Set the VBW $\geq 3 \times$ RBW.
4. Detector = Peak.
5. Trace mode = max hold
6. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.
7. Measure and record the results in the test report.

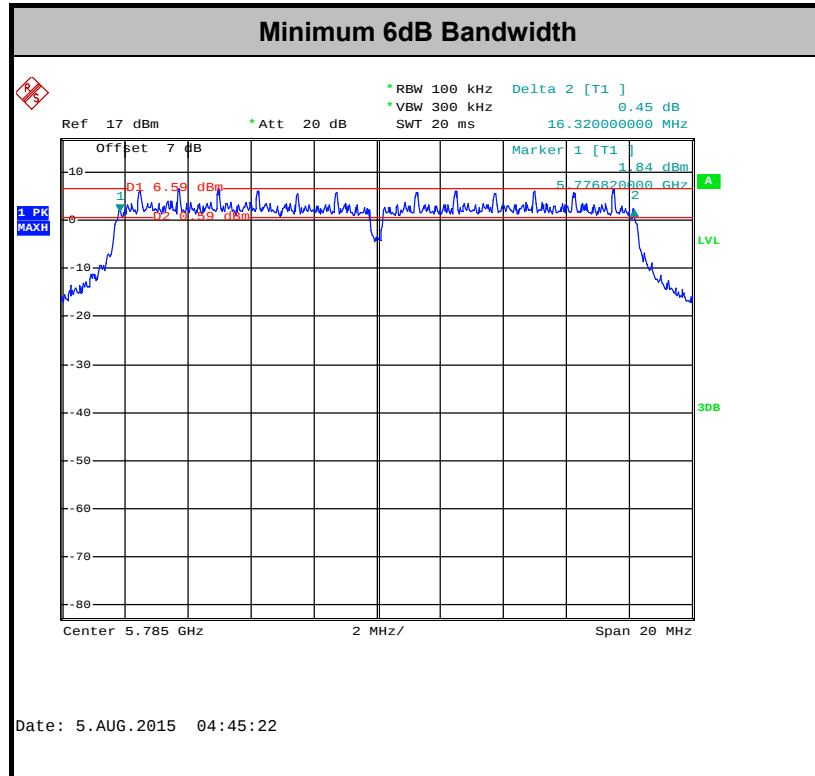
3.1.4 Test Setup





3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



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

3.2 Maximum Conducted Output Power Measurement

3.2.1 Limit of Maximum Conducted Output Power

<FCC 14-30 CFR 15.407>

For the band 5.725–5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

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

3.2.2 Measuring Instruments

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

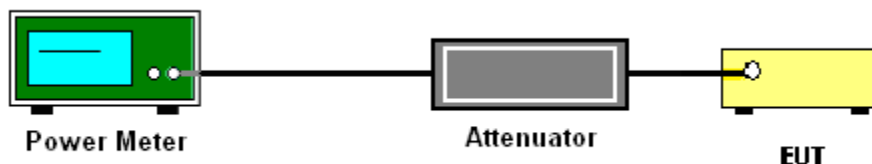
3.2.3 Test Procedures

The testing follows Method PM of FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

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

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

3.2.4 Test Setup



3.2.5 Test Result of Maximum Conducted Output Power

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

<FCC 14-30 CFR 15.407>

For the band 5.725–5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

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

3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.
Section F) Maximum power spectral density.

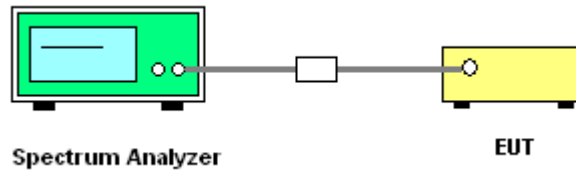
Method SA-2

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

1. The testing follows Method SA-2 of FCC KDB 789033 D01 General UNII Test Procedures v01r03.
 - Measure the duty cycle.
 - Set span to encompass the entire emission bandwidth (EBW) of the signal.
 - Set RBW = 300 kHz.
 - Set VBW $\geq$ 1 MHz.
 - Number of points in sweep $\geq$ 2 Span / RBW.
 - Sweep time = auto.
 - Detector = RMS
 - Trace average at least 100 traces in power averaging mode.
 - Add $10 \log(500\text{kHz}/\text{RBW})$ to the test result.
 - Add $10 \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times. For example, add $10 \log(1/0.25) = 6$ dB if the duty cycle is 25 percent.

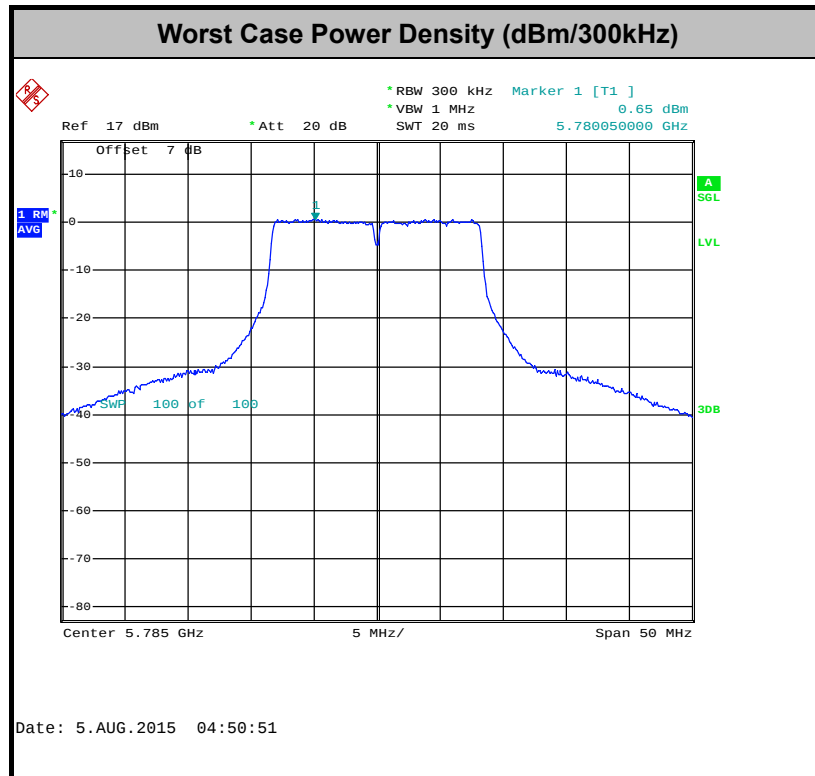
2. The RF output of EUT was connected to the spectrum analyzer by a low loss cable.
3. Each plot has already offset with cable loss, and attenuator loss. Measure the PPSD and record it.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Unwanted Emissions Measurement

This section as specified in FCC Part 15.407(b) is to measure unwanted emissions through radiated measurement for band edge spurious emissions and out of band emissions measurement. The unwanted emissions shall comply with 15.407(b)(1) to (6), and restricted bands per FCC Part 15.205.

3.4.1 Limit of Unwanted Emissions

- (1) For transmitters operating in the 5725-5850 MHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of -17 dBm/MHz (78.3dBμV/m); for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an EIRP of -27 dBm/MHz (68.3dBμV/m).
- (2) Unwanted spurious emissions fallen in restricted bands per FCC Part 15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,

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

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

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

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

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

3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows FCC KDB 789033 D02 General UNII Test Procedures New Rules v01.

Section G) Unwanted emissions measurement.

(1) Procedure for Unwanted Emissions Measurements Below 1000MHz

- RBW = 120 kHz
- VBW = 300 kHz
- Detector = Peak
- Trace mode = max hold

(2) Procedure for Peak Unwanted Emissions Measurements Above 1000 MHz

- RBW = 1 MHz
- VBW $\geq$ 3 MHz
- Detector = Peak
- Sweep time = auto
- Trace mode = max hold

(3) Procedures for Average Unwanted Emissions Measurements Above 1000MHz

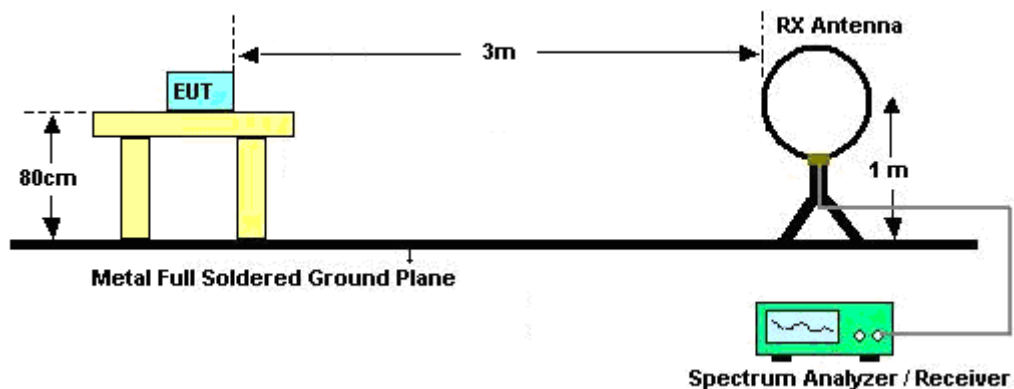
- RBW = 1 MHz
- VBW = 10 Hz, when duty cycle is no less than 98 percent.
- VBW $\geq$ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

Band	Duty Cycle (%)	T(ms)	1/T(kHz)	VBW Setting
802.11a	87.82	1.37	0.73	1kHz
802.11n HT20	86.41	1.27	0.79	1kHz
802.11n HT40	75.83	0.64	1.56	3kHz
802.11n VHT20	83.14	0.99	1.01	3kHz
802.11n VHT40	71.26	0.50	2.00	3kHz
802.11n VHT80	55.11	0.25	4.00	10kHz

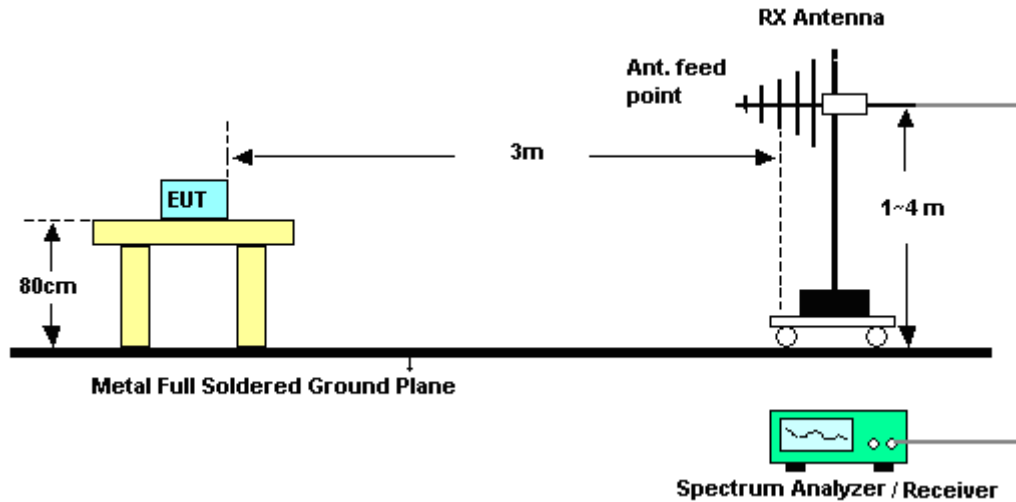
2. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
3. The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
4. The antenna is a broadband antenna and its height is adjusted between one meter and four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then adjust the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

3.4.4 Test Setup

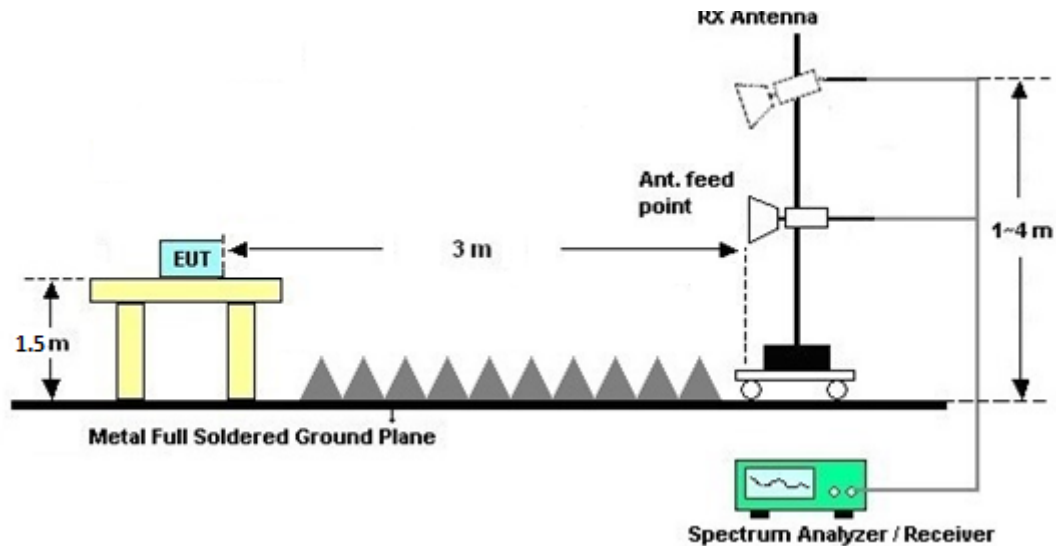
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

3.4.6 Test Result of Radiated Band Edges

Please refer to Appendix B.

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

Please refer to Appendix B.

3.5 AC Conducted Emission Measurement

3.5.1 Limit of AC Conducted Emission

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

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

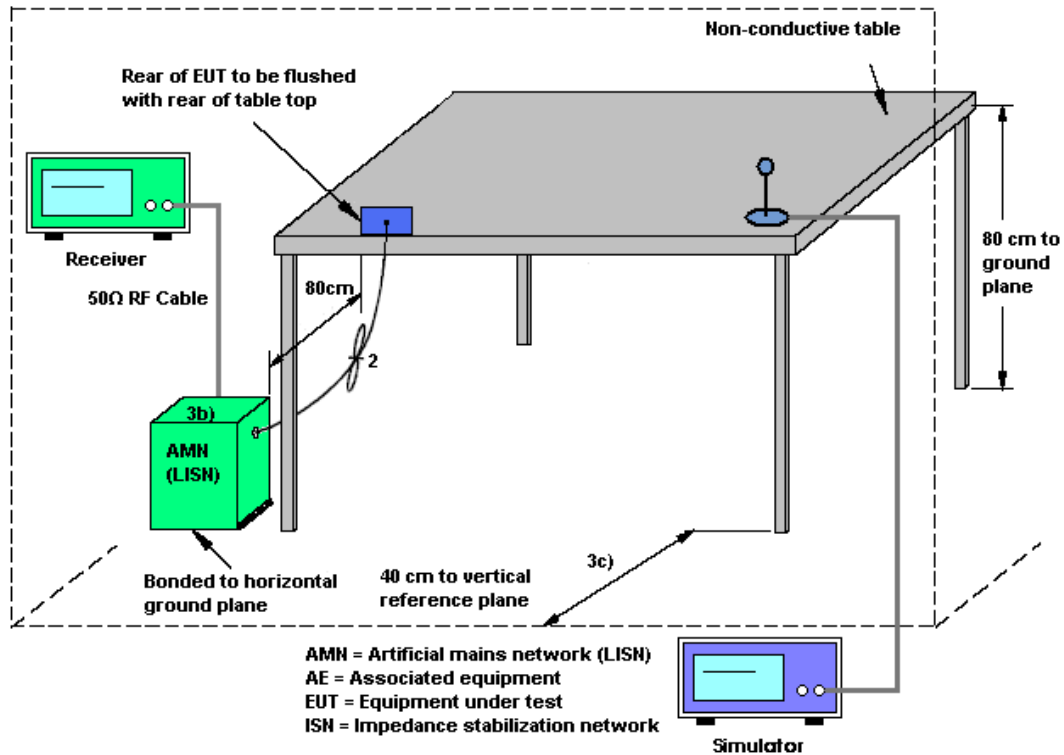
3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

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

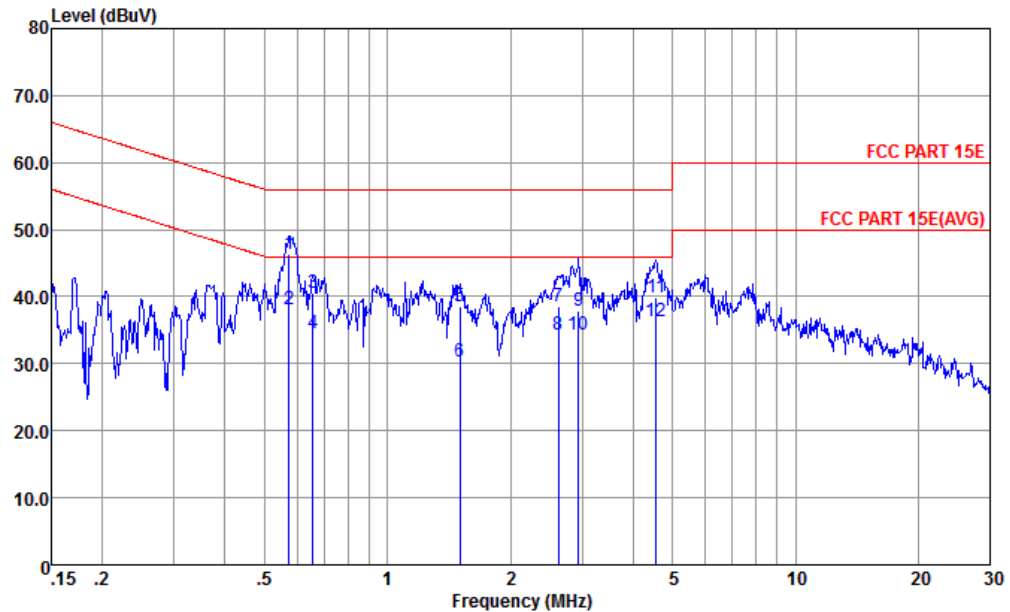
3.5.4 Test Setup





3.5.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eko Guan	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter)		

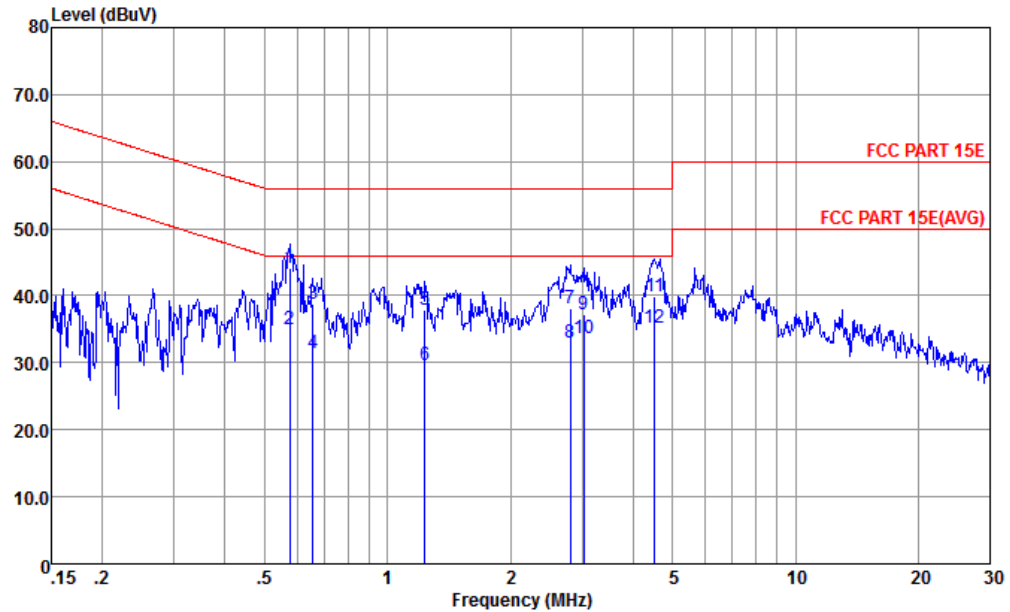


Site : CO01-KS
Condition : FCC PART 15E LISN-L20140306 LINE

mode		: Mode 1						
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.57	46.33	-9.67	56.00	35.50	0.20	10.63	QP
2 *	0.57	38.03	-7.97	46.00	27.20	0.20	10.63	Average
3	0.66	40.64	-15.36	56.00	29.80	0.20	10.64	QP
4	0.66	34.54	-11.46	46.00	23.70	0.20	10.64	Average
5	1.50	38.58	-17.42	56.00	27.80	0.10	10.68	QP
6	1.50	30.38	-15.62	46.00	19.60	0.10	10.68	Average
7	2.62	38.66	-17.34	56.00	27.80	0.12	10.74	QP
8	2.62	34.36	-11.64	46.00	23.50	0.12	10.74	Average
9	2.95	37.81	-18.19	56.00	26.90	0.13	10.78	QP
10	2.95	34.21	-11.79	46.00	23.30	0.13	10.78	Average
11	4.55	39.93	-16.07	56.00	28.90	0.19	10.84	QP
12	4.55	36.33	-9.67	46.00	25.30	0.19	10.84	Average



Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Eko Guan	Relative Humidity :	44~46%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN (5GHz) Link + Earphone + USB Cable (Charging from Adapter)		



Site : CO01-KS
Condition : FCC PART 15E LISN-N20140306 NEUTRAL

mode		: Mode 1						
	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.58	44.09	-11.91	56.00	33.20	0.26	10.63	QP
2	0.58	34.99	-11.01	46.00	24.10	0.26	10.63	Average
3	0.66	38.75	-17.25	56.00	27.90	0.21	10.64	QP
4	0.66	31.45	-14.55	46.00	20.60	0.21	10.64	Average
5	1.24	37.96	-18.04	56.00	27.20	0.10	10.66	QP
6	1.24	29.56	-16.44	46.00	18.80	0.10	10.66	Average
7	2.81	38.09	-17.91	56.00	27.20	0.13	10.76	QP
8	2.81	33.09	-12.91	46.00	22.20	0.13	10.76	Average
9	3.03	37.13	-18.87	56.00	26.20	0.14	10.79	QP
10	3.03	33.73	-12.27	46.00	22.80	0.14	10.79	Average
11	4.53	39.83	-16.17	56.00	28.80	0.19	10.84	QP
12 *	4.53	35.23	-10.77	46.00	24.20	0.19	10.84	Average

3.6 Frequency Stability Measurement

3.6.1 Limit of Frequency Stability

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

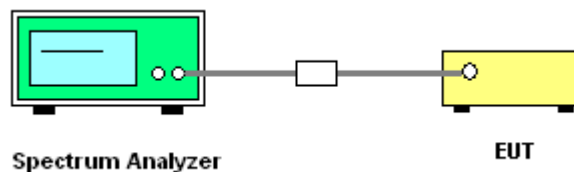
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

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

3.6.4 Test Setup



3.6.5 Test Result of Frequency Stability

Please refer to Appendix A.

3.7 Automatically Discontinue Transmission

3.7.1 Limit of Automatically Discontinue Transmission

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

3.7.2 Measuring Instruments

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

3.7.3 Test Result of Automatically Discontinue Transmission

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



3.8 Antenna Requirements

3.8.1 Standard Applicable

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

3.8.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.8.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSP40	100319	9kHz~40GHz	Oct. 28, 2014	Aug. 05, 2015	Oct. 27, 2015	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	30MHz~40GHz	Jan. 23, 2015	Aug. 05, 2015	Jan. 22, 2016	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 23, 2015	Aug. 05, 2015	Jan. 22, 2016	Conducted (TH01-KS)
Thermal Chamber	Ten Billion	TTC-B3S	TBN-960502	-40~+150°C	Oct. 25, 2014	Aug. 05, 2015	Oct. 24, 2015	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Sep. 29, 2014	Aug. 11, 2015	Sep. 28, 2015	Radiation (03CH02-KS)
Spectrum Analyzer	R&S	FSV40	101040	10kHz~40GHz; Max 30dBm	Sep. 25, 2014	Aug. 11, 2015	Sep. 24, 2015	Radiation (03CH02-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 13, 2014	Aug. 11, 2015	Nov. 12, 2015	Radiation (03CH02-KS)
Bilog Antenna	TeseQ	CBL6112D	37879	30MHz~2GHz	Sep. 13, 2014	Aug. 11, 2015	Sep. 12, 2015	Radiation (03CH02-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Nov. 08, 2014	Aug. 11, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
Active Horn Antenna	com-power	AHA-118	701030	1GHz~18GHz	Nov. 08, 2014	Aug. 11, 2015	Nov. 07, 2015	Radiation (03CH02-KS)
SHF-EHF Horn	com-power	AH-840	101070	18GHz~40GHz	Sep. 04, 2014	Aug. 11, 2015	Sep. 03, 2015	Radiation (03CH02-KS)
Amplifier	com-power	PA-103A	161069	1kHz~1000MHz / 32 dB	May 04, 2015	Aug. 11, 2015	May 03, 2016	Radiation (03CH02-KS)
Amplifier	Agilent	8449B	3008A02384	1GHz~26.5GHz Gain 30dB	Oct. 28, 2014	Aug. 11, 2015	Oct. 27, 2015	Radiation (03CH02-KS)
AC Power Source	Chroma	61601	6160100024 73	N/A	NCR	Aug. 11, 2015	NCR	Radiation (03CH02-KS)
Turn Table	MF	MF7802	N/A	0~360 degree	NCR	Aug. 11, 2015	NCR	Radiation (03CH02-KS)
Antenna Mast	MF	MF7802	N/A	1 m~4 m	NCR	Aug. 11, 2015	NCR	Radiation (03CH02-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz	May 04, 2015	Aug. 06, 2015	May 03, 2016	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 25, 2014	Aug. 06, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 25, 2014	Aug. 06, 2015	Oct. 24, 2015	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP0000008 11	AC 0V~300V, 45Hz~1000Hz	Oct. 25, 2014	Aug. 06, 2015	Oct. 24, 2015	Conduction (CO01-KS)

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.3dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	5.1dB
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Appendix A. Conducted Test Results

Report Number : FR561105E

Test Engineer:	Ocean Chen	Temperature:	21~25	°C
Test Date:	2015/8/5	Relative Humidity:	51~54	%

TEST RESULTS DATA
6dB Bandwidth

Band IV							
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	6 dB Bandwidth (MHz)	FCC 6dB Bandwidth Limit (MHz)	Pass/Fail
11a	6Mbps	1	149	5745	16.34	0.5	Pass
11a	6Mbps	1	157	5785	16.32	0.5	Pass
11a	6Mbps	1	165	5825	16.34	0.5	Pass
HT20	MCS0	1	149	5745	17.56	0.5	Pass
HT20	MCS0	1	157	5785	17.6	0.5	Pass
HT20	MCS0	1	165	5825	17.6	0.5	Pass
HT40	MCS0	1	151	5755	35.12	0.5	Pass
HT40	MCS0	1	159	5795	35.12	0.5	Pass
VHT20	MCS0	1	149	5745	17.56	0.5	Pass
VHT20	MCS0	1	157	5785	17.56	0.5	Pass
VHT20	MCS0	1	165	5825	17.56	0.5	Pass
VHT40	MCS0	1	151	5755	35.2	0.5	Pass
VHT40	MCS0	1	159	5795	35.12	0.5	Pass
VHT80	MCS0	1	155	5775	75.04	0.5	Pass

TEST RESULTS DATA
Average Power Table

FCC Band IV										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)	FCC Conducted Power Limit (dBm)	DG (dBi)		Pass/Fail
11a	6Mbps	1	149	5745	0.56	15.49	30.00	-6.00		Pass
11a	6Mbps	1	157	5785	0.56	15.96	30.00	-6.00		Pass
11a	6Mbps	1	165	5825	0.56	15.82	30.00	-6.00		Pass
HT20	MCS0	1	149	5745	0.63	11.57	30.00	-6.00		Pass
HT20	MCS0	1	157	5785	0.63	12.25	30.00	-6.00		Pass
HT20	MCS0	1	165	5825	0.63	12.10	30.00	-6.00		Pass
HT40	MCS0	1	151	5755	1.20	10.96	30.00	-6.00		Pass
HT40	MCS0	1	159	5795	1.20	11.44	30.00	-6.00		Pass
VHT20	MCS0	1	149	5745	0.80	9.76	30.00	-6.00		Pass
VHT20	MCS0	1	157	5785	0.80	10.47	30.00	-6.00		Pass
VHT20	MCS0	1	165	5825	0.80	10.21	30.00	-6.00		Pass
VHT40	MCS0	1	151	5755	1.47	9.45	30.00	-6.00		Pass
VHT40	MCS0	1	159	5795	1.47	10.03	30.00	-6.00		Pass
VHT80	MCS0	1	155	5775	2.59	10.23	30.00	-6.00		Pass

TEST RESULTS DATA
Power Spectral Density

Band IV										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	10log (500kHz /RBW) Factor (dB)	Average Power Density (dBm/500kHz)	Average PSD Limit (dBm/500kHz)	DG (dBi)	Pass/Fail
11a	6Mbps	1	149	5745	0.56	2.22	3.06	30.00	-6.00	Pass
11a	6Mbps	1	157	5785	0.56	2.22	3.43	30.00	-6.00	Pass
11a	6Mbps	1	165	5825	0.56	2.22	3.13	30.00	-6.00	Pass
HT20	MCS0	1	149	5745	0.63	2.22	-1.15	30.00	-6.00	Pass
HT20	MCS0	1	157	5785	0.63	2.22	-0.66	30.00	-6.00	Pass
HT20	MCS0	1	165	5825	0.63	2.22	-0.93	30.00	-6.00	Pass
HT40	MCS0	1	151	5755	1.20	2.22	-4.73	30.00	-6.00	Pass
HT40	MCS0	1	159	5795	1.20	2.22	-4.07	30.00	-6.00	Pass
VHT20	MCS0	1	149	5745	0.80	2.22	-3.13	30.00	-6.00	Pass
VHT20	MCS0	1	157	5785	0.80	2.22	-2.22	30.00	-6.00	Pass
VHT20	MCS0	1	165	5825	0.80	2.22	-2.43	30.00	-6.00	Pass
VHT40	MCS0	1	151	5755	1.47	2.22	-5.91	30.00	-6.00	Pass
VHT40	MCS0	1	159	5795	1.47	2.22	-5.34	30.00	-6.00	Pass
VHT80	MCS0	1	155	5775	2.59	2.22	-7.49	30.00	-6.00	Pass

TEST RESULTS DATA
Frequency Stability

Band IV										
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	Center Frequency (MHz)	Frequency Deviation (MHz)	Frequency Stability (ppm)	Temperature (°C)	Voltage (V)	Note
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	3.7	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	4.2	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	20	3.8	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	-30	3.8	
11a	6Mbps	1	149	5745	5745.000	0.000	0.00	50	3.8	



Appendix B. Radiated Test Results

Band 4 - 5725~5850MHz

WIFI 802.11a (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11a CH 149 5745MHz	*	5742	103.31	-	-	96.93	35.19	7.48	36.29	259	12	P	H
	*	5740	92.8	-	-	86.42	35.19	7.48	36.29	259	12	A	H
	!	5712.68	66.05	-2.25	68.3	59.71	35.16	7.45	36.27	259	12	P	H
	!	5724.92	75.82	-2.48	78.3	69.45	35.18	7.47	36.28	259	12	P	H
	*	5740	99.1	-	-	92.72	35.19	7.48	36.29	253	227	P	V
	*	5740	88.94	-	-	82.56	35.19	7.48	36.29	253	227	A	V
	!	5710.2	63.08	-5.22	68.3	56.74	35.16	7.45	36.27	253	227	P	V
	!	5724.92	72.48	-5.82	78.3	66.11	35.18	7.47	36.28	253	227	P	V
802.11a CH 157 5785MHz	*	5778	102.5	-	-	96.08	35.22	7.51	36.31	234	199	P	H
	*	5790	92.54	-	-	86.09	35.24	7.53	36.32	234	199	A	H
	*	5780	98.43	-	-	92.01	35.22	7.51	36.31	239	52	P	V
	*	5780	88.48	-	-	82.06	35.22	7.51	36.31	239	52	A	V
802.11a CH 165 5825MHz	*	5822	103.04	-	-	96.55	35.27	7.57	36.35	151	197	P	H
	*	5820	91.95	-	-	85.46	35.27	7.57	36.35	151	197	A	H
		5851.44	68.31	-9.99	78.3	61.8	35.28	7.59	36.36	151	197	P	H
		5860.48	62.04	-6.26	68.3	55.5	35.3	7.61	36.37	151	197	P	H
	*	5830	99.58	-	-	93.09	35.27	7.57	36.35	300	197	P	V
	*	5830	89.76	-	-	83.27	35.27	7.57	36.35	300	197	A	V
		5850.32	66.37	-11.93	78.3	59.86	35.28	7.59	36.36	300	197	P	V
		5860.16	62.26	-6.04	68.3	55.72	35.3	7.61	36.37	300	197	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11a (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11a CH 149 5745MHz		11490	48.69	-25.31	74	35.96	38.99	10.77	37.03	150	262	P	H
		11490	47.89	-26.11	74	35.16	38.99	10.77	37.03	165	216	P	V
802.11a CH 157 5785MHz		11570	49.32	-24.68	74	36.47	39.06	10.8	37.01	150	85	P	H
		11571	48.89	-25.11	74	36.04	39.06	10.8	37.01	150	196	P	V
802.11a CH 165 5825MHz		11650	49.27	-24.73	74	36.32	39.11	10.83	36.99	150	100	P	H
		11649	49.63	-24.37	74	36.68	39.11	10.83	36.99	150	148	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz	*	5750	96.72	-	-	90.34	35.19	7.48	36.29	277	41	P	H
	*	5738	86.39	-	-	80.01	35.19	7.48	36.29	277	41	A	H
		5713.32	55.43	-12.87	68.3	49.09	35.16	7.45	36.27	277	41	P	H
		5723.64	64.24	-14.06	78.3	57.87	35.18	7.47	36.28	277	41	P	H
	*	5750	99.09	-	-	92.71	35.19	7.48	36.29	280	270	P	V
	*	5752	88.52	-	-	82.11	35.21	7.5	36.3	280	270	A	V
		5714.12	59.51	-8.79	68.3	53.17	35.16	7.45	36.27	280	270	P	V
		5724.12	65.23	-13.07	78.3	58.86	35.18	7.47	36.28	280	270	P	V
802.11n HT20 CH 157 5785MHz	*	5790	97.02	-	-	90.57	35.24	7.53	36.32	150	105	P	H
	*	5788	86.28	-	-	79.83	35.24	7.53	36.32	150	105	A	H
	*	5780	97.67	-	-	91.25	35.22	7.51	36.31	279	258	P	V
	*	5780	87.41	-	-	80.99	35.22	7.51	36.31	279	258	A	V
802.11n HT20 CH 165 5825MHz	*	5830	96.28	-	-	89.79	35.27	7.57	36.35	300	43	P	H
	*	5828	85.73	-	-	79.24	35.27	7.57	36.35	300	43	A	H
		5851.68	56.62	-21.68	78.3	50.11	35.28	7.59	36.36	300	43	P	H
		5866.16	51.76	-16.54	68.3	45.22	35.3	7.61	36.37	300	43	P	H
	*	5830	97.84	-	-	91.35	35.27	7.57	36.35	255	249	P	V
	*	5830	87.52	-	-	81.03	35.27	7.57	36.35	255	249	A	V
		5851.76	60.98	-17.32	78.3	54.47	35.28	7.59	36.36	255	249	P	V
		5878.08	51.71	-16.59	68.3	45.16	35.3	7.63	36.38	255	249	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 149 5745MHz		11490	49.15	-24.85	74	36.42	38.99	10.77	37.03	200	158	P	H
		11490	48.46	-25.54	74	35.73	38.99	10.77	37.03	150	200	P	V
802.11n HT20 CH 157 5785MHz		11570	49.55	-24.45	74	36.7	39.06	10.8	37.01	150	216	P	H
		11571	49.17	-24.83	74	36.32	39.06	10.8	37.01	195	205	P	V
802.11n HT20 CH 165 5825MHz		11650	49.37	-24.63	74	36.42	39.11	10.83	36.99	150	120	P	H
		11649	49.39	-24.61	74	36.44	39.11	10.83	36.99	150	78	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz	*	5766	95.31	-	-	88.9	35.21	7.5	36.3	150	55	P	H
	*	5768	85.44	-	-	79.03	35.21	7.5	36.3	150	55	A	H
	!	5714.68	62.44	-5.86	68.3	56.1	35.16	7.45	36.27	150	55	P	H
		5720.92	64.34	-13.96	78.3	57.97	35.18	7.47	36.28	150	55	P	H
	*	5748	92.83	-	-	86.45	35.19	7.48	36.29	298	243	P	V
	*	5744	83.71	-	-	77.33	35.19	7.48	36.29	298	243	A	V
		5713.72	59.14	-9.16	68.3	52.8	35.16	7.45	36.27	298	243	P	V
		5723.48	61.22	-17.08	78.3	54.85	35.18	7.47	36.28	298	243	P	V
802.11n HT40 CH 159 5795MHz	*	5784	95.07	-	-	88.65	35.22	7.51	36.31	150	56	P	H
	*	5784	85.59	-	-	79.17	35.22	7.51	36.31	150	56	A	H
		5850	55.77	-22.53	78.3	49.26	35.28	7.59	36.36	150	56	P	H
		5861.52	52.3	-16	68.3	45.76	35.3	7.61	36.37	150	56	P	H
	*	5808	88.21	-	-	81.74	35.25	7.55	36.33	150	214	P	V
	*	5808	78.47	-	-	72	35.25	7.55	36.33	150	214	A	V
		5856.08	51	-27.3	78.3	44.46	35.3	7.61	36.37	150	214	P	V
		5875.84	51.14	-17.16	68.3	44.59	35.3	7.63	36.38	150	214	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT40 CH 151 5755MHz		11511	48.17	-25.83	74	35.43	39	10.77	37.03	150	60	P	H
		11511	47.66	-26.34	74	34.92	39	10.77	37.03	285	324	P	V
802.11n HT40 CH 159 5795MHz		11589	48.81	-25.19	74	35.94	39.07	10.81	37.01	150	294	P	H
		11589	48.39	-25.61	74	35.52	39.07	10.81	37.01	150	315	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ac VHT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20 CH 149 5745MHz	*	5738	96.4	-	-	90.02	35.19	7.48	36.29	150	252	P	H
	*	5740	86.87	-	-	80.49	35.19	7.48	36.29	150	252	A	H
		5689.56	52.32	-15.98	68.3	45.98	35.15	7.44	36.25	150	252	P	H
		5723.4	63.29	-15.01	78.3	56.92	35.18	7.47	36.28	150	252	P	H
	*	5740	97.5	-	-	91.12	35.19	7.48	36.29	163	9	P	V
	*	5740	88.12	-	-	81.74	35.19	7.48	36.29	163	9	A	V
		5692.84	52.43	-15.87	68.3	46.09	35.15	7.44	36.25	163	9	P	V
802.11ac VHT20 CH 157 5785MHz		5723.24	64.2	-14.1	78.3	57.83	35.18	7.47	36.28	163	9	P	V
	*	5778	96.53	-	-	90.11	35.22	7.51	36.31	150	246	P	H
	*	5780	86.87	-	-	80.45	35.22	7.51	36.31	150	246	A	H
	*	5780	97.36	-	-	90.94	35.22	7.51	36.31	209	347	P	V
	*	5778	87.98	-	-	81.56	35.22	7.51	36.31	209	347	A	V
	*	5824	94.07	-	-	87.58	35.27	7.57	36.35	188	213	P	H
	*	5820	84.98	-	-	78.49	35.27	7.57	36.35	188	213	A	H
802.11ac VHT20 CH 165 5825MHz		5853.52	51	-27.3	78.3	44.46	35.3	7.61	36.37	188	213	P	H
		5883.76	51.89	-16.41	68.3	45.34	35.3	7.63	36.38	188	213	P	H
	*	5818	97.59	-	-	91.12	35.25	7.55	36.33	196	4	P	V
	*	5820	87.99	-	-	81.5	35.27	7.57	36.35	196	4	A	V
		5850.24	52.74	-25.56	78.3	46.23	35.28	7.59	36.36	196	4	P	V
		5876.16	51.9	-16.4	68.3	45.35	35.3	7.63	36.38	196	4	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11ac VHT20 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT20		11490	48.39	-25.61	74	35.66	38.99	10.77	37.03	165	314	P	H
CH 149 5745MHz		11490	47.21	-26.79	74	34.48	38.99	10.77	37.03	218	18	P	V
802.11ac VHT20		11571	48.61	-25.39	74	35.76	39.06	10.8	37.01	150	321	P	H
CH 157 5785MHz		11571	48.1	-25.9	74	35.25	39.06	10.8	37.01	185	341	P	V
802.11ac VHT20		11649	48.73	-25.27	74	35.78	39.11	10.83	36.99	150	315	P	H
CH 165 5825MHz		11649	48.53	-25.47	74	35.58	39.11	10.83	36.99	153	295	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz
WIFI 802.11ac VHT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40 CH 151 5755MHz	*	5752	92.25	-	-	85.84	35.21	7.5	36.3	150	224	P	H
	*	5746	82.59	-	-	76.21	35.19	7.48	36.29	150	224	A	H
		5713.96	56.87	-11.43	68.3	50.53	35.16	7.45	36.27	150	224	P	H
		5721.16	61	-17.3	78.3	54.63	35.18	7.47	36.28	150	224	P	H
	*	5744	88.94	-	-	82.56	35.19	7.48	36.29	150	335	P	V
	*	5744	79.56	-	-	73.18	35.19	7.48	36.29	150	335	A	V
		5713.64	54.11	-14.19	68.3	47.77	35.16	7.45	36.27	150	335	P	V
		5723.88	57.71	-20.59	78.3	51.34	35.18	7.47	36.28	150	335	P	V
802.11ac VHT40 CH 159 5795MHz	*	5806	92.47	-	-	86	35.25	7.55	36.33	150	200	P	H
	*	5806	82.5	-	-	76.03	35.25	7.55	36.33	150	200	A	H
		5856.32	50.59	-27.71	78.3	44.05	35.3	7.61	36.37	150	200	P	H
		5867.2	50.56	-17.74	68.3	44.02	35.3	7.61	36.37	150	200	P	H
	*	5782	89.77	-	-	83.35	35.22	7.51	36.31	150	35	P	V
	*	5786	80.15	-	-	73.7	35.24	7.53	36.32	150	35	A	V
		5856.96	50.82	-27.48	78.3	44.28	35.3	7.61	36.37	150	35	P	V
		5864.16	51.46	-16.84	68.3	44.92	35.3	7.61	36.37	150	35	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11ac VHT40 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT40		11510	48.16	-25.84	74	35.42	39	10.77	37.03	150	182	P	H
CH 151 5755MHz		11511	48.91	-25.09	74	36.17	39	10.77	37.03	162	14	P	V
802.11ac VHT40		11590	48.42	-25.58	74	35.55	39.07	10.81	37.01	162	89	P	H
CH 159 5795MHz		11589	48.53	-25.47	74	35.66	39.07	10.81	37.01	200	147	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Band 4 5725~5850MHz

WIFI 802.11ac VHT80 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80 CH 155 5775MHz	*	5758	90.33	-	-	83.92	35.21	7.5	36.3	150	244	P	H
	*	5774	81.6	-	-	75.18	35.22	7.51	36.31	150	244	A	H
		5714.68	58.36	-9.94	68.3	52.02	35.16	7.45	36.27	150	244	P	H
		5718.68	60.45	-17.85	78.3	54.08	35.18	7.47	36.28	150	244	P	H
		5854.08	53.99	-24.31	78.3	47.45	35.3	7.61	36.37	150	244	P	H
		5863.28	52.36	-15.94	68.3	45.82	35.3	7.61	36.37	150	244	P	H
	*	5778	91.54	-	-	85.12	35.22	7.51	36.31	184	11	P	V
	*	5778	82.31	-	-	75.89	35.22	7.51	36.31	184	11	A	V
		5714.92	58.28	-10.02	68.3	51.94	35.16	7.45	36.27	184	11	P	V
		5718.76	60.91	-17.39	78.3	54.54	35.18	7.47	36.28	184	11	P	V
		5853.36	54.72	-23.58	78.3	48.21	35.28	7.59	36.36	184	11	P	V
		5860	52.3	-26	78.3	45.76	35.3	7.61	36.37	184	11	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

**Band 4 5725~5850MHz****WIFI 802.11ac VHT80 (Harmonic @ 3m)**

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ac VHT80		11550	48.59	-25.41	74	35.78	39.04	10.79	37.02	150	238	P	H
CH 155 5775MHz		11550	48.08	-25.92	74	35.27	39.04	10.79	37.02	186	346	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

5GHz WIFI 802.11a (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11a LF		79.47	26.48	-13.52	40	51.96	8.88	1.15	35.51	174	216	P	H
		268.62	19.97	-26.03	46	40.46	12.18	2.15	34.82	-	-	P	H
		384.05	24.54	-21.46	46	41.44	15.7	2.58	35.18	-	-	P	H
		460.68	21.68	-24.32	46	36.61	17.06	2.83	34.82	-	-	P	H
		634.31	18.6	-27.4	46	31.28	18.84	3.35	34.87	-	-	P	H
		710.94	19.59	-26.41	46	31.34	19.41	3.59	34.75	-	-	P	H
		30	32.44	-7.56	40	47.83	19.1	0.73	35.22	162	85	P	V
		42.61	30.02	-9.98	40	51.95	12	0.86	34.79	-	-	P	V
		81.41	26.85	-13.15	40	51.95	9.16	1.17	35.43	-	-	P	V
		204.6	19.36	-24.14	43.5	42.97	9.59	1.87	35.07	-	-	P	V
		288.02	18.84	-27.16	46	38.38	13.01	2.23	34.78	-	-	P	V
		557.68	19.27	-26.73	46	32.44	18.25	3.15	34.57	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Emission below 1GHz

5GHz WIFI 802.11n HT20 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT20 LF		79.47	29.18	-10.82	40	54.66	8.88	1.15	35.51	136	29	P	H
		204.6	28.02	-15.48	43.5	51.63	9.59	1.87	35.07	-	-	P	H
		384.05	28.66	-17.34	46	45.56	15.7	2.58	35.18	-	-	P	H
		556.71	23.87	-22.13	46	37.04	18.24	3.15	34.56	-	-	P	H
		803.09	21.92	-24.08	46	32.29	20.35	3.81	34.53	-	-	P	H
		951.5	25.28	-20.72	46	33.96	21.71	4.16	34.55	-	-	P	H
		30	33.35	-6.65	40	48.74	19.1	0.73	35.22	100	148	P	V
		203.63	25.64	-17.86	43.5	49.3	9.55	1.86	35.07	-	-	P	V
		414.12	23.04	-22.96	46	39.06	16.43	2.69	35.14	-	-	P	V
		568.35	25.06	-20.94	46	38.24	18.31	3.18	34.67	-	-	P	V
		647.89	20.39	-25.61	46	32.85	18.98	3.39	34.83	-	-	P	V
		945.68	22.11	-23.89	46	30.83	21.68	4.15	34.55	-	-	P	V
Remark	1. No other spurious found.												
	2. All results are PASS against limit line.												



Emission below 1GHz

5GHz WIFI 802.11n HT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11n HT40 LF		79.47	30.82	-9.18	40	56.3	8.88	1.15	35.51	120	155	P	H
		204.6	28.9	-14.6	43.5	52.51	9.59	1.87	35.07	-	-	P	H
		307.42	28.16	-17.84	46	47	13.67	2.3	34.81	-	-	P	H
		384.05	27.46	-18.54	46	44.36	15.7	2.58	35.18	-	-	P	H
		556.71	20.02	-25.98	46	33.19	18.24	3.15	34.56	-	-	P	H
		945.68	23.07	-22.93	46	31.79	21.68	4.15	34.55	-	-	P	H
		30	33.48	-6.52	40	48.87	19.1	0.73	35.22	133	102	P	V
		42.61	32.48	-7.52	40	54.41	12	0.86	34.79	-	-	P	V
		204.6	23.98	-19.52	43.5	47.59	9.59	1.87	35.07	-	-	P	V
		384.05	22.37	-23.63	46	39.27	15.7	2.58	35.18	-	-	P	V
		595.51	18.16	-27.84	46	31.37	18.47	3.24	34.92	-	-	P	V
		815.7	21.15	-24.85	46	31.24	20.55	3.84	34.48	-	-	P	V
Remark	1. No other spurious found.												
	2. All results are PASS against limit line.												



Emission below 1GHz

5GHz WIFI 802.11ac VHT20 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT20 LF		30	33.25	-6.75	40	48.64	19.1	0.73	35.22	113	205	P	H
		79.47	29.98	-10.02	40	55.46	8.88	1.15	35.51			P	H
		213.33	25.41	-18.09	43.5	48.6	9.94	1.9	35.03			P	H
		384.05	27.71	-18.29	46	44.61	15.7	2.58	35.18			P	H
		710.94	24.29	-21.71	46	36.04	19.41	3.59	34.75			P	H
		951.5	28.02	-17.98	46	36.7	21.71	4.16	34.55			P	H
		79.47	34.19	-5.81	40	59.67	8.88	1.15	35.51	100	202	P	V
		203.63	33.59	-9.91	43.5	57.25	9.55	1.86	35.07			P	V
		384.05	24.21	-21.79	46	41.11	15.7	2.58	35.18			P	V
		595.51	22.4	-23.6	46	35.61	18.47	3.24	34.92			P	V
		825.4	21.52	-24.48	46	31.39	20.71	3.86	34.44			P	V
		949.56	26.43	-19.57	46	35.11	21.7	4.16	34.54			P	V
Remark	3. No other spurious found.												
	4. All results are PASS against limit line.												



Emission below 1GHz

5GHz WIFI 802.11ac VHT40 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT40 LF		79.47	31.9	-8.1	40	57.38	8.88	1.15	35.51	155	202	P	H
		158.04	25.11	-18.39	43.5	47.48	10.92	1.62	34.91	-	-	P	H
		345.25	22.32	-23.68	46	40.44	14.49	2.44	35.05	-	-	P	H
		384.05	22.81	-23.19	46	39.71	15.7	2.58	35.18	-	-	P	H
		634.31	20.88	-25.12	46	33.56	18.84	3.35	34.87	-	-	P	H
		796.3	19.9	-26.1	46	30.38	20.26	3.79	34.53	-	-	P	H
		30	33.46	-6.54	40	48.85	19.1	0.73	35.22	150	147	P	V
		198.78	24.82	-18.68	43.5	48.62	9.44	1.84	35.08	-	-	P	V
		288.02	19.25	-26.75	46	38.79	13.01	2.23	34.78	-	-	P	V
		414.12	21.87	-24.13	46	37.89	16.43	2.69	35.14	-	-	P	V
		495.6	24.28	-21.72	46	38.65	17.27	2.94	34.58	-	-	P	V
		612.97	19.89	-26.11	46	32.9	18.63	3.29	34.93	-	-	P	V
Remark	5. No other spurious found.												
	6. All results are PASS against limit line.												



Emission below 1GHz

5GHz WIFI 802.11ac VHT80 (LF @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
5GHz 802.11ac VHT80 LF		79.47	24.9	-15.1	40	50.38	8.88	1.15	35.51	200	315	P	H
		158.04	25.11	-18.39	43.5	47.48	10.92	1.62	34.91	-	-	P	H
		307.42	22.03	-23.97	46	40.87	13.67	2.3	34.81	-	-	P	H
		384.05	23.81	-22.19	46	40.71	15.7	2.58	35.18	-	-	P	H
		634.31	17.88	-28.12	46	30.56	18.84	3.35	34.87	-	-	P	H
		796.3	15.9	-30.1	46	26.38	20.26	3.79	34.53	-	-	P	H
		30	35.46	-4.54	40	50.85	19.1	0.73	35.22	-	-	P	V
		41.64	35.78	-4.22	40	57.16	12.6	0.85	34.83	100	36	P	V
		80.44	29.92	-10.08	40	55.23	9	1.16	35.47	-	-	P	V
		223.03	24.37	-21.63	46	47.09	10.32	1.95	34.99	-	-	P	V
		414.12	23.87	-22.13	46	39.89	16.43	2.69	35.14	-	-	P	V
		495.6	26.28	-19.72	46	40.65	17.27	2.94	34.58	-	-	P	V
Remark	7. No other spurious found.												
	8. All results are PASS against limit line.												

**Note symbol**

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



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

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

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

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

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

= -10.46(dB)

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