



FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : CDMA /LTE Multi-Mode Digital Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z3001S
FCC ID : SRQ-Z3001S
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Nov. 16, 2017 and testing was completed on Dec. 22, 2017. 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.

Approved by: James Huang / Manager



Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335
China



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR7N1618C	Rev. 01	Initial issue of report	Dec. 27, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.247(a)(2)	6dB Bandwidth	$\geq 0.5\text{MHz}$	Pass	-
3.2	15.247(b)	Power Output Measurement	$\leq 30\text{dBm}$	Pass	-
3.3	15.247(e)	Power Spectral Density	$\leq 8\text{dBm}/3\text{kHz}$	Pass	-
3.4	15.247(d)	Conducted Band Edges	$\leq 20\text{dBc}$	Pass	-
		Conducted Spurious Emission		Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	15.209(a) & 15.247(d)	Pass	Under limit 1.32 dB at 2389.950 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 10.99 dB at 1.762 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-



1 General Description

1.1 Applicant

ZTE CORPORATION

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

1.2 Manufacturer

ZTE CORPORATION

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

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	CDMA /LTE Multi-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z3001S
FCC ID	SRQ-Z3001S
EUT supports Radios application	CDMA/EV-DO/LTE WLAN 2.4GHz 802.11b/g/n HT20/HT40 Bluetooth v3.0 + EDR / Bluetooth v4.0 LE / Bluetooth v4.1 LE
IMEI/MEID Code	Conducted: 990008980001080 Conduction: 99000898000100 Radiation: 99000898000216
HW Version	Z3001SHW1.0
SW Version	Z3001SV1.0.0B02
EUT Stage	Identical Prototype

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

1.4 Product Specification of Equipment Under Test

Standards-related Product Specification	
Tx/Rx Channel Frequency Range	2412 MHz ~ 2462 MHz
Maximum (Peak) Output Power to antenna	802.11b : 18.82 dBm (0.0762 W) 802.11g : 23.10 dBm (0.2042 W) 802.11n HT20 : 21.76 dBm (0.1500 W) 802.11n HT40 : 21.59 dBm (0.1442 W)
Antenna Type / Gain	PIFA Antenna with gain 0.43 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)

1.5 Modification of EUT

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

1.6 Testing Location

Sporton International (Kunshan) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600155-0) and the FCC designation No. is CN5013.

Test Site	Sporton International (Kunshan) Inc.			
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958			
Test Site No.	Sporton Site No.			FCC Test Firm Registration No.
	TH01-KS	03CH03-KS	CO01-KS	630927

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



1.7 Applicable Standards

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

- ♦ FCC Part 15 Subpart C §15.247
- ♦ FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
- ♦ ANSI C63.10-2013

Remark:

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

2 Test Configuration of Equipment Under Test

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

2.1 Carrier Frequency and Channel

Frequency Band	Channel	Freq. (MHz)	Channel	Freq. (MHz)
2400-2483.5 MHz	1	2412	7	2442
	2	2417	8	2447
	3	2422	9	2452
	4	2427	10	2457
	5	2432	11	2462
	6	2437	-	-

2.2 Test Mode

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

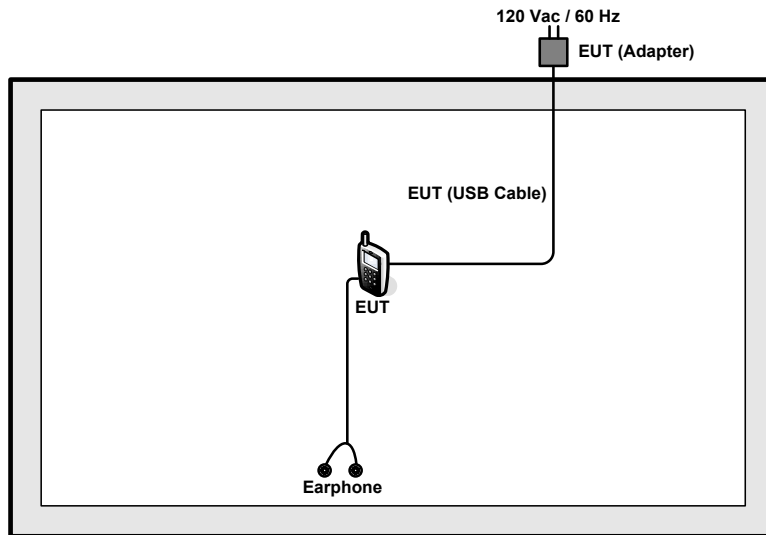
Modulation	Data Rate
802.11b	1 Mbps
802.11g	6 Mbps
802.11n HT20	MCS0
802.11n HT40	MCS0

Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter 1) + Battery 1
	Mode 2 : GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter 2) + Battery 2
	Mode 3 : GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter 3) + Battery 3
	Remark: 1. The worst case of conducted emission is mode 1; only the test data of it was reported. 2. For Radiated TCs, the tests were performed with Adapter 1, Battery 1, Earphone and USB Cable.

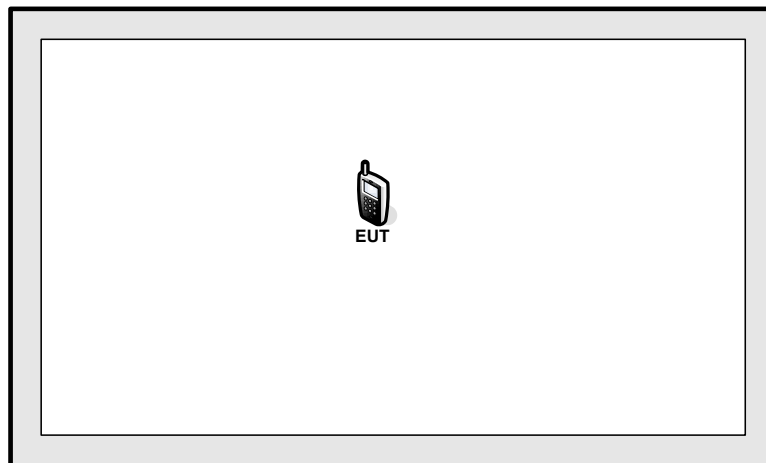
2.3 Connection Diagram of Test System

<WLAN Tx Mode>

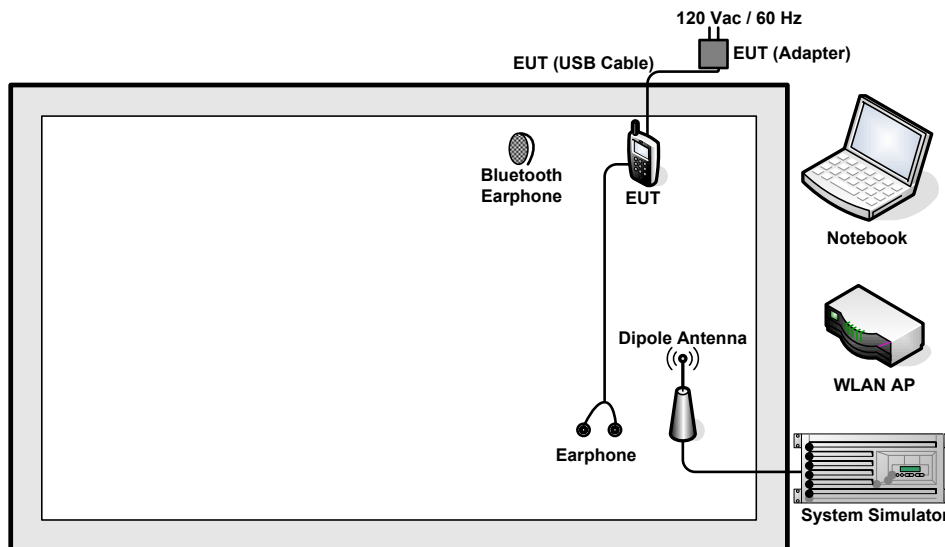
For 802.11b, 11g



For 802.11n HT20, HT40



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	LINKSYS	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	shielded cable DC O/P 1.8m , Unshielded AC I/P cable 1.8m
4.	Bluetooth Earphone	Lenovo	LBH308	NA	N/A	N/A
5.	Earphone	Lenovo	LH102	NA	Unshielded,1.2m	N/A

2.5 EUT Operation Test Setup

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

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



2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example :

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.8 dB.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)}. \\ &= 5.8 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

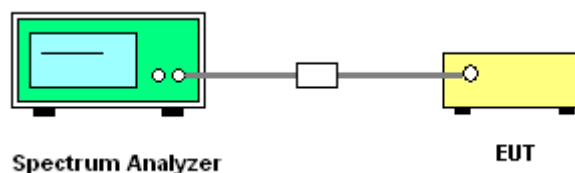
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6 dB bandwidth must be greater than 500 kHz.
5. Measure and record the results in the test report.

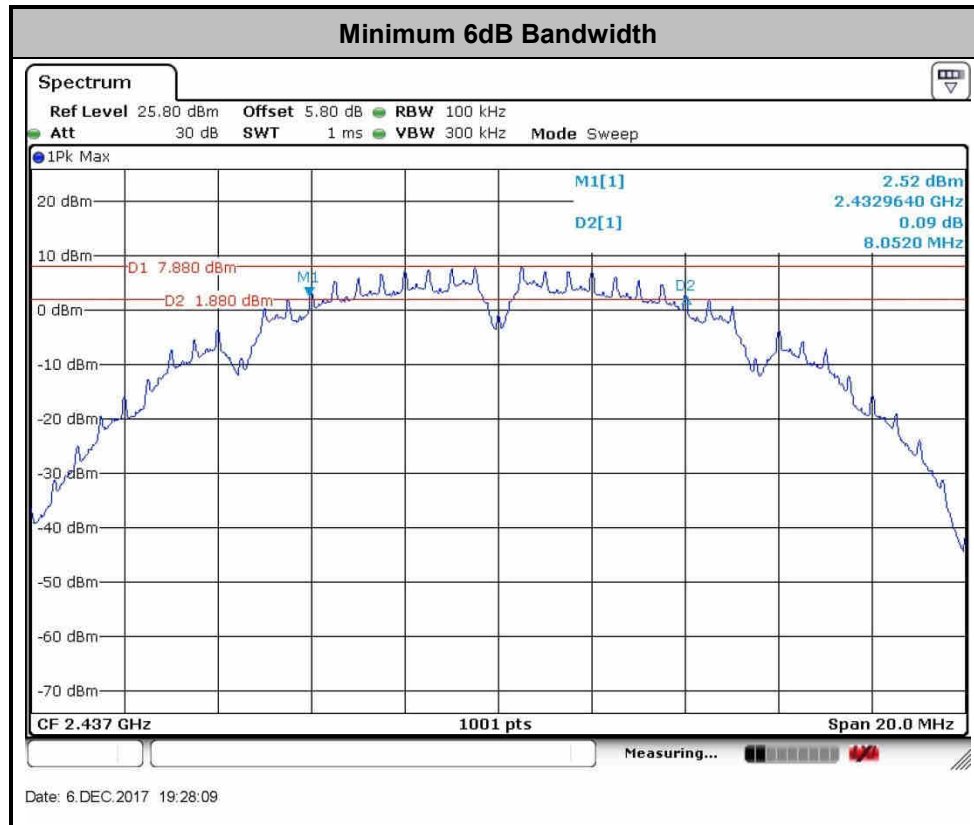
3.1.4 Test Setup





3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



3.2 Output Power Measurement

3.2.1 Limit of Output Power

For systems using digital modulation in the 2400-2483.5MHz, the limit for peak output power is 30dBm. If transmitting antenna of directional gain greater than 6dBi are used the peak output power from the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the antenna exceeds 6 dBi. In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

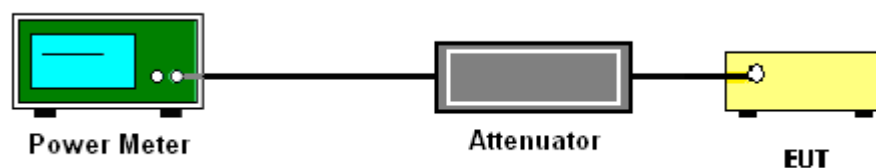
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

1. The testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.2 PKPM1 Peak power meter method.
2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Measure the conducted output power and record the results in the test report.

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

The peak power spectral density shall not be greater than 8dBm in any 3kHz band at any time interval of continuous transmission.

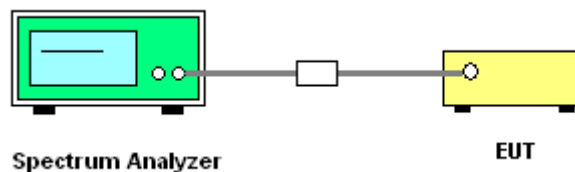
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

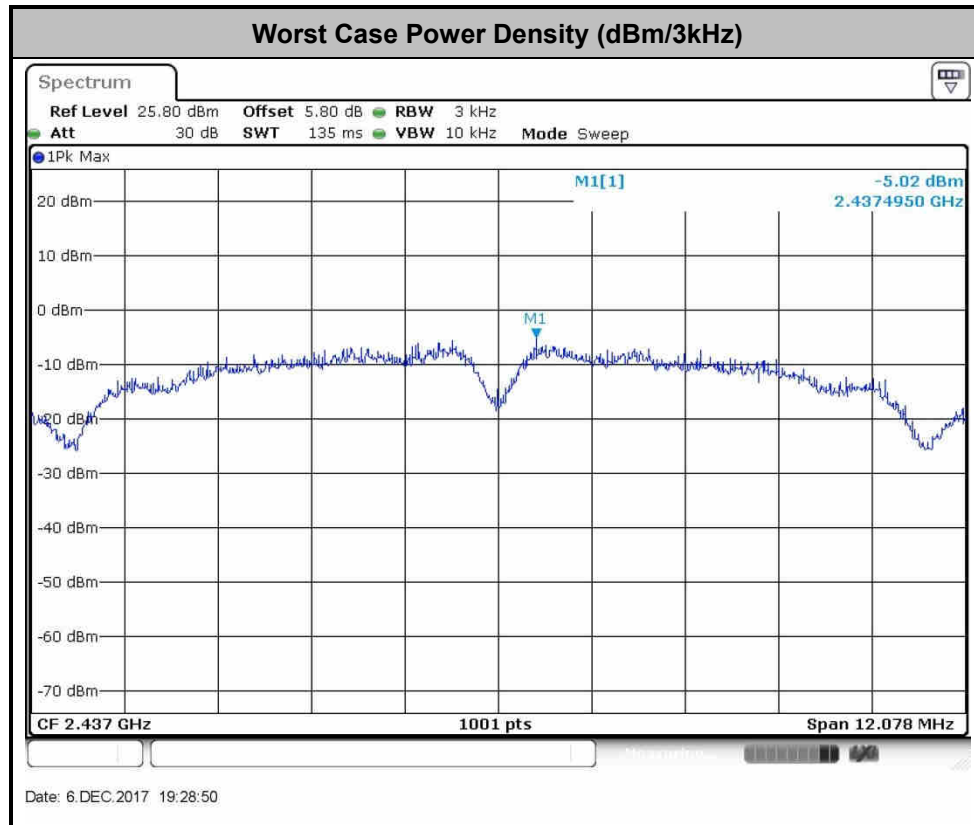
1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)
5. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.
6. Measure and record the results in the test report.

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

In any 100 kHz bandwidth outside of the authorized frequency band, the emissions which fall in the non-restricted bands shall be attenuated at least 20 dB / 30dB relative to the maximum PSD level in 100 kHz by RF conducted measurement.

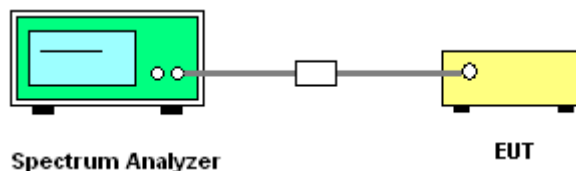
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.
5. Measure and record the results in the test report.
6. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

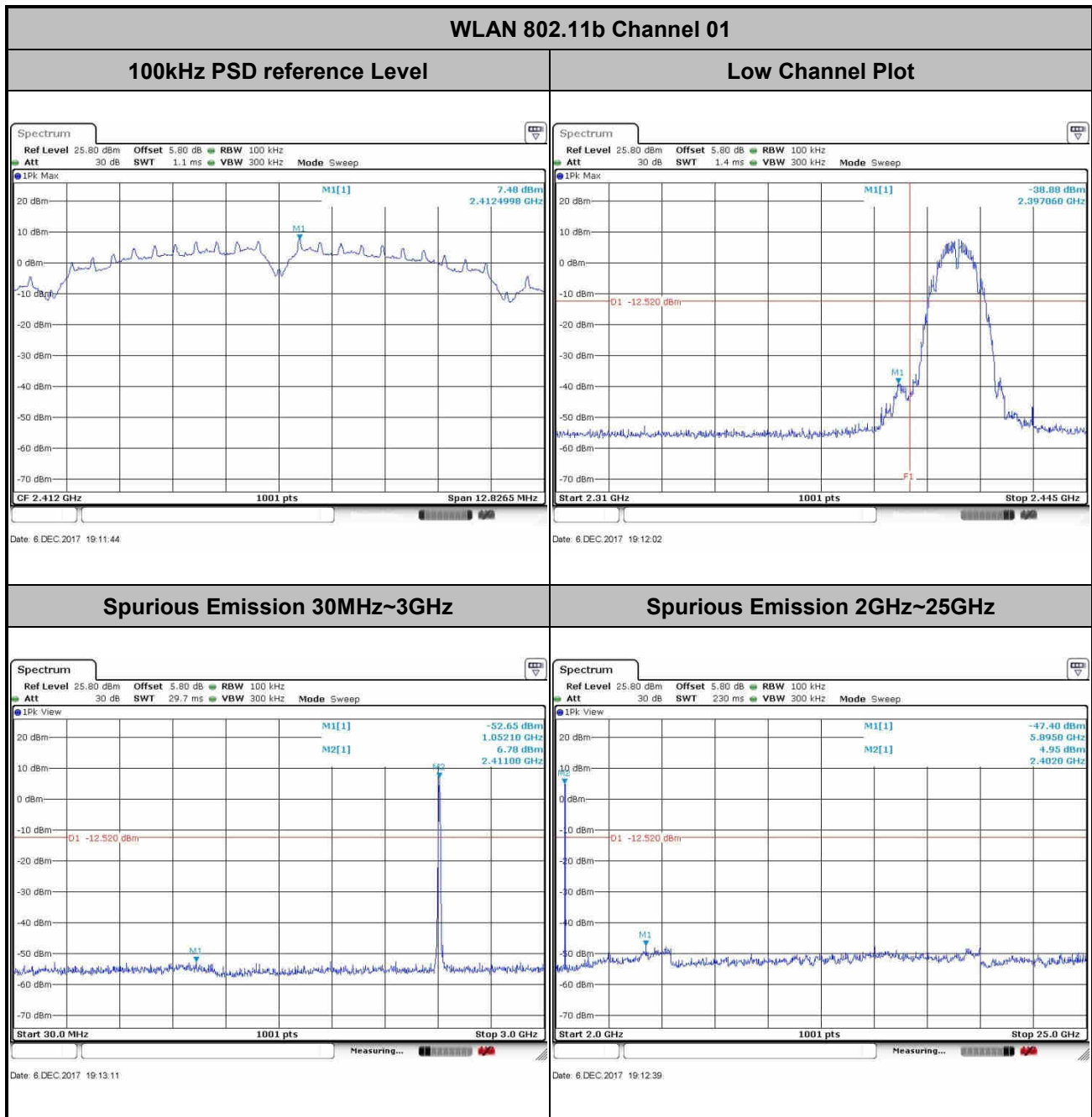
3.4.4 Test Setup





3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

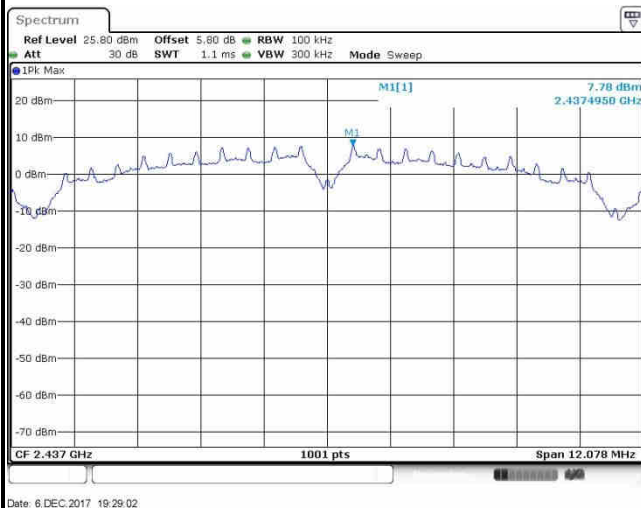




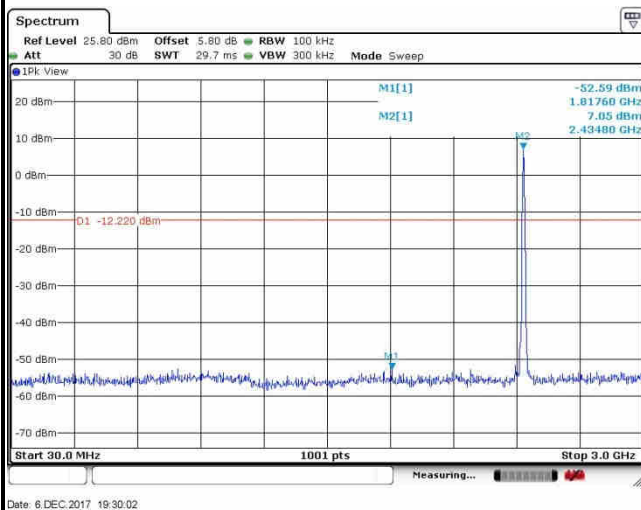
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11b Channel 06

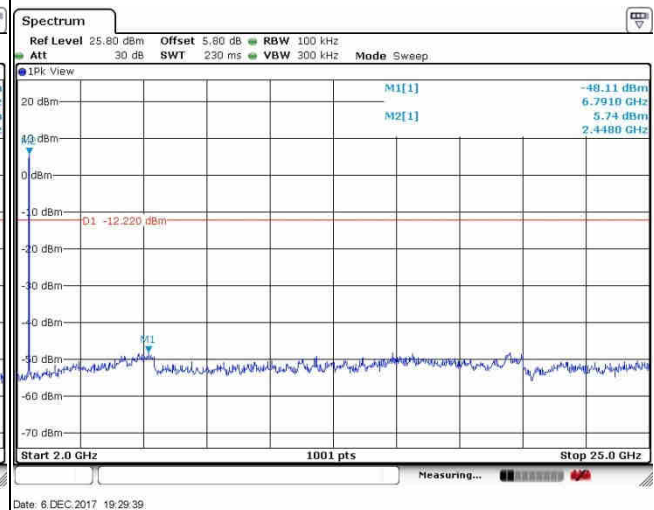
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

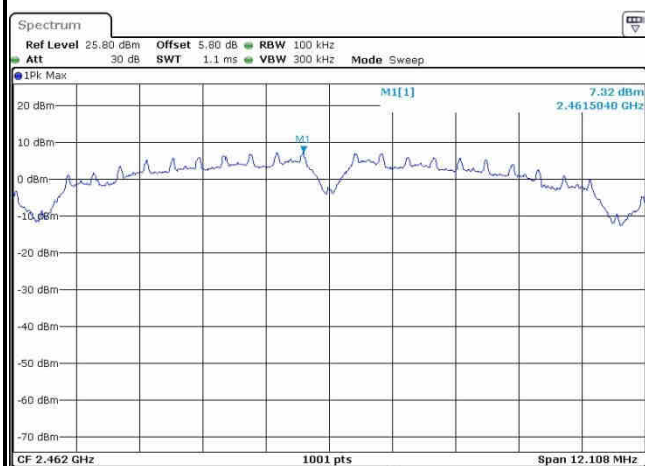




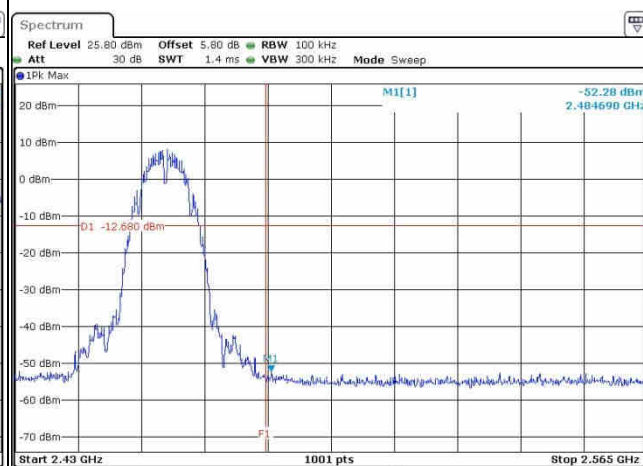
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11b Channel 11

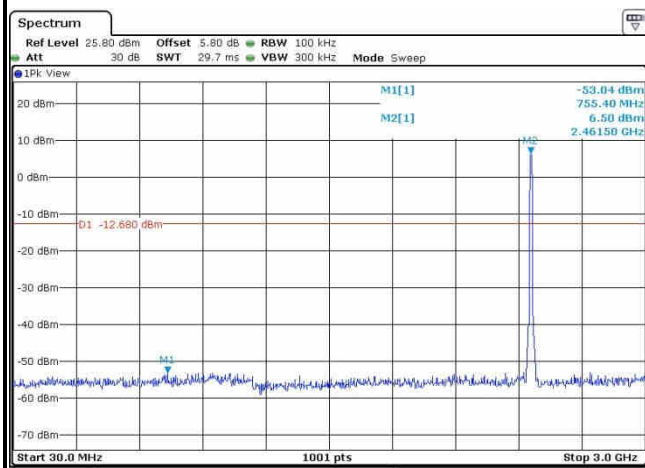
100kHz PSD reference Level



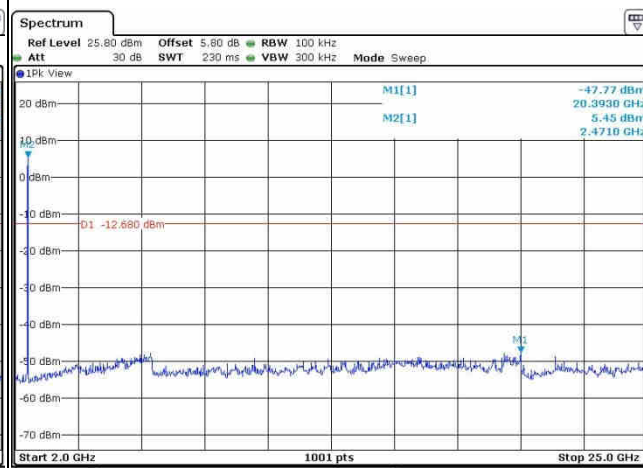
High Channel Plot



Spurious Emission 30MHz~3GHz

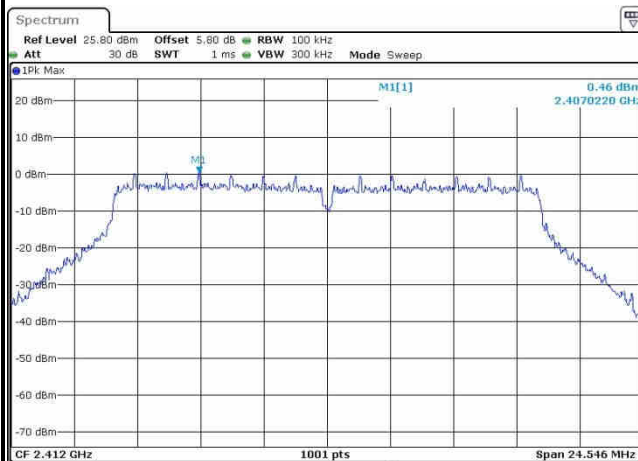


Spurious Emission 2GHz~25GHz

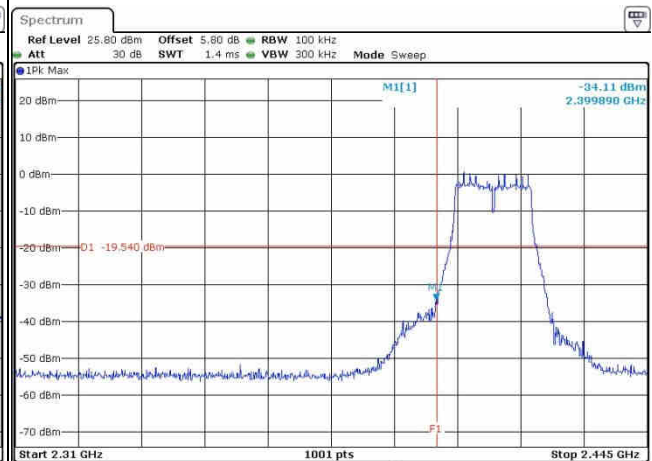




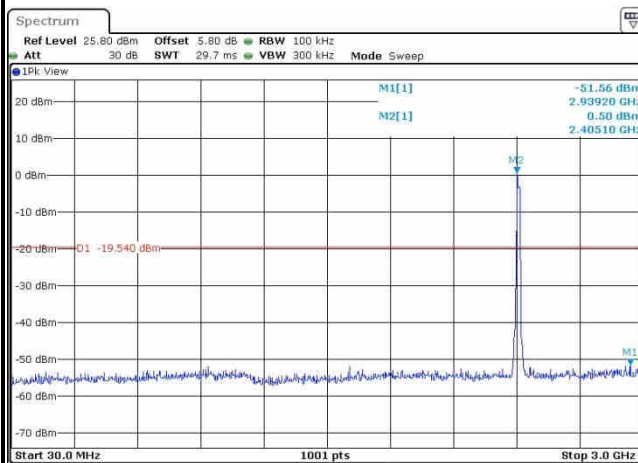
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

WLAN 802.11g Channel 01**100kHz PSD reference Level**

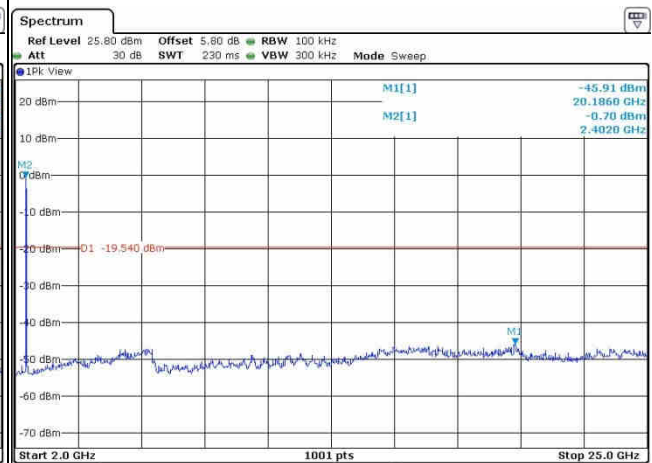
Date: 18 DEC 2017 10:52:48

Low Channel Plot

Date: 18 DEC 2017 10:53:33

Spurious Emission 30MHz~3GHz

Date: 18 DEC 2017 12:26:05

Spurious Emission 2GHz~25GHz

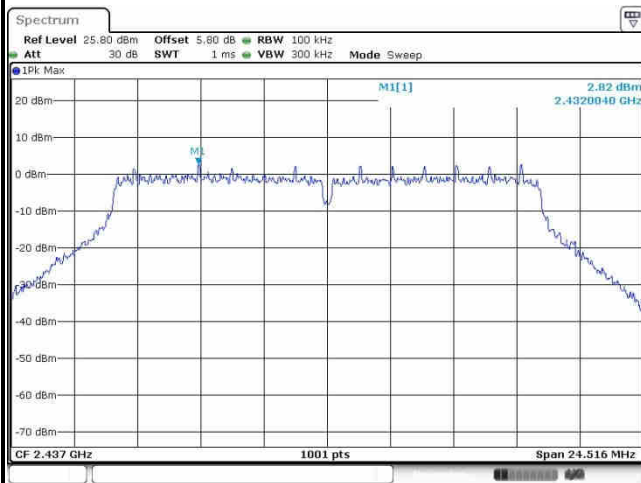
Date: 18 DEC 2017 12:30:04



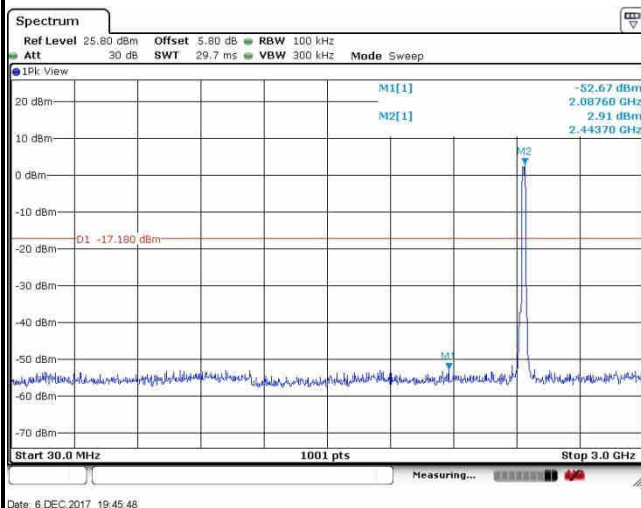
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

WLAN 802.11g Channel 06

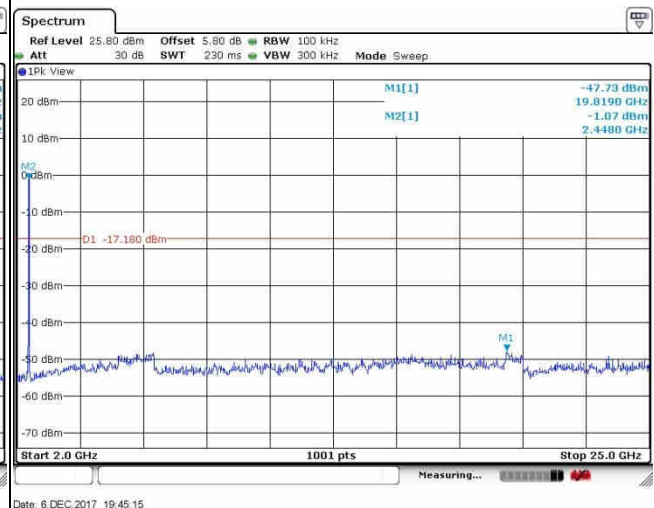
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

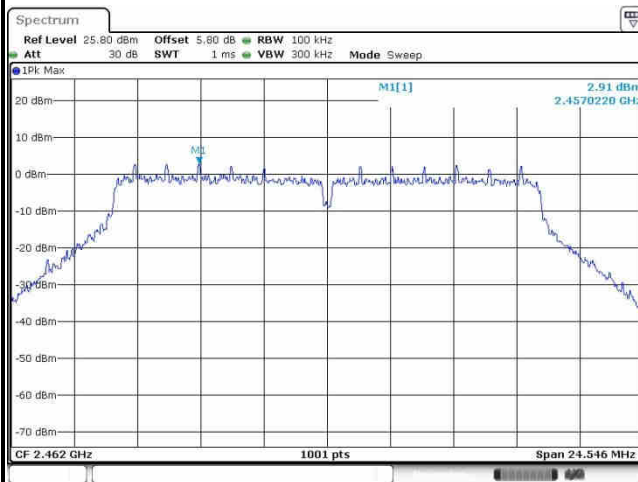




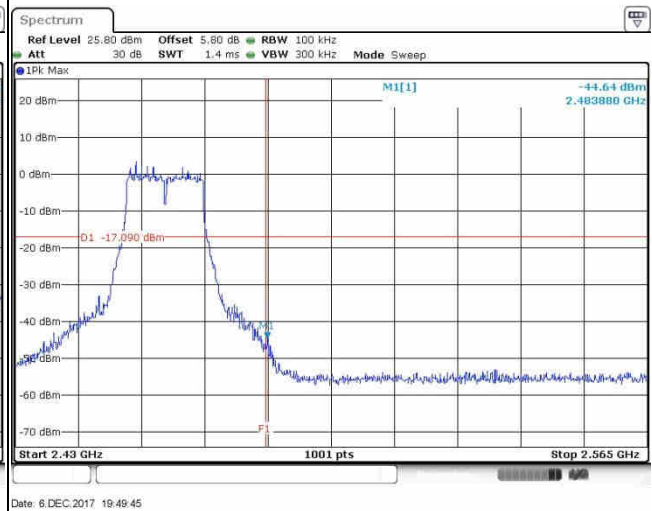
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

WLAN 802.11g Channel 11

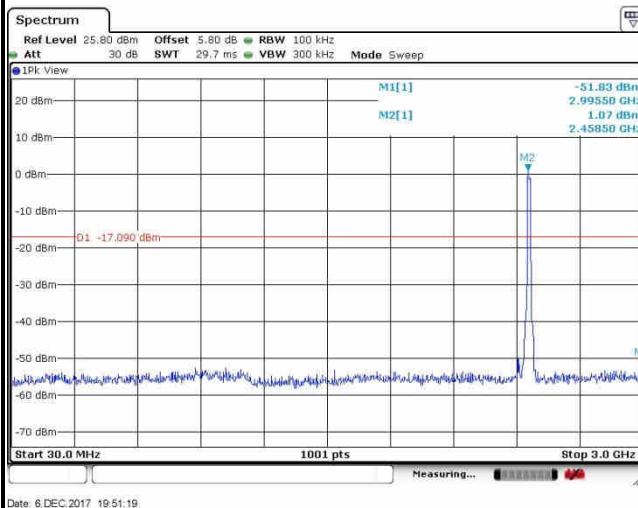
100kHz PSD reference Level



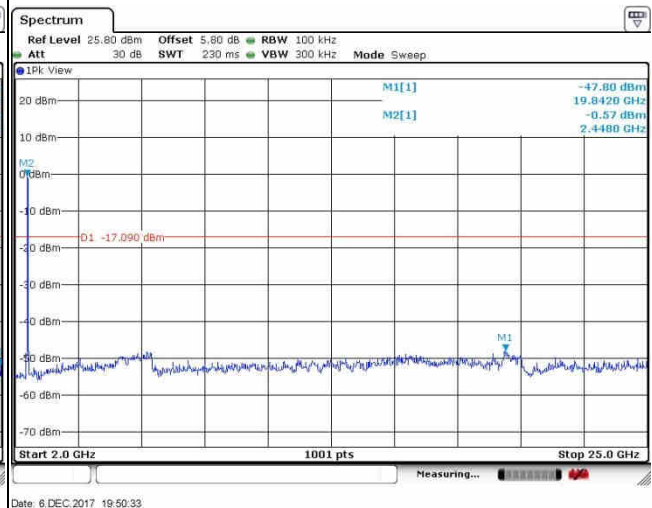
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

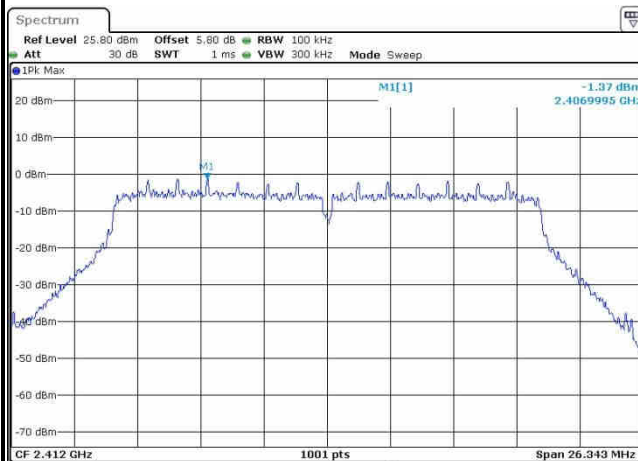




Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	01	Test Engineer :	Silent Hai

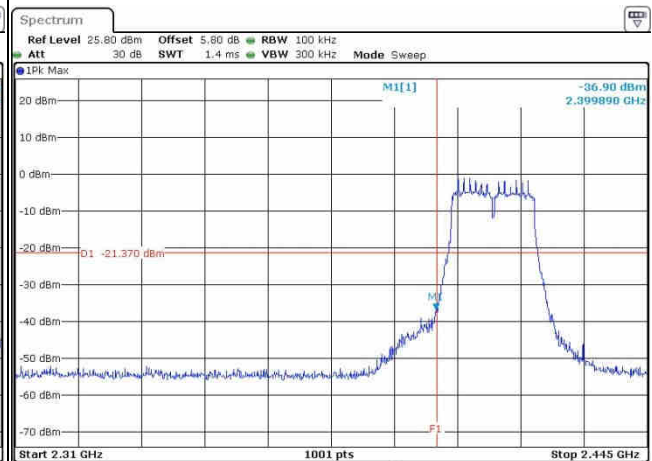
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



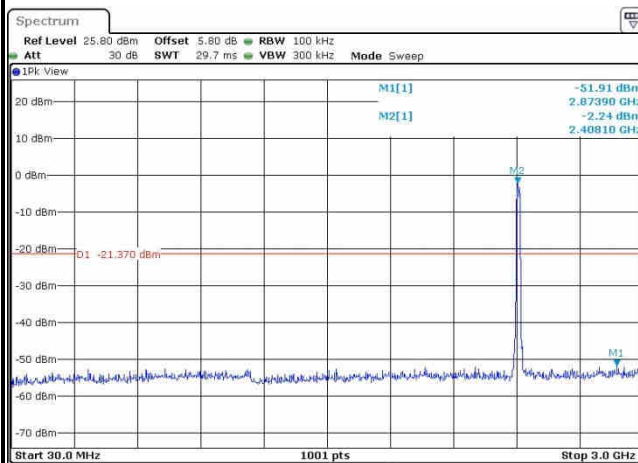
Date: 18 DEC 2017 12:50:53

Low Channel Plot



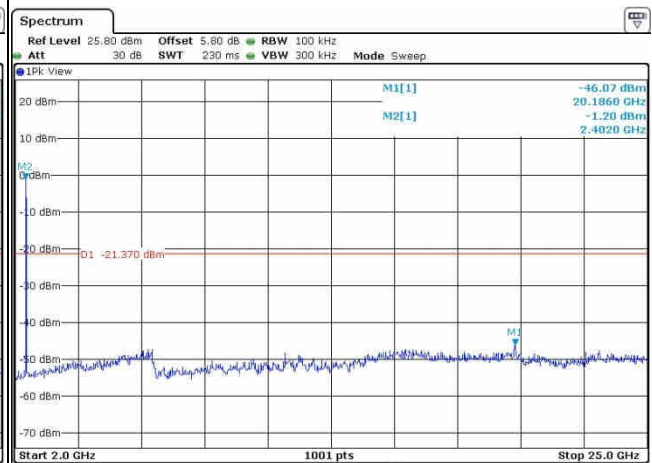
Date: 18 DEC 2017 12:51:08

Spurious Emission 30MHz~3GHz



Date: 18 DEC 2017 12:51:22

Spurious Emission 2GHz~25GHz



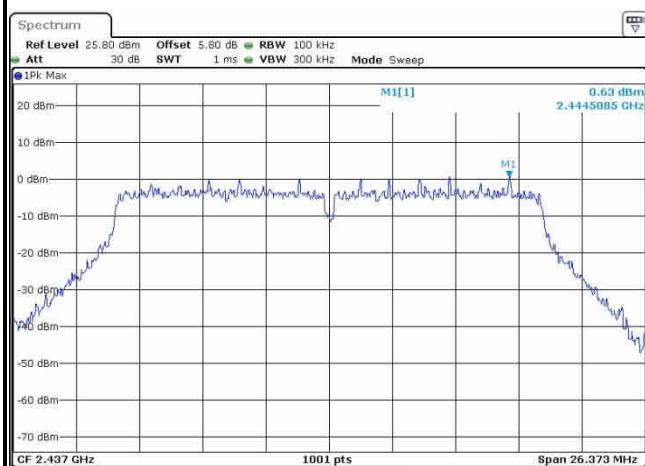
Date: 18 DEC 2017 12:52:10



Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

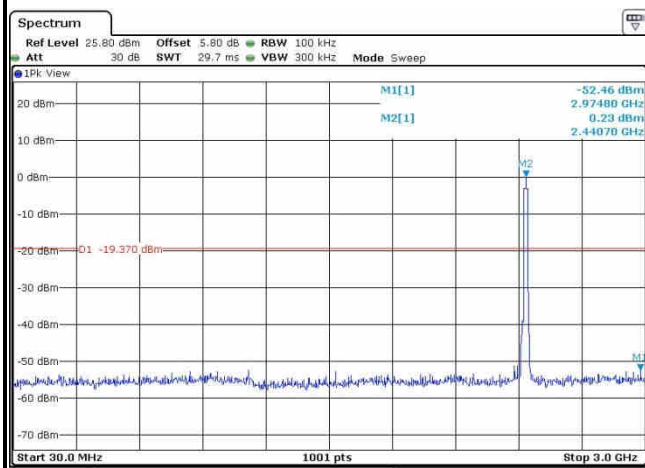
WLAN 802.11n HT20 Channel 06

100kHz PSD reference Level



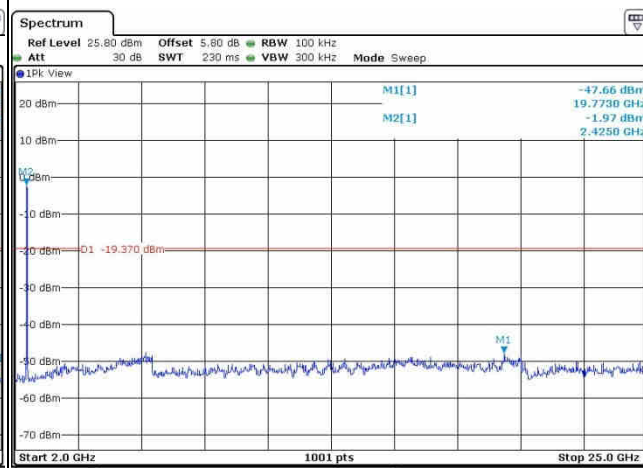
Date: 6 DEC. 2017 19:58:15

Spurious Emission 30MHz~3GHz



Date: 6 DEC. 2017 19:59:51

Spurious Emission 2GHz~25GHz



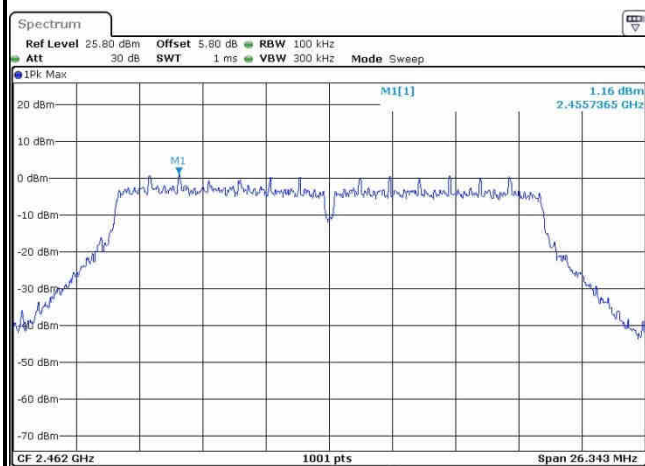
Date: 6 DEC. 2017 19:59:26



Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	11	Test Engineer :	Silent Hai

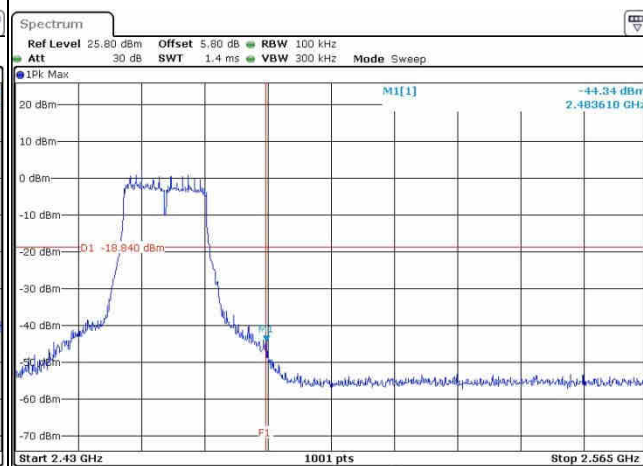
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



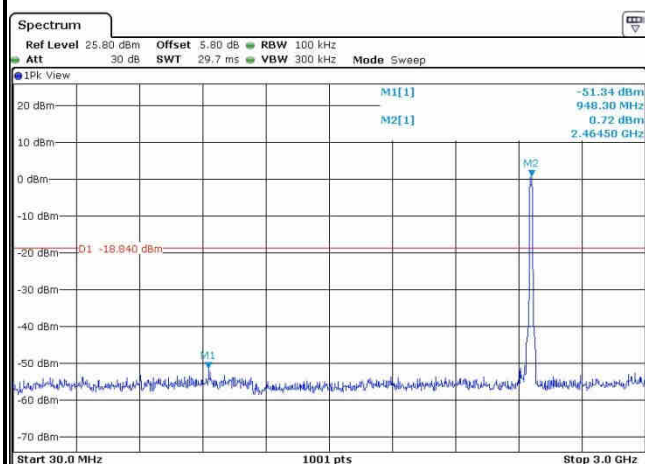
Date: 6 DEC. 2017 20:38:15

High Channel Plot



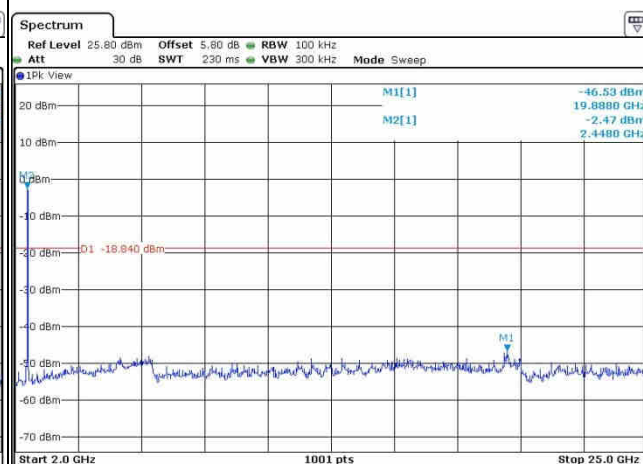
Date: 6 DEC. 2017 20:38:29

Spurious Emission 30MHz~3GHz



Date: 6 DEC. 2017 20:39:21

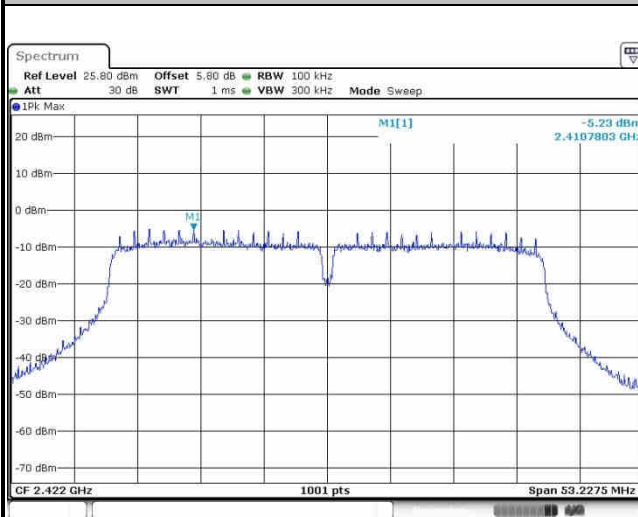
Spurious Emission 2GHz~25GHz



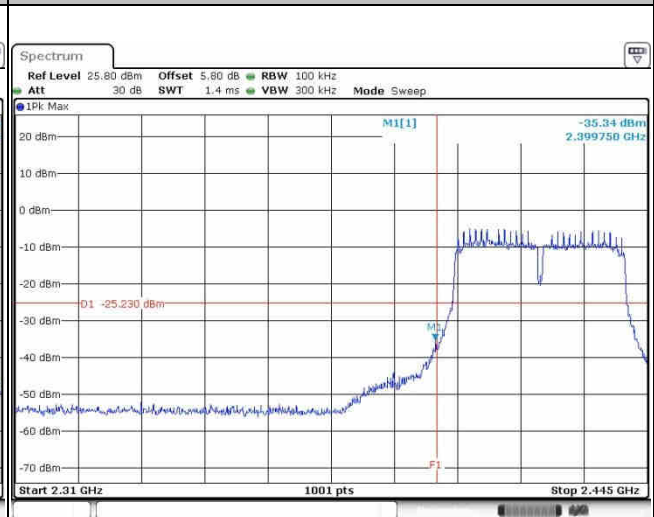
Date: 6 DEC. 2017 20:39:02



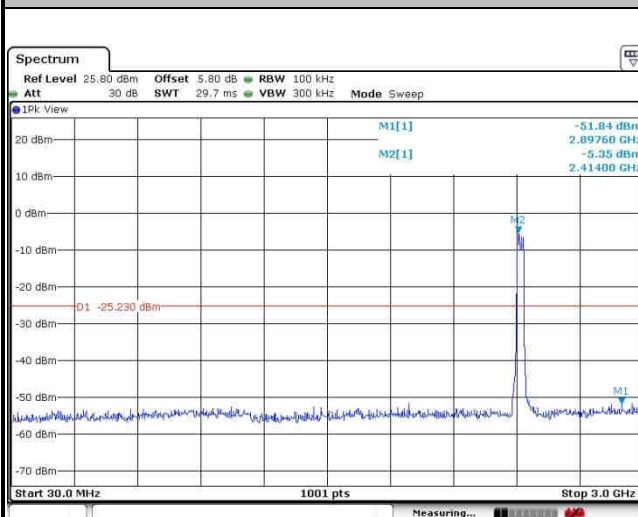
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~55%
Test Channel :	03	Test Engineer :	Silent Hai

WLAN 802.11n HT20 Channel 01**100kHz PSD reference Level**

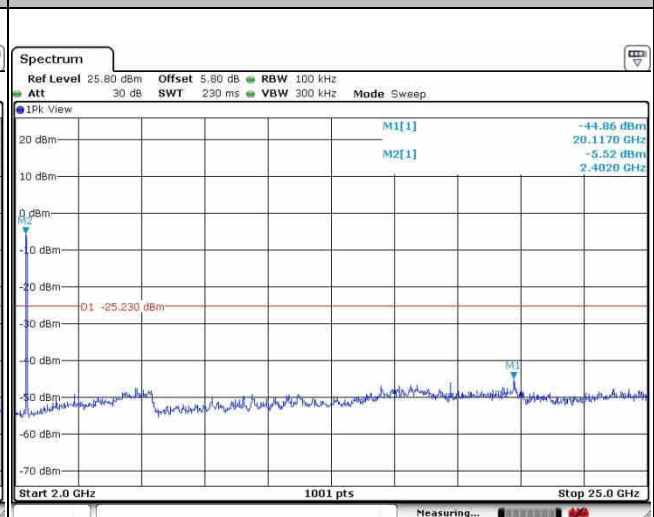
Date: 18 DEC 2017 13:04:09

Low Channel Plot

Date: 18 DEC 2017 13:04:22

Spurious Emission 30MHz~3GHz

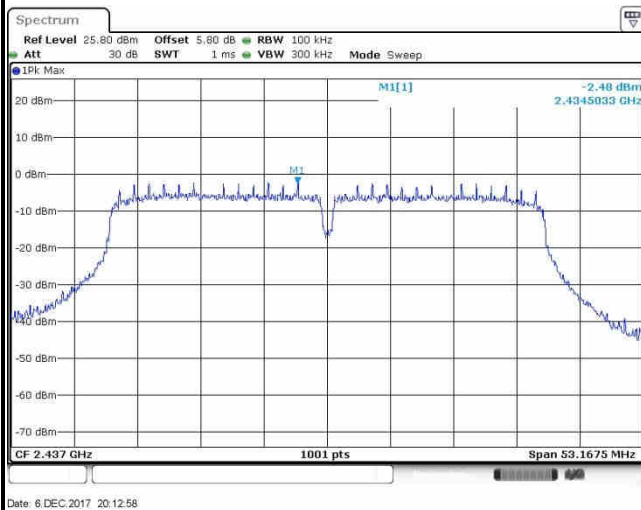
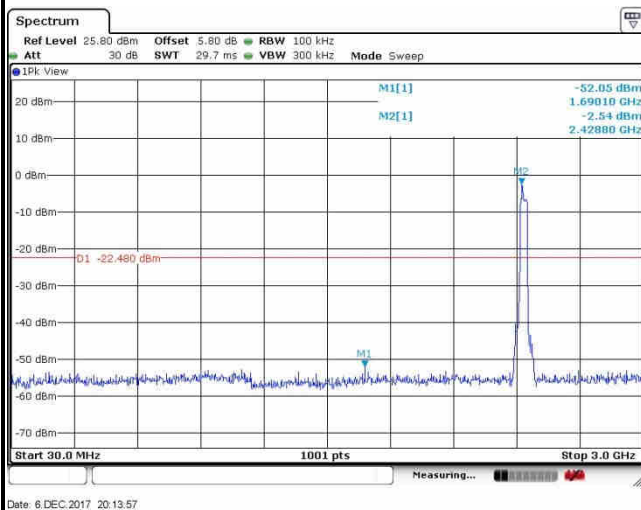
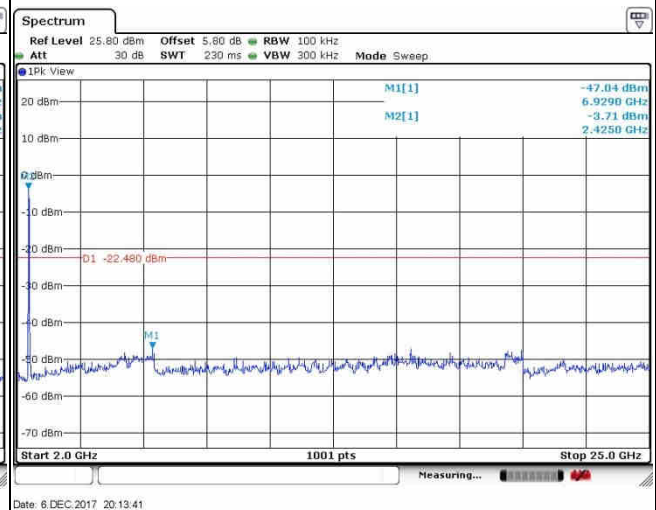
Date: 18 DEC 2017 13:06:25

Spurious Emission 2GHz~25GHz

Date: 18 DEC 2017 13:06:29



Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~55%
Test Channel :	06	Test Engineer :	Silent Hai

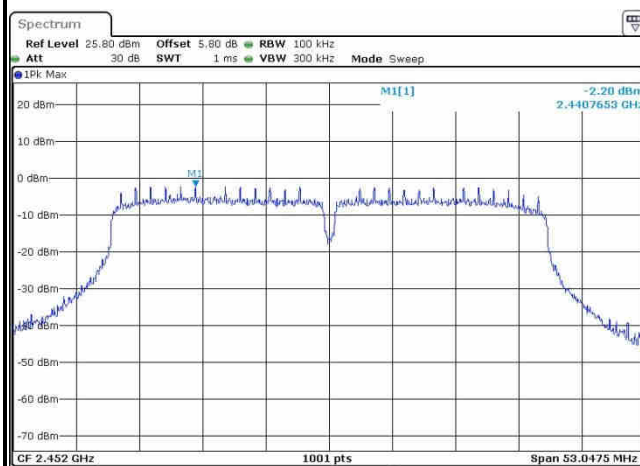
WLAN 802.11n HT20 Channel 06**100kHz PSD reference Level****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~55%
Test Channel :	09	Test Engineer :	Silent Hai

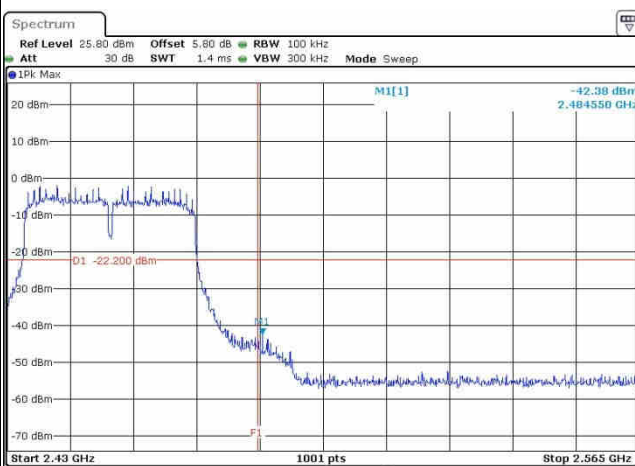
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



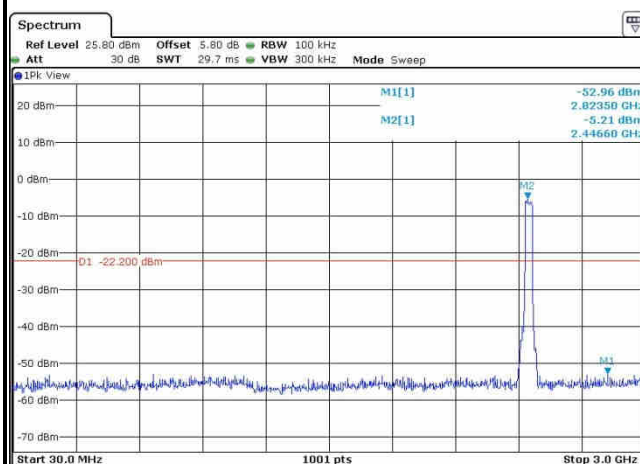
Date: 6 DEC. 2017 20:16:24

High Channel Plot



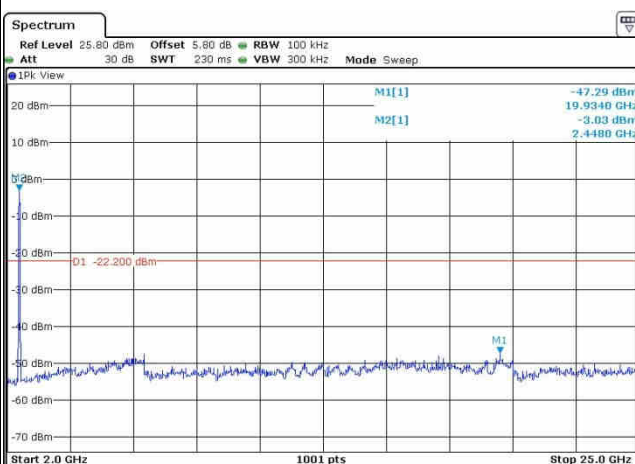
Date: 6 DEC. 2017 20:16:44

Spurious Emission 30MHz~3GHz



Date: 6 DEC. 2017 20:18:42

Spurious Emission 2GHz~25GHz



Date: 6 DEC. 2017 20:18:22

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

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

3.5.2 Measuring Instruments

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



3.5.3 Test Procedures

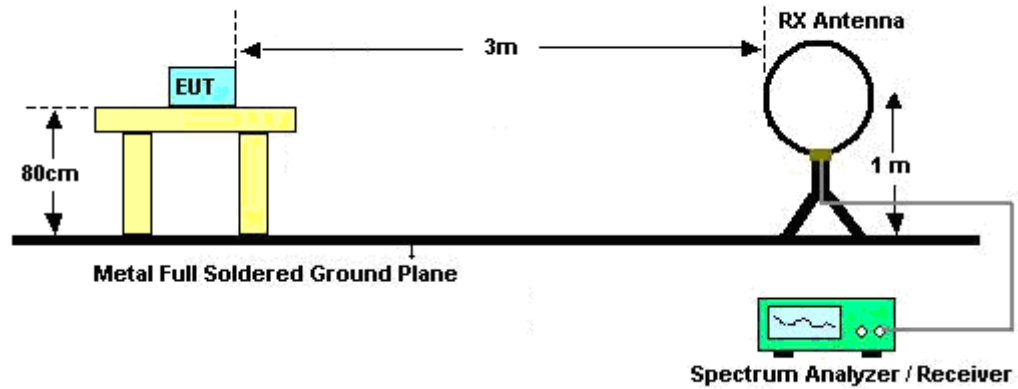
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. 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.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

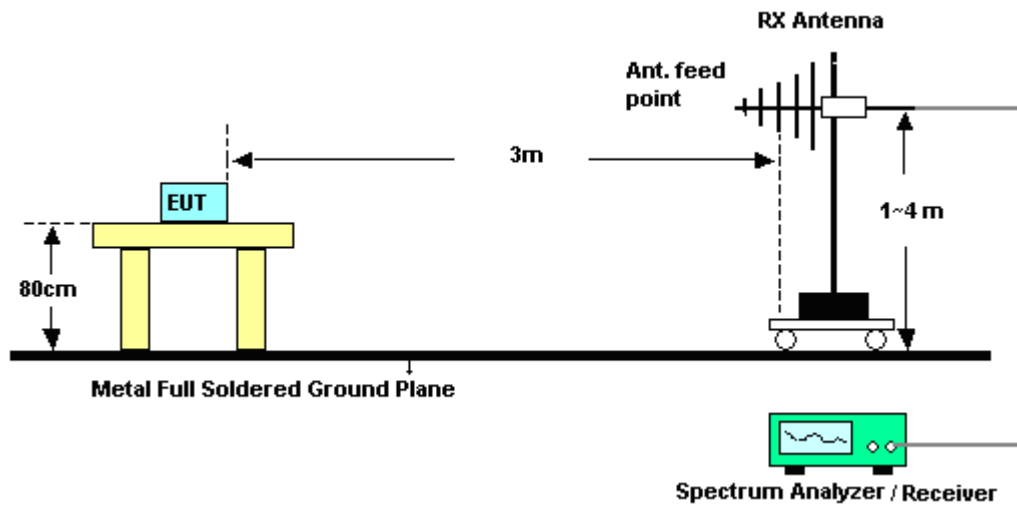
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

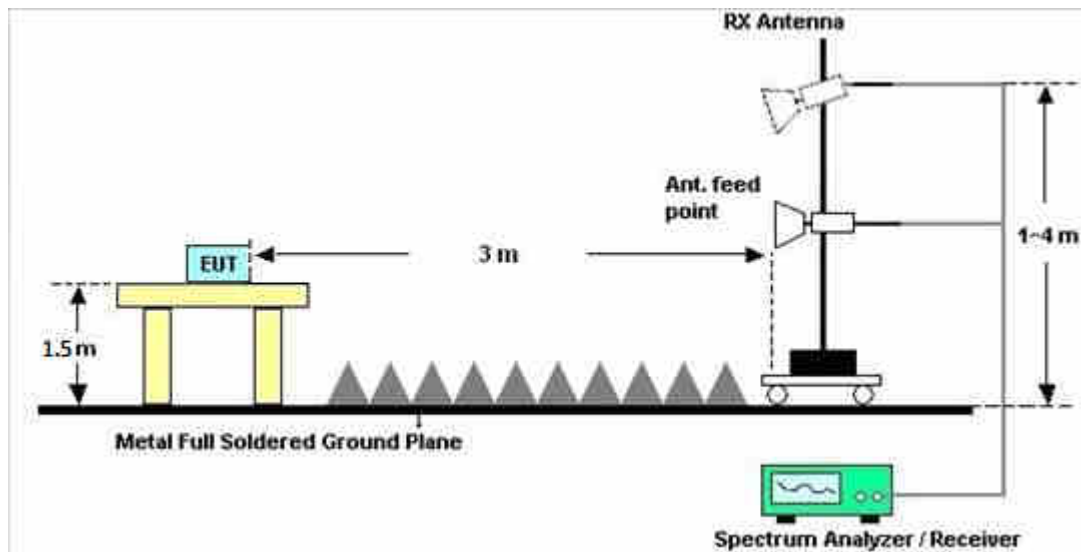
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B.

3.5.7 Duty Cycle

Please refer to Appendix C.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

3.6 AC Conducted Emission Measurement

3.6.1 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.

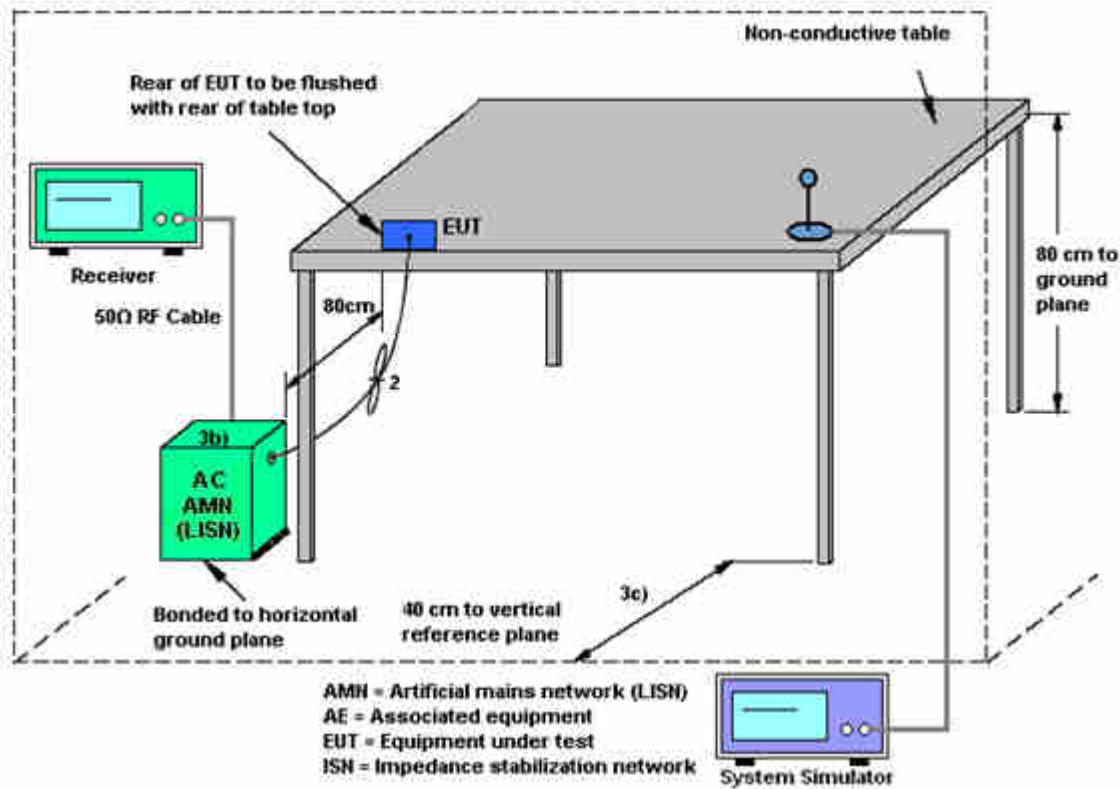
3.6.2 Measuring Instruments

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

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it 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 (IF bandwidth = 9kHz) with Maximum Hold Mode.

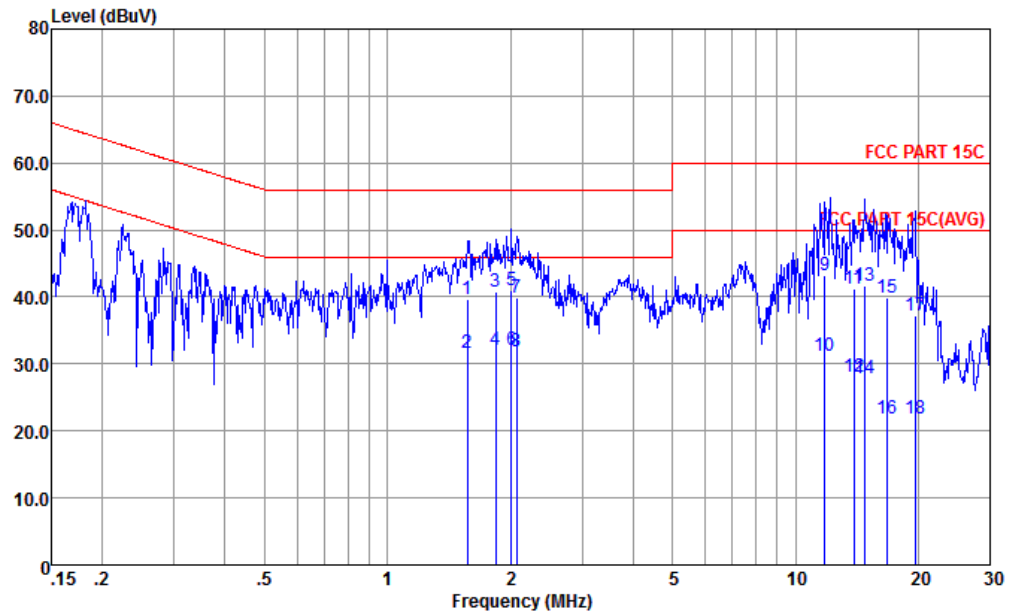
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	42~45%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter 1) + Battery 1		

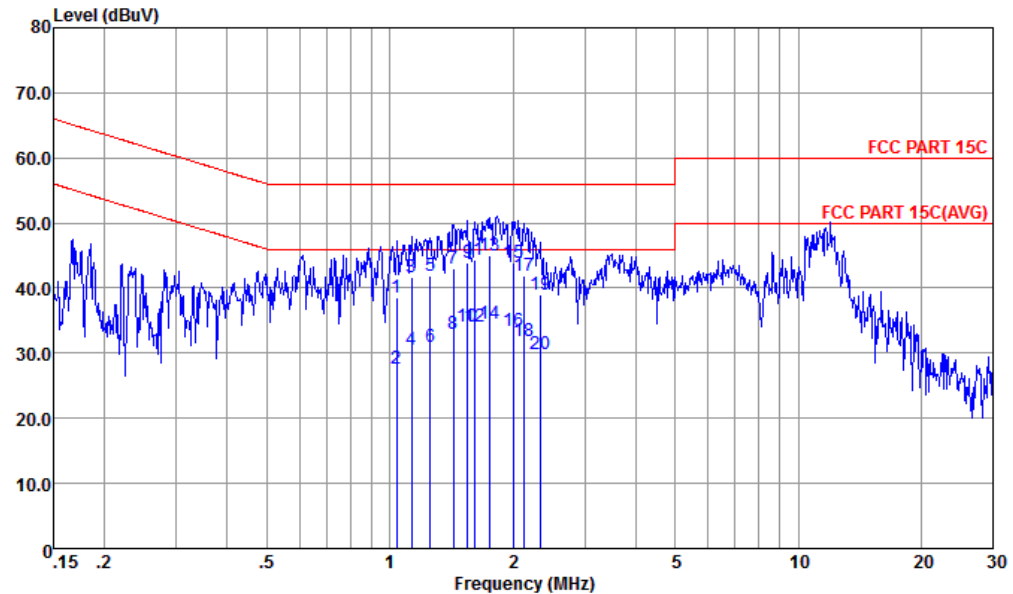


Site : CO01-KS
Condition : FCC PART 15C LISN-L-171013-060103 LINE
mode : Mode 1
: 99000898000100 #6

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	1.568	39.65	-16.35	56.00	29.20	0.27	10.18	QP
2	1.568	31.75	-14.25	46.00	21.30	0.27	10.18	Average
3	1.839	40.68	-15.32	56.00	30.20	0.28	10.20	QP
4	1.839	32.08	-13.92	46.00	21.60	0.28	10.20	Average
5	2.012	41.09	-14.91	56.00	30.60	0.28	10.21	QP
6 *	2.012	32.09	-13.91	46.00	21.60	0.28	10.21	Average
7	2.077	40.00	-16.00	56.00	29.51	0.28	10.21	QP
8	2.077	31.80	-14.20	46.00	21.31	0.28	10.21	Average
9	11.807	43.28	-16.72	60.00	32.61	0.31	10.36	QP
10	11.807	31.28	-18.72	50.00	20.61	0.31	10.36	Average
11	13.915	41.27	-18.73	60.00	30.59	0.28	10.40	QP
12	13.915	27.97	-22.03	50.00	17.29	0.28	10.40	Average
13	14.750	41.58	-18.42	60.00	30.90	0.27	10.41	QP
14	14.750	27.78	-22.22	50.00	17.10	0.27	10.41	Average
15	16.839	39.87	-20.13	60.00	29.20	0.23	10.44	QP
16	16.839	21.87	-28.13	50.00	11.20	0.23	10.44	Average
17	19.740	37.26	-22.74	60.00	26.60	0.18	10.48	QP
18	19.740	21.86	-28.14	50.00	11.20	0.18	10.48	Average



Test Mode :	Mode 1	Temperature :	22~24℃
Test Engineer :	Amos Zhang	Relative Humidity :	42~45%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter 1) + Battery 1		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-171013-060103 NEUTRAL

mode : Mode 1
: 99000898000100 #6

	Freq	Level	Over	Limit	Read	LISN	Cable	Remark
	MHz	dBuV	Limit	Line	Level	Factor	Loss	
			dB	dBuV	dBuV	dB	dB	
1	1.037	38.62	-17.38	56.00	28.20	0.31	10.11	QP
2	1.037	27.72	-18.28	46.00	17.30	0.31	10.11	Average
3	1.129	41.74	-14.26	56.00	31.30	0.31	10.13	QP
4	1.129	30.64	-15.36	46.00	20.20	0.31	10.13	Average
5	1.255	41.96	-14.04	56.00	31.51	0.31	10.14	QP
6	1.255	31.06	-14.94	46.00	20.61	0.31	10.14	Average
7	1.433	43.08	-12.92	56.00	32.60	0.32	10.16	QP
8	1.433	33.08	-12.92	46.00	22.60	0.32	10.16	Average
9	1.552	43.99	-12.01	56.00	33.49	0.32	10.18	QP
10	1.552	34.09	-11.91	46.00	23.59	0.32	10.18	Average
11	1.610	44.40	-11.60	56.00	33.90	0.32	10.18	QP
12	1.610	34.10	-11.90	46.00	23.60	0.32	10.18	Average
13 *	1.762	45.01	-10.99	56.00	34.50	0.32	10.19	QP
14	1.762	34.61	-11.39	46.00	24.10	0.32	10.19	Average
15	2.012	43.83	-12.17	56.00	33.30	0.32	10.21	QP
16	2.012	33.43	-12.57	46.00	22.90	0.32	10.21	Average
17	2.133	41.83	-14.17	56.00	31.30	0.32	10.21	QP
18	2.133	31.83	-14.17	46.00	21.30	0.32	10.21	Average
19	2.346	39.03	-16.97	56.00	28.51	0.32	10.20	QP
20	2.346	29.83	-16.17	46.00	19.31	0.32	10.20	Average



3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101040	10Hz~40GHz	Aug. 08, 2017	Dec. 06, 2017~ Dec. 18, 2017	Aug. 07, 2018	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 19, 2017	Dec. 06, 2017~ Dec. 18, 2017	Jan. 18, 2018	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 19, 2017	Dec. 06, 2017~ Dec. 18, 2017	Jan. 18, 2018	Conducted (TH01-KS)
EMI Test Receiver	Keysight	N9038A	MY56400004	3Hz~8.5GHz; Max 30dBm	Oct. 19, 2017	Dec. 22, 2017	Oct. 18, 2018	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 18, 2017	Dec. 22, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 22, 2017	Dec. 22, 2017	Oct. 21, 2018	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 22, 2017	Dec. 22, 2017	Apr. 21, 2018	Radiation (03CH03-KS)
Double Ridge Horn Antenna	ETS-Lindgren	3117	75957	1GHz~18GHz	Oct. 21, 2017	Dec. 22, 2017	Oct. 20, 2018	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Feb. 15, 2017	Dec. 22, 2017	Feb. 14, 2018	Radiation (03CH03-KS)
Amplifier	com-power	PA-103A	161069	1MHz~1000MHz / 32 dB	Apr. 18, 2017	Dec. 22, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	MITEQ	TTA1840-35-HG	1887435	18GHz~40GHz	Oct. 12, 2017	Dec. 22, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	2025788	1GHz~18GHz	Apr. 18, 2017	Dec. 22, 2017	Apr. 17, 2018	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 12, 2017	Dec. 22, 2017	Oct. 11, 2018	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Dec. 22, 2017	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 22, 2017	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 22, 2017	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESC17	100768	9kHz~7GHz;	Apr. 20, 2017	Dec. 11, 2017	Apr. 19, 2018	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2017	Dec. 11, 2017	Oct. 12, 2018	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2017	Dec. 11, 2017	Oct. 12, 2018	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP000000811	AC 0V~300V, 45Hz~1000Hz	Oct. 12, 2017	Dec. 11, 2017	Oct. 11, 2018	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6dB
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.5dB
---	-------

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.7dB
---	-------



Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Silent Hai	Temperature:	21~25	°C
Test Date:	2017/12/6~2017/12/18	Relative Humidity:	51~55	%

TEST RESULTS DATA
6dB Bandwidth

2.4GHz Band							
Mod.	Data Rate	Ntx	CH.	Freq. (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	8.55	0.50	Pass
11b	1Mbps	1	6	2437	8.05	0.50	Pass
11b	1Mbps	1	11	2462	8.07	0.50	Pass
11g	6Mbps	1	1	2412	16.36	0.50	Pass
11g	6Mbps	1	6	2437	16.34	0.50	Pass
11g	6Mbps	1	11	2462	16.36	0.50	Pass
HT20	MCS0	1	1	2412	17.56	0.50	Pass
HT20	MCS0	1	6	2437	17.58	0.50	Pass
HT20	MCS0	1	11	2462	17.56	0.50	Pass
HT40	MCS0	1	3	2422	35.49	0.50	Pass
HT40	MCS0	1	6	2437	35.45	0.50	Pass
HT40	MCS0	1	9	2452	35.37	0.50	Pass

TEST RESULTS DATA
Peak Power Table

2.4GHz Band										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
11b	1Mbps	1	1	2412	18.58	30.00	0.43	19.01	36.00	Pass
11b	1Mbps	1	6	2437	18.68	30.00	0.43	19.11	36.00	Pass
11b	1Mbps	1	11	2462	18.82	30.00	0.43	19.25	36.00	Pass
11g	6Mbps	1	1	2412	21.67	30.00	0.43	22.10	36.00	Pass
11g	6Mbps	1	6	2437	22.95	30.00	0.43	23.38	36.00	Pass
11g	6Mbps	1	11	2462	23.10	30.00	0.43	23.53	36.00	Pass
HT20	MCS0	1	1	2412	20.06	30.00	0.43	20.49	36.00	Pass
HT20	MCS0	1	6	2437	21.56	30.00	0.43	21.99	36.00	Pass
HT20	MCS0	1	11	2462	21.76	30.00	0.43	22.19	36.00	Pass
HT40	MCS0	1	3	2422	18.49	30.00	0.43	18.92	36.00	Pass
HT40	MCS0	1	6	2437	21.47	30.00	0.43	21.90	36.00	Pass
HT40	MCS0	1	9	2452	21.59	30.00	0.43	22.02	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.12	15.74
11b	1Mbps	1	6	2437	0.12	15.86
11b	1Mbps	1	11	2462	0.12	16.19
11g	6Mbps	1	1	2412	0.58	11.69
11g	6Mbps	1	6	2437	0.58	13.92
11g	6Mbps	1	11	2462	0.58	14.15
HT20	MCS0	1	1	2412	0.62	10.20
HT20	MCS0	1	6	2437	0.62	11.91
HT20	MCS0	1	11	2462	0.62	12.25
HT40	MCS0	1	3	2422	0.64	8.74
HT40	MCS0	1	6	2437	0.64	11.72
HT40	MCS0	1	9	2452	0.64	11.92

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-7.22	0.43	8.00	Pass
11b	1Mbps	1	6	2437	-5.02	0.43	8.00	Pass
11b	1Mbps	1	11	2462	-6.92	0.43	8.00	Pass
11g	6Mbps	1	1	2412	-13.05	0.43	8.00	Pass
11g	6Mbps	1	6	2437	-12.20	0.43	8.00	Pass
11g	6Mbps	1	11	2462	-11.22	0.43	8.00	Pass
HT20	MCS0	1	1	2412	-15.11	0.43	8.00	Pass
HT20	MCS0	1	6	2437	-13.10	0.43	8.00	Pass
HT20	MCS0	1	11	2462	-13.75	0.43	8.00	Pass
HT40	MCS0	1	3	2422	-19.00	0.43	8.00	Pass
HT40	MCS0	1	6	2437	-16.98	0.43	8.00	Pass
HT40	MCS0	1	9	2452	-16.16	0.43	8.00	Pass



Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.43	57.41	-16.59	74	55.17	31.3	7.59	36.65	306	104	P	H
		2389.82	47.65	-6.35	54	45.4	31.3	7.59	36.64	306	104	A	H
	*	2412	107.58	-	-	105.27	31.33	7.62	36.64	306	104	P	H
	*	2410	104.35	-	-	102.04	31.33	7.62	36.64	306	104	A	H
		2357.45	58.06	-15.94	74	55.96	31.25	7.52	36.67	301	16	P	V
		2387.35	46.57	-7.43	54	44.33	31.3	7.59	36.65	301	16	A	V
	*	2412	102.02	-	-	99.71	31.33	7.62	36.64	301	16	P	V
	*	2410	98.76	-	-	96.45	31.33	7.62	36.64	301	16	A	V
802.11b CH 06 2437MHz		2371.49	57.62	-16.38	74	55.45	31.27	7.55	36.65	297	120	P	H
		2381.37	46.94	-7.06	54	44.77	31.27	7.55	36.65	297	120	A	H
	*	2436	105.52	-	-	103.17	31.36	7.64	36.65	297	120	P	H
	*	2438	102.36	-	-	99.95	31.39	7.67	36.65	297	120	A	H
		2498.14	58.5	-15.5	74	55.98	31.47	7.74	36.69	297	120	P	H
		2493.82	47.02	-6.98	54	44.5	31.47	7.74	36.69	297	120	A	H
		2387.87	57.4	-16.6	74	55.16	31.3	7.59	36.65	300	58	P	V
		2382.8	46.75	-7.25	54	44.58	31.27	7.55	36.65	300	58	A	V
	*	2436	102.39	-	-	100.04	31.36	7.64	36.65	300	58	P	V
	*	2436	99.29	-	-	96.94	31.36	7.64	36.65	300	58	A	V
		2490.88	57.56	-16.44	74	55.03	31.47	7.74	36.68	300	58	P	V
		2490.16	46.95	-7.05	54	44.42	31.47	7.74	36.68	300	58	A	V



802.11b CH 11 2462MHz	*	2462	106.09	-	-	103.66	31.41	7.69	36.67	330	105	P	H
	*	2462	102.84	-	-	100.41	31.41	7.69	36.67	330	105	A	H
		2486.44	57.52	-16.48	74	55.04	31.44	7.72	36.68	330	105	P	H
		2483.56	46.83	-7.17	54	44.35	31.44	7.72	36.68	330	105	A	H
	*	2462	102.57	-	-	100.14	31.41	7.69	36.67	327	21	P	V
	*	2460	99.32	-	-	96.89	31.41	7.69	36.67	327	21	A	V
		2489.08	57.9	-16.1	74	55.37	31.47	7.74	36.68	327	21	P	V
		2485.84	46.81	-7.19	54	44.33	31.44	7.72	36.68	327	21	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11b (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)
802.11b CH 01 2412MHz		4824	33.6	-40.4	74	55.95	30.68	11.5	64.53	100	360	P	H
		4824	33.77	-40.23	74	56.12	30.68	11.5	64.53	100	360	P	V
802.11b CH 06 2437MHz		4872	33.51	-40.49	74	55.7	30.85	11.56	64.6	100	360	P	H
		7311	38.57	-35.43	74	54.79	34.81	13.98	65.01	100	360	P	H
		4874	33.95	-40.05	74	56.14	30.85	11.56	64.6	100	360	P	V
		7308	38.24	-35.76	74	54.46	34.81	13.98	65.01	100	360	P	V
802.11b CH 11 2462MHz		4926	33.87	-40.13	74	55.91	31.02	11.62	64.68	100	360	P	H
		7386	39.43	-34.57	74	55.48	35.03	13.97	65.05	100	360	P	H
		4926	34.2	-39.8	74	56.24	31.02	11.62	64.68	100	360	P	V
		7386	39.3	-34.7	74	55.35	35.03	13.97	65.05	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
WIFI 802.11g (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)
802.11g CH 01 2412MHz		2389.82	67.72	-6.28	74	65.47	31.3	7.59	36.64	317	163	P	H
		2389.95	52.41	-1.59	54	50.16	31.3	7.59	36.64	317	163	A	H
	*	2408	105.03	-	-	102.72	31.33	7.62	36.64	317	163	P	H
	*	2406	97.14	-	-	94.83	31.33	7.62	36.64	317	163	A	H
		2389.95	67.3	-6.7	74	65.05	31.3	7.59	36.64	309	73	P	V
		2389.95	52.45	-1.55	54	50.2	31.3	7.59	36.64	309	73	A	V
	*	2406	105.89	-	-	103.58	31.33	7.62	36.64	309	73	P	V
	*	2408	98.04	-	-	95.73	31.33	7.62	36.64	309	73	A	V
802.11g CH 06 2437MHz		2342.24	57.23	-16.77	74	55.2	31.22	7.48	36.67	400	165	P	H
		2384.62	47.87	-6.13	54	45.7	31.27	7.55	36.65	400	165	A	H
	*	2444	105.88	-	-	103.49	31.39	7.67	36.67	400	165	P	H
	*	2442	97.92	-	-	95.53	31.39	7.67	36.67	400	165	A	H
		2490.34	57.73	-16.27	74	55.2	31.47	7.74	36.68	400	165	P	H
		2491.48	47.03	-6.97	54	44.5	31.47	7.74	36.68	400	165	A	H
		2384.62	57.88	-16.12	74	55.71	31.27	7.55	36.65	104	115	P	V
		2384.49	49.09	-4.91	54	46.92	31.27	7.55	36.65	104	115	A	V
	*	2444	106.96	-	-	104.57	31.39	7.67	36.67	104	115	P	V
	*	2442	99.02	-	-	96.63	31.39	7.67	36.67	104	115	A	V
		2497.42	58.04	-15.96	74	55.52	31.47	7.74	36.69	104	115	P	V
		2488.9	47.08	-6.92	54	44.55	31.47	7.74	36.68	104	115	A	V



802.11g CH 11 2462MHz	*	2456	106.16	-	-	103.73	31.41	7.69	36.67	314	164	P	H
	*	2456	98.39	-	-	95.96	31.41	7.69	36.67	314	164	A	H
		2483.51	66.77	-7.23	74	64.29	31.44	7.72	36.68	314	164	P	H
		2483.68	50.26	-3.74	54	47.78	31.44	7.72	36.68	314	164	A	H
	*	2456	108.17	-	-	105.74	31.41	7.69	36.67	260	82	P	V
	*	2456	100.42	-	-	97.99	31.41	7.69	36.67	260	82	A	V
		2483.92	66.61	-7.39	74	64.13	31.44	7.72	36.68	260	82	P	V
		2483.51	51.32	-2.68	54	48.84	31.44	7.72	36.68	260	82	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

WIFI 802.11g (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)
802.11g CH 01 2412MHz		4824	32.46	-41.54	74	54.81	30.68	11.5	64.53	100	360	P	H
		4824	33.95	-40.05	74	56.3	30.68	11.5	64.53	100	360	P	V
802.11g CH 06 2437MHz		4872	32.28	-41.72	74	54.47	30.85	11.56	64.6	100	360	P	H
		7311	38.12	-35.88	74	54.34	34.81	13.98	65.01	100	360	P	H
		4874	33.34	-40.66	74	55.53	30.85	11.56	64.6	100	360	P	V
		7308	39.26	-34.74	74	55.48	34.81	13.98	65.01	100	360	P	V
802.11g CH 11 2462MHz		4926	32.88	-41.12	74	54.92	31.02	11.62	64.68	100	360	P	H
		7386	40.85	-33.15	74	56.9	35.03	13.97	65.05	100	360	P	H
		4926	32.96	-41.04	74	55	31.02	11.62	64.68	100	360	P	V
		7386	38.2	-35.8	74	54.25	35.03	13.97	65.05	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

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 01 2412MHz		2389.82	66.83	-7.17	74	64.58	31.3	7.59	36.64	394	84	P	H
		2389.95	52.68	-1.32	54	50.43	31.3	7.59	36.64	394	84	A	H
	*	2406	104.23	-	-	101.92	31.33	7.62	36.64	394	84	P	H
	*	2404	96.28	-	-	93.97	31.33	7.62	36.64	394	84	A	H
		2389.04	63.59	-10.41	74	61.35	31.3	7.59	36.65	304	62	P	V
		2389.95	49.63	-4.37	54	47.38	31.3	7.59	36.64	304	62	A	V
	*	2406	99.54	-	-	97.23	31.33	7.62	36.64	304	62	P	V
	*	2408	91.89	-	-	89.58	31.33	7.62	36.64	304	62	A	V
802.11n HT20 CH 06 2437MHz		2384.88	57.78	-16.22	74	55.61	31.27	7.55	36.65	378	87	P	H
		2385.27	47.9	-6.1	54	45.73	31.27	7.55	36.65	378	87	A	H
	*	2442	105.21	-	-	102.82	31.39	7.67	36.67	378	87	P	H
	*	2442	97.31	-	-	94.92	31.39	7.67	36.67	378	87	A	H
		2490.94	57.95	-16.05	74	55.42	31.47	7.74	36.68	378	87	P	H
		2488.3	47.33	-6.67	54	44.8	31.47	7.74	36.68	378	87	A	H
		2357.84	58.12	-15.88	74	56.02	31.25	7.52	36.67	388	48	P	V
		2384.88	47.73	-6.27	54	45.56	31.27	7.55	36.65	388	48	A	V
	*	2442	103.31	-	-	100.92	31.39	7.67	36.67	388	48	P	V
	*	2444	94.98	-	-	92.59	31.39	7.67	36.67	388	48	A	V
		2494.42	58.66	-15.34	74	56.14	31.47	7.74	36.69	388	48	P	V
		2491.96	47.3	-6.7	54	44.78	31.47	7.74	36.69	388	48	A	V



802.11n HT20 CH 11 2462MHz	*	2456	105.54	-	-	103.11	31.41	7.69	36.67	300	99	P	H
	*	2454	97.68	-	-	95.25	31.41	7.69	36.67	300	99	A	H
		2483.56	61.11	-12.89	74	58.63	31.44	7.72	36.68	300	99	P	H
		2483.51	48.46	-5.54	54	45.98	31.44	7.72	36.68	300	99	A	H
	*	2454	103.49	-	-	101.06	31.41	7.69	36.67	380	47	P	V
	*	2454	95.67	-	-	93.24	31.41	7.69	36.67	380	47	A	V
		2483.98	58.03	-15.97	74	55.55	31.44	7.72	36.68	380	47	P	V
		2483.92	47.48	-6.52	54	45	31.44	7.72	36.68	380	47	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
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 01 2412MHz		4824	39.05	-34.95	74	56.43	35.65	11.5	64.53	100	360	P	H
		4824	36.8	-37.2	74	54.18	35.65	11.5	64.53	100	360	P	V
802.11n HT20 CH 06 2437MHz		4872	32.83	-41.17	74	50.26	35.61	11.56	64.6	100	360	P	H
		7308	37.3	-36.7	74	52.44	35.89	13.98	65.01	100	360	P	H
		4872	31.41	-42.59	74	48.84	35.61	11.56	64.6	100	360	P	V
		7308	37.08	-36.92	74	52.22	35.89	13.98	65.01	100	360	P	V
802.11n HT20 CH 11 2462MHz		4926	37.8	-36.2	74	55.29	35.57	11.62	64.68	100	360	P	H
		7386	39.1	-34.9	74	54.24	35.94	13.97	65.05	100	360	P	H
		4926	38.31	-35.69	74	55.8	35.57	11.62	64.68	100	360	P	V
		7386	38.25	-35.75	74	53.39	35.94	13.97	65.05	100	360	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

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 03 2422MHz		2389.56	64.21	-9.79	74	61.97	31.3	7.59	36.65	264	83	P	H
		2389.82	52.46	-1.54	54	50.21	31.3	7.59	36.64	264	83	A	H
	*	2410	100.64	-	-	98.33	31.33	7.62	36.64	264	83	P	H
	*	2410	92.67	-	-	90.36	31.33	7.62	36.64	264	83	A	H
		2486.56	57.95	-16.05	74	55.47	31.44	7.72	36.68	264	83	P	H
		2492.98	47.53	-6.47	54	45.01	31.47	7.74	36.69	264	83	A	H
		2389.82	62.67	-11.33	74	60.42	31.3	7.59	36.64	388	57	P	V
		2389.56	50.57	-3.43	54	48.33	31.3	7.59	36.65	388	57	A	V
	*	2410	97.37	-	-	95.06	31.33	7.62	36.64	388	57	P	V
	*	2410	89.13	-	-	86.82	31.33	7.62	36.64	388	57	A	V
		2495.38	58.41	-15.59	74	55.89	31.47	7.74	36.69	388	57	P	V
		2493.16	47.49	-6.51	54	44.97	31.47	7.74	36.69	388	57	A	V
802.11n HT40 CH 06 2437MHz		2389.56	61.25	-12.75	74	59.01	31.3	7.59	36.65	293	93	P	H
		2389.95	49.12	-4.88	54	46.87	31.3	7.59	36.64	293	93	A	H
	*	2448	103.27	-	-	100.88	31.39	7.67	36.67	293	93	P	H
	*	2450	95.04	-	-	92.65	31.39	7.67	36.67	293	93	A	H
		2484.76	61.59	-12.41	74	59.11	31.44	7.72	36.68	293	93	P	H
		2483.51	48.12	-5.88	54	45.64	31.44	7.72	36.68	293	93	A	H
		2387.74	59.14	-14.86	74	56.9	31.3	7.59	36.65	383	41	P	V
		2389.95	48.3	-5.7	54	46.05	31.3	7.59	36.64	383	41	A	V
	*	2446	100.59	-	-	98.2	31.39	7.67	36.67	383	41	P	V
	*	2450	91.69	-	-	89.3	31.39	7.67	36.67	383	41	A	V
		2495.56	58.02	-15.98	74	55.5	31.47	7.74	36.69	383	41	P	V
		2484.16	47.52	-6.48	54	45.04	31.44	7.72	36.68	383	41	A	V



802.11n HT40 CH 09 2452MHz		2343.41	58.13	-15.87	74	56.1	31.22	7.48	36.67	294	100	P	H
		2389.69	47.53	-6.47	54	45.29	31.3	7.59	36.65	294	100	A	H
	*	2450	102.7	-	-	100.31	31.39	7.67	36.67	294	100	P	H
	*	2450	94.84	-	-	92.45	31.39	7.67	36.67	294	100	A	H
		2484.04	61.26	-12.74	74	58.78	31.44	7.72	36.68	294	100	P	H
		2484.34	49.29	-4.71	54	46.81	31.44	7.72	36.68	294	100	A	H
		2389.43	57.76	-16.24	74	55.52	31.3	7.59	36.65	377	49	P	V
		2368.5	47.37	-6.63	54	45.25	31.25	7.52	36.65	377	49	A	V
	*	2444	100.44	-	-	98.05	31.39	7.67	36.67	377	49	P	V
	*	2454	92.3	-	-	89.87	31.41	7.69	36.67	377	49	A	V
		2483.74	59.45	-14.55	74	56.97	31.44	7.72	36.68	377	49	P	V
		2483.56	48.42	-5.58	54	45.94	31.44	7.72	36.68	377	49	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz
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		4842	39.47	-34.53	74	56.87	35.63	11.52	64.55	100	0	P	H
HT40		7266	40.22	-33.78	74	55.35	35.87	13.99	64.99	100	0	P	H
CH 03		4842	40	-34	74	57.4	35.63	11.52	64.55	100	360	P	V
2422MHz		7266	39.86	-34.14	74	54.99	35.87	13.99	64.99	100	360	P	V
802.11n		4872	39.22	-34.78	74	56.65	35.61	11.56	64.6	100	360	P	H
HT40		7308	38.99	-35.01	74	54.13	35.89	13.98	65.01	100	360	P	H
CH 06		4872	39.64	-34.36	74	57.07	35.61	11.56	64.6	100	0	P	V
2437MHz		7308	40.26	-33.74	74	55.4	35.89	13.98	65.01	100	0	P	V
802.11n		4902	38.65	-35.35	74	56.12	35.58	11.6	64.65	100	0	P	H
HT40		7356	39.75	-34.25	74	54.89	35.92	13.97	65.03	100	0	P	H
CH 09		4902	39.33	-34.67	74	56.8	35.58	11.6	64.65	100	0	P	V
2452MHz		7356	38.98	-35.02	74	54.12	35.92	13.97	65.03	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT20 (LF)

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)
2.4GHz 802.11n HT20 LF		30	25.09	-14.91	40	29.53	27.2	0.65	32.29	256	32	P	H
		97.9	17.19	-26.31	43.5	29.32	18.74	1.39	32.26	-	-	P	H
		216.24	20.09	-25.91	46	33.91	16.23	2.16	32.21	-	-	P	H
		252.13	18.71	-27.29	46	31.28	17.17	2.35	32.09	-	-	P	H
		342.34	22.32	-23.68	46	30.35	20.94	3.12	32.09	-	-	P	H
		449.04	25.2	-20.8	46	28.51	25.45	3.18	31.94	-	-	P	H
		30	27.58	-12.42	40	32.02	27.2	0.65	32.29	162	56	P	V
		44.55	25.1	-14.9	40	36.82	19.45	1.02	32.19	-	-	P	V
		73.65	22.18	-17.82	40	38.46	14.66	1.26	32.2	-	-	P	V
		90.14	21.68	-21.82	43.5	35.08	17.5	1.37	32.27	-	-	P	V
		269.59	19.82	-26.18	46	31.62	17.85	2.43	32.08	-	-	P	V
		323.91	27.52	-18.48	46	36.59	20.13	2.88	32.08	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



dNote 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.	
2		(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)

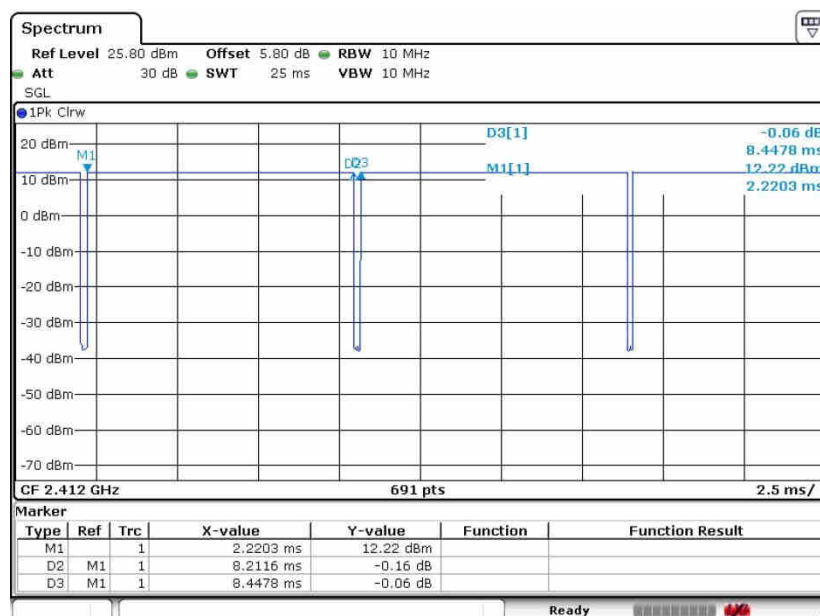
= -10.46(dB)

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

Appendix C. Duty Cycle Plots

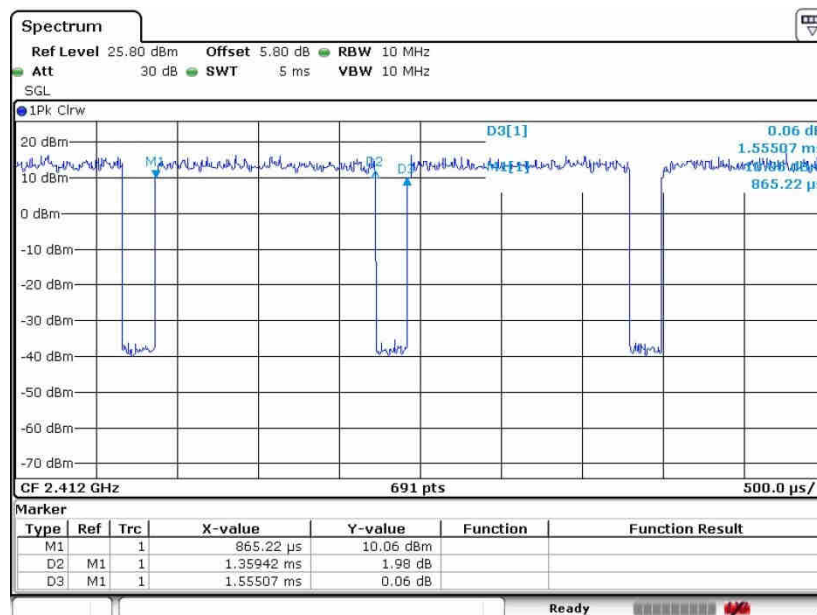
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.20	8.212	0.122	300Hz
802.11g	87.42	1.359	0.736	1kHz
802.11n HT20	86.70	1.275	0.784	1kHz
802.11n HT40	86.29	1.232	0.812	1kHz

802.11b

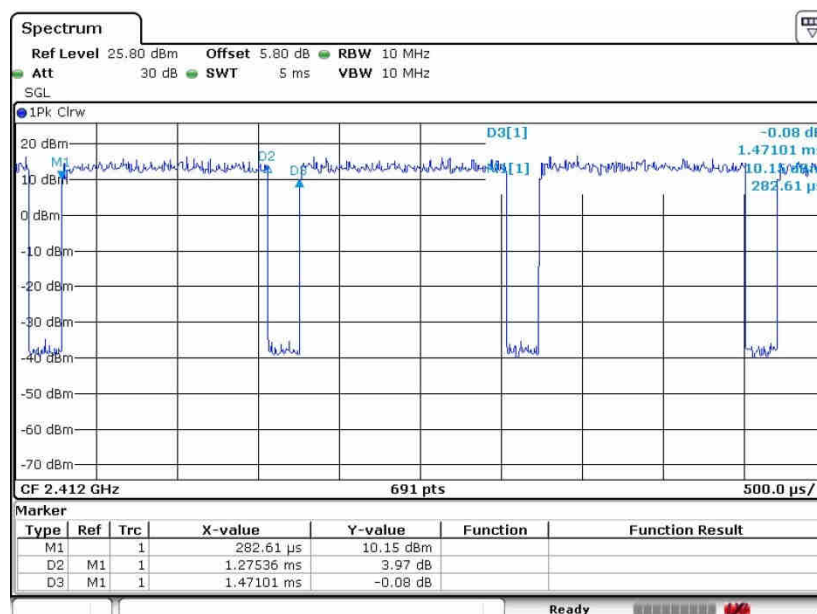




802.11g



802.11n HT20





802.11n HT40

