

FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : WCDMA/LTE Multi-mode Digital
Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z836BL
FCC ID : SRQ-Z836BL
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was completed on Oct. 31, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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



Prepared by: James Huang / Manager



Approved by: Jones Tsai / Manager



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR692313C	Rev. 01	Initial issue of report	Nov. 11, 2016

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 0.81 dB at 2389.950 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 6.59 dB at 0.549 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	WCDMA/LTE Multi-mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z836BL
FCC ID	SRQ-Z836BL
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/ HSPA+(16QAM uplink is not supported)/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/HT40/ Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/ Bluetooth v4.2 LE
IMEI Code	Conducted: 862447030002950 Radiated: 862447030002216 Conduction: 862447030002588
HW Version	Z836BLHWV1.0
SW Version	Z836BLV1.0.0B01
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 : 20.83 dBm (0.1211 W) 802.11g : 21.83 dBm (0.1524 W) 802.11n HT20 : 22.02 dBm (0.1592 W) 802.11n HT40 : 20.63 dBm (0.1156 W)
Antenna Type / Gain	PIFA Antenna with gain -3.00 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

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 Registration No.
	TH01-KS	CO01-KS	03CH03-KS	306251

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 v03r05
- ♦ 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

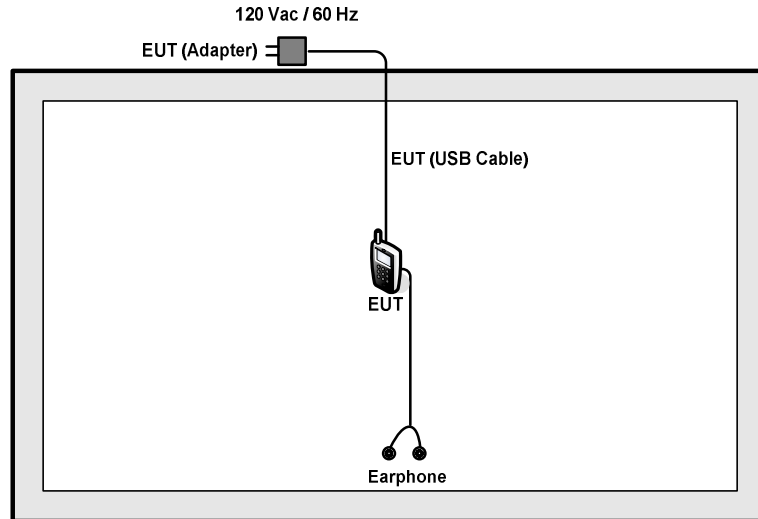
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

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

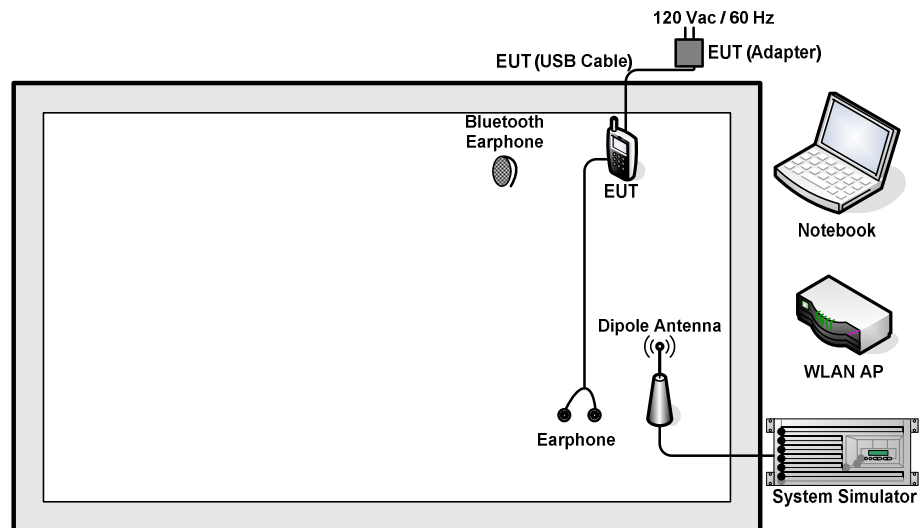
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter 1) + Battery 1
	Mode 2 : GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter 2) + Battery 2
	Mode 3 : GSM850 Idle + Bluetooth Link + WLAN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

2.3 Connection Diagram of Test System

<WLAN Tx Mode>



<AC Conducted Emission Mode>



2.4 Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	Linksys	WRT600N	Q87-WRT600NV11	N/A	Unshielded, 1.8 m
3.	Notebook	Lenovo	G480	N/A	N/A	Shielded cable DC O/P 1.8 m Unshielded AC I/P cable 1.2 m
4.	Bluetooth Earphone	Nokia	BH-106	QTLBH-106	N/A	N/A
5.	Earphone	Lenovo	LH102	N/A	Unshielded, 1.2 m	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 Notebook under large package sizes transmission.

2.6 Measurement Results Explanation Example

For all conducted test items:

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

Example:

The spectrum analyzer offset is derived from RF cable loss.

Offset = RF cable loss.

Following shows an offset computation example with cable loss 5.50 dB.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} \\ &= 5.50 \text{ (dB)}\end{aligned}$$

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 v03r05.
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.

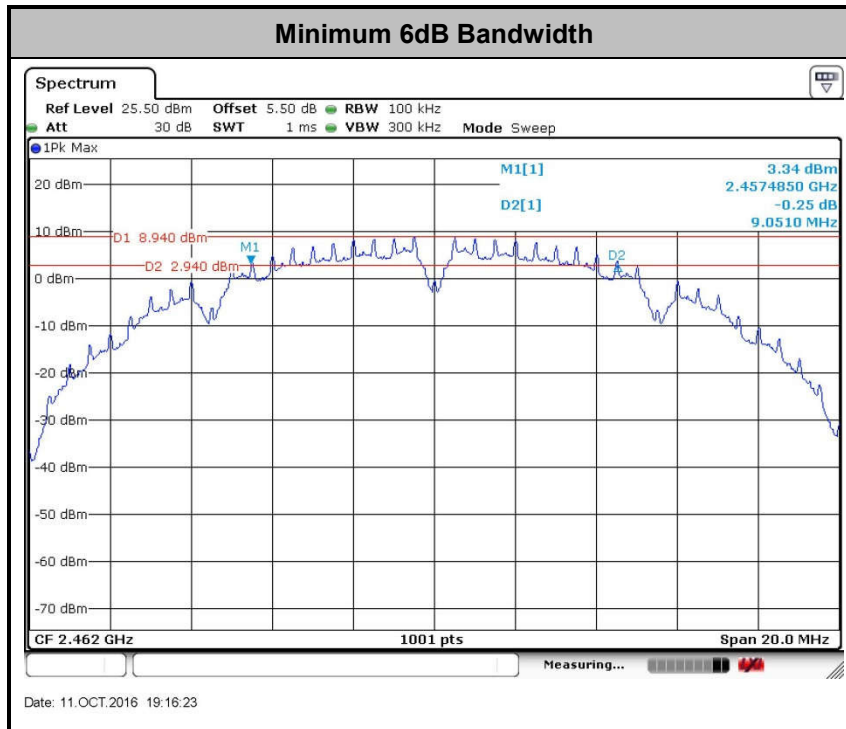
3.1.4 Test Setup





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.

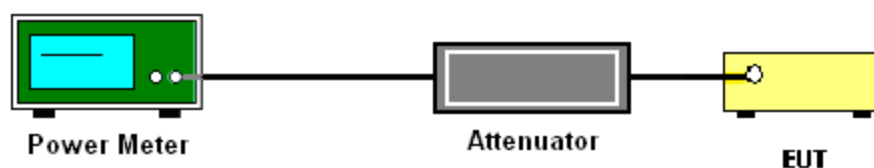
3.2.2 Measuring Instruments

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 v03r05.
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.

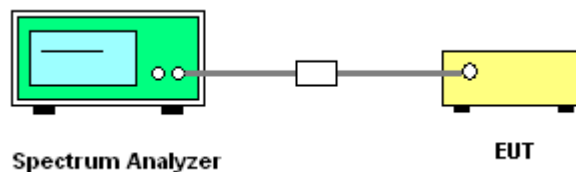
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

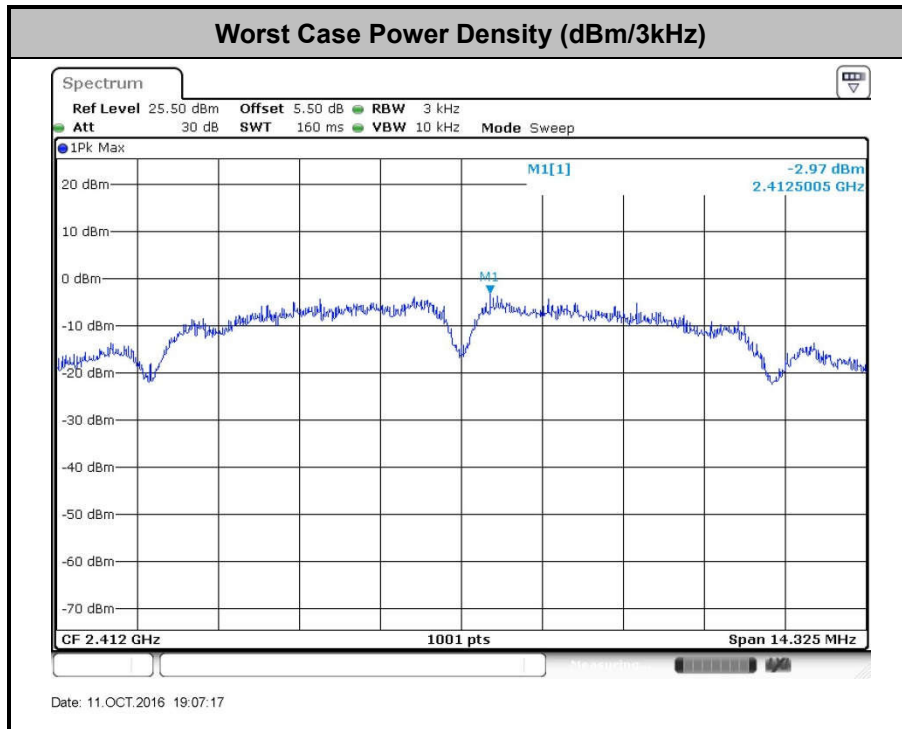
1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum 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 and radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

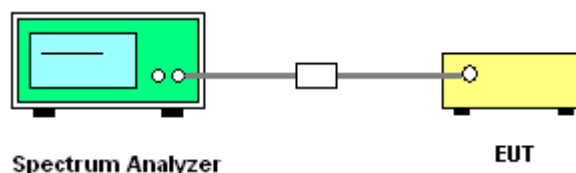
3.4.2 Measuring Instruments

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 v03r05.
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 per 15.247(d).
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.

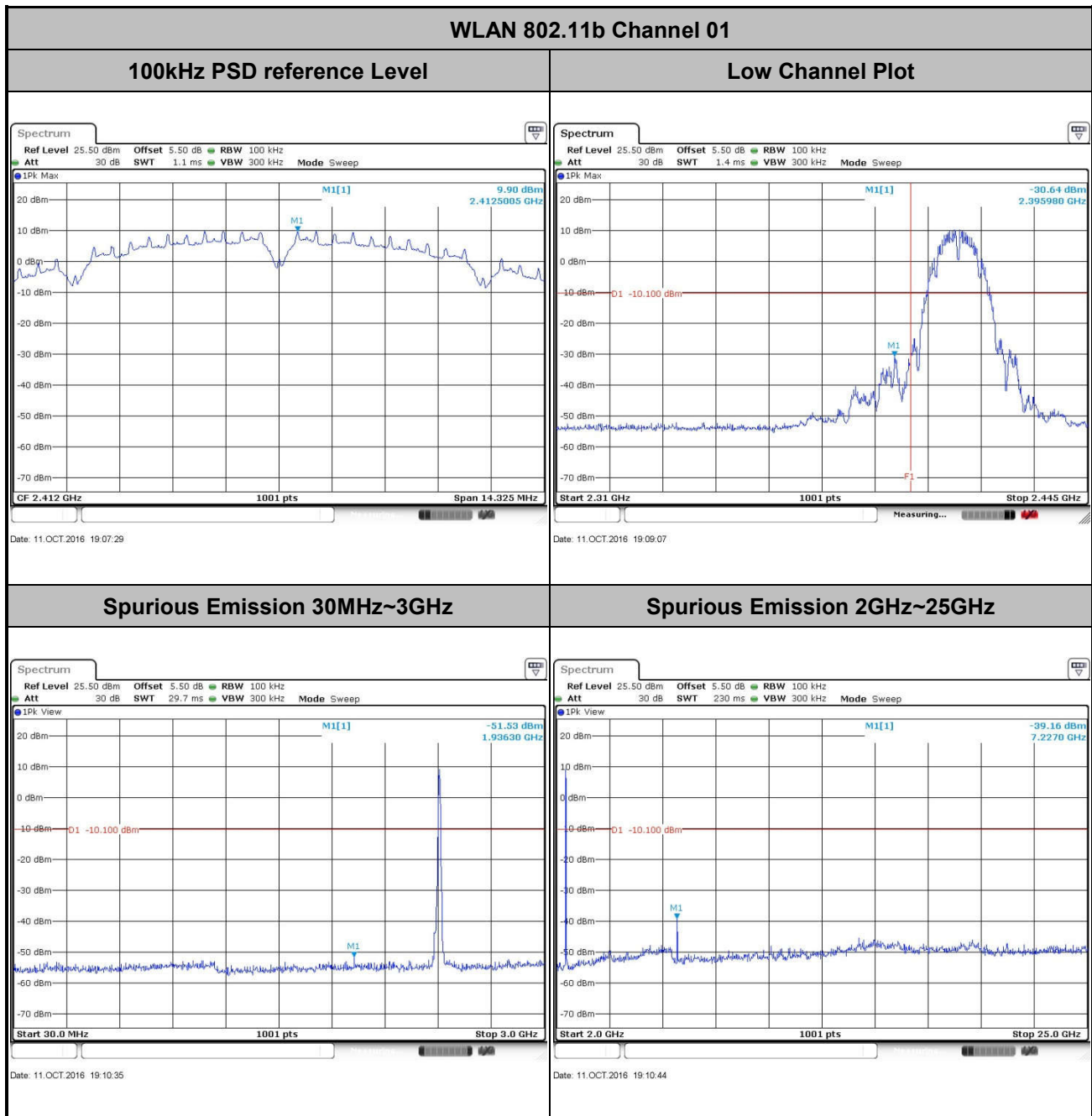
3.4.4 Test Setup





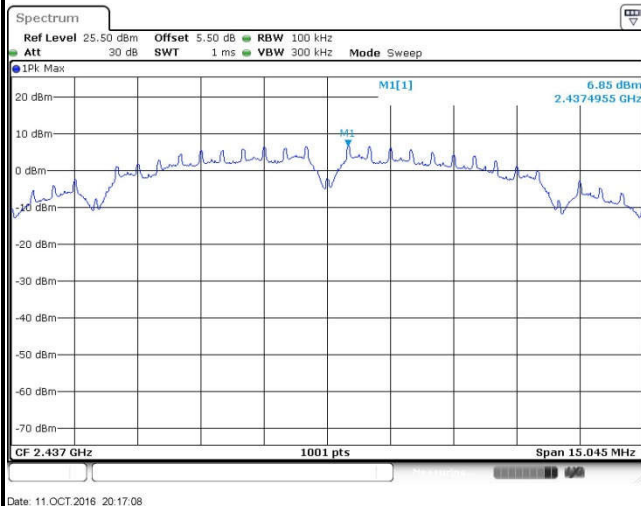
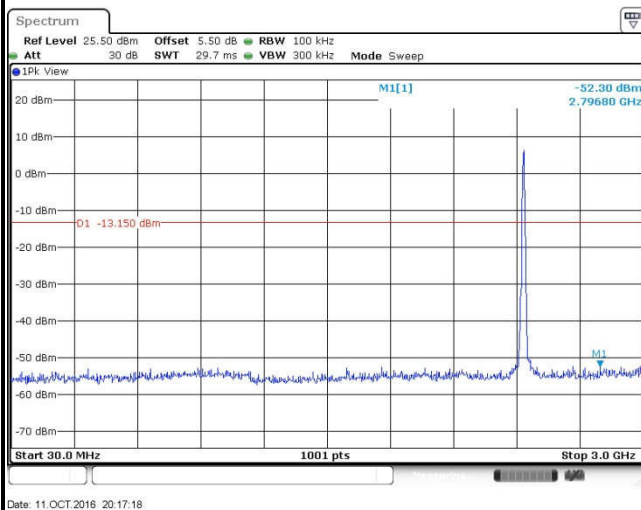
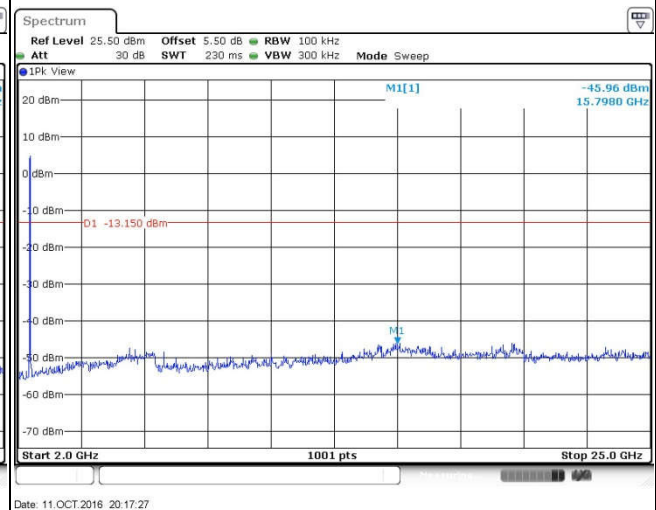
3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Mode :	802.11b	Temperature :	24~25℃
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Chen





Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Chen

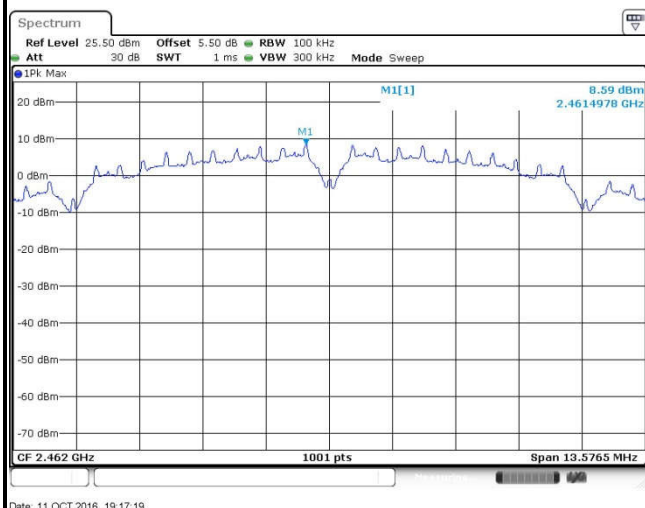
WLAN 802.11b Channel 06**100kHz PSD reference Level****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



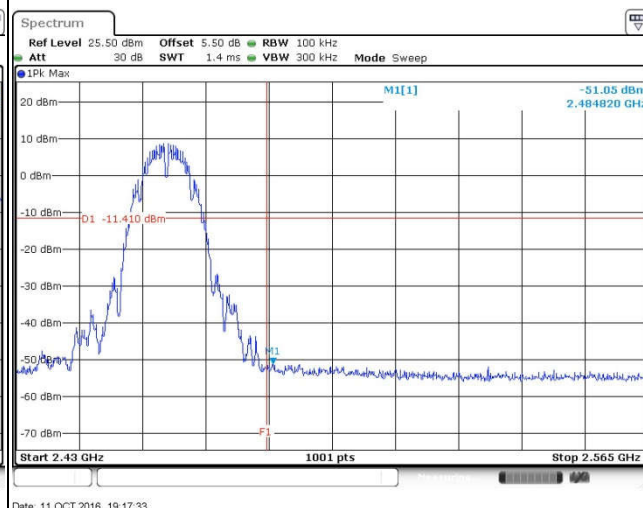
Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Chen

WLAN 802.11b Channel 11

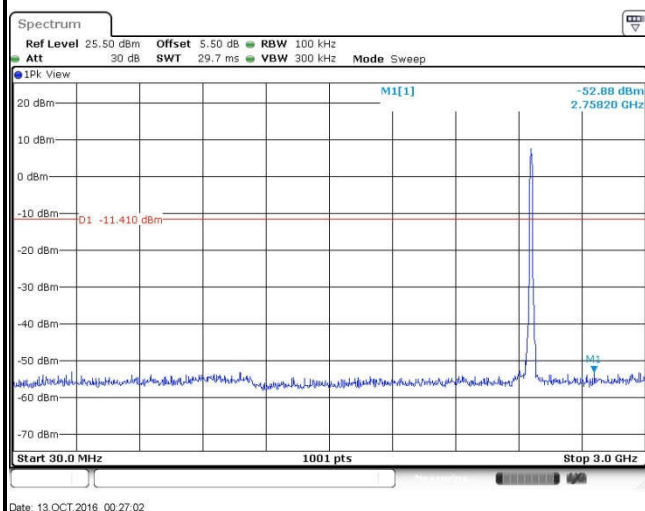
100kHz PSD reference Level



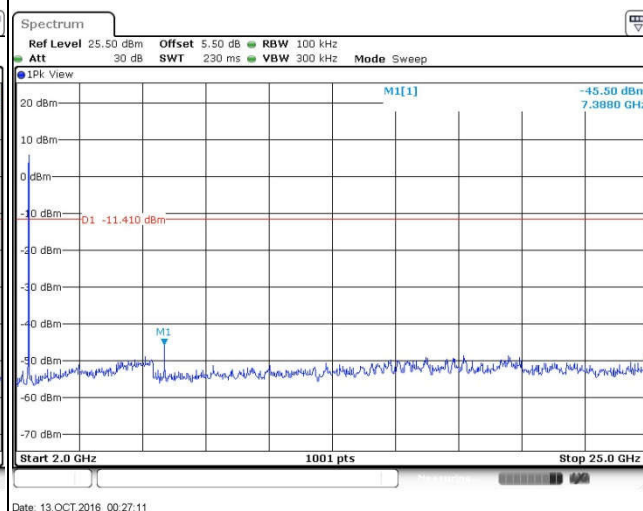
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

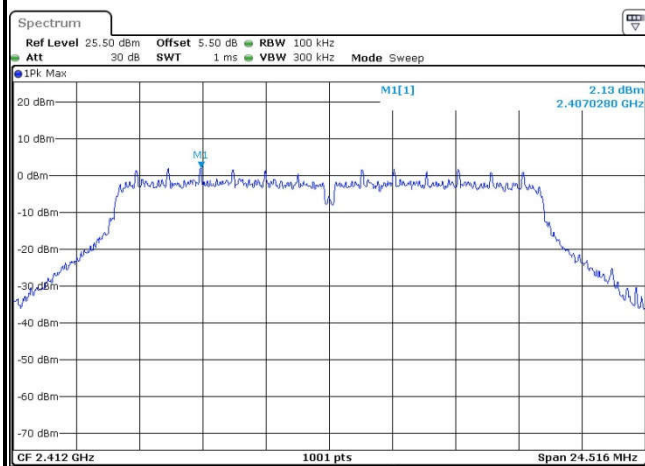




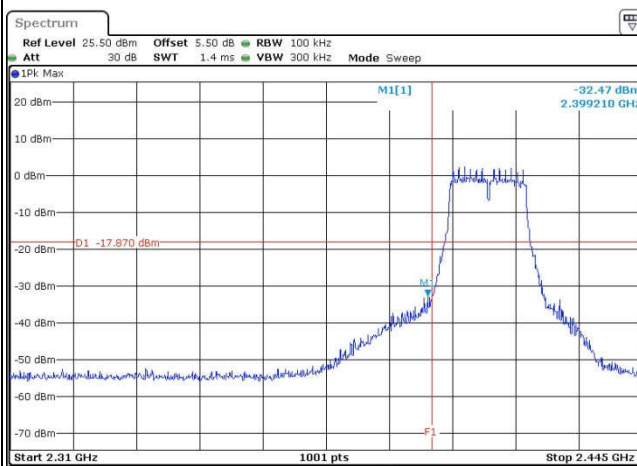
Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Chen

WLAN 802.11g Channel 01

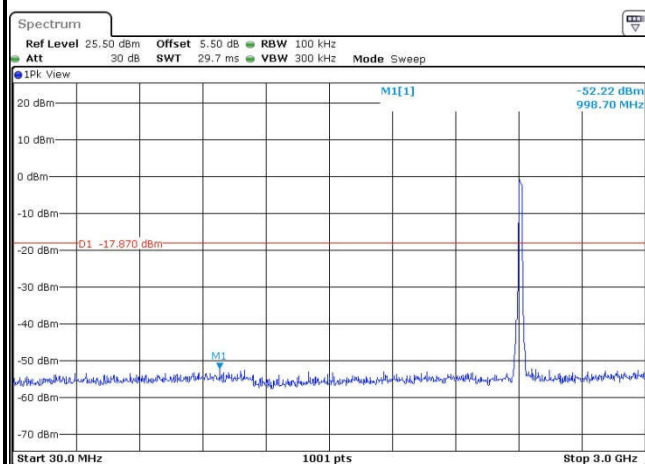
100kHz PSD reference Level



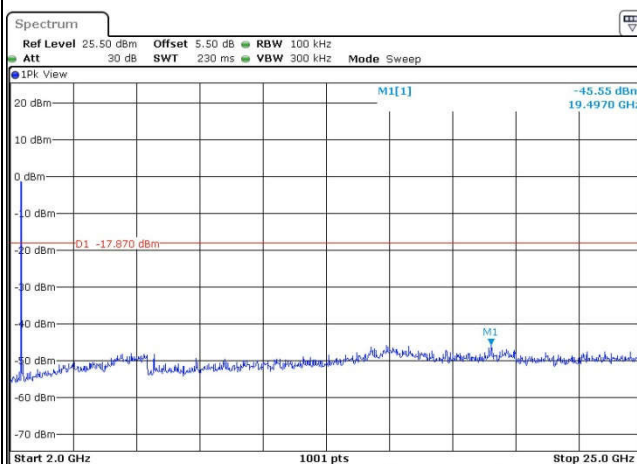
Low Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

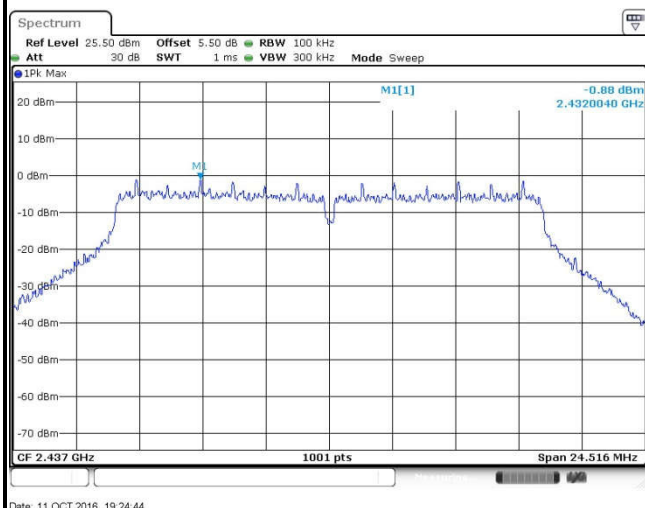




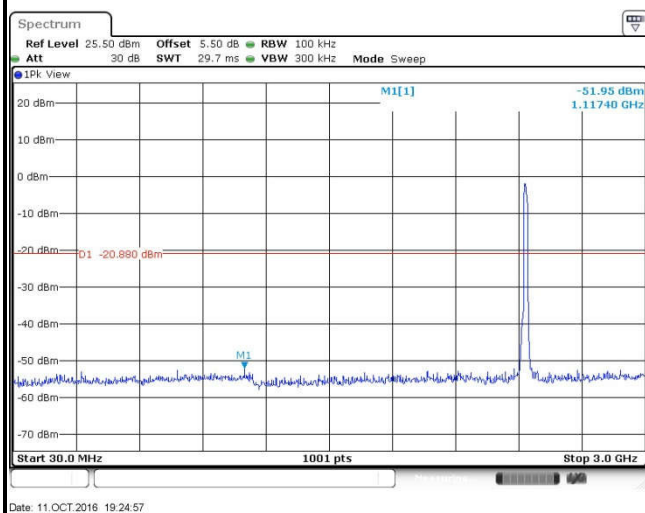
Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Chen

WLAN 802.11g Channel 06

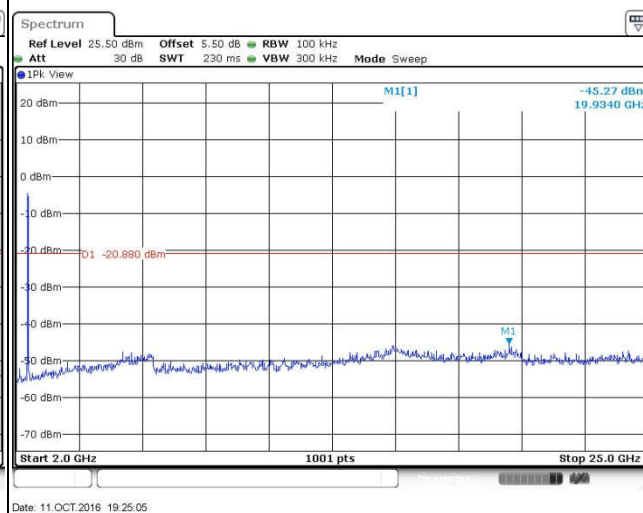
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

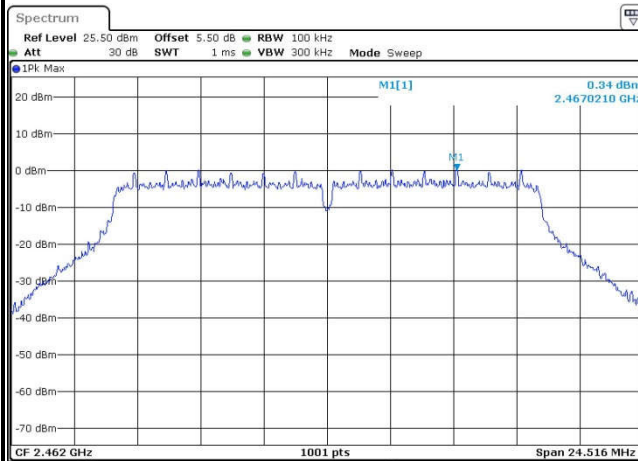
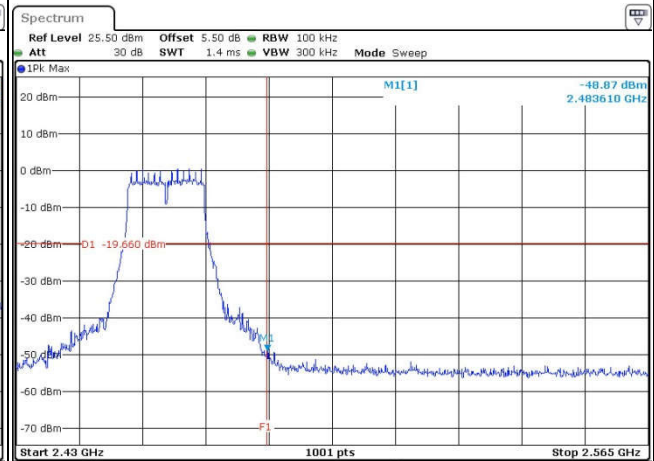
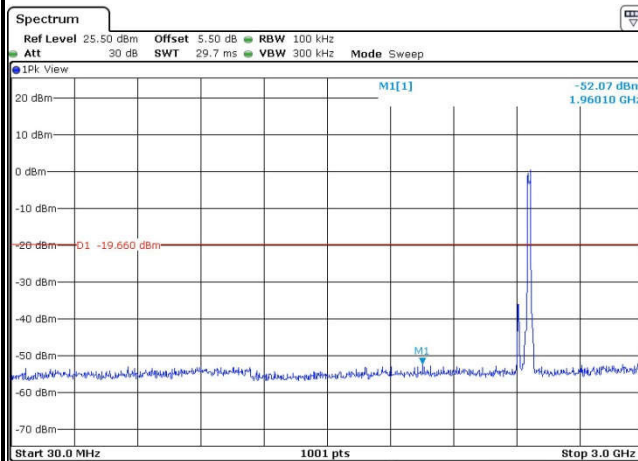
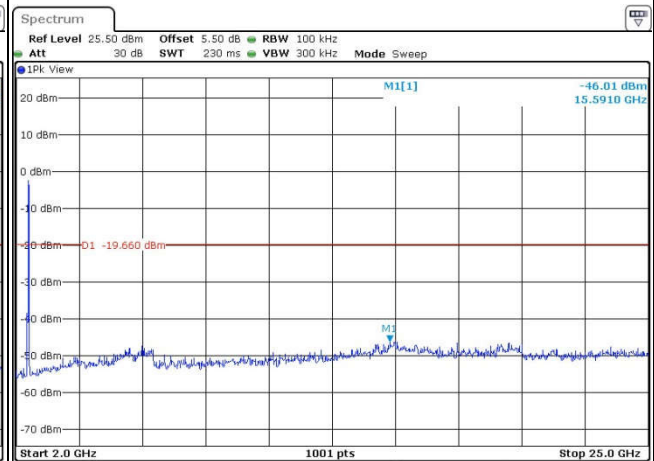


Spurious Emission 2GHz~25GHz





Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Chen

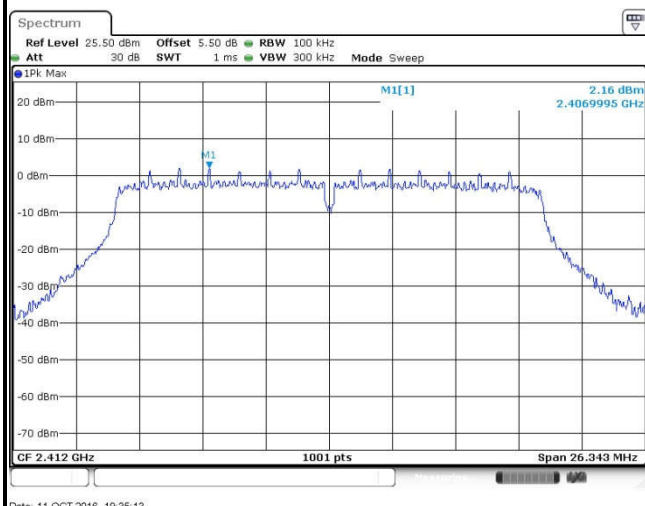
WLAN 802.11g Channel 11**100kHz PSD reference Level****High Channel Plot****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



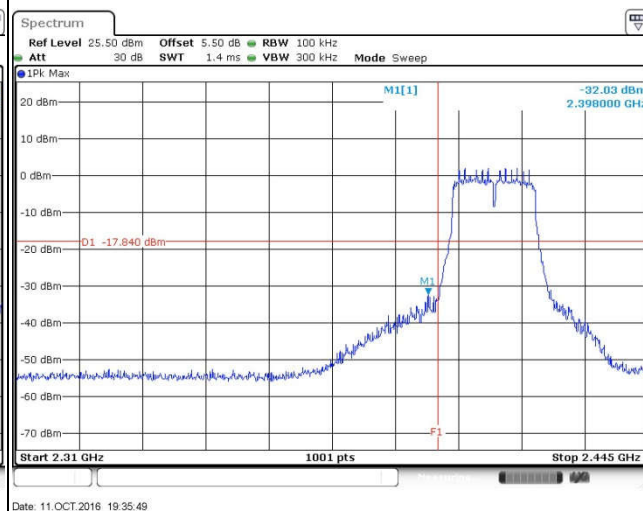
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Chen

WLAN 802.11n HT20 Channel 01

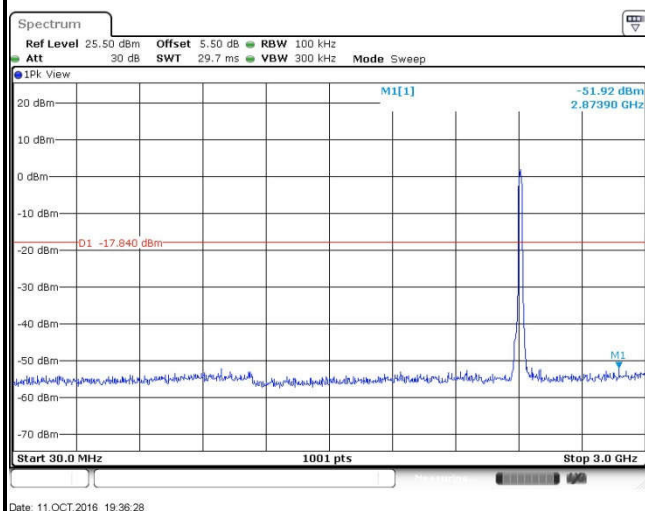
100kHz PSD reference Level



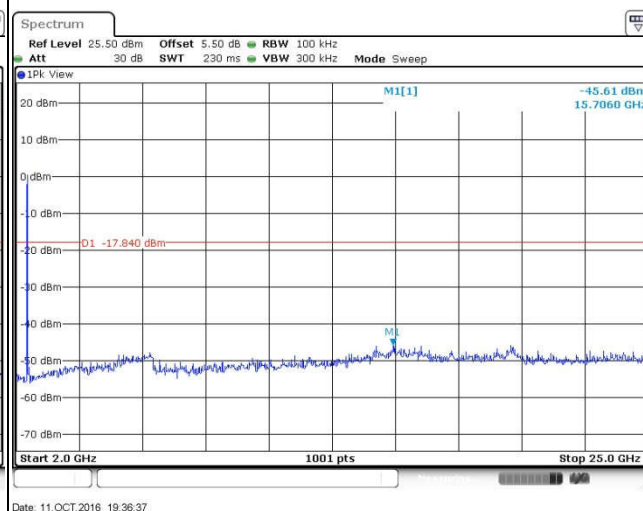
Low Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

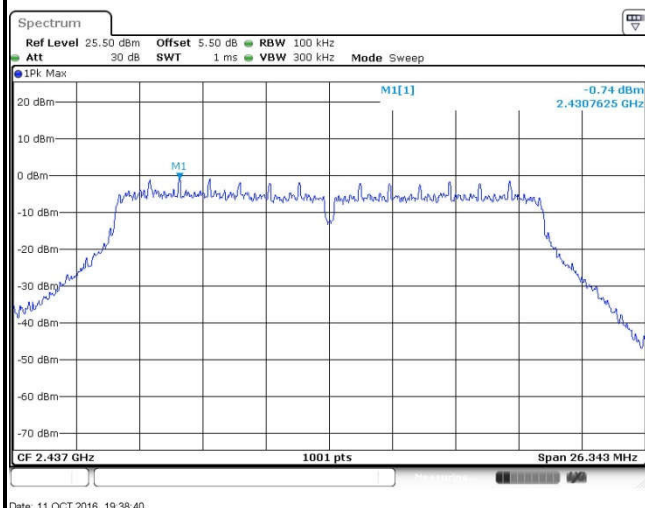




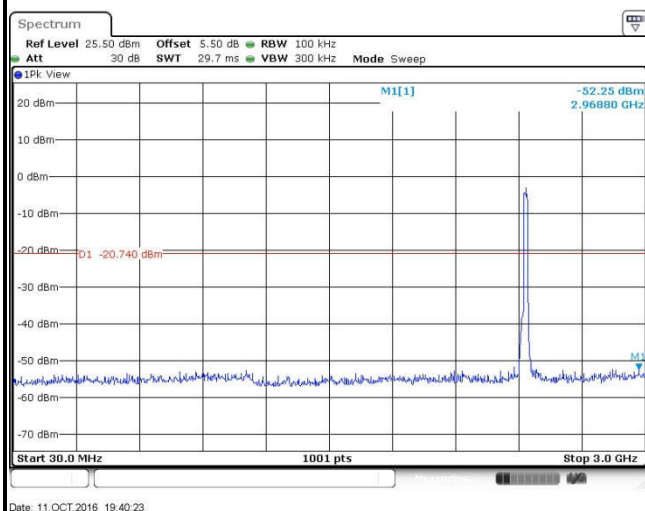
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Chen

WLAN 802.11n HT20 Channel 06

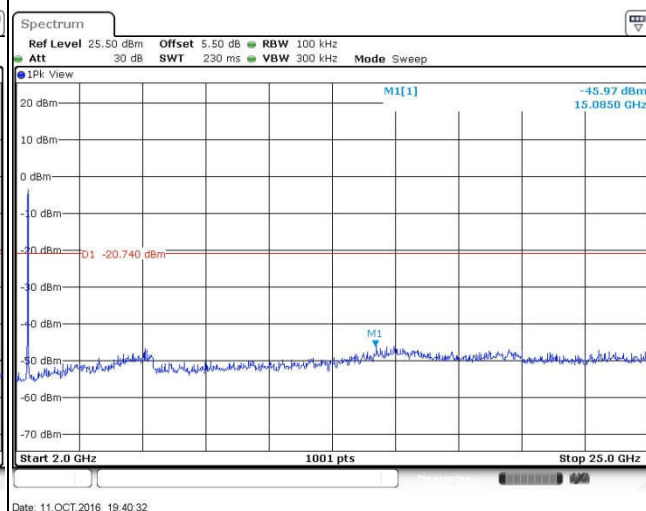
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

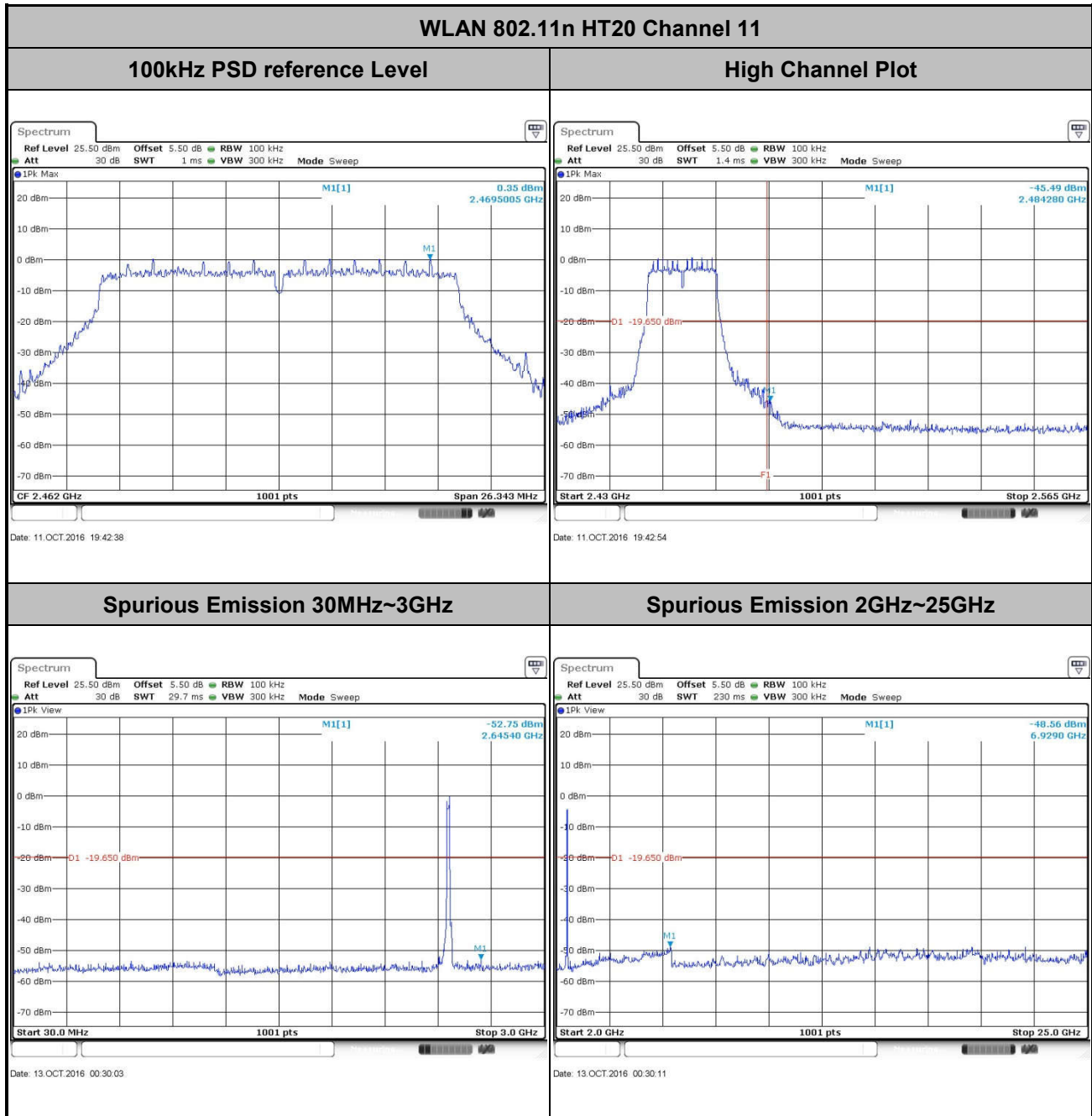


Spurious Emission 2GHz~25GHz



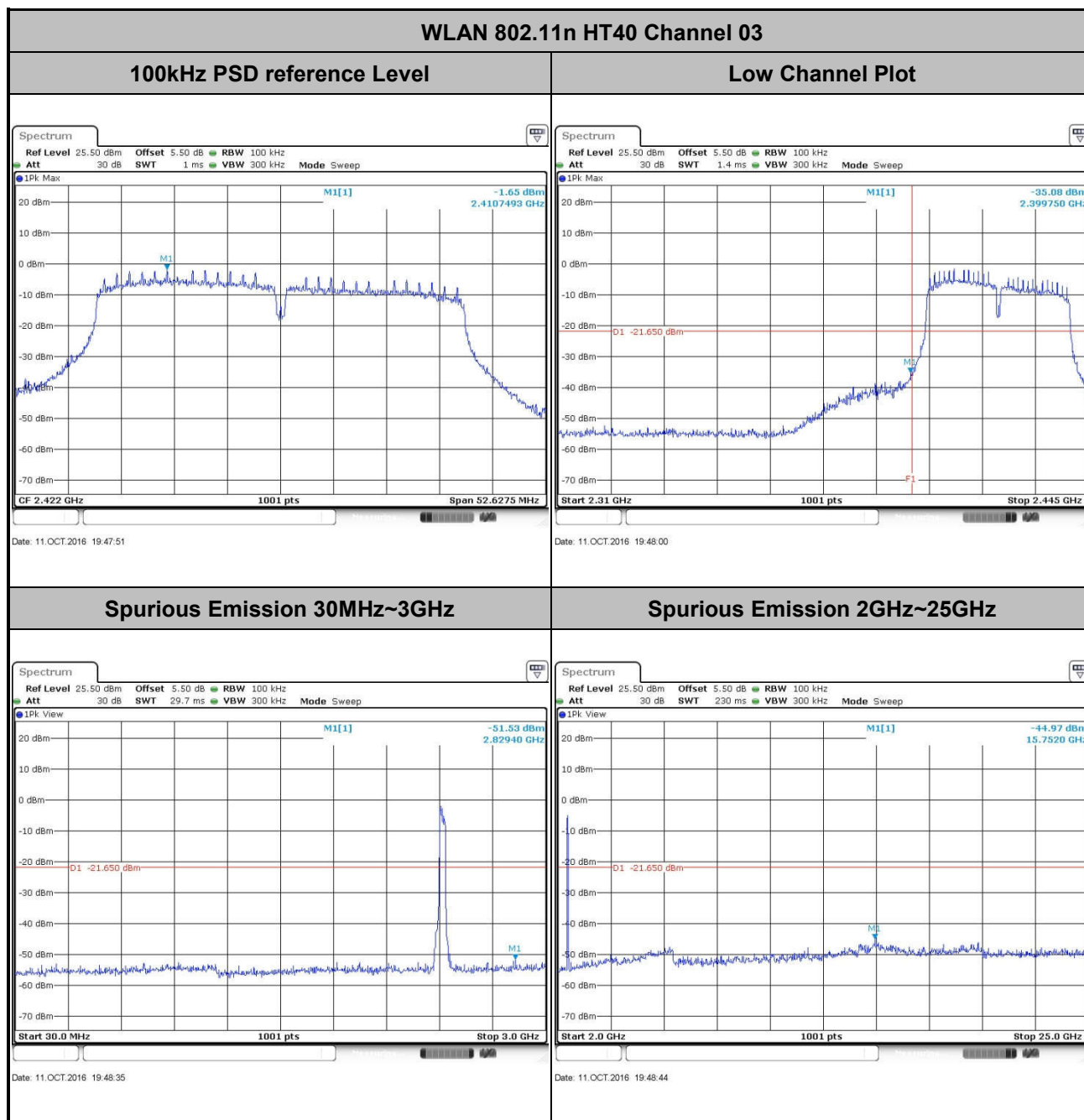


Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Chen



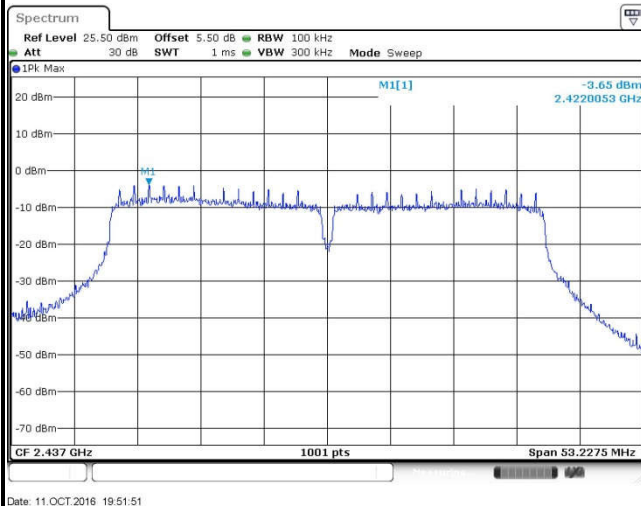
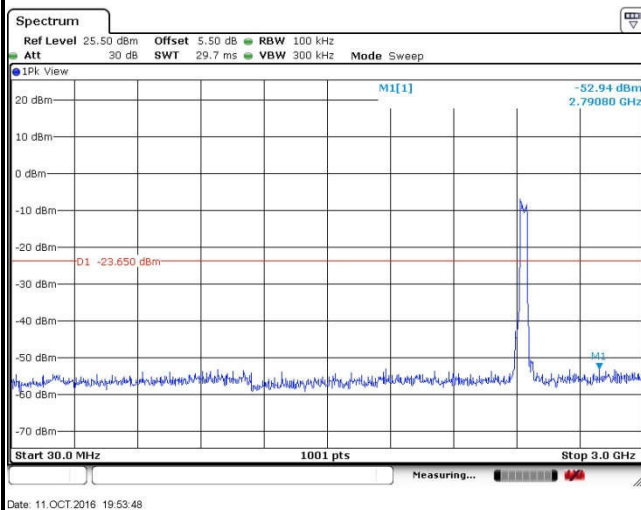
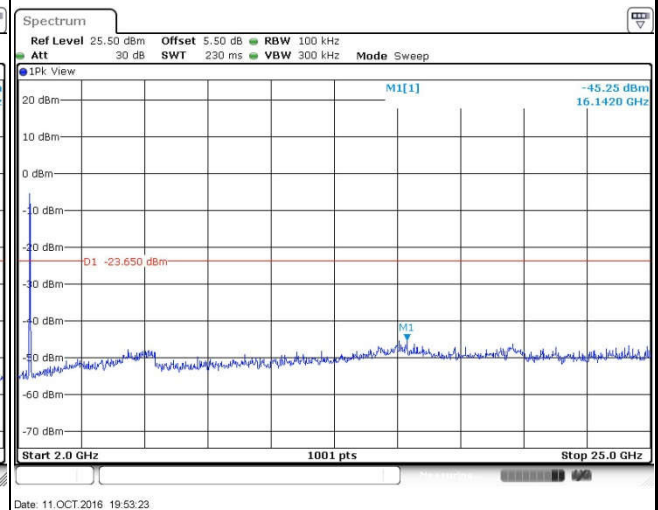


Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	03	Test Engineer :	Ivan Chen



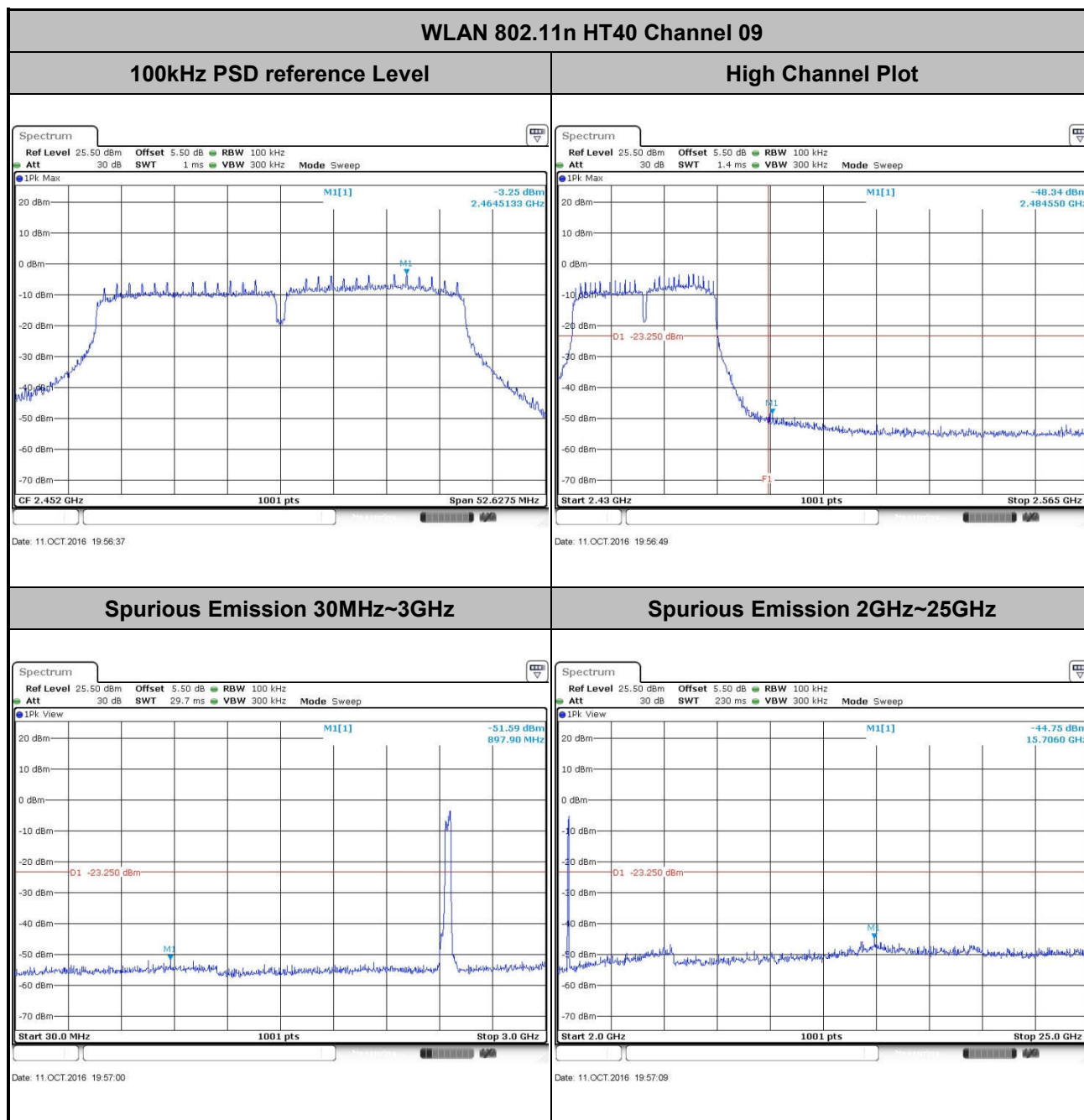


Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Chen

WLAN 802.11n HT40 Channel 06**100kHz PSD reference Level****Spurious Emission 30MHz~3GHz****Spurious Emission 2GHz~25GHz**



Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	09	Test Engineer :	Ivan Chen



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 FCC section 15.209 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

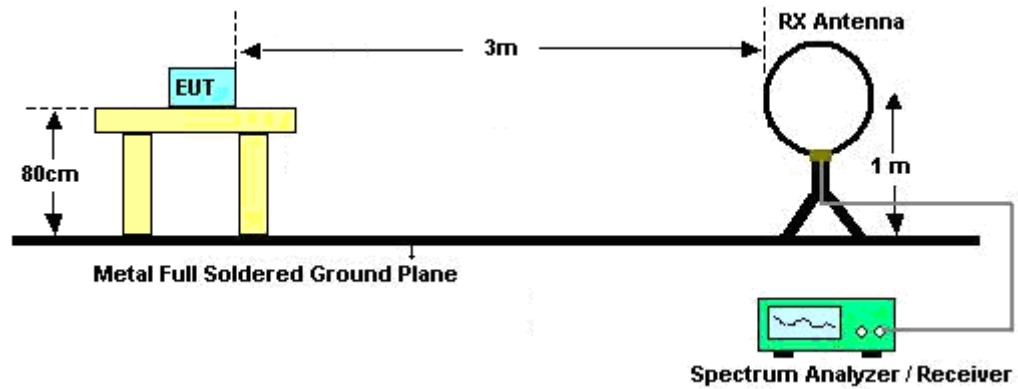
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the 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:

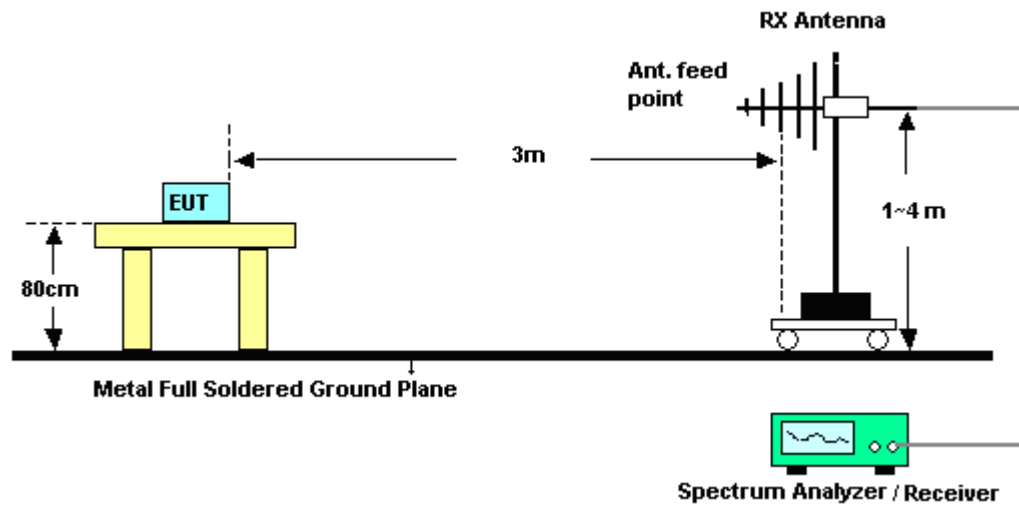
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

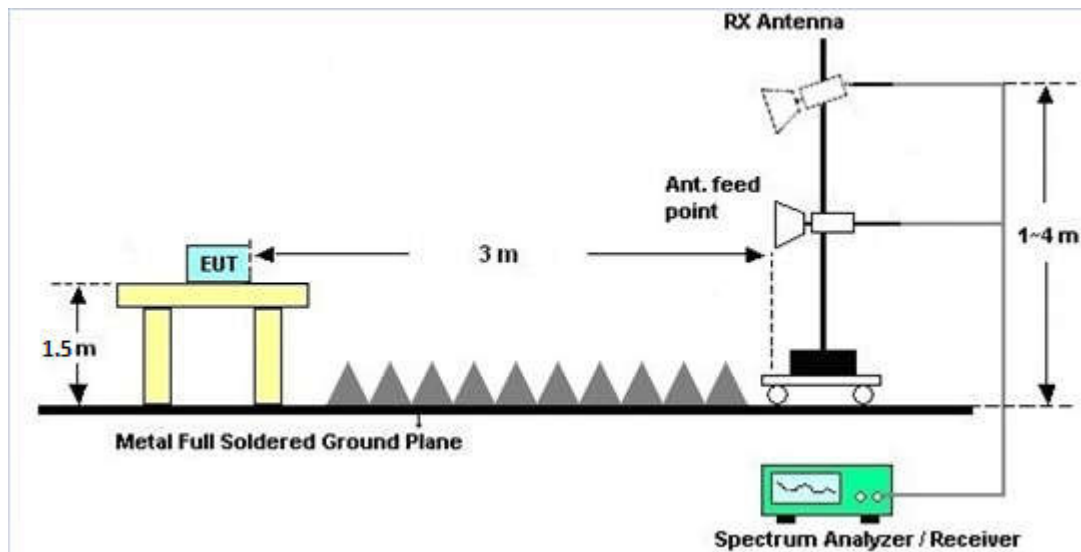
For radiated emissions below 30MHz



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 per 15.31(o) 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.

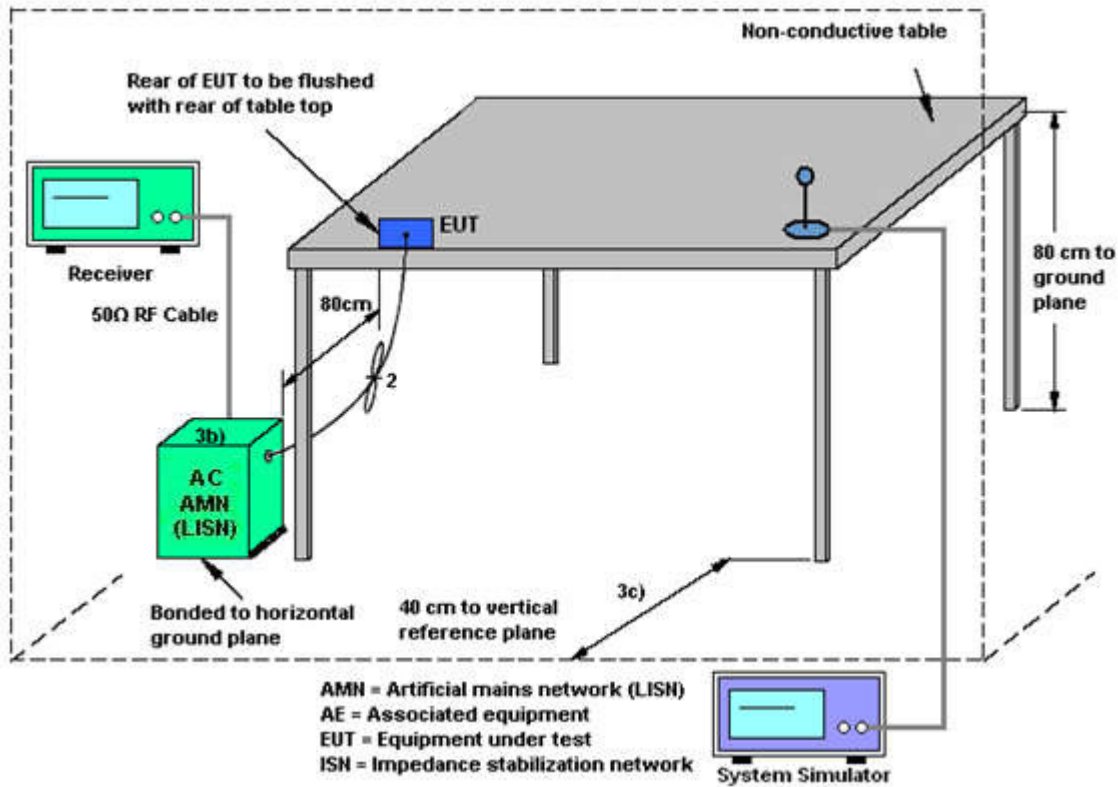
3.6.2 Measuring Instruments

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.

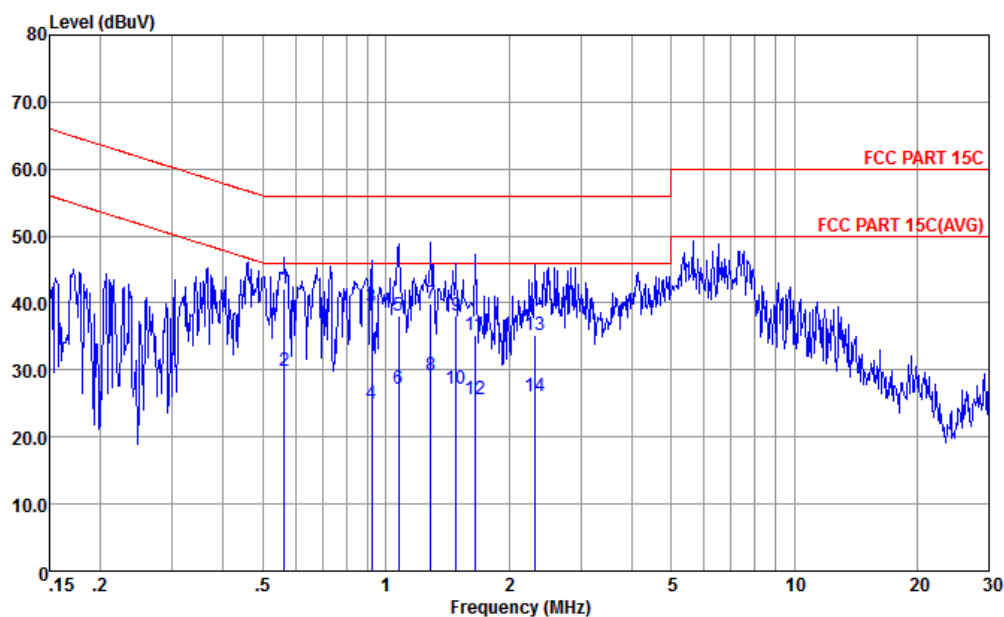
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Morris Li	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter 1) + Battery 1		



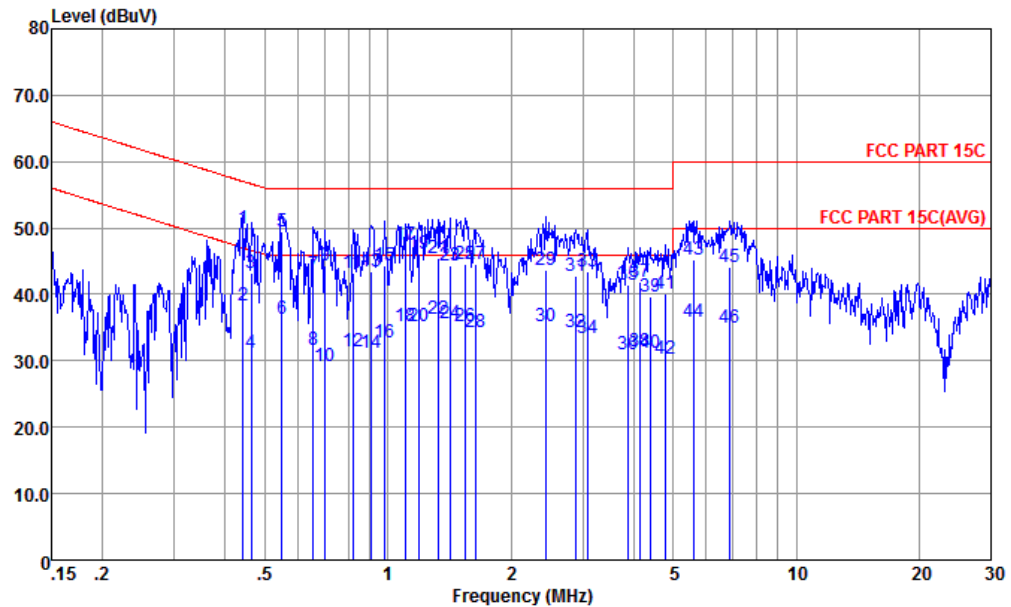
Site : CO01-KS
Condition : FCC PART 15C LISN-L-20151024 LINE

mode : Mode 1
IMEI : 862447030002588/01

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.564	42.22	-13.78	56.00	31.81	0.23	10.18	QP
2	0.564	29.92	-16.08	46.00	19.51	0.23	10.18	Average
3	0.923	39.33	-16.67	56.00	28.90	0.25	10.18	QP
4	0.923	25.03	-20.97	46.00	14.60	0.25	10.18	Average
5	1.077	38.03	-17.97	56.00	27.60	0.24	10.19	QP
6	1.077	27.13	-18.87	46.00	16.70	0.24	10.19	Average
7	1.289	39.81	-16.19	56.00	29.40	0.22	10.19	QP
8	1.289	29.21	-16.79	46.00	18.80	0.22	10.19	Average
9	1.487	38.20	-17.80	56.00	27.80	0.21	10.19	QP
10	1.487	27.30	-18.70	46.00	16.90	0.21	10.19	Average
11	1.654	35.19	-20.81	56.00	24.80	0.20	10.19	QP
12	1.654	25.69	-20.31	46.00	15.30	0.20	10.19	Average
13	2.321	35.18	-20.82	56.00	24.80	0.18	10.20	QP
14	2.321	25.98	-20.02	46.00	15.60	0.18	10.20	Average



Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Morris Li	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter 1) + Battery 1		

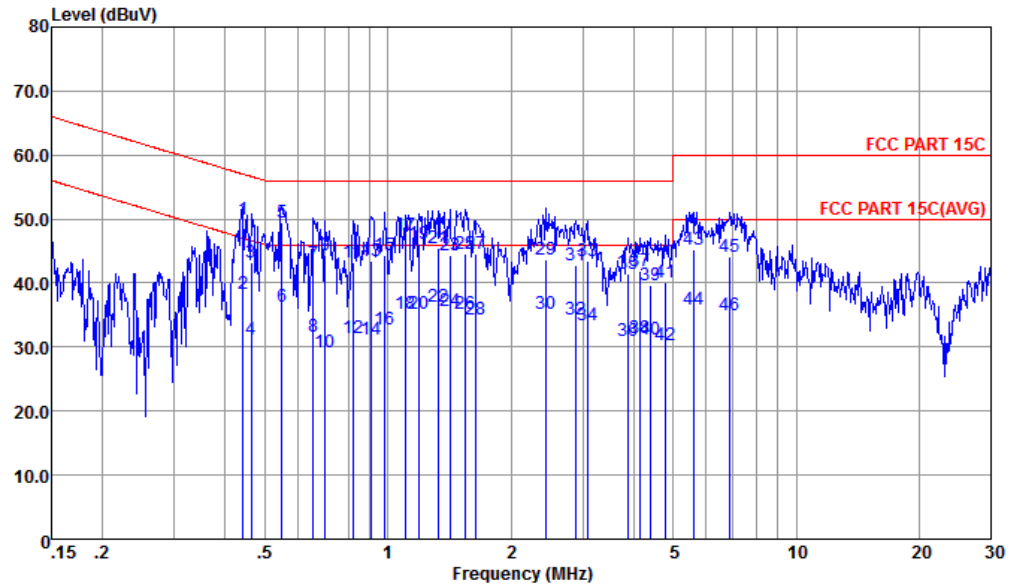


Site : CO01-KS
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL
mode : Mode 1
IMEI : 862447030002588/01

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.442	50.01	-7.01	57.02	39.50	0.32	10.19	QP
2	0.442	38.31	-8.71	47.02	27.80	0.32	10.19	Average
3	0.464	43.31	-13.32	56.63	32.80	0.32	10.19	QP
4	0.464	31.21	-15.42	46.63	20.70	0.32	10.19	Average
5 *	0.549	49.41	-6.59	56.00	38.90	0.33	10.18	QP
6	0.549	36.31	-9.69	46.00	25.80	0.33	10.18	Average
7	0.658	43.12	-12.88	56.00	32.60	0.34	10.18	QP
8	0.658	31.72	-14.28	46.00	21.20	0.34	10.18	Average
9	0.701	44.42	-11.58	56.00	33.90	0.34	10.18	QP
10	0.701	29.22	-16.78	46.00	18.70	0.34	10.18	Average
11	0.822	43.23	-12.77	56.00	32.70	0.35	10.18	QP
12	0.822	31.33	-14.67	46.00	20.80	0.35	10.18	Average
13	0.914	43.35	-12.65	56.00	32.81	0.36	10.18	QP
14	0.914	31.25	-14.75	46.00	20.71	0.36	10.18	Average
15	0.984	44.36	-11.64	56.00	33.80	0.37	10.19	QP
16	0.984	32.86	-13.14	46.00	22.30	0.37	10.19	Average
17	1.100	47.36	-8.64	56.00	36.80	0.37	10.19	QP
18	1.100	35.26	-10.74	46.00	24.70	0.37	10.19	Average
19	1.191	46.06	-9.94	56.00	35.50	0.37	10.19	QP
20	1.191	35.26	-10.74	46.00	24.70	0.37	10.19	Average
21	1.324	45.46	-10.54	56.00	34.90	0.37	10.19	QP
22	1.324	36.36	-9.64	46.00	25.80	0.37	10.19	Average



Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Morris Li	Relative Humidity :	48~50%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link + Earphone + USB Cable (Charging from Adapter 1) + Battery 1		



Site : CO01-KS
Condition : FCC PART 15C LISN-N-20151024 NEUTRAL
mode : Mode 1
IMEI : 862447030002588/01

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
23	1.418	44.36	-11.64	56.00	33.79	0.38	10.19	QP
24	1.418	35.76	-10.24	46.00	25.19	0.38	10.19	Average
25	1.552	44.46	-11.54	56.00	33.89	0.38	10.19	QP
26	1.552	35.26	-10.74	46.00	24.69	0.38	10.19	Average
27	1.645	44.47	-11.53	56.00	33.90	0.38	10.19	QP
28	1.645	34.27	-11.73	46.00	23.70	0.38	10.19	Average
29	2.435	43.78	-12.22	56.00	33.20	0.38	10.20	QP
30	2.435	35.28	-10.72	46.00	24.70	0.38	10.20	Average
31	2.884	42.79	-13.21	56.00	32.21	0.37	10.21	QP
32	2.884	34.39	-11.61	46.00	23.81	0.37	10.21	Average
33	3.074	43.39	-12.61	56.00	32.80	0.37	10.22	QP
34	3.074	33.49	-12.51	46.00	22.90	0.37	10.22	Average
35	3.881	41.40	-14.60	56.00	30.79	0.37	10.24	QP
36	3.881	31.00	-15.00	46.00	20.39	0.37	10.24	Average
37	4.136	42.00	-14.00	56.00	31.40	0.36	10.24	QP
38	4.136	31.40	-14.60	46.00	20.80	0.36	10.24	Average
39	4.384	39.70	-16.30	56.00	29.10	0.36	10.24	QP
40	4.384	31.10	-14.90	46.00	20.50	0.36	10.24	Average
41	4.772	40.10	-15.90	56.00	29.50	0.36	10.24	QP
42	4.772	30.30	-15.70	46.00	19.70	0.36	10.24	Average
43	5.623	45.29	-14.71	60.00	34.70	0.34	10.25	QP
44	5.623	35.79	-14.21	50.00	25.20	0.34	10.25	Average
45	6.878	44.18	-15.82	60.00	33.61	0.29	10.28	QP
46	6.878	34.88	-15.12	50.00	24.31	0.29	10.28	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 FCC 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. 09, 2016	Oct. 11, 2016~ Oct. 13, 2016	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Oct. 11, 2016~ Oct. 13, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Oct. 11, 2016~ Oct. 13, 2016	Jan. 19, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESCI	100534	9kHz~3GHz	Oct. 24, 2015	Sep. 30, 2016~ Oct. 09, 2016	Oct. 23, 2016	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY55150244	10Hz~44GHz	Apr. 22, 2016	Sep. 30, 2016~ Oct. 09, 2016	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Nov. 07, 2015	Sep. 30, 2016~ Oct. 09, 2016	Nov. 06, 2016	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Sep. 30, 2016~ Oct. 09, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1356	1GHz~18GHz	Apr. 16, 2016	Sep. 30, 2016~ Oct. 09, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA170249	15GHz~40GHz	Mar. 03, 2016	Sep. 30, 2016~ Oct. 09, 2016	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Sep. 30, 2016~ Oct. 09, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
high gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	1943529	1GHz~18GHz	Jan. 20, 2016	Sep. 30, 2016~ Oct. 09, 2016	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A02370	1GHz~26.5GHz	Oct. 24, 2015	Sep. 30, 2016~ Oct. 09, 2016	Oct. 23, 2016	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F104090004	N/A	NCR	Sep. 30, 2016~ Oct. 09, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Sep. 30, 2016~ Oct. 09, 2016	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Sep. 30, 2016~ Oct. 09, 2016	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 29, 2016	Oct. 31, 2016	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Oct. 31, 2016	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Oct. 31, 2016	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Oct. 31, 2016	Oct. 12, 2017	Conduction (CO01-KS)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

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

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

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

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6dB
--	-------



Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Ivan Chen	Temperature:	24~25	°C
Test Date:	2016/10/11~2016/10/113	Relative Humidity:	54~55	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
11b	1Mbps	1	1	2412	14.34	9.55	0.50	Pass
11b	1Mbps	1	6	2437	14.24	10.03	0.50	Pass
11b	1Mbps	1	11	2462	14.29	9.05	0.50	Pass
11g	6Mbps	1	1	2412	18.08	16.34	0.50	Pass
11g	6Mbps	1	6	2437	18.73	16.34	0.50	Pass
11g	6Mbps	1	11	2462	18.53	16.34	0.50	Pass
HT20	MCS0	1	1	2412	18.93	17.56	0.50	Pass
HT20	MCS0	1	6	2437	19.38	17.56	0.50	Pass
HT20	MCS0	1	11	2462	18.93	17.56	0.50	Pass
HT40	MCS0	1	3	2422	36.16	35.09	0.50	Pass
HT40	MCS0	1	6	2437	37.26	35.49	0.50	Pass
HT40	MCS0	1	9	2452	36.66	35.09	0.50	Pass

TEST RESULTS DATA
Peak Power Table

2.4GHz Band										
Mod.	Data Rate	NTX	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	20.83	30.00	-3.00	17.83	36.00	Pass
11b	1Mbps	1	6	2437	18.05	30.00	-3.00	15.05	36.00	Pass
11b	1Mbps	1	11	2462	19.62	30.00	-3.00	16.62	36.00	Pass
11g	6Mbps	1	1	2412	21.83	30.00	-3.00	18.83	36.00	Pass
11g	6Mbps	1	6	2437	19.98	30.00	-3.00	16.98	36.00	Pass
11g	6Mbps	1	11	2462	20.93	30.00	-3.00	17.93	36.00	Pass
HT20	MCS0	1	1	2412	22.02	30.00	-3.00	19.02	36.00	Pass
HT20	MCS0	1	6	2437	20.01	30.00	-3.00	17.01	36.00	Pass
HT20	MCS0	1	11	2462	20.96	30.00	-3.00	17.96	36.00	Pass
HT40	MCS0	1	3	2422	20.63	30.00	-3.00	17.63	36.00	Pass
HT40	MCS0	1	6	2437	19.81	30.00	-3.00	16.81	36.00	Pass
HT40	MCS0	1	9	2452	19.93	30.00	-3.00	16.93	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

2.4GHz Band						
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.10	18.77
11b	1Mbps	1	6	2437	0.10	15.34
11b	1Mbps	1	11	2462	0.10	17.34
11g	6Mbps	1	1	2412	0.58	13.24
11g	6Mbps	1	6	2437	0.58	9.83
11g	6Mbps	1	11	2462	0.58	11.63
HT20	MCS0	1	1	2412	0.64	13.39
HT20	MCS0	1	6	2437	0.64	10.01
HT20	MCS0	1	11	2462	0.64	11.70
HT40	MCS0	1	3	2422	1.19	10.84
HT40	MCS0	1	6	2437	1.19	9.22
HT40	MCS0	1	9	2452	1.19	9.42

TEST RESULTS DATA
Peak Power Density

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm /3kHz)	DG (dBi)	Peak PSD Limit (dBm /3kHz)	Pass/Fail
11b	1Mbps	1	1	2412	-2.97	-3.00	8.00	Pass
11b	1Mbps	1	6	2437	-7.99	-3.00	8.00	Pass
11b	1Mbps	1	11	2462	-5.42	-3.00	8.00	Pass
11g	6Mbps	1	1	2412	-11.81	-3.00	8.00	Pass
11g	6Mbps	1	6	2437	-15.32	-3.00	8.00	Pass
11g	6Mbps	1	11	2462	-13.32	-3.00	8.00	Pass
HT20	MCS0	1	1	2412	-12.95	-3.00	8.00	Pass
HT20	MCS0	1	6	2437	-15.10	-3.00	8.00	Pass
HT20	MCS0	1	11	2462	-13.28	-3.00	8.00	Pass
HT40	MCS0	1	3	2422	-16.52	-3.00	8.00	Pass
HT40	MCS0	1	6	2437	-17.74	-3.00	8.00	Pass
HT40	MCS0	1	9	2452	-18.55	-3.00	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		2386.05	55.74	-18.26	74	60.29	27	5.47	37.02	327	51	P	H
	!	2385.92	49.34	-4.66	54	53.89	27	5.47	37.02	327	51	A	H
	*	2412	106.42	-	-	110.82	27.13	5.47	37	327	51	P	H
	*	2410	103.23	-	-	107.63	27.13	5.47	37	327	51	A	H
		2386.05	56.98	-17.02	74	61.53	27	5.47	37.02	100	98	P	V
	!	2385.92	50.54	-3.46	54	55.09	27	5.47	37.02	100	98	A	V
	*	2412	107.52	-	-	111.92	27.13	5.47	37	100	98	P	V
	*	2410	104.36	-	-	108.76	27.13	5.47	37	100	98	A	V
802.11b CH 06 2437MHz		2380.59	51.29	-22.71	74	55.91	26.95	5.45	37.02	280	139	P	H
		2381.63	41.44	-12.56	54	46.06	26.95	5.45	37.02	280	139	A	H
		2492.68	51.81	-22.19	74	55.45	27.77	5.52	36.93	280	139	P	H
		2492.56	40.86	-13.14	54	44.5	27.77	5.52	36.93	280	139	A	H
	*	2436	102.4	-	-	106.65	27.26	5.48	36.99	280	139	P	H
	*	2436	99.09	-	-	103.34	27.26	5.48	36.99	280	139	A	H
		2382.41	52.28	-21.72	74	56.9	26.95	5.45	37.02	111	104	P	V
		2381.5	41.46	-12.54	54	46.08	26.95	5.45	37.02	111	104	A	V
		2490.94	52.29	-21.71	74	55.93	27.77	5.52	36.93	111	104	P	V
		2493.22	41.24	-12.76	54	44.88	27.77	5.52	36.93	111	104	A	V
	*	2436	103.35	-	-	107.6	27.26	5.48	36.99	111	104	P	V
	*	2436	100.2	-	-	104.45	27.26	5.48	36.99	111	104	A	V



802.11b CH 11 2462MHz		2483.74	53.23	-20.77	74	57.02	27.64	5.51	36.94	311	52	P	H
		2487.22	42.49	-11.51	54	46.28	27.64	5.51	36.94	311	52	A	H
	*	2464	103.72	-	-	107.67	27.51	5.5	36.96	311	52	P	H
	*	2464	100.65	-	-	104.6	27.51	5.5	36.96	311	52	A	H
		2486.62	52.67	-21.33	74	56.46	27.64	5.51	36.94	100	105	P	V
		2487.04	42.62	-11.38	54	46.41	27.64	5.51	36.94	100	105	A	V
	*	2464	105.53	-	-	109.48	27.51	5.5	36.96	100	105	P	V
	*	2464	102.36	-	-	106.31	27.51	5.5	36.96	100	105	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		4824	41.5	-32.5	74	38.95	31.51	7.72	36.68	100	360	P	H
CH 01		4824	40.85	-33.15	74	38.3	31.51	7.72	36.68	100	0	P	V
2412MHz													
802.11b		4872	42.07	-31.93	74	39.38	31.59	7.76	36.66	100	360	P	H
CH 06		7308	46.43	-27.57	74	39.33	34.03	9.76	36.69	100	360	P	H
2437MHz		4872	42.2	-31.8	74	39.51	31.59	7.76	36.66	100	360	P	V
		7308	46.18	-27.82	74	39.08	34.03	9.76	36.69	100	360	P	V
802.11b		4926	42.1	-31.9	74	39.28	31.67	7.8	36.65	100	360	P	H
CH 11		7386	46.89	-27.11	74	39.52	34.29	9.86	36.78	100	360	P	H
2462MHz		4926	42.45	-31.55	74	39.63	31.67	7.8	36.65	100	360	P	V
		7386	48.05	-25.95	74	40.68	34.29	9.86	36.78	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		2389.17	64.78	-9.22	74	69.33	27	5.47	37.02	330	49	P	H
	!	2389.82	49.98	-4.02	54	54.53	27	5.47	37.02	330	49	A	H
	*	2408	102.67	-	-	107.07	27.13	5.47	37	330	49	P	H
	*	2408	94.73	-	-	99.13	27.13	5.47	37	330	49	A	H
		2389.82	67.8	-6.2	74	72.35	27	5.47	37.02	100	97	P	V
	!	2389.95	51.2	-2.8	54	55.75	27	5.47	37.02	100	97	A	V
	*	2416	104.51	-	-	108.91	27.13	5.47	37	100	97	P	V
	*	2408	96.59	-	-	100.99	27.13	5.47	37	100	97	A	V
802.11g CH 06 2437MHz		2384.36	52.23	-21.77	74	56.85	26.95	5.45	37.02	320	55	P	H
		2384.75	42.52	-11.48	54	47.14	26.95	5.45	37.02	320	55	A	H
		2490.28	52.16	-21.84	74	55.8	27.77	5.52	36.93	320	55	P	H
		2489.32	41.99	-12.01	54	45.63	27.77	5.52	36.93	320	55	A	H
	*	2430	100.44	-	-	104.69	27.26	5.48	36.99	320	55	P	H
	*	2430	92.37	-	-	96.62	27.26	5.48	36.99	320	55	A	H
		2384.36	53.03	-20.97	74	57.65	26.95	5.45	37.02	102	130	P	V
		2384.75	43.6	-10.4	54	48.22	26.95	5.45	37.02	102	130	A	V
		2489.32	52.11	-21.89	74	55.75	27.77	5.52	36.93	102	130	P	V
		2489.56	42.27	-11.73	54	45.91	27.77	5.52	36.93	102	130	A	V
	*	2430	101.46	-	-	105.71	27.26	5.48	36.99	102	130	P	V
	*	2430	93.64	-	-	97.89	27.26	5.48	36.99	102	130	A	V



802.11g CH 11 2462MHz		2483.68	60.06	-13.94	74	63.85	27.64	5.51	36.94	355	51	P	H
		2483.56	43.71	-10.29	54	47.5	27.64	5.51	36.94	355	51	A	H
	*	2470	101.16	-	-	105.11	27.51	5.5	36.96	355	51	P	H
	*	2470	93.37	-	-	97.32	27.51	5.5	36.96	355	51	A	H
		2484.4	58.88	-15.12	74	62.67	27.64	5.51	36.94	109	129	P	V
		2484.04	43.39	-10.61	54	47.18	27.64	5.51	36.94	109	129	A	V
	*	2468	101.75	-	-	105.7	27.51	5.5	36.96	109	129	P	V
	*	2468	93.74	-	-	97.69	27.51	5.5	36.96	109	129	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	41.48	-32.52	74	38.93	31.51	7.72	36.68	100	360	P	H
		4824	42	-32	74	39.45	31.51	7.72	36.68	100	360	P	V
802.11g CH 06 2437MHz		4872	41.83	-32.17	74	39.14	31.59	7.76	36.66	100	360	P	H
		7308	46.24	-27.76	74	39.14	34.03	9.76	36.69	100	360	P	H
		4872	42.84	-31.16	74	40.15	31.59	7.76	36.66	100	360	P	V
		7308	45.5	-28.5	74	38.4	34.03	9.76	36.69	100	360	P	V
802.11g CH 11 2462MHz		4926	43.15	-30.85	74	40.33	31.67	7.8	36.65	100	360	P	H
		7386	45.92	-28.08	74	38.55	34.29	9.86	36.78	100	360	P	H
		4926	42.84	-31.16	74	40.02	31.67	7.8	36.65	100	360	P	V
		7386	47.08	-26.92	74	39.71	34.29	9.86	36.78	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		2389.69	64.67	-9.33	74	69.22	27	5.47	37.02	331	46	P	H
	!	2389.56	50.24	-3.76	54	54.79	27	5.47	37.02	331	46	A	H
	*	2410	101.55	-	-	105.95	27.13	5.47	37	331	46	P	H
	*	2408	93.65	-	-	98.05	27.13	5.47	37	331	46	A	H
		2389.04	67.23	-6.77	74	71.78	27	5.47	37.02	101	94	P	V
	!	2389.95	53.19	-0.81	54	57.74	27	5.47	37.02	101	94	A	V
	*	2408	105.06	-	-	109.46	27.13	5.47	37	101	94	P	V
	*	2408	96.9	-	-	101.3	27.13	5.47	37	101	94	A	V
802.11n HT20 CH 06 2437MHz		2385.14	51.87	-22.13	74	56.49	26.95	5.45	37.02	290	50	P	H
		2385.4	42.98	-11.02	54	47.6	26.95	5.45	37.02	290	50	A	H
		2492.2	51.95	-22.05	74	55.59	27.77	5.52	36.93	290	50	P	H
		2488.78	41.82	-12.18	54	45.46	27.77	5.52	36.93	290	50	A	H
	*	2430	99.77	-	-	104.02	27.26	5.48	36.99	290	50	P	H
	*	2430	92.07	-	-	96.32	27.26	5.48	36.99	290	50	A	H
		2384.62	53.47	-20.53	74	58.09	26.95	5.45	37.02	100	96	P	V
		2385.01	44.1	-9.9	54	48.72	26.95	5.45	37.02	100	96	A	V
		2489.2	52.72	-21.28	74	56.36	27.77	5.52	36.93	100	96	P	V
		2488.78	42.64	-11.36	54	46.28	27.77	5.52	36.93	100	96	A	V
	*	2430	101.27	-	-	105.52	27.26	5.48	36.99	100	96	P	V
	*	2430	93.4	-	-	97.65	27.26	5.48	36.99	100	96	A	V



802.11n HT20 CH 11 2462MHz		2483.62	59.91	-14.09	74	63.7	27.64	5.51	36.94	286	48	P	H
		2483.56	43.55	-10.45	54	47.34	27.64	5.51	36.94	286	48	A	H
	*	2468	100.61	-	-	104.56	27.51	5.5	36.96	286	48	P	H
	*	2466	92.5	-	-	96.45	27.51	5.5	36.96	286	48	A	H
		2484.16	62.36	-11.64	74	66.15	27.64	5.51	36.94	108	99	P	V
		2483.5	45.18	-8.82	54	48.97	27.64	5.51	36.94	108	99	A	V
	*	2468	101.66	-	-	105.61	27.51	5.5	36.96	108	99	P	V
	*	2468	93.48	-	-	97.43	27.51	5.5	36.96	108	99	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	42.62	-31.38	74	40.07	31.51	7.72	36.68	100	360	P	H
		4824	42.5	-31.5	74	39.95	31.51	7.72	36.68	100	360	P	V
802.11n HT20 CH 06 2437MHz		4872	42.41	-31.59	74	39.72	31.59	7.76	36.66	100	360	P	H
		7308	46.33	-27.67	74	39.23	34.03	9.76	36.69	100	360	P	H
		4872	41.55	-32.45	74	38.86	31.59	7.76	36.66	100	360	P	V
		7308	45.53	-28.47	74	38.43	34.03	9.76	36.69	100	360	P	V
802.11n HT20 CH 11 2462MHz		4926	42.38	-31.62	74	39.56	31.67	7.8	36.65	100	360	P	H
		7386	45.72	-28.28	74	38.35	34.29	9.86	36.78	100	360	P	H
		4926	42.98	-31.02	74	40.16	31.67	7.8	36.65	100	360	P	V
		7386	47.01	-26.99	74	39.64	34.29	9.86	36.78	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		2383.71	63.95	-10.05	74	68.57	26.95	5.45	37.02	317	49	P	H
	!	2389.3	52.51	-1.49	54	57.06	27	5.47	37.02	317	49	A	H
		2496.58	51.81	-22.19	74	55.45	27.77	5.52	36.93	317	49	P	H
		2499.34	41.84	-12.16	54	45.48	27.77	5.52	36.93	317	49	A	H
	*	2410	99.35	-	-	103.75	27.13	5.47	37	317	49	P	H
	*	2410	91.44	-	-	95.84	27.13	5.47	37	317	49	A	H
		2385.66	65.48	-8.52	74	70.03	27	5.47	37.02	139	130	P	V
	!	2388.91	52.8	-1.2	54	57.35	27	5.47	37.02	139	130	A	V
		2492.38	51.97	-22.03	74	55.61	27.77	5.52	36.93	139	130	P	V
		2486.38	41.76	-12.24	54	45.55	27.64	5.51	36.94	139	130	A	V
	*	2410	99.41	-	-	103.81	27.13	5.47	37	139	130	P	V
	*	2410	91.75	-	-	96.15	27.13	5.47	37	139	130	A	V
802.11n HT40 CH 06 2437MHz		2389.82	58.98	-15.02	74	63.53	27	5.47	37.02	324	50	P	H
		2389.95	45.48	-8.52	54	50.03	27	5.47	37.02	324	50	A	H
		2483.74	51.71	-22.29	74	55.5	27.64	5.51	36.94	324	50	P	H
		2489.56	42.11	-11.89	54	45.75	27.77	5.52	36.93	324	50	A	H
	*	2426	97.59	-	-	101.84	27.26	5.48	36.99	324	50	P	H
	*	2424	89.99	-	-	94.24	27.26	5.48	36.99	324	50	A	H
		2388.78	60.04	-13.96	74	64.59	27	5.47	37.02	103	94	P	V
		2389.95	45.45	-8.55	54	50	27	5.47	37.02	103	94	A	V
		2483.86	52.11	-21.89	74	55.9	27.64	5.51	36.94	103	94	P	V
		2486.08	42.04	-11.96	54	45.83	27.64	5.51	36.94	103	94	A	V
	*	2424	96.89	-	-	101.14	27.26	5.48	36.99	103	94	P	V
	*	2424	89.09	-	-	93.34	27.26	5.48	36.99	103	94	A	V



802.11n HT40 CH 09 2452MHz		2375.39	50.24	-23.76	74	54.86	26.95	5.45	37.02	276	42	P	H
		2388.13	41.12	-12.88	54	45.67	27	5.47	37.02	276	42	A	H
		2484.52	57.94	-16.06	74	61.73	27.64	5.51	36.94	276	42	P	H
		2483.56	43.94	-10.06	54	47.73	27.64	5.51	36.94	276	42	A	H
	*	2466	96.59	-	-	100.54	27.51	5.5	36.96	276	42	P	H
	*	2466	88.76	-	-	92.71	27.51	5.5	36.96	276	42	A	H
		2366.81	50.59	-23.41	74	55.27	26.91	5.43	37.02	113	124	P	V
		2389.3	41.14	-12.86	54	45.69	27	5.47	37.02	113	124	A	V
		2484.04	59.95	-14.05	74	63.74	27.64	5.51	36.94	113	124	P	V
		2486.44	45.12	-8.88	54	48.91	27.64	5.51	36.94	113	124	A	V
	*	2466	98.35	-	-	102.3	27.51	5.5	36.96	113	124	P	V
	*	2464	91.04	-	-	94.99	27.51	5.5	36.96	113	124	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 HT40 CH 03 2422MHz		4842	42.87	-31.13	74	40.28	31.53	7.74	36.68	100	360	P	H
		7266	45.81	-28.19	74	38.82	33.93	9.72	36.66	100	360	P	H
		4842	42.29	-31.71	74	39.7	31.53	7.74	36.68	300	360	P	V
		7266	45.61	-28.39	74	38.62	33.93	9.72	36.66	300	360	P	V
802.11n HT40 CH 06 2437MHz		4872	42.58	-31.42	74	39.89	31.59	7.76	36.66	100	360	P	H
		7311	45.16	-28.84	74	38.06	34.03	9.76	36.69	100	360	P	H
		4872	42.1	-31.9	74	39.41	31.59	7.76	36.66	100	0	P	V
		7308	46.27	-27.73	74	39.17	34.03	9.76	36.69	100	0	P	V
802.11n HT40 CH 09 2452MHz		4902	42.51	-31.49	74	39.74	31.64	7.78	36.65	300	360	P	H
		7356	46.73	-27.27	74	39.47	34.19	9.82	36.75	300	360	P	H
		4902	41.88	-32.12	74	39.11	31.64	7.78	36.65	100	360	P	V
		7356	46.3	-27.7	74	39.04	34.19	9.82	36.75	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

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		31.94	30.58	-9.42	40	34.68	26.52	0.68	31.3	100	25	P	H
		115.36	20.06	-23.44	43.5	31.65	18.59	1.29	31.47	-	-	P	H
		169.68	21.05	-22.45	43.5	33.92	17.08	1.58	31.53	-	-	P	H
		216.24	23.31	-22.69	46	36.83	16.23	1.73	31.48	-	-	P	H
		438.37	27.05	-18.95	46	30.73	24.96	2.6	31.24	-	-	P	H
		615.88	27.16	-18.84	46	30.71	24.88	3.11	31.54	-	-	P	H
	!	31.94	36.58	-3.42	40	40.68	26.52	0.68	31.3	300	125	P	V
		81.41	22.04	-17.96	40	36.52	15.93	1.1	31.51	-	-	P	V
		98.87	22.45	-21.05	43.5	33.87	18.82	1.2	31.44	-	-	P	V
		306.45	24.32	-21.68	46	34.18	19.32	2.16	31.34	-	-	P	V
		323.91	27.52	-18.48	46	36.48	20.13	2.21	31.3	-	-	P	V
		450.01	26.93	-19.07	46	30.03	25.5	2.64	31.24	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

**Note symbol**

*	Fundamental Frequency which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is over limit line.
P/A	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)

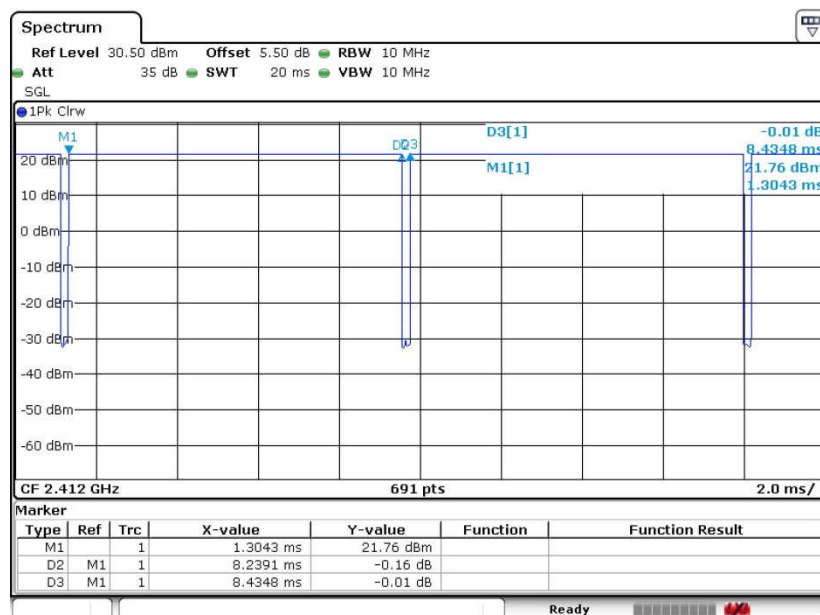
= -10.46(dB)

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

Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.68	8.24	0.12	300Hz
802.11g	87.50	1.37	0.73	1kHz
802.11n HT20	86.27	1.28	0.78	1kHz
802.11n HT40	76.12	0.64	1.57	3kHz

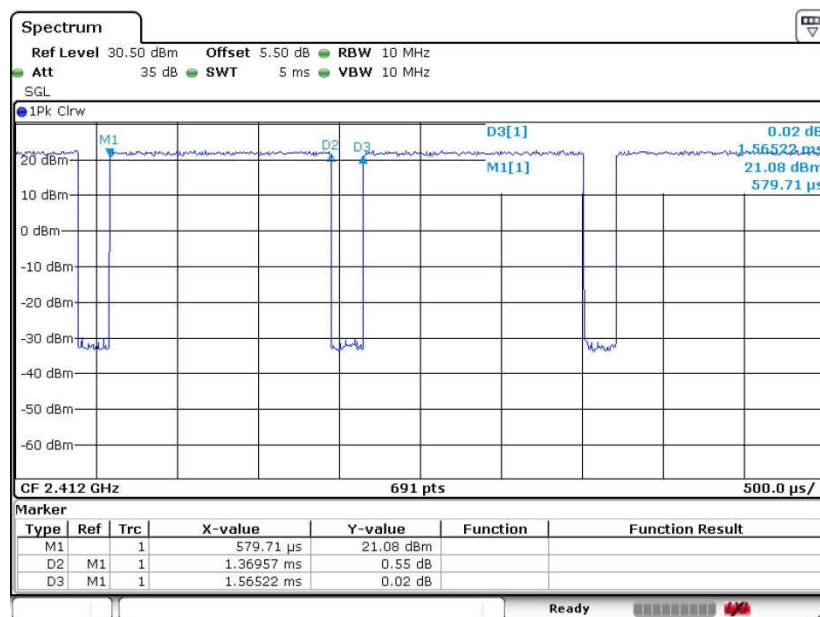
802.11b



Date: 30.SEP.2016 10:57:42

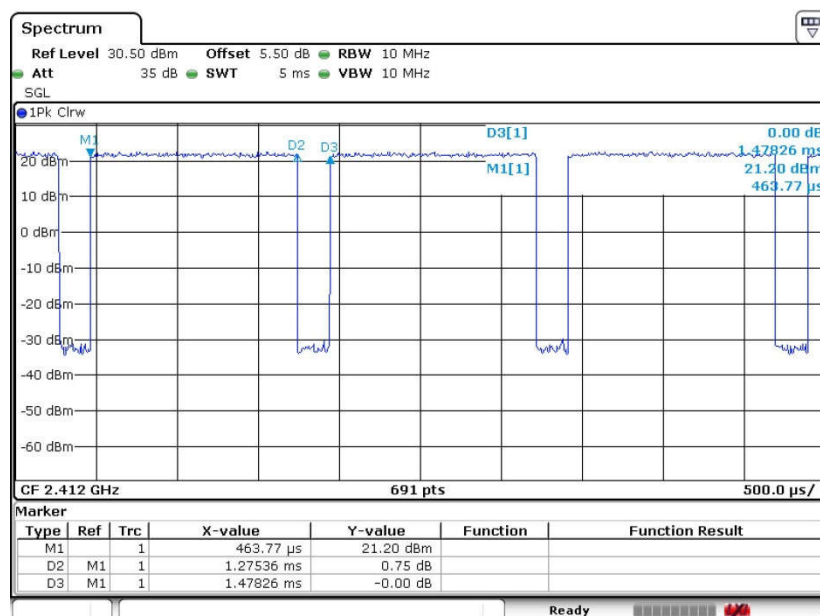


802.11g



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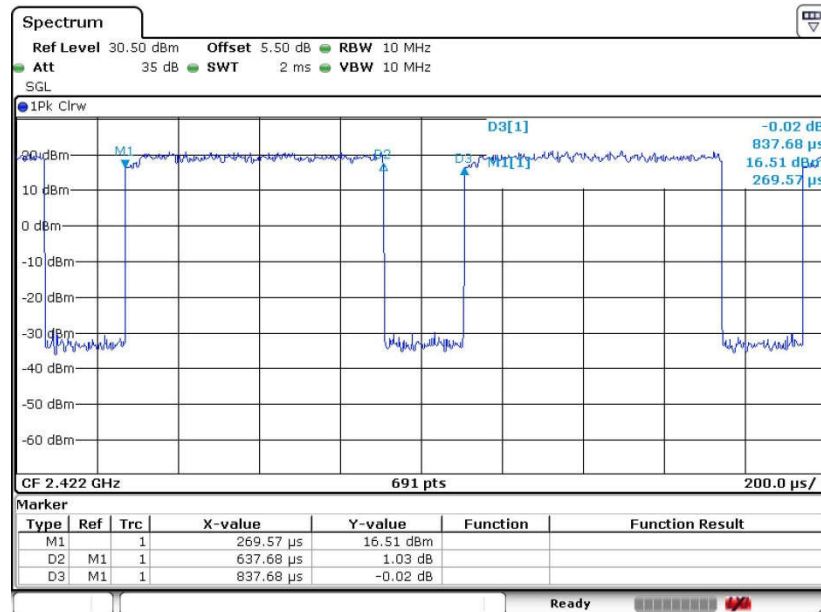
802.11n20



Date: 30.SEP.2016 10:58:28



802.11n40



Date: 30.SEP.2016 10:59:33