



FCC RF Test Report

APPLICANT : ZTE CORPORATION
EQUIPMENT : LTE/WCDMA/CDMA/GSM Multi-Mode Digital
Mobile Phone
BRAND NAME : ZTE
MODEL NAME : Z986DL
FCC ID : SRQ-Z986DL
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on Sep. 28, 2016 and testing was completed on Dec. 19, 2016. We, SPORTON INTERNATIONAL (KUNSHAN) INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

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

Prepared by: James Huang / Manager

Approved by: Jones Tsai / Manager



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



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SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	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 6.16 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.85 dB at 0.440 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	LTE/WCDMA/CDMA/GSM Multi-Mode Digital Mobile Phone
Brand Name	ZTE
Model Name	Z986DL
FCC ID	SRQ-Z986DL
EUT supports Radios application	CDMA/EV-DO/GSM/GPRS/EGPRS/WCDMA/HSPA/HSPA+(16QAM uplink is not supported)/LTE/WLAN 2.4GHz 802.11b/g/n HT20/HT40/WLAN 5GHz 802.11a/n HT20/HT40/WLAN 5GHz 802.11ac VHT20/VHT40/Bluetooth v3.0 + EDR/Bluetooth v4.0 LE/ Bluetooth v4.2 LE
MEID Code	Conducted: 990006860008050/990006860008001 Conduction: 990006860007516 Radiation: 990006860007458/990006860007401
HW Version	Z986DLHWV1.1
SW Version	Z986DLV1.0.0B01
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 : 17.38 dBm (0.0547 W) 802.11g : 23.89 dBm (0.2449 W) 802.11n HT20 : 22.71 dBm (0.1866 W) 802.11n HT40 : 23.03 dBm (0.2009 W)
Antenna Type / Gain	PIFA Antenna with gain -2.85 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	03CH03-KS	CO01-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

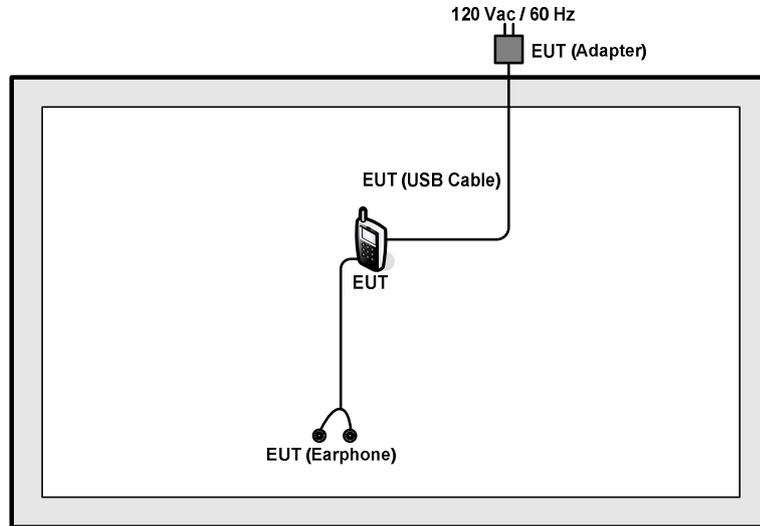
Final test mode of conducted test items and radiated spurious emissions are considering the modulation and worse data rates as below table.

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

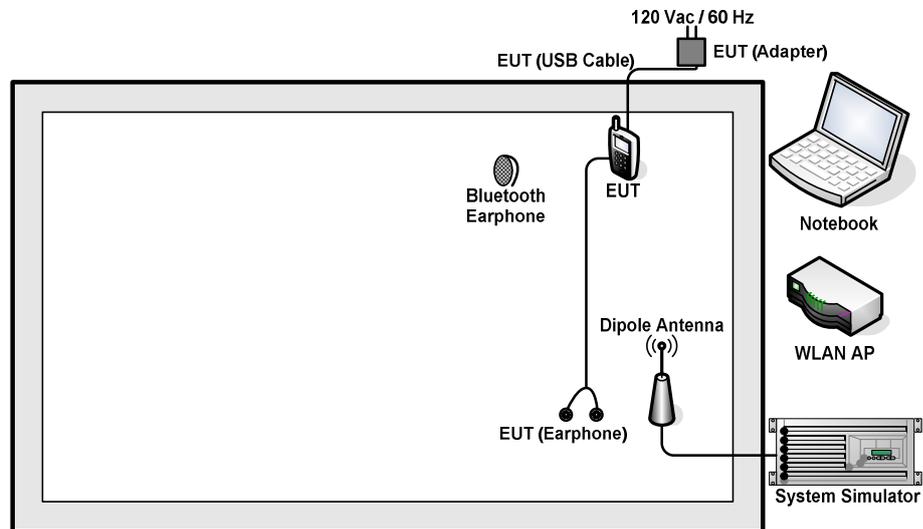
Test Cases	
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter)
Remark: For Radiated TCs, The tests were performance with Adapter, Earphone, and USB Cable.	

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	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	PRC4	N/A	AC I/P: Unshielded, 1.8 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Lenovo	LBH308	N/A	N/A	N/A
5.	Earphone	Lenovo	LH102	N/A	N/A	Unshielded, 1.2 m

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 5.8 dB.

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

= 5.8 (dB)

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.

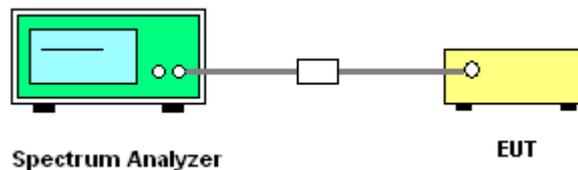
3.1.2 Measuring Instruments

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.

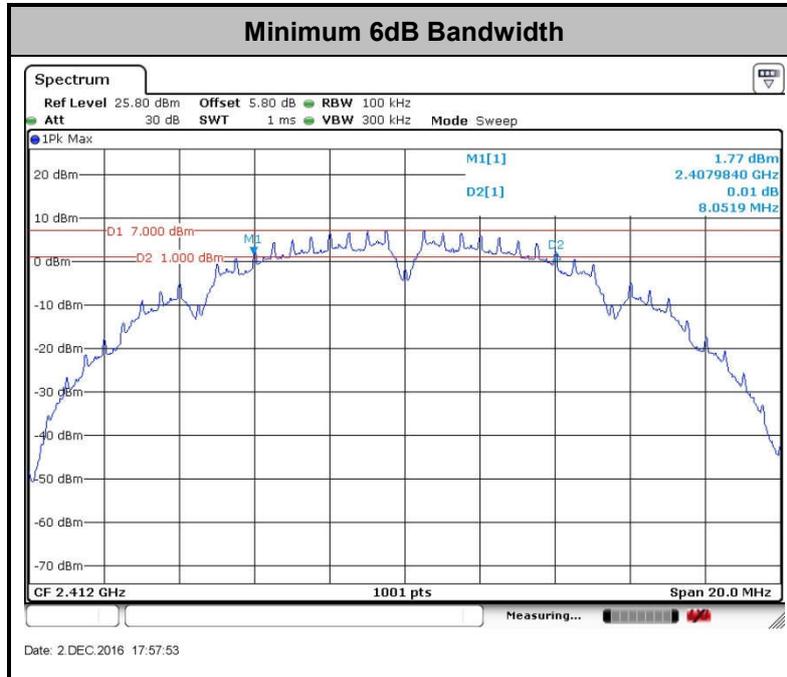
3.1.4 Test Setup





3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



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

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.

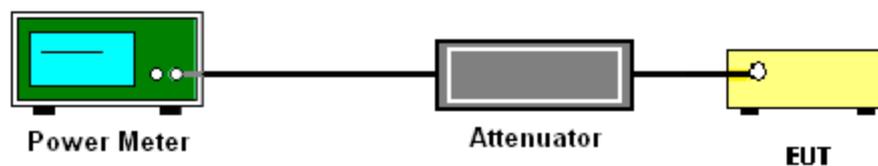
3.2.2 Measuring Instruments

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 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.

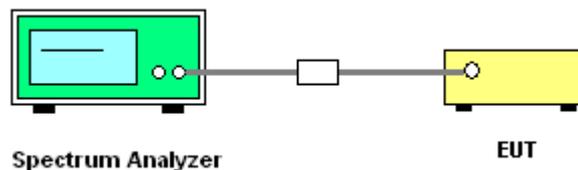
3.3.2 Measuring Instruments

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 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.

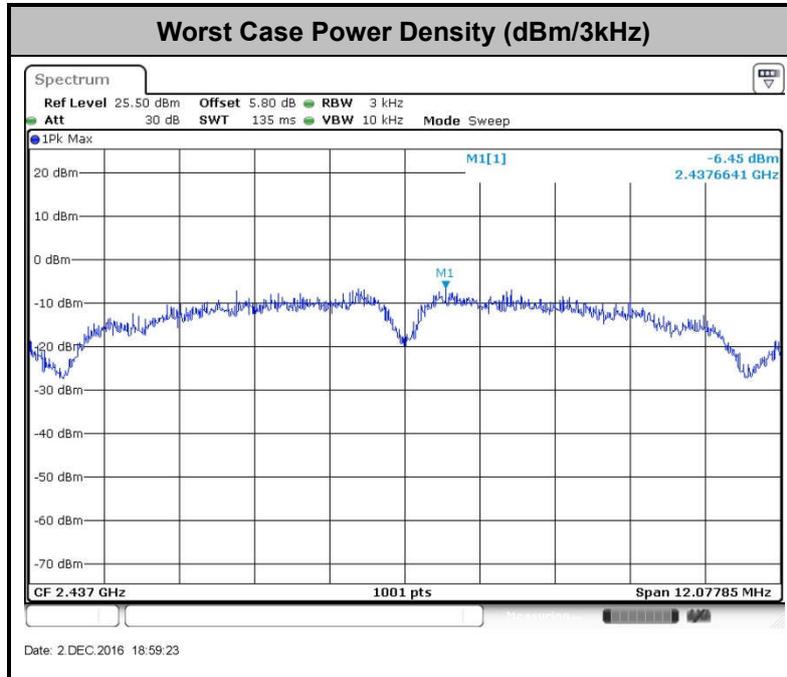
3.3.4 Test Setup





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).

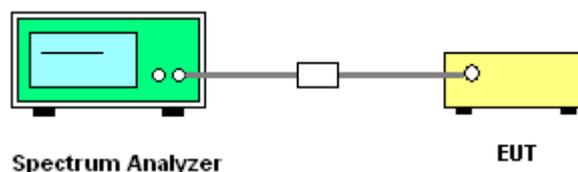
3.4.2 Measuring Instruments

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.

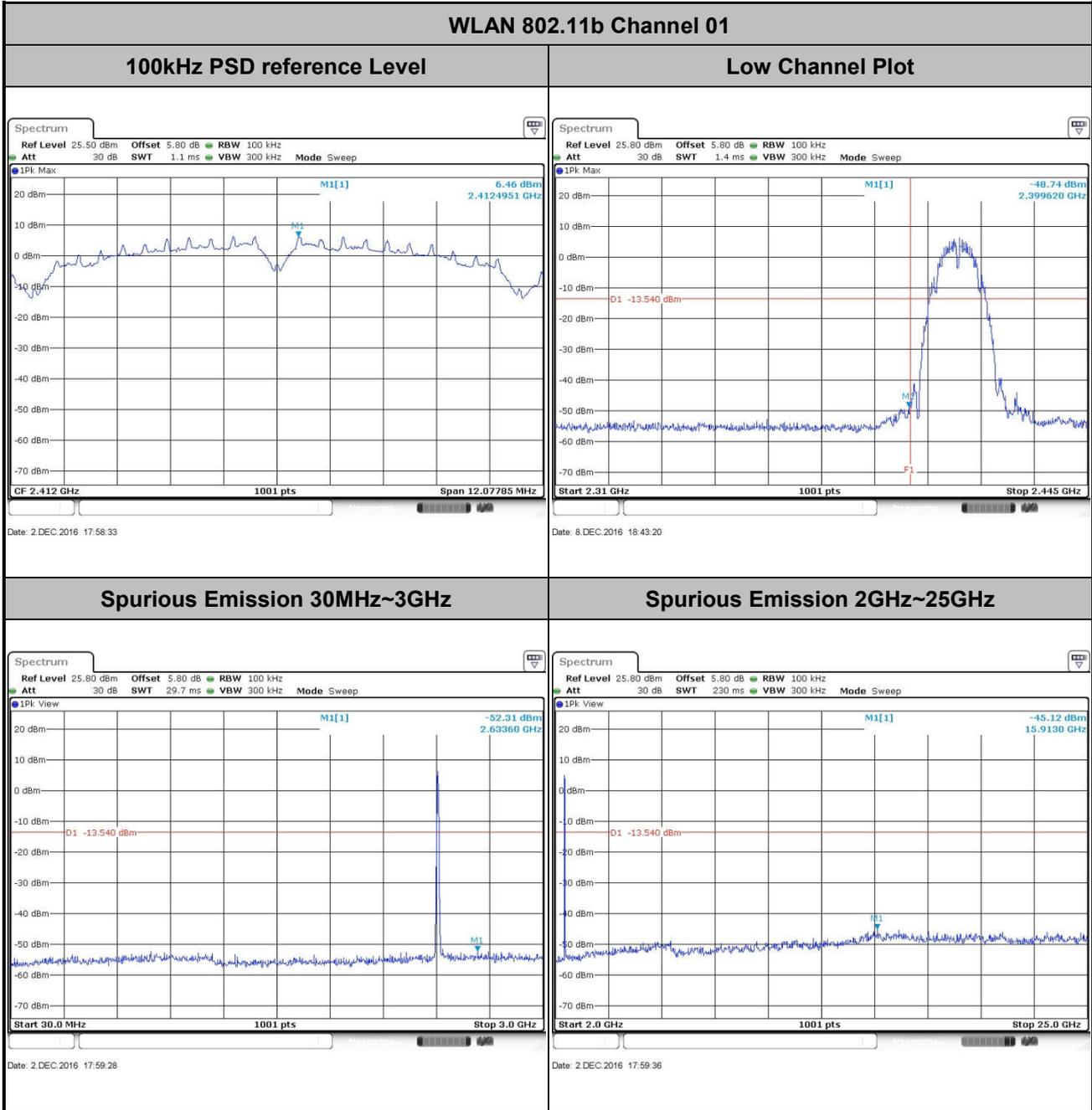
3.4.4 Test Setup





3.4.5 Test Result of Conducted Band Edges and Spurious Emission

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

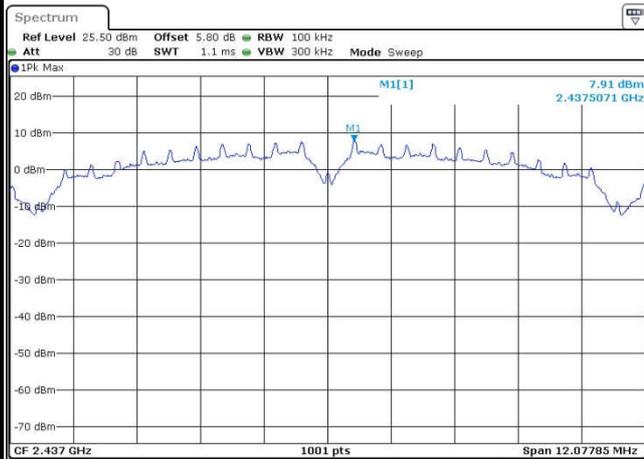




Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Zhang

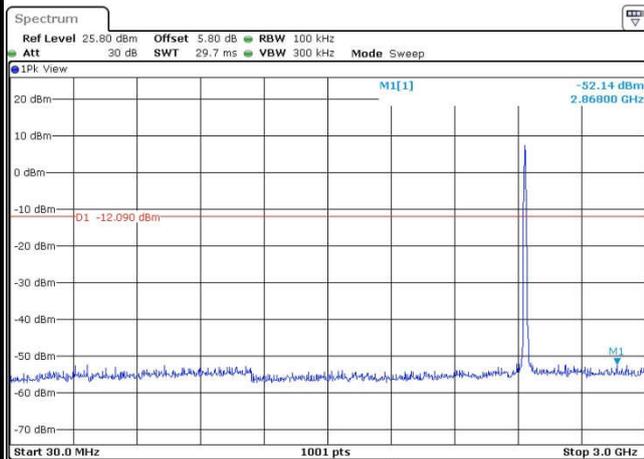
WLAN 802.11b Channel 06

100kHz PSD reference Level



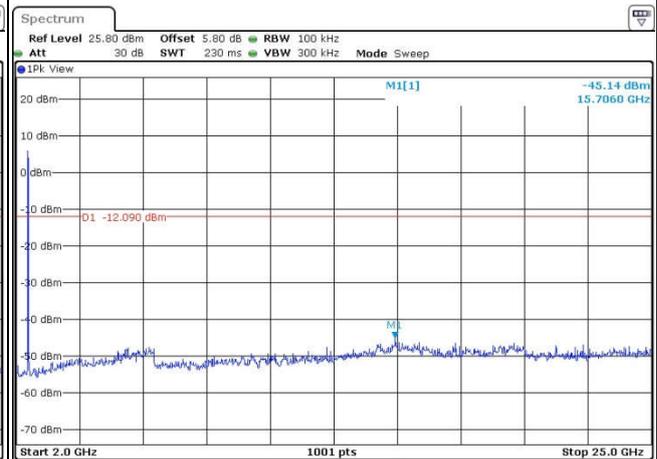
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Spurious Emission 30MHz~3GHz



Date: 2 DEC. 2016 18:59:59

Spurious Emission 2GHz~25GHz



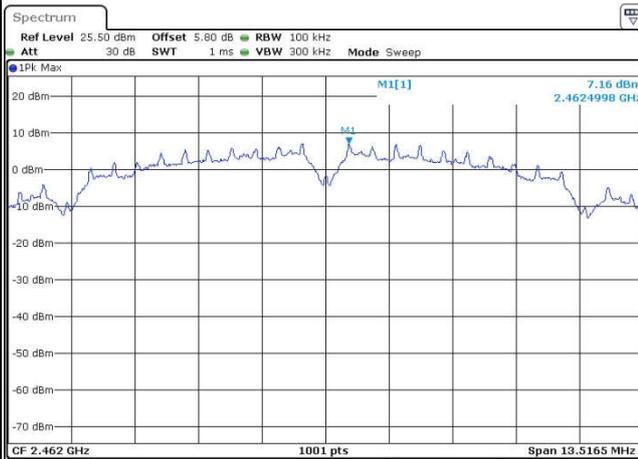
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Test Mode :	802.11b	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Zhang

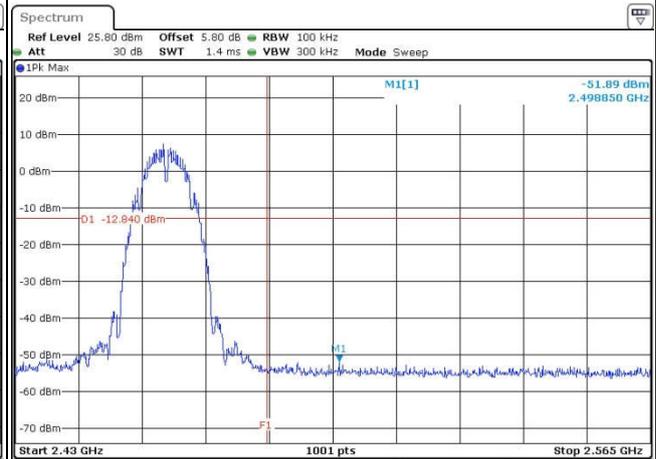
WLAN 802.11b Channel 11

100kHz PSD reference Level



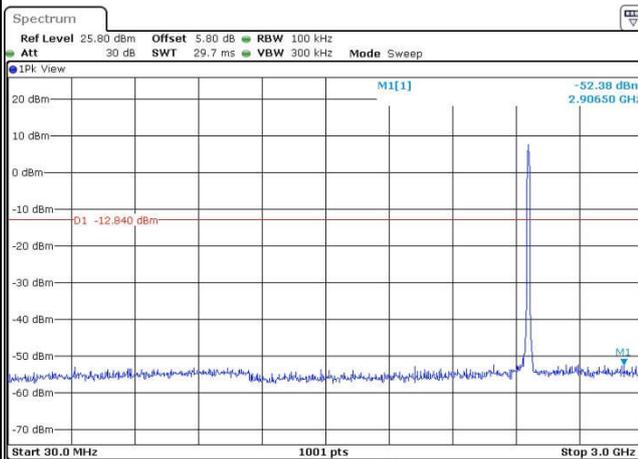
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High Channel Plot



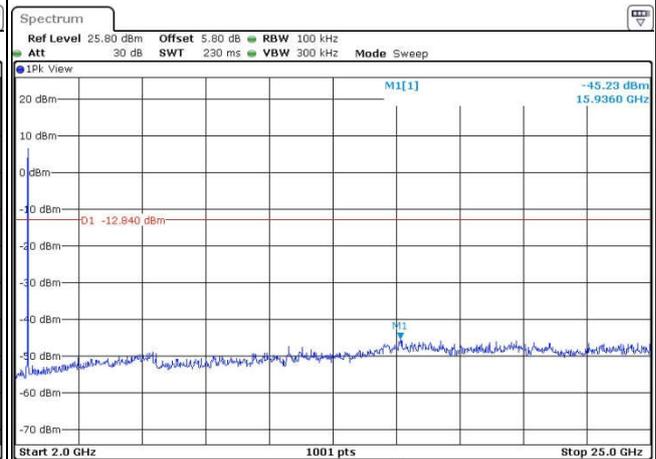
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Spurious Emission 30MHz~3GHz



Date: 2 DEC.2016 18:09:22

Spurious Emission 2GHz~25GHz



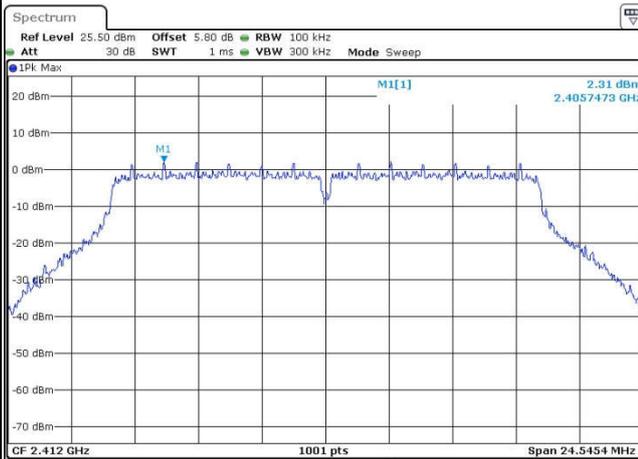
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Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Zhang

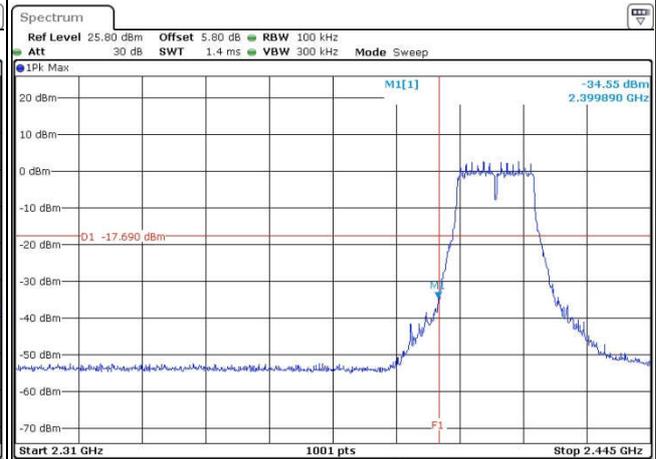
WLAN 802.11g Channel 01

100kHz PSD reference Level



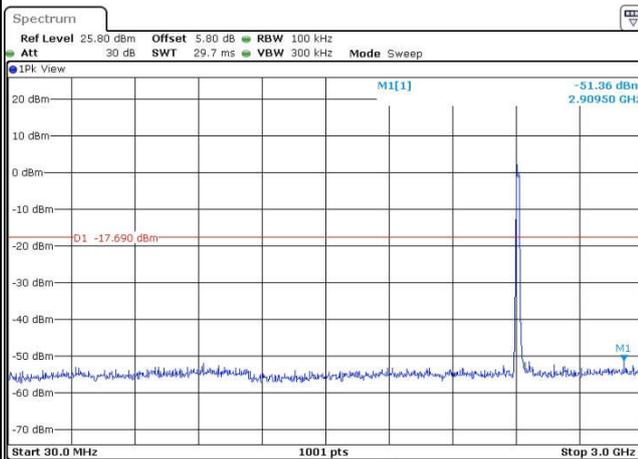
Date: 7 DEC. 2016 20:24:21

Low Channel Plot



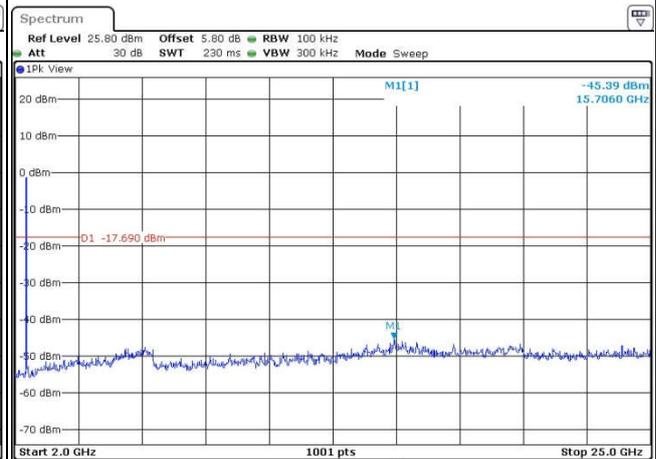
Date: 8 DEC. 2016 18:49:37

Spurious Emission 30MHz~3GHz



Date: 8 DEC. 2016 19:33:42

Spurious Emission 2GHz~25GHz



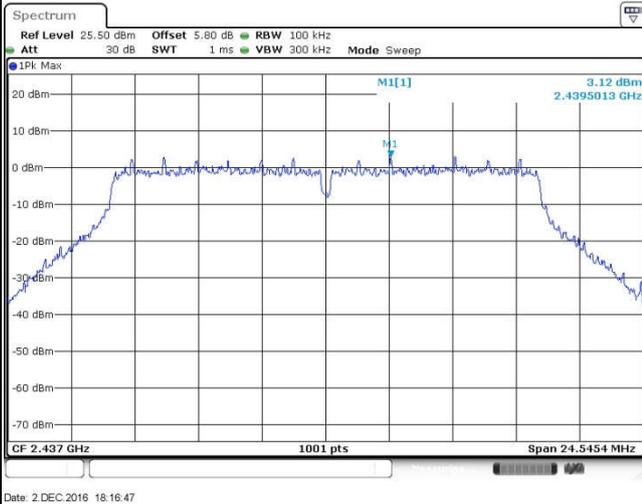
Date: 8 DEC. 2016 19:33:50



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

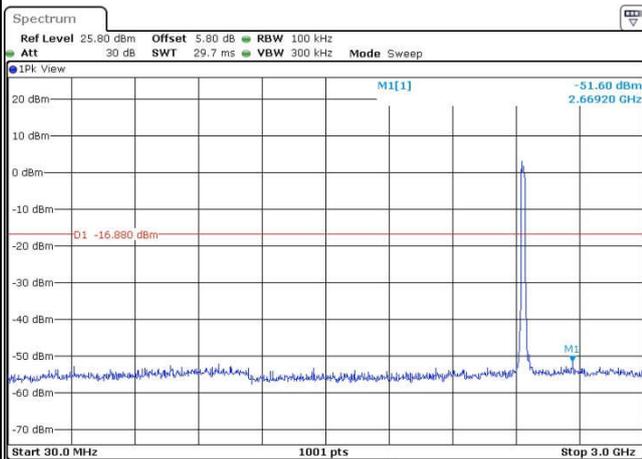
WLAN 802.11g Channel 06

100kHz PSD reference Level



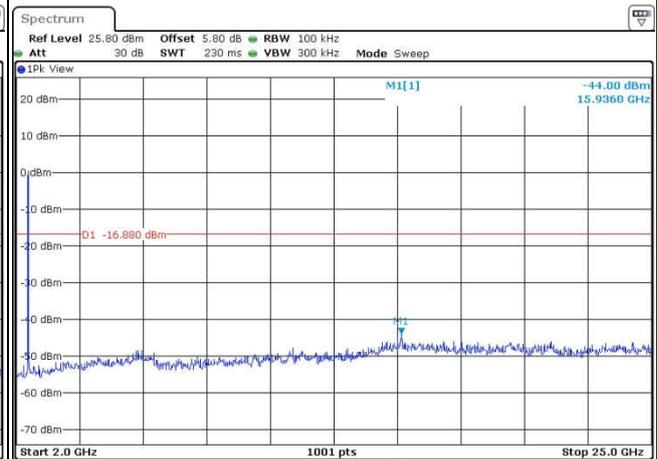
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Spurious Emission 30MHz~3GHz



Date: 2 DEC. 2016 18:16:57

Spurious Emission 2GHz~25GHz



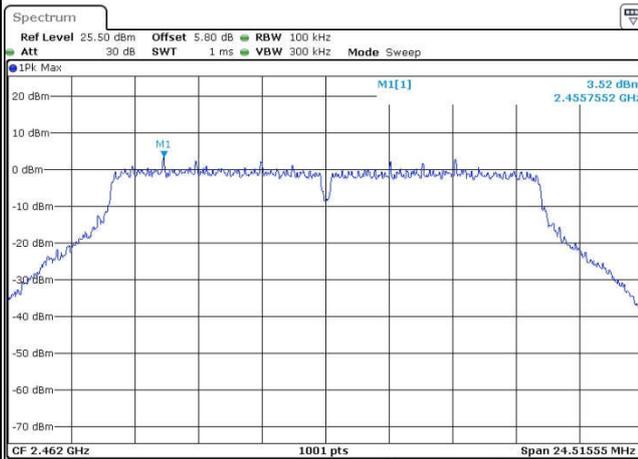
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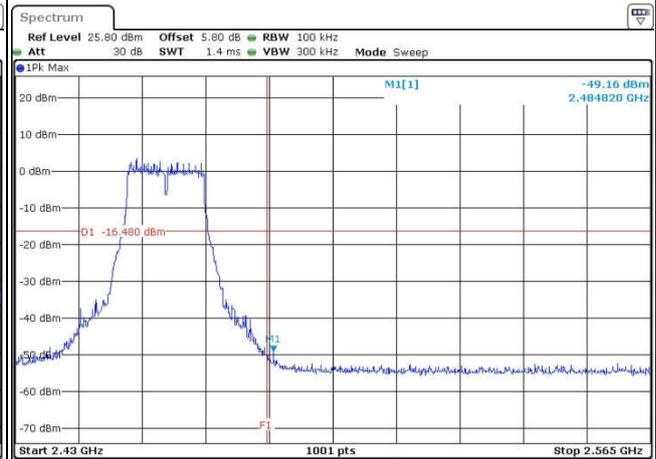
Test Mode :	802.11g	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Zhang

WLAN 802.11g Channel 11

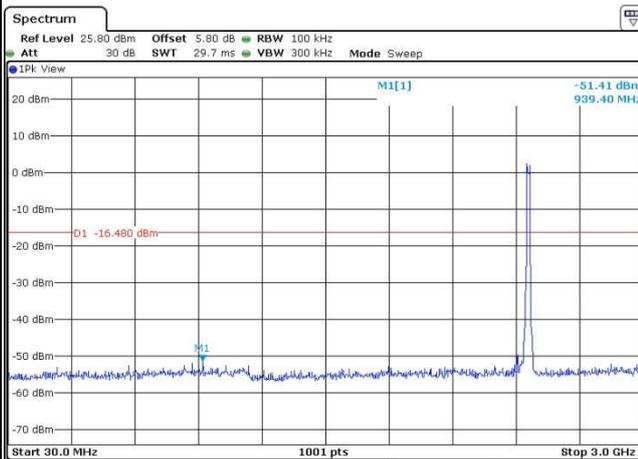
100kHz PSD reference Level



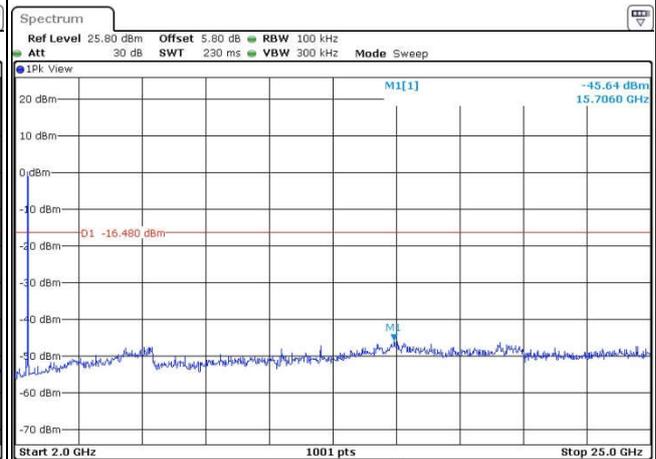
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

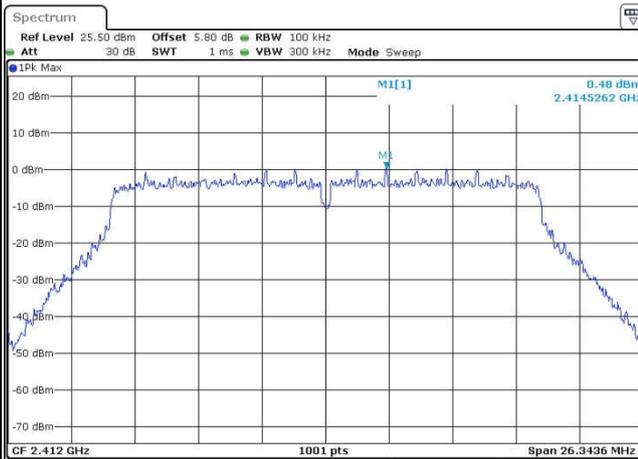




Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Low	Relative Humidity :	54~55%
Test Channel :	01	Test Engineer :	Ivan Zhang

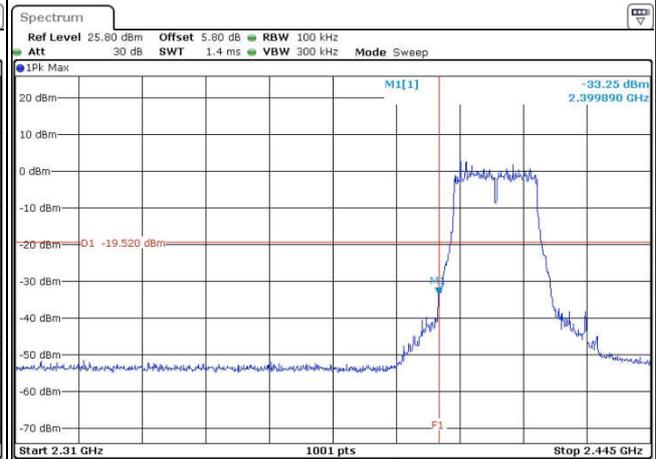
WLAN 802.11n HT20 Channel 01

100kHz PSD reference Level



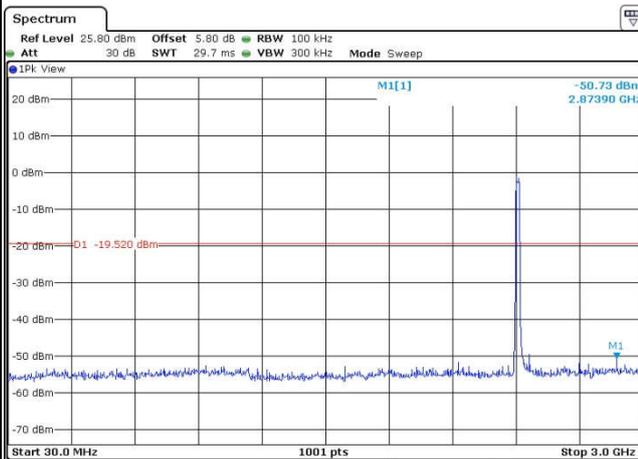
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Low Channel Plot



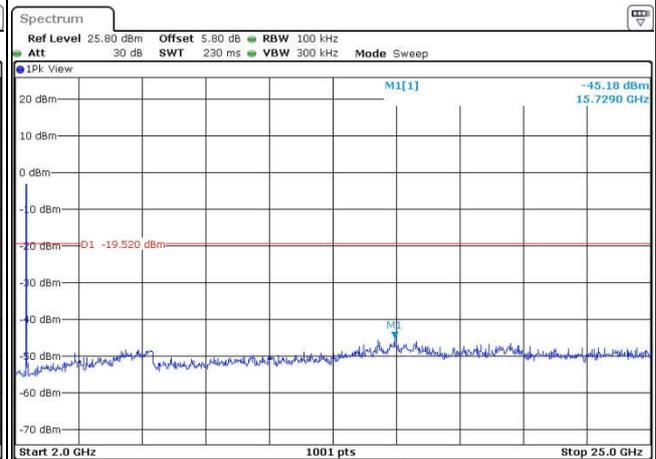
Date: 8 DEC.2016 18:55:15

Spurious Emission 30MHz~3GHz



Date: 8 DEC.2016 19:43:20

Spurious Emission 2GHz~25GHz



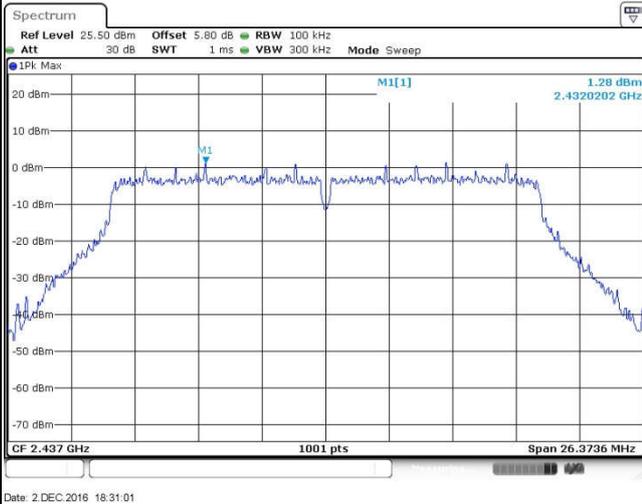
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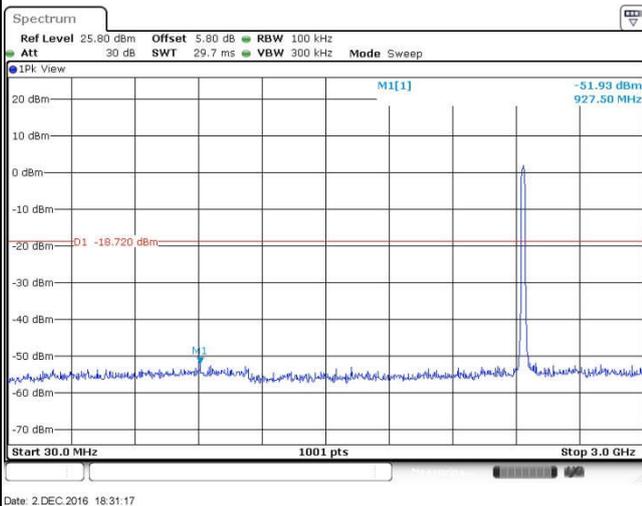
Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11n HT20 Channel 06

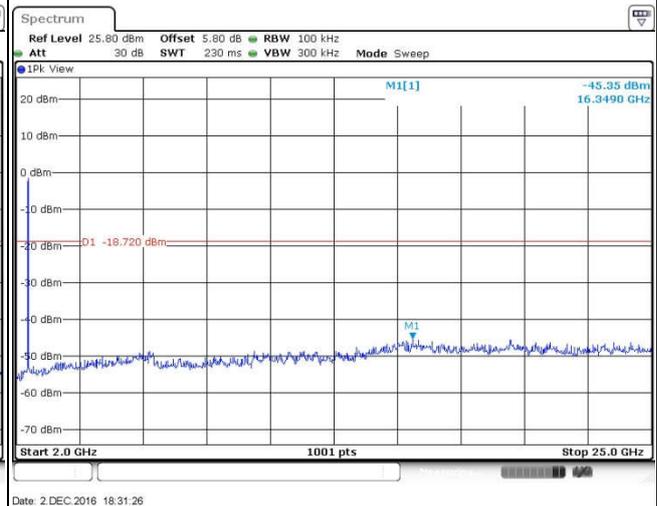
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

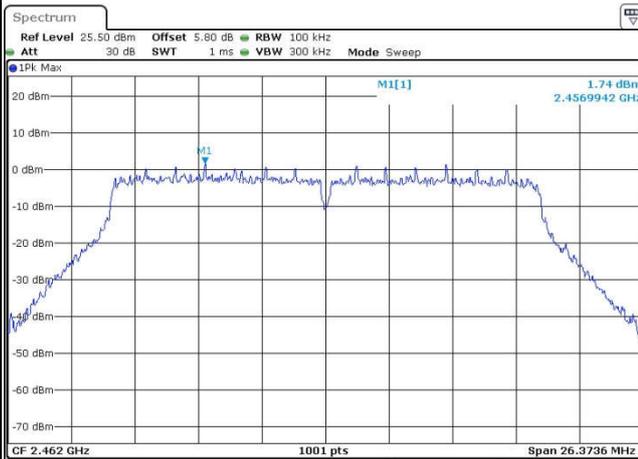




Test Mode :	802.11n HT20	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	11	Test Engineer :	Ivan Zhang

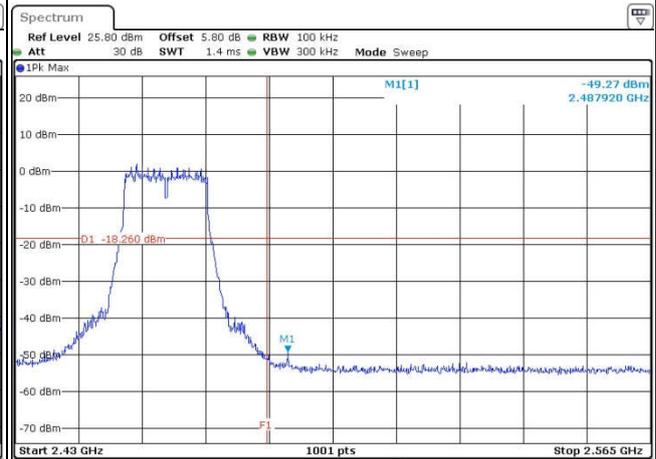
WLAN 802.11n HT20 Channel 11

100kHz PSD reference Level



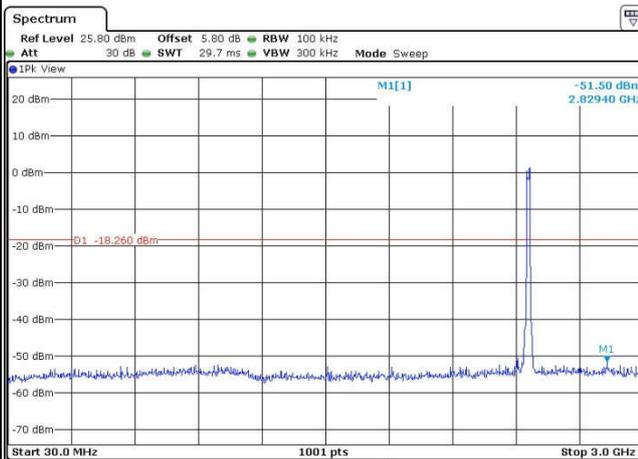
Date: 2 DEC. 2016 18:33:53

High Channel Plot



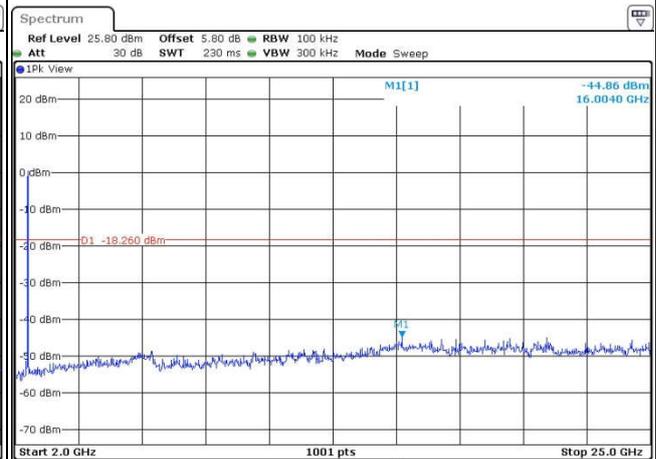
Date: 8 DEC. 2016 18:56:27

Spurious Emission 30MHz~3GHz



Date: 2 DEC. 2016 18:39:14

Spurious Emission 2GHz~25GHz



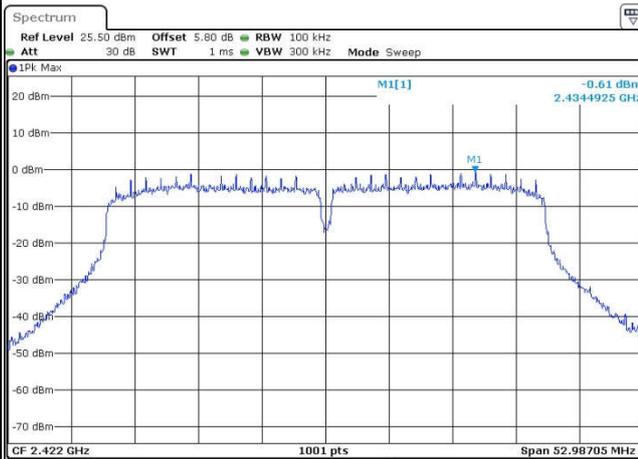
Date: 2 DEC. 2016 18:37:21



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

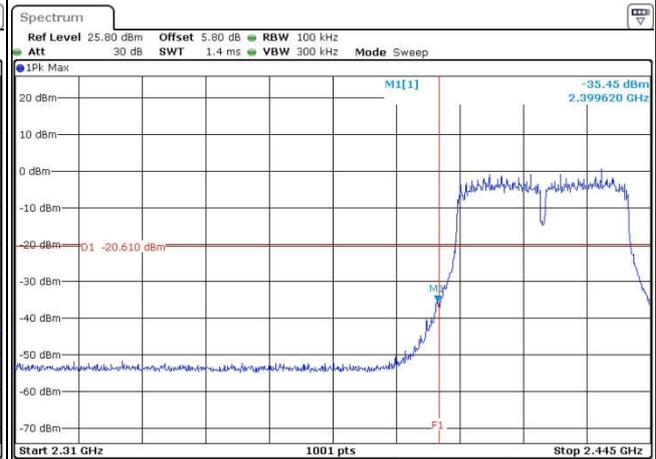
WLAN 802.11n HT40 Channel 03

100kHz PSD reference Level



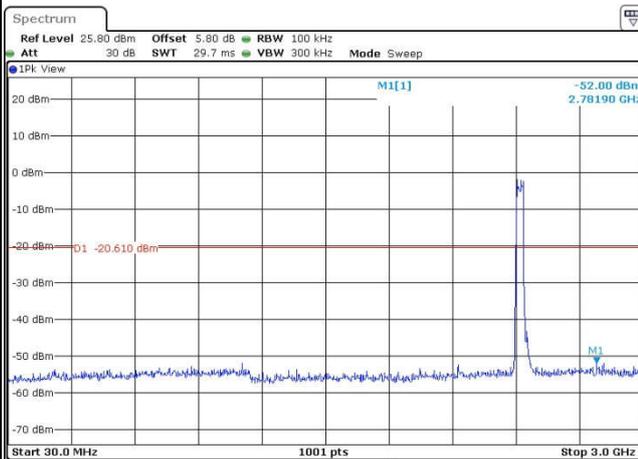
Date: 2 DEC. 2016 18:43:29

Low Channel Plot



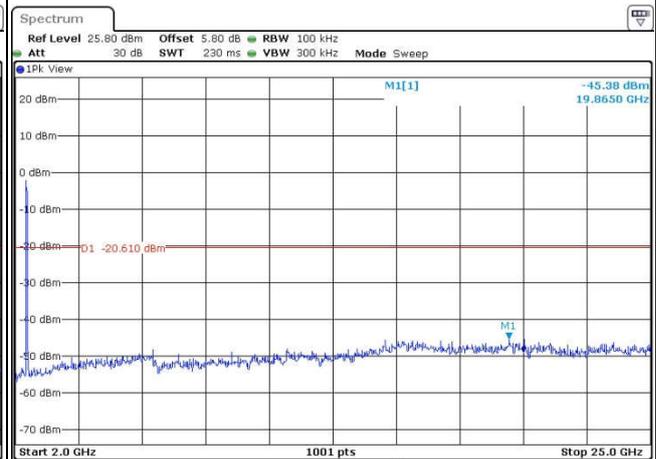
Date: 8 DEC. 2016 18:59:52

Spurious Emission 30MHz~3GHz



Date: 2 DEC. 2016 18:44:19

Spurious Emission 2GHz~25GHz



Date: 2 DEC. 2016 18:44:27

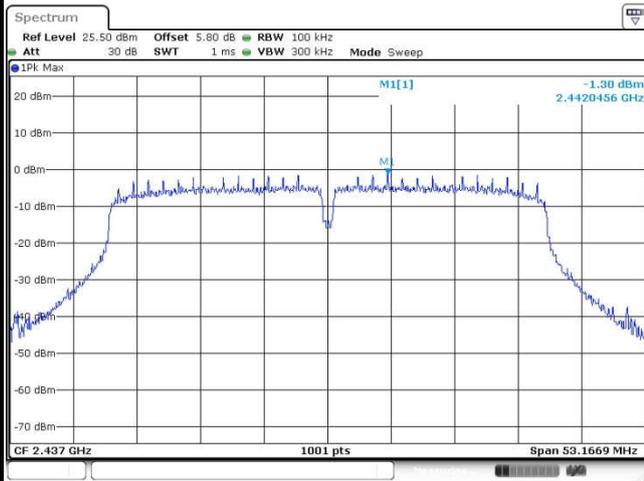


Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	54~55%
Test Channel :	06	Test Engineer :	Ivan Zhang

WLAN 802.11n HT40 Channel 06

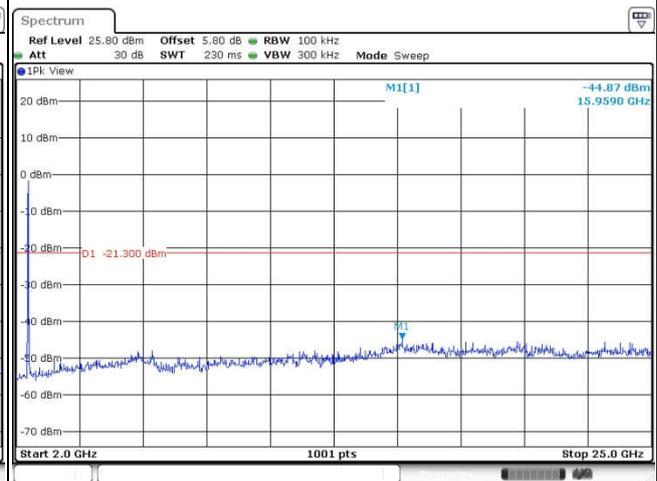
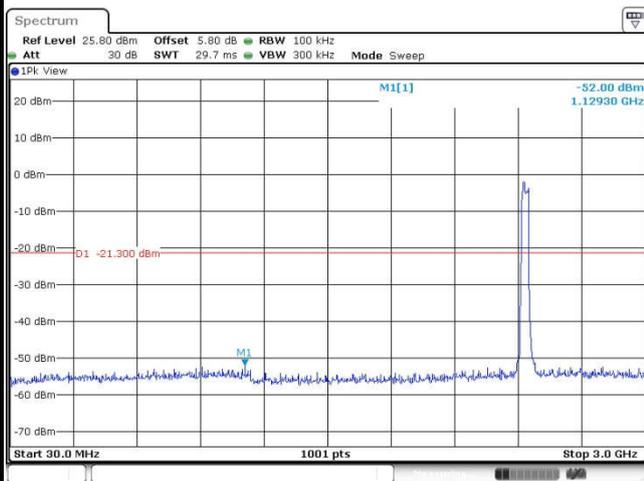
100kHz PSD reference Level

Mid Channel Plot



Spurious Emission 30MHz~3GHz

Spurious Emission 2GHz~25GHz

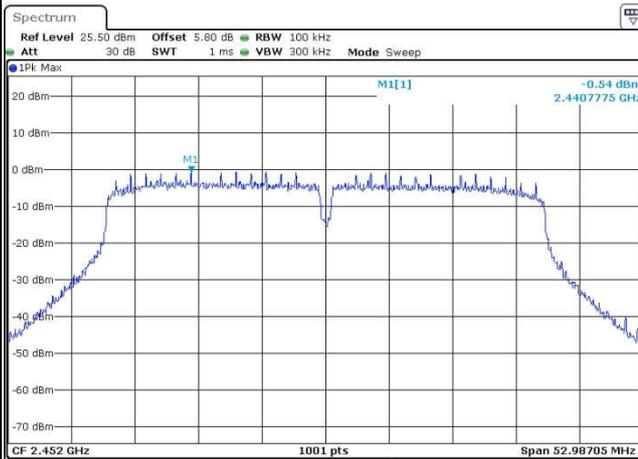




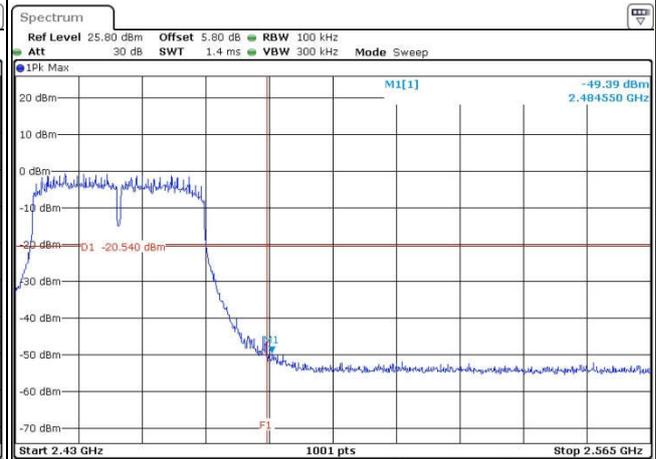
Test Mode :	802.11n HT40	Temperature :	24~25°C
Test Band :	2.4GHz High	Relative Humidity :	54~55%
Test Channel :	09	Test Engineer :	Ivan Zhang

WLAN 802.11n HT40 Channel 09

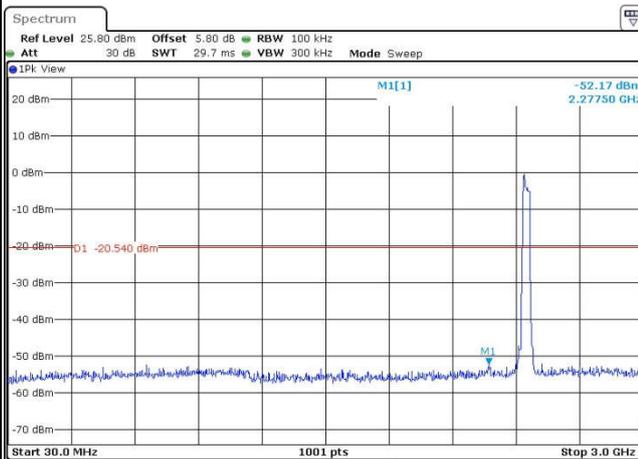
100kHz PSD reference Level



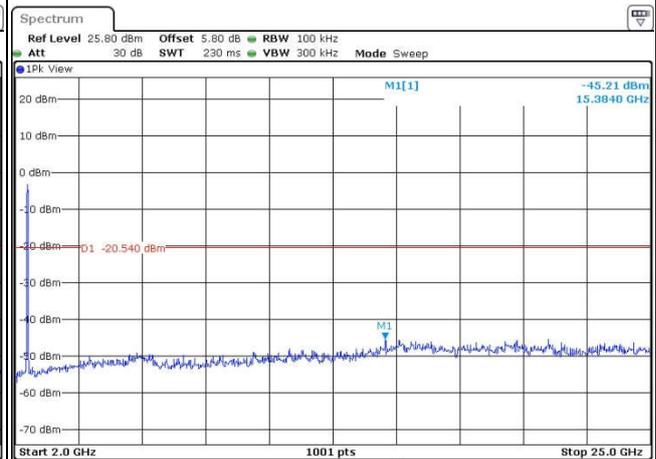
High Channel Plot



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz





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.

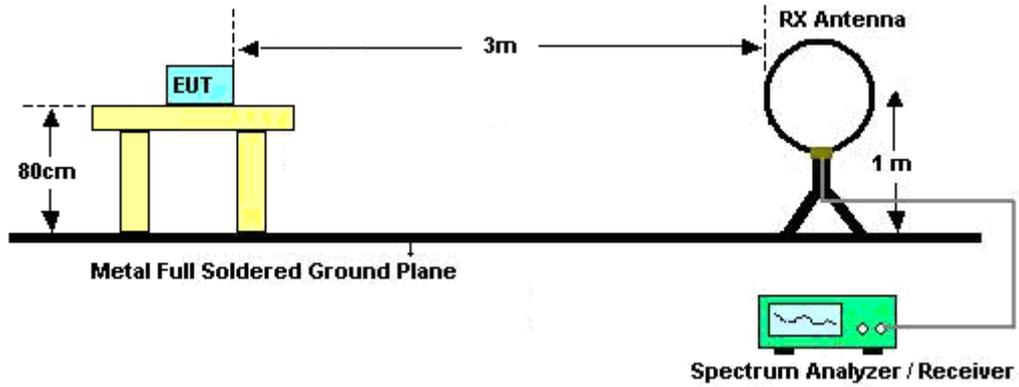


3.5.3 Test Procedures

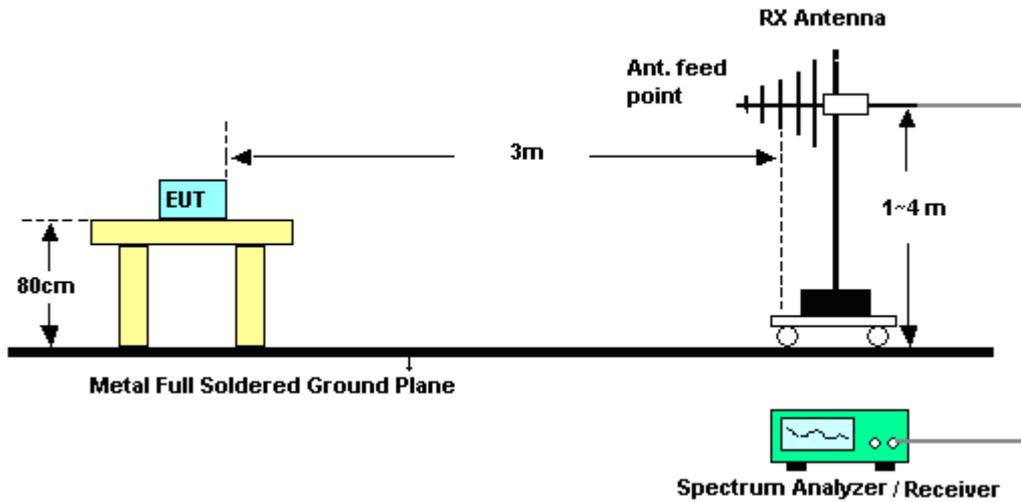
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r05.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the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

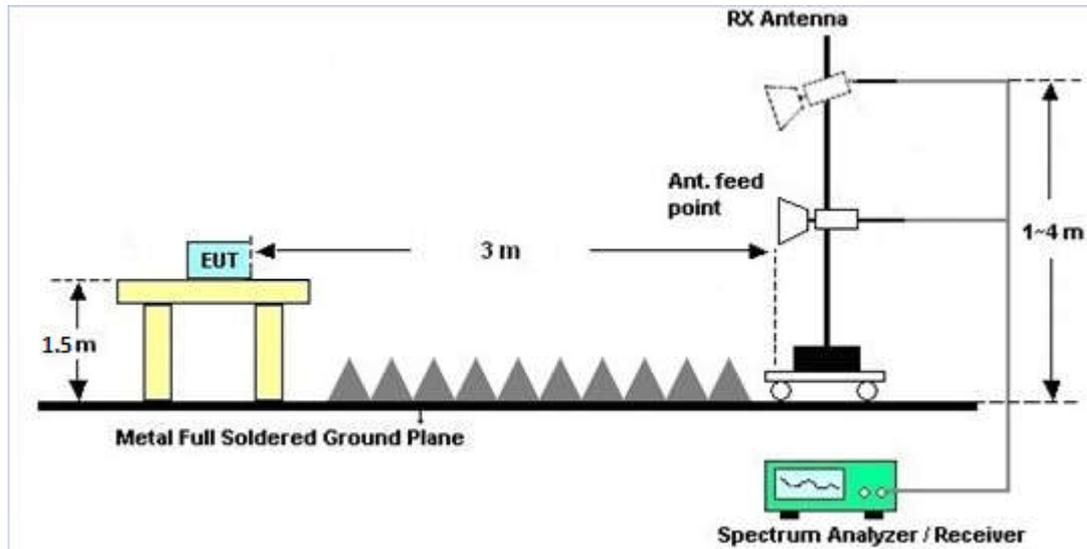
For radiated emissions below 30MHz



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.

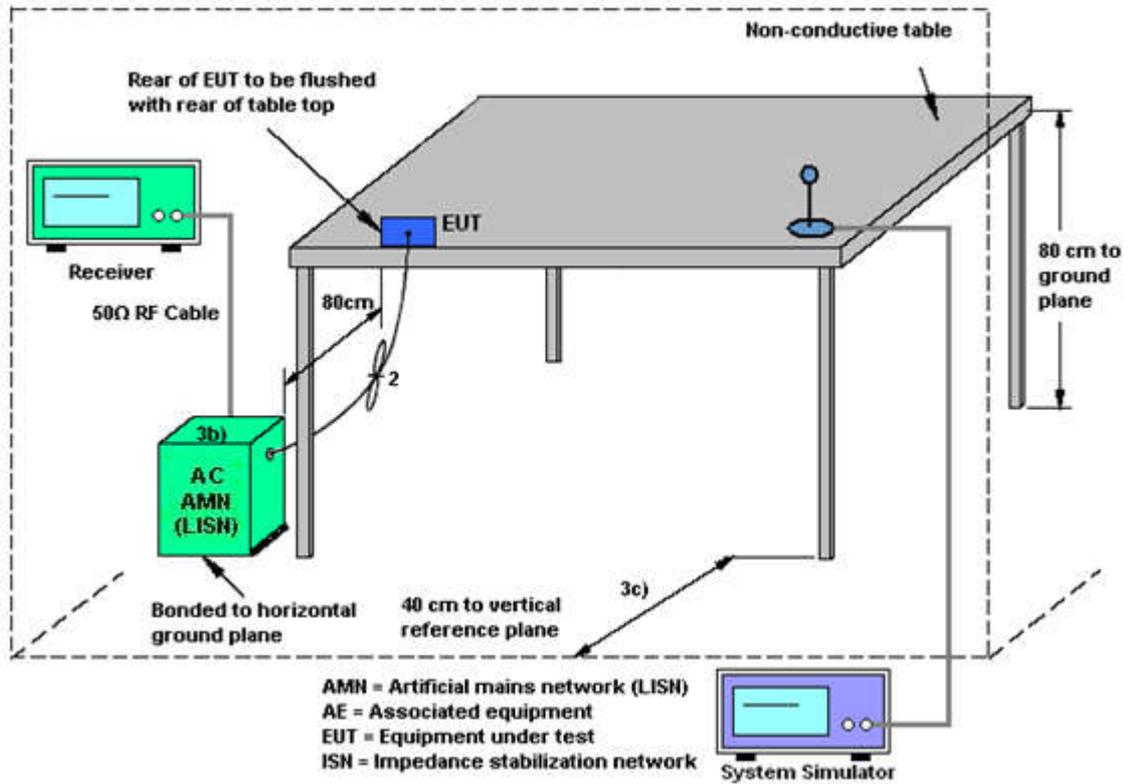
3.6.2 Measuring Instruments

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.

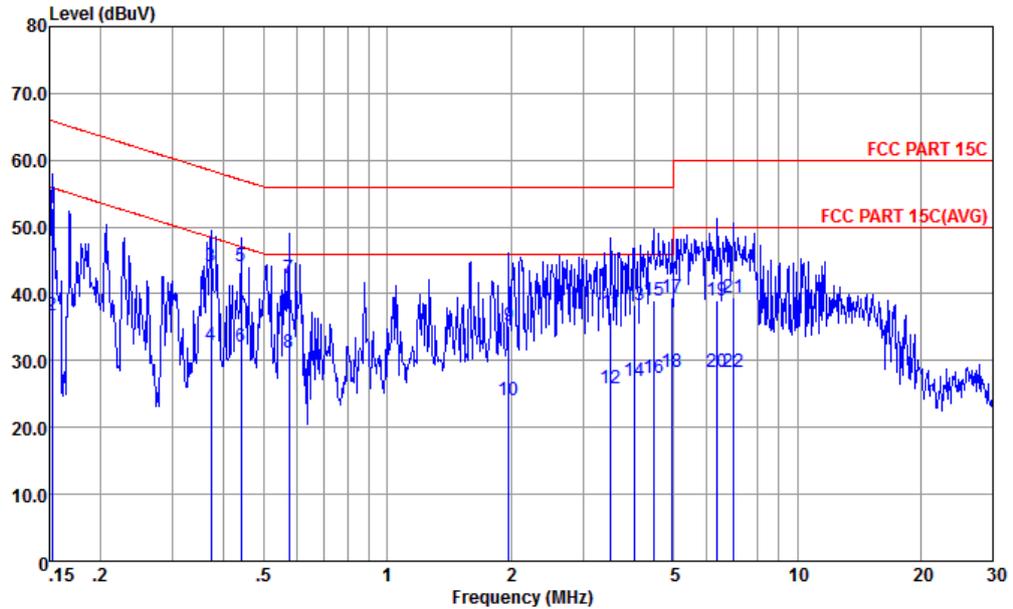
3.6.4 Test Setup





3.6.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Morris Li	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter)		



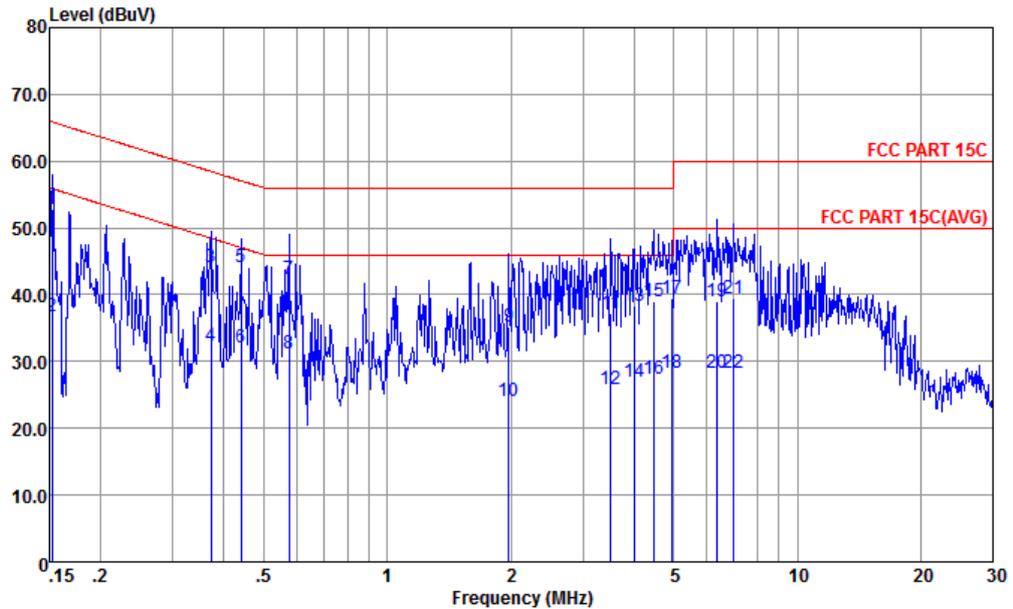
Site : CO01-KS
 Condition : FCC PART 15C LISN-L-20151024 LINE

mode : Mode 1
 IMEI : 990006860007516
 : #6

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	52.80	-13.07	65.87	41.90	0.51	10.39	QP
2	0.152	36.70	-19.17	55.87	25.80	0.51	10.39	Average
3	0.371	44.04	-14.43	58.47	33.60	0.23	10.21	QP
4	0.371	32.24	-16.23	48.47	21.80	0.23	10.21	Average
5 *	0.440	44.22	-12.85	57.07	33.80	0.23	10.19	QP
6	0.440	32.12	-14.95	47.07	21.70	0.23	10.19	Average
7	0.576	42.32	-13.68	56.00	31.91	0.23	10.18	QP
8	0.576	31.22	-14.78	46.00	20.81	0.23	10.18	Average
9	1.980	35.27	-20.73	56.00	24.90	0.18	10.19	QP
10	1.980	24.17	-21.83	46.00	13.80	0.18	10.19	Average
11	3.509	37.22	-18.78	56.00	26.80	0.19	10.23	QP
12	3.509	25.82	-20.18	46.00	15.40	0.19	10.23	Average
13	4.006	38.23	-17.77	56.00	27.80	0.19	10.24	QP
14	4.006	26.93	-19.07	46.00	16.50	0.19	10.24	Average
15	4.454	39.03	-16.97	56.00	28.60	0.19	10.24	QP
16	4.454	27.33	-18.67	46.00	16.90	0.19	10.24	Average



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Morris Li	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter)		



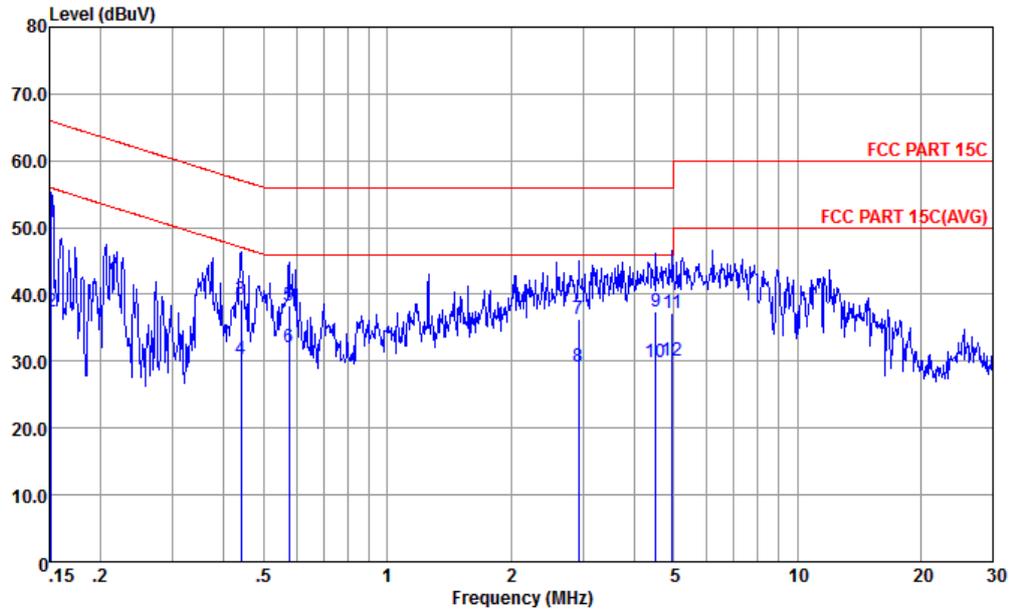
Site : CO01-KS
 Condition : FCC PART 15C LISN-L-20151024 LINE

mode : Mode 1
 IMEI : 990006860007516
 : #6

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
17	4.952	39.33	-16.67	56.00	28.90	0.19	10.24	QP
18	4.952	28.23	-17.77	46.00	17.80	0.19	10.24	Average
19	6.386	38.99	-21.01	60.00	28.50	0.22	10.27	QP
20	6.386	28.39	-21.61	50.00	17.90	0.22	10.27	Average
21	6.988	39.41	-20.59	60.00	28.90	0.23	10.28	QP
22	6.988	28.31	-21.69	50.00	17.80	0.23	10.28	Average



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Morris Li	Relative Humidity :	42~44%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Link + WLAN Link(2.4G) + Earphone + USB Cable (Charging from Adapter)		



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

mode : Mode 1
 IMEI : 990006860007516
 : #6

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.152	50.89	-15.02	65.91	40.20	0.30	10.39	QP
2	0.152	37.49	-18.42	55.91	26.80	0.30	10.39	Average
3	0.440	39.31	-17.76	57.07	28.80	0.32	10.19	QP
4	0.440	30.31	-16.76	47.07	19.80	0.32	10.19	Average
5	0.576	38.31	-17.69	56.00	27.80	0.33	10.18	QP
6 *	0.576	32.11	-13.89	46.00	21.60	0.33	10.18	Average
7	2.931	36.39	-19.61	56.00	25.80	0.37	10.22	QP
8	2.931	29.09	-16.91	46.00	18.50	0.37	10.22	Average
9	4.525	37.40	-18.60	56.00	26.80	0.36	10.24	QP
10	4.525	29.90	-16.10	46.00	19.30	0.36	10.24	Average
11	4.952	37.30	-18.70	56.00	26.70	0.36	10.24	QP
12	4.952	30.00	-16.00	46.00	19.40	0.36	10.24	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	Dec. 01, 2016~ Dec. 08, 2016	Aug. 08, 2017	Conducted (TH01-KS)
Pulse Power Sensor	Anritsu	MA2411B	0917070	300MHz~40GHz	Jan. 20, 2016	Dec. 01, 2016~ Dec. 08, 2016	Jan. 19, 2017	Conducted (TH01-KS)
Power Meter	Anritsu	ML2495A	1005002	50MHz Bandwidth	Jan. 20, 2016	Dec. 01, 2016~ Dec. 08, 2016	Jan. 19, 2017	Conducted (TH01-KS)
EMI Test Receiver	R&S	ESR7	101403	9kHz~7GHz; Max 30dBm	Aug. 09, 2016	Dec. 01, 2016~ Dec. 14, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
EXA Spectrum Analyzer	Keysight	N9010A	MY551502 44	10Hz~44GHz	Apr. 22, 2016	Dec. 01, 2016~ Dec. 14, 2016	Apr. 21, 2017	Radiation (03CH03-KS)
Loop Antenna	R&S	HFH2-Z2	100321	9kHz~30MHz	Oct. 23, 2016	Dec. 01, 2016~ Dec. 14, 2016	Oct. 22, 2017	Radiation (03CH03-KS)
Bilog Antenna	TeseQ	CBL6112D	35406	25MHz~2GHz	Apr. 16, 2016	Dec. 01, 2016~ Dec. 14, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-135 6	1GHz~18GHz	Apr. 16, 2016	Dec. 01, 2016~ Dec. 14, 2016	Apr. 15, 2017	Radiation (03CH03-KS)
SHF-EHF Horn	Schwarzbeck	BBHA 9170	BBHA1702 49	15GHz~40GHz	Mar. 03, 2016	Dec. 01, 2016~ Dec. 14, 2016	Mar. 02, 2017	Radiation (03CH03-KS)
Amplifier	SONOMA	310N	187289	9kHz~1GHz	Aug. 09, 2016	Dec. 01, 2016~ Dec. 14, 2016	Aug. 08, 2017	Radiation (03CH03-KS)
High Gain Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	1943529	1GHz~18GHz	Jan. 20, 2016	Dec. 01, 2016~ Dec. 14, 2016	Jan. 19, 2017	Radiation (03CH03-KS)
Amplifier	Agilent	8449B	3008A023 70	1GHz~26.5GHz	Oct. 13, 2016	Dec. 01, 2016~ Dec. 14, 2016	Oct. 12, 2017	Radiation (03CH03-KS)
AC Power Source	Chroma	61601	F1040900 04	N/A	NCR	Dec. 01, 2016~ Dec. 14, 2016	NCR	Radiation (03CH03-KS)
Turn Table	ChamPro	EM 1000-T	060762-T	0~360 degree	NCR	Dec. 01, 2016~ Dec. 14, 2016	NCR	Radiation (03CH03-KS)
Antenna Mast	ChamPro	EM 1000-A	060762-A	1 m~4 m	NCR	Dec. 01, 2016~ Dec. 14, 2016	NCR	Radiation (03CH03-KS)
EMI Receiver	R&S	ESCI7	100768	9kHz~7GHz;	Apr. 29, 2016	Dec. 19, 2016	Apr. 28, 2017	Conduction (CO01-KS)
AC LISN	MessTec	AN3016	060103	9kHz~30MHz	Oct. 13, 2016	Dec. 19, 2016	Oct. 12, 2017	Conduction (CO01-KS)
AC LISN (for auxiliary equipment)	MessTec	AN3016	060105	9kHz~30MHz	Oct. 13, 2016	Dec. 19, 2016	Oct. 12, 2017	Conduction (CO01-KS)
AC Power Source	Chroma	61602	ABP00000 0811	AC 0V~300V, 45Hz~1000Hz	Oct. 13, 2016	Dec. 19, 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% ($U = 2Uc(y)$)	4.5 dB
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Uncertainty of Radiated Emission Measurement (1GHz ~ 18GHz)

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

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

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



Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Ivan Zhang	Temperature:	24~25	°C
Test Date:	2016/12/1~2016/12/8	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	13.09	8.05	0.50	Pass
11b	1Mbps	1	6	2437	13.24	8.05	0.50	Pass
11b	1Mbps	1	11	2462	13.34	9.01	0.50	Pass
11g	6Mbps	1	1	2412	18.13	16.36	0.50	Pass
11g	6Mbps	1	6	2437	18.13	16.36	0.50	Pass
11g	6Mbps	1	11	2462	18.33	16.34	0.50	Pass
HT20	MCS0	1	1	2412	18.93	17.56	0.50	Pass
HT20	MCS0	1	6	2437	19.08	17.58	0.50	Pass
HT20	MCS0	1	11	2462	18.98	17.58	0.50	Pass
HT40	MCS0	1	3	2422	36.46	35.32	0.50	Pass
HT40	MCS0	1	6	2437	36.46	35.44	0.50	Pass
HT40	MCS0	1	9	2452	36.56	35.32	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	17.33	30.00	-2.85	14.48	36.00	Pass
11b	1Mbps	1	6	2437	17.34	30.00	-2.85	14.49	36.00	Pass
11b	1Mbps	1	11	2462	17.38	30.00	-2.85	14.53	36.00	Pass
11g	6Mbps	1	1	2412	23.57	30.00	-2.85	20.72	36.00	Pass
11g	6Mbps	1	6	2437	23.82	30.00	-2.85	20.97	36.00	Pass
11g	6Mbps	1	11	2462	23.89	30.00	-2.85	21.04	36.00	Pass
HT20	MCS0	1	1	2412	21.66	30.00	-2.85	18.81	36.00	Pass
HT20	MCS0	1	6	2437	22.14	30.00	-2.85	19.29	36.00	Pass
HT20	MCS0	1	11	2462	22.71	30.00	-2.85	19.86	36.00	Pass
HT40	MCS0	1	3	2422	22.14	30.00	-2.85	19.29	36.00	Pass
HT40	MCS0	1	6	2437	22.62	30.00	-2.85	19.77	36.00	Pass
HT40	MCS0	1	9	2452	23.03	30.00	-2.85	20.18	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	14.93
11b	1Mbps	1	6	2437	0.10	15.03
11b	1Mbps	1	11	2462	0.10	15.06
11g	6Mbps	1	1	2412	0.58	13.62
11g	6Mbps	1	6	2437	0.58	14.07
11g	6Mbps	1	11	2462	0.58	14.10
HT20	MCS0	1	1	2412	0.64	12.08
HT20	MCS0	1	6	2437	0.64	12.45
HT20	MCS0	1	11	2462	0.64	13.05
HT40	MCS0	1	3	2422	0.64	12.05
HT40	MCS0	1	6	2437	0.64	12.38
HT40	MCS0	1	9	2452	0.64	12.96

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	-6.95	-2.85	8.00	Pass
11b	1Mbps	1	6	2437	-6.45	-2.85	8.00	Pass
11b	1Mbps	1	11	2462	-7.16	-2.85	8.00	Pass
11g	6Mbps	1	1	2412	-12.14	-2.85	8.00	Pass
11g	6Mbps	1	6	2437	-10.67	-2.85	8.00	Pass
11g	6Mbps	1	11	2462	-9.97	-2.85	8.00	Pass
HT20	MCS0	1	1	2412	-13.95	-2.85	8.00	Pass
HT20	MCS0	1	6	2437	-12.00	-2.85	8.00	Pass
HT20	MCS0	1	11	2462	-12.21	-2.85	8.00	Pass
HT40	MCS0	1	3	2422	-14.23	-2.85	8.00	Pass
HT40	MCS0	1	6	2437	-14.70	-2.85	8.00	Pass
HT40	MCS0	1	9	2452	-14.69	-2.85	8.00	Pass



Appendix B. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		2355.63	51.22	-22.78	74	55.9	26.91	5.43	37.02	341	51	P	H
		2389.95	40	-14.00	54	44.55	27	5.47	37.02	341	51	A	H
	*	2412	103.91	-	-	108.31	27.13	5.47	37	341	51	P	H
	*	2410	100.4	-	-	104.8	27.13	5.47	37	341	51	A	H
		2384.36	50.84	-23.16	74	55.46	26.95	5.45	37.02	347	112	P	V
		2389.43	39.81	-14.19	54	44.36	27	5.47	37.02	347	112	A	V
	*	2412	102.52	-	-	106.92	27.13	5.47	37	347	112	P	V
	*	2412	99.36	-	-	103.76	27.13	5.47	37	347	112	A	V
802.11b CH 06 2437MHz		2377.21	50.88	-23.12	74	55.5	26.95	5.45	37.02	100	46	P	H
		2387.35	39.76	-14.24	54	44.31	27	5.47	37.02	100	46	A	H
		2486.26	51.63	-22.37	74	55.42	27.64	5.51	36.94	100	46	P	H
		2486.44	40.96	-13.04	54	44.75	27.64	5.51	36.94	100	46	A	H
	*	2438	105.08	-	-	109.17	27.39	5.49	36.97	100	46	P	H
	*	2438	102.04	-	-	106.13	27.39	5.49	36.97	100	46	A	H
		2366.42	51.56	-22.44	74	56.24	26.91	5.43	37.02	338	123	P	V
		2388	39.74	-14.26	54	44.29	27	5.47	37.02	338	123	A	V
		2496.28	51.33	-22.67	74	54.97	27.77	5.52	36.93	338	123	P	V
		2484.58	40.63	-13.37	54	44.42	27.64	5.51	36.94	338	123	A	V
	*	2438	103.14	-	-	107.23	27.39	5.49	36.97	338	123	P	V
	*	2438	100.12	-	-	104.21	27.39	5.49	36.97	338	123	A	V



802.11b CH 11 2462MHz		2484.82	52.51	-21.49	74	56.3	27.64	5.51	36.94	160	43	P	H
		2487.16	42.55	-11.45	54	46.34	27.64	5.51	36.94	160	43	A	H
	*	2462	107.18	-	-	111.13	27.51	5.5	36.96	160	43	P	H
	*	2462	103.99	-	-	107.94	27.51	5.5	36.96	160	43	A	H
		2489.14	51.82	-22.18	74	55.46	27.77	5.52	36.93	372	111	P	V
		2487.16	41.36	-12.64	54	45.15	27.64	5.51	36.94	372	111	A	V
	*	2462	103.28	-	-	107.23	27.51	5.5	36.96	372	111	P	V
	*	2462	100.11	-	-	104.06	27.51	5.5	36.96	372	111	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	42.34	-31.66	74	39.79	31.51	7.72	36.68	100	360	P	H
		4824	41.79	-32.21	74	39.24	31.51	7.72	36.68	100	360	P	V
802.11b CH 06 2437MHz		4872	42.55	-31.45	74	39.86	31.59	7.76	36.66	100	360	P	H
		7311	47.25	-26.75	74	40.15	34.03	9.76	36.69	100	360	P	H
		4872	43.41	-30.59	74	40.72	31.59	7.76	36.66	100	360	P	V
802.11b CH 11 2462MHz		7311	46.5	-27.50	74	39.4	34.03	9.76	36.69	100	360	P	V
		4926	43.44	-30.56	74	40.62	31.67	7.8	36.65	100	360	P	H
		7386	45.85	-28.15	74	38.48	34.29	9.86	36.78	100	360	P	H
		4924	43.3	-30.70	74	40.48	31.67	7.8	36.65	100	359	P	V
802.11b CH 11 2462MHz		7386	46.64	-27.36	74	39.27	34.29	9.86	36.78	100	359	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)

Table with 14 columns: WIFI Ant. 2, Note, Frequency (MHz), Level (dBµV/m), Over Limit (dB), Limit Line (dBµV/m), Read Level (dBµV), Antenna Factor (dB/m), Cable Loss (dB), Preamp Factor (dB), Ant Pos (cm), Table Pos (deg), Peak Avg. (P/A), Pol. (H/V). Rows include data for 802.11g CH 01 (2412MHz) and 802.11g CH 06 (2437MHz).



802.11g CH 11 2462MHz		2483.5	55.48	-18.52	74	59.27	27.64	5.51	36.94	230	58	P	H
		2483.5	42.93	-11.07	54	46.72	27.64	5.51	36.94	230	58	A	H
	*	2456	106.29	-	-	110.24	27.51	5.5	36.96	230	58	P	H
	*	2454	98.61	-	-	102.56	27.51	5.5	36.96	230	58	A	H
		2483.92	55.24	-18.76	74	59.03	27.64	5.51	36.94	382	119	P	V
		2483.5	42.22	-11.78	54	46.01	27.64	5.51	36.94	382	119	A	V
	*	2456	105.23	-	-	109.18	27.51	5.5	36.96	382	119	P	V
	*	2456	97.5	-	-	101.45	27.51	5.5	36.96	382	119	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. 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	41.5	-32.50	74	38.95	31.51	7.72	36.68	100	360	P	H
		4824	42.69	-31.31	74	40.14	31.51	7.72	36.68	100	360	P	V
802.11g CH 06 2437MHz		4872	42.27	-31.73	74	39.58	31.59	7.76	36.66	100	360	P	H
		7308	45.48	-28.52	74	38.38	34.03	9.76	36.69	100	360	P	H
		4872	42.23	-31.77	74	39.54	31.59	7.76	36.66	100	360	P	V
		7308	45.54	-28.46	74	38.44	34.03	9.76	36.69	100	360	P	V
802.11g CH 11 2462MHz		4926	43.5	-30.50	74	40.68	31.67	7.8	36.65	100	360	P	H
		7386	46.1	-27.90	74	38.73	34.29	9.86	36.78	100	360	P	H
		4926	42.28	-31.72	74	39.46	31.67	7.8	36.65	100	360	P	V
		7386	46.05	-27.95	74	38.68	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 802.11n HT20 (Band Edge @ 3m)**

WIFI Ant. 2	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		2387.09	50.88	-23.12	74	55.43	27	5.47	37.02	174	32	P	H
		2389.95	40.79	-13.21	54	45.34	27	5.47	37.02	174	32	A	H
	*	2410	103.61	-	-	108.01	27.13	5.47	37	174	32	P	H
	*	2414	95.51	-	-	99.91	27.13	5.47	37	174	32	A	H
		2343.67	50.68	-23.32	74	55.42	26.86	5.41	37.01	300	110	P	V
		2389.95	40.24	-13.76	54	44.79	27	5.47	37.02	300	110	A	V
	*	2410	97.74	-	-	102.14	27.13	5.47	37	300	110	P	V
	*	2410	90.09	-	-	94.49	27.13	5.47	37	300	110	A	V
802.11n HT20 CH 06 2437MHz		2386.31	50.95	-23.05	74	55.5	27	5.47	37.02	166	32	P	H
		2389.82	40.14	-13.86	54	44.69	27	5.47	37.02	166	32	A	H
		2488.3	52.54	-21.46	74	56.18	27.77	5.52	36.93	166	32	P	H
		2488.66	42.9	-11.10	54	46.54	27.77	5.52	36.93	166	32	A	H
	*	2446	105.46	-	-	109.55	27.39	5.49	36.97	166	32	P	H
	*	2444	97.85	-	-	101.94	27.39	5.49	36.97	166	32	A	H
		2363.82	50.35	-23.65	74	55.03	26.91	5.43	37.02	340	112	P	V
		2388.39	40.1	-13.90	54	44.65	27	5.47	37.02	340	112	A	V
		2489.08	51.26	-22.74	74	54.9	27.77	5.52	36.93	340	112	P	V
		2488.72	41.59	-12.41	54	45.23	27.77	5.52	36.93	340	112	A	V
	*	2442	99.71	-	-	103.8	27.39	5.49	36.97	340	112	P	V
*	2444	92.1	-	-	96.19	27.39	5.49	36.97	340	112	A	V	



802.11n HT20 CH 11 2462MHz		2483.5	57.02	-16.98	74	60.81	27.64	5.51	36.94	126	82	P	H
		2483.5	43.58	-10.42	54	47.37	27.64	5.51	36.94	126	82	A	H
	*	2458	105.82	-	-	109.77	27.51	5.5	36.96	126	82	P	H
	*	2456	98.04	-	-	101.99	27.51	5.5	36.96	126	82	A	H
		2484.4	53.02	-20.98	74	56.81	27.64	5.51	36.94	295	106	P	V
		2483.74	41.86	-12.14	54	45.65	27.64	5.51	36.94	295	106	A	V
	*	2456	100.9	-	-	104.85	27.51	5.5	36.96	295	106	P	V
	*	2454	92.92	-	-	96.87	27.51	5.5	36.96	295	106	A	V
Remark	<ol style="list-style-type: none"> No other spurious found. 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	41.57	-32.43	74	39.02	31.51	7.72	36.68	100	360	P	H
		4824	41.36	-32.64	74	38.81	31.51	7.72	36.68	100	360	P	V
802.11n HT20 CH 06 2437MHz		4872	43.1	-30.90	74	40.41	31.59	7.76	36.66	100	360	P	H
		7308	46.18	-27.82	74	39.08	34.03	9.76	36.69	100	360	P	H
		4872	42.34	-31.66	74	39.65	31.59	7.76	36.66	100	360	P	V
		7308	46.03	-27.97	74	38.93	34.03	9.76	36.69	100	360	P	V
802.11n HT20 CH 11 2462MHz		4926	42.96	-31.04	74	40.14	31.67	7.8	36.65	100	360	P	H
		7386	45.76	-28.24	74	38.39	34.29	9.86	36.78	100	360	P	H
		4926	42.18	-31.82	74	39.36	31.67	7.8	36.65	100	360	P	V
		7386	46	-28.00	74	38.63	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		2389.82	52.73	-21.27	74	57.28	27	5.47	37.02	139	38	P	H
		2389.82	40.84	-13.16	54	45.39	27	5.47	37.02	139	38	A	H
		2489.26	51.81	-22.19	74	55.45	27.77	5.52	36.93	139	38	P	H
		2484.16	42.05	-11.95	54	45.84	27.64	5.51	36.94	139	38	A	H
	*	2414	101.23	-	-	105.63	27.13	5.47	37	139	38	P	H
	*	2412	93.91	-	-	98.31	27.13	5.47	37	139	38	A	H
		2343.02	50.69	-23.31	74	55.43	26.86	5.41	37.01	341	113	P	V
		2389.82	40.59	-13.41	54	45.14	27	5.47	37.02	341	113	A	V
		2483.86	51.99	-22.01	74	55.78	27.64	5.51	36.94	341	113	P	V
		2486.08	41.46	-12.54	54	45.25	27.64	5.51	36.94	341	113	A	V
	*	2410	97.86	-	-	102.26	27.13	5.47	37	341	113	P	V
	*	2436	89.57	-	-	93.82	27.26	5.48	36.99	341	113	A	V
802.11n HT40 CH 06 2437MHz		2362.65	50.54	-23.46	74	55.22	26.91	5.43	37.02	166	39	P	H
		2387.48	40.11	-13.89	54	44.66	27	5.47	37.02	166	39	A	H
		2485.36	54.17	-19.83	74	57.96	27.64	5.51	36.94	166	39	P	H
		2483.5	43.67	-10.33	54	47.46	27.64	5.51	36.94	166	39	A	H
	*	2448	103.06	-	-	107.15	27.39	5.49	36.97	166	39	P	H
	*	2448	95.39	-	-	99.48	27.39	5.49	36.97	166	39	A	H
		2373.7	51.02	-22.98	74	55.64	26.95	5.45	37.02	375	111	P	V
		2389.43	40.17	-13.83	54	44.72	27	5.47	37.02	375	111	A	V
		2485.78	52.37	-21.63	74	56.16	27.64	5.51	36.94	375	111	P	V
		2483.5	41.98	-12.02	54	45.77	27.64	5.51	36.94	375	111	A	V
	*	2448	98.98	-	-	103.07	27.39	5.49	36.97	375	111	P	V
	*	2448	91.42	-	-	95.51	27.39	5.49	36.97	375	111	A	V



802.11n HT40 CH 09 2452MHz		2343.8	50.97	-23.03	74	55.71	26.86	5.41	37.01	136	40	P	H
		2387.09	40.35	-13.65	54	44.9	27	5.47	37.02	136	40	A	H
		2484.82	61.11	-12.89	74	64.9	27.64	5.51	36.94	136	40	P	H
		2483.5	47.84	-6.16	54	51.63	27.64	5.51	36.94	136	40	A	H
	*	2450	103.72	-	-	107.81	27.39	5.49	36.97	136	40	P	H
	*	2446	95.86	-	-	99.95	27.39	5.49	36.97	136	40	A	H
		2383.58	50.63	-23.37	74	55.25	26.95	5.45	37.02	337	103	P	V
		2389.69	40.26	-13.74	54	44.81	27	5.47	37.02	337	103	A	V
		2485.06	57.88	-16.12	74	61.67	27.64	5.51	36.94	337	103	P	V
		2483.56	44.11	-9.89	54	47.9	27.64	5.51	36.94	337	103	A	V
	*	2442	98.25	-	-	102.34	27.39	5.49	36.97	337	103	P	V
	*	2448	90.54	-	-	94.63	27.39	5.49	36.97	337	103	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. 2	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	41.63	-32.37	74	39.04	31.53	7.74	36.68	100	360	P	H
HT40		7266	45.56	-28.44	74	38.57	33.93	9.72	36.66	100	360	P	H
CH 03		4842	41.77	-32.23	74	39.18	31.53	7.74	36.68	100	360	P	V
2422MHz		7368	46.24	-27.76	74	38.92	34.24	9.84	36.76	100	360	P	V
802.11n		4872	41.3	-32.70	74	38.61	31.59	7.76	36.66	100	360	P	H
HT40		7308	45.72	-28.28	74	38.62	34.03	9.76	36.69	100	360	P	H
CH 06		4872	42.65	-31.35	74	39.96	31.59	7.76	36.66	100	360	P	V
2437MHz		7308	45.54	-28.46	74	38.44	34.03	9.76	36.69	100	360	P	V
802.11n		4902	42.12	-31.88	74	39.35	31.64	7.78	36.65	100	360	P	H
HT40		7356	45.74	-28.26	74	38.48	34.19	9.82	36.75	100	360	P	H
CH 09		4902	41.95	-32.05	74	39.18	31.64	7.78	36.65	100	360	P	V
2452MHz		7356	45.4	-28.60	74	38.14	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 HT40 (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 HT40 LF		30.97	31.81	-8.19	40	35.58	26.86	0.66	31.29	100	0	P	H
		77.53	25.56	-14.44	40	40.78	15.2	1.07	31.49	-	-	P	H
		134.76	23.69	-19.81	43.5	35.62	18.19	1.4	31.52	-	-	P	H
		323.91	29.07	-16.93	46	38.03	20.13	2.21	31.3	-	-	P	H
		451.95	29.52	-16.48	46	32.7	25.41	2.65	31.24	-	-	P	H
		861.29	32.02	-13.98	46	30.28	28.88	3.75	30.89	-	-	P	H
		30	29.37	-10.63	40	32.79	27.2	0.65	31.27	100	0	P	V
		94.99	23.78	-19.72	43.5	35.56	18.5	1.17	31.45	-	-	P	V
		134.76	24.68	-18.82	43.5	36.61	18.19	1.4	31.52	-	-	P	V
		257.95	26.06	-19.94	46	38.31	17.4	1.79	31.44	-	-	P	V
		441.28	30.5	-15.50	46	34.04	25.09	2.61	31.24	-	-	P	V
	926.28	31.75	-14.25	46	29.59	29.02	3.92	30.78	-	-	P	V	
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



Note symbol

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



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

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
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

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

For Peak Limit @ 2390MHz:

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

For Average Limit @ 2390MHz:

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

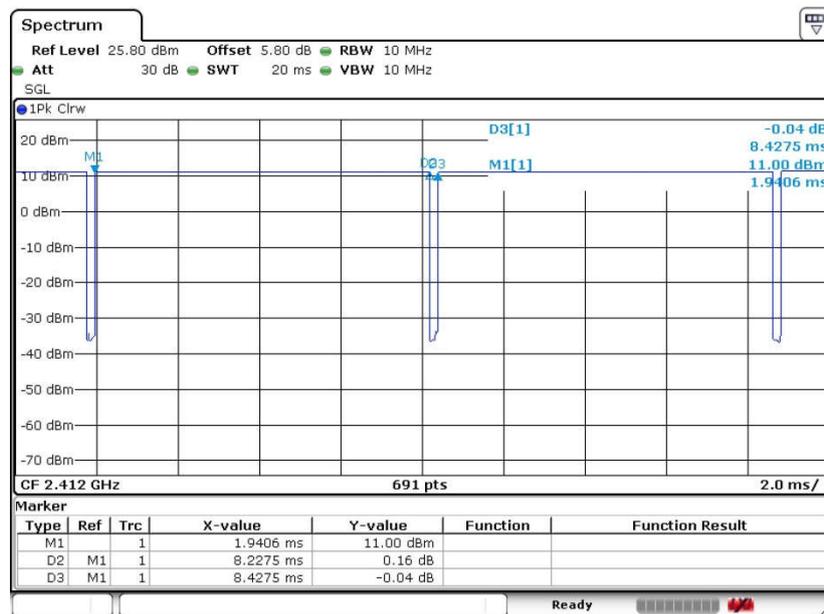
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix C. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.63	8.23	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	86.31	1.23	0.81	1kHz

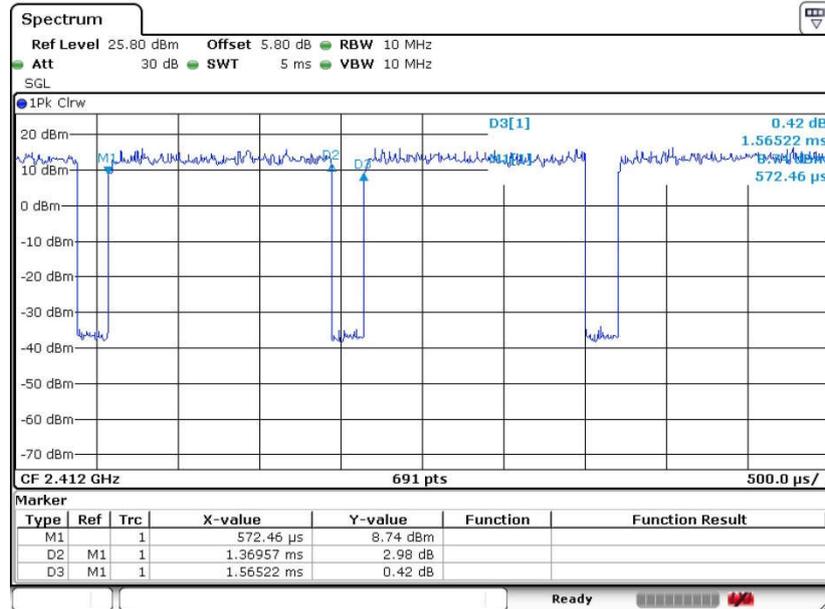
802.11b



Date: 1.DEC.2016 20:10:38

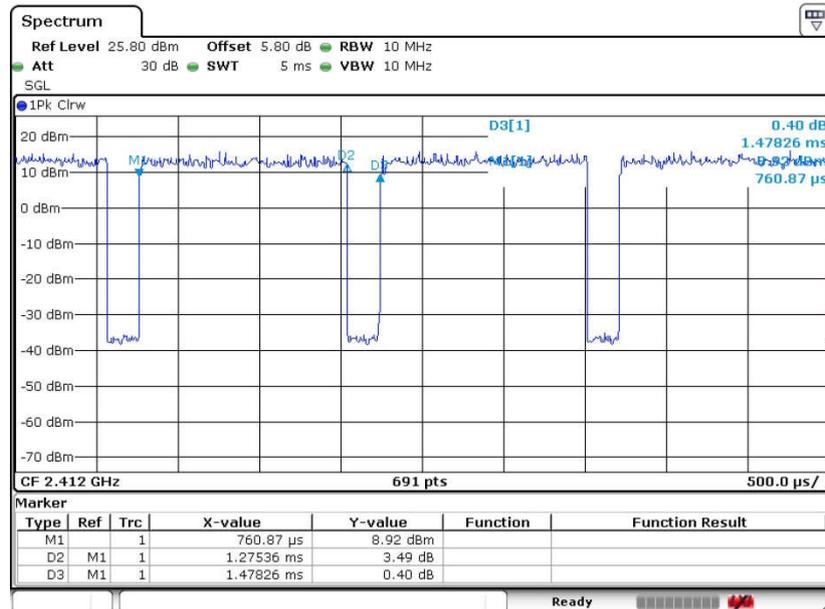


802.11g



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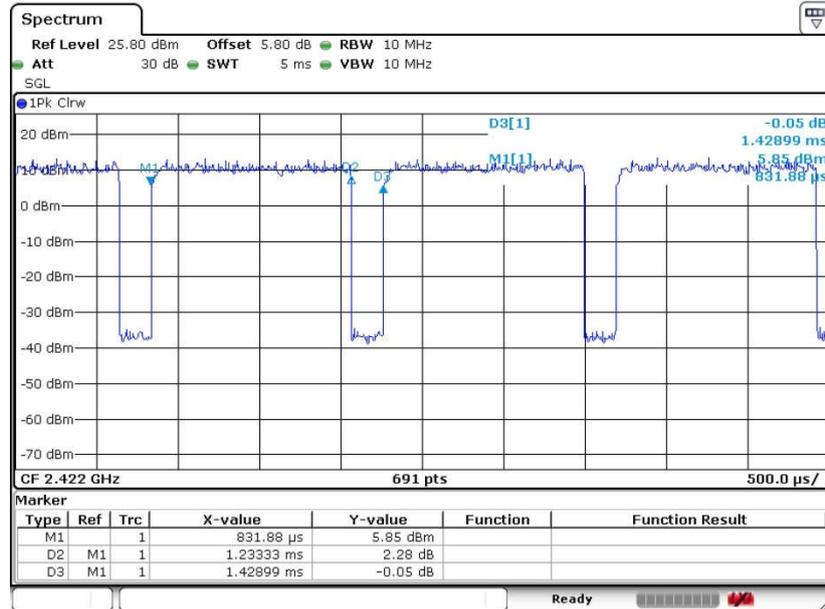
802.11n20



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802.11n40



Date: 1.DEC.2016 20:18:42