



FCC RF Test Report

APPLICANT : Entel PCS Telecomunicaciones S.A.
EQUIPMENT : Mobile Phone
BRAND NAME : öwn
MODEL NAME : Smart 9 Pro
FCC ID : 2AO8VSMART9PRO
STANDARD : FCC Part 15 Subpart C §15.247
CLASSIFICATION : (DTS) Digital Transmission System

The product was received on May 22, 2018 and testing was completed on Jun. 05, 2018. We, Sporton International (Shenzhen) 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 (Shenzhen) Inc., the test report shall not be reproduced except in full.

Approved by: Eric Shih / Manager



Sporton International (Shenzhen) Inc.

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Guangdong Province 518055 China***



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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR852215C	Rev. 01	Initial issue of report	Jun. 22, 2018

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 2.15 dB at 2483.500 MHz
3.6	15.207	AC Conducted Emission	15.207(a)	Pass	Under limit 12.70 dB at 0.680 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	N/A	Pass	-

1 General Description

1.1 Applicant

Entel PCS Telecomunicaciones S.A.
Costanera Sur 2760, Torre C, piso 18, las condes

1.2 Manufacturer

Öwn
Av Costanera Sur 2760, piso 22

1.3 Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Phone
Brand Name	öwn
Model Name	Smart 9 Pro
FCC ID	2AO8VSMART9PRO
EUT supports Radios application	GSM/GPRS/EGPRS/WCDMA/HSPA/DC-HSDPA/HSPA+/LTE/ WLAN 2.4GHz 802.11b/g/n HT20/HT40 Bluetooth BR/EDR/LE
IMEI Code	Conducted: 354147042329731 Conduction: 354147042329707 Radiation: 354147042329723
HW Version	Smart 9 Pro_Mainboard_P3
SW Version	Smart 9 Pro_2309
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 : 21.01 dBm (0.1262 W) 802.11g : 25.55 dBm (0.3589 W) 802.11n HT20 : 26.03 dBm (0.4009 W) 802.11n HT40 : 25.76 dBm (0.3767 W)
Antenna Type / Gain	Fixed Internal Antenna with gain -0.20 dBi
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)



1.5 Modification of EUT

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

1.6 Testing Location

Sporton International (Shenzhen) Inc. is accredited to ISO 17025 by National Voluntary Laboratory Accreditation Program (NVLAP code: 600156-0) and the FCC designation No. are CN5018 and CN5019.

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan Shenzhen City Guangdong Province 518055 China TEL: +86-755-8637-9589 FAX: +86-755-8637-9595		
Test Site No.	Sporton Site No.		FCC Test Firm Registration No.
	TH01-SZ	CO01-SZ	251365

Test Site	Sporton International (Shenzhen) Inc.		
Test Site Location	No. 3 Bldg the third floor of south, Shahe River west, Fengzeyuan Warehouse, Nanshan District Shenzhen City Guangdong Province 518055 China TEL: +86-755-3320-2398		
Test Site No.	Sporton Site No.		FCC Test Firm Registration No.
	03CH03-SZ		577730

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



1.7 Applicable Standards

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

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

Remark:

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

2 Test Configuration of Equipment Under Test

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

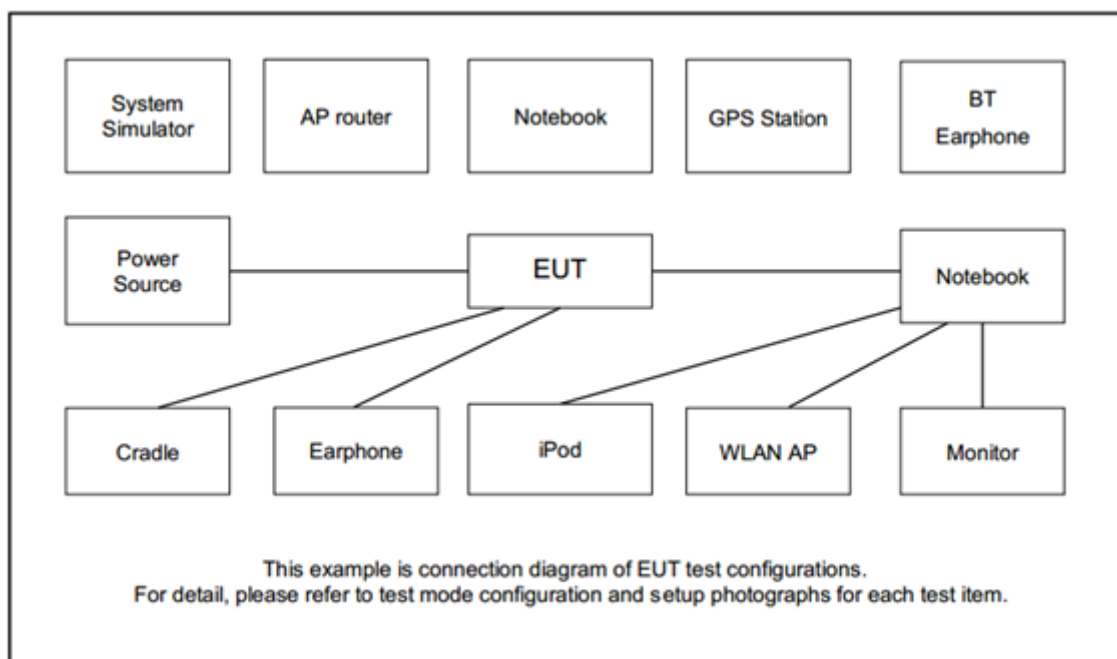
2.2 Test Mode

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 :GSM1900 Idle + Bluetooth Link + WLAN Link + USB Cable (Charging from Adapter)
Remark: - For Radiated Test Cases, The tests were performed with Adapter, wireless charger, Earphone and USB Cable. - Wireless charging mode verify worse case of adapter mode for RSE.	

2.3 Connection Diagram of Test System



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,1.8m
2.	WLAN AP	D-Link	DIR-820L	KA2IR820LA1	N/A	Unshielded,1.8m
3.	Notebook	Lenovo	E540	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Bluetooth Earphone	Samsung	EO-MG900	PYAHS-107W	N/A	N/A
5.	Wireless Charger	Samsung	EP-NG930	2016J0528	N/A	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 and attenuator factor 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 and attenuator factor.

Offset = RF cable loss + attenuator factor.

Following shows an offset computation example with cable loss 5.0 dB and 10dB attenuator.

$$\begin{aligned}\text{Offset(dB)} &= \text{RF cable loss(dB)} + \text{attenuator factor(dB)} \\ &= 5.0 + 10 = 15.0 \text{ (dB)}\end{aligned}$$

3 Test Result

3.1 6dB Bandwidth Measurement

3.1.1 Limit of 6dB Bandwidth

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

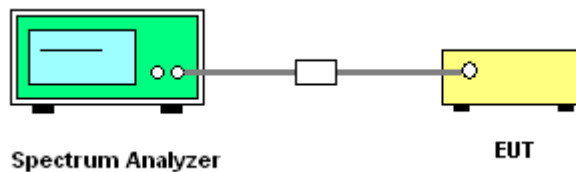
3.1.2 Measuring Instruments

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

3.1.3 Test Procedures

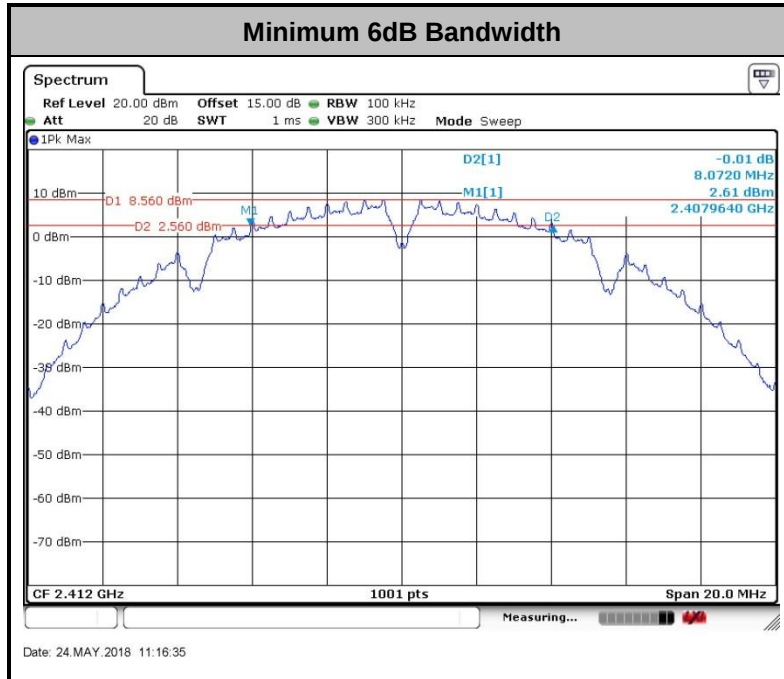
1. The testing follows FCC KDB Publication No. 558074 DTS D01 Meas. Guidance v04.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit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

3.1.4 Test Setup



3.1.5 Test Result of 6dB Bandwidth

Please refer to Appendix A.



3.2 Peak Output Power Measurement

3.2.1 Limit of Peak Output Power

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

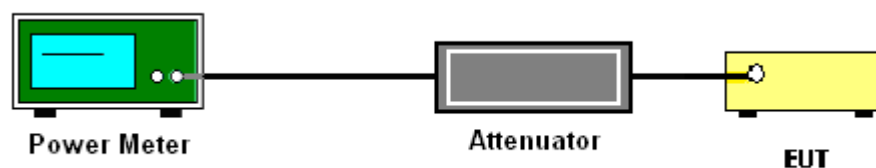
3.2.2 Measuring Instruments

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

3.2.3 Test Procedures

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

3.2.4 Test Setup



3.2.5 Test Result of Peak Output Power

Please refer to Appendix A.

3.2.6 Test Result of Average output Power (Reporting Only)

Please refer to Appendix A.

3.3 Power Spectral Density Measurement

3.3.1 Limit of Power Spectral Density

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

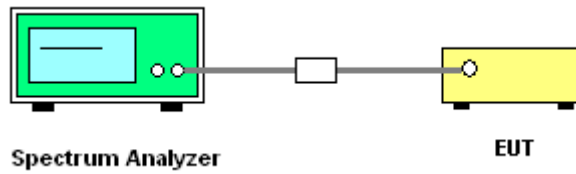
3.3.2 Measuring Instruments

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

3.3.3 Test Procedures

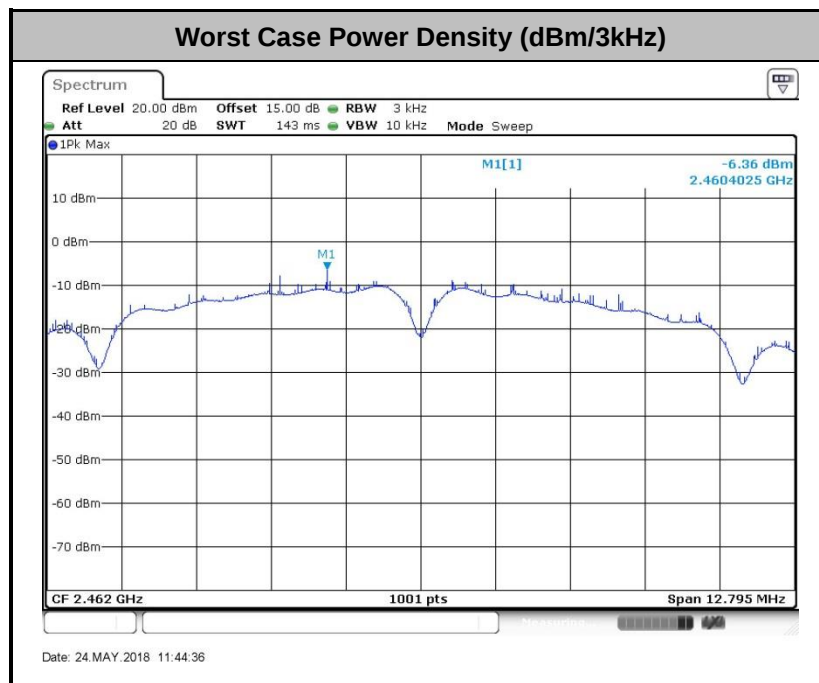
1. The testing follows Measurement Procedure 10.2 Method PKPSD of FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum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

3.3.4 Test Setup



3.3.5 Test Result of Power Spectral Density

Please refer to Appendix A.



3.4 Conducted Band Edges and Spurious Emission Measurement

3.4.1 Limit of Conducted Band Edges and Spurious Emission Measurement

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

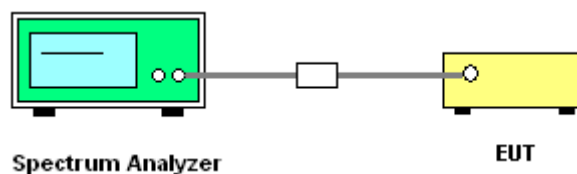
3.4.2 Measuring Instruments

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

3.4.3 Test Procedures

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

3.4.4 Test Setup

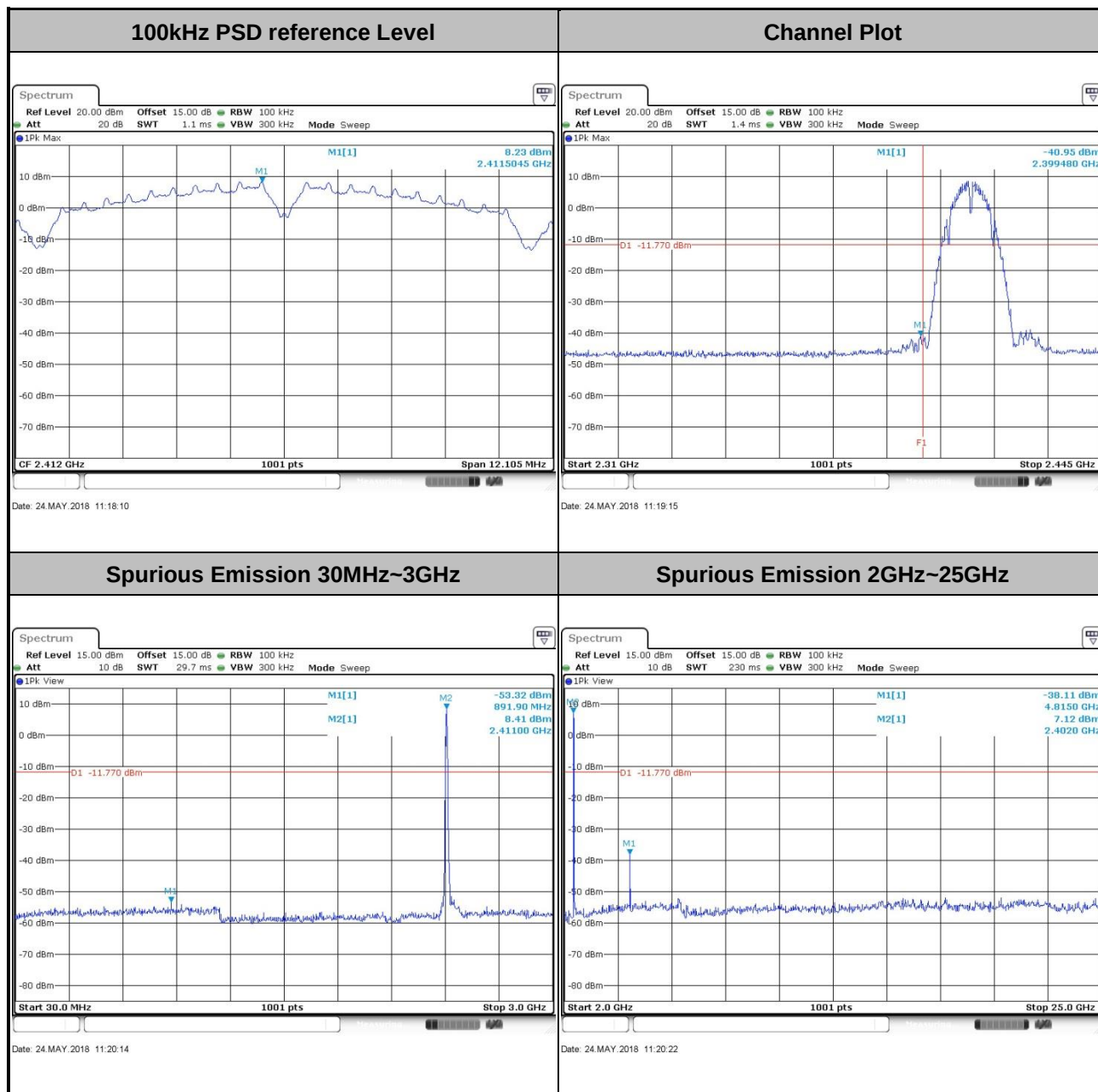




3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Test Engineer :	Wilson Chen	Temperature :	24~26°C
		Relative Humidity :	50~53%

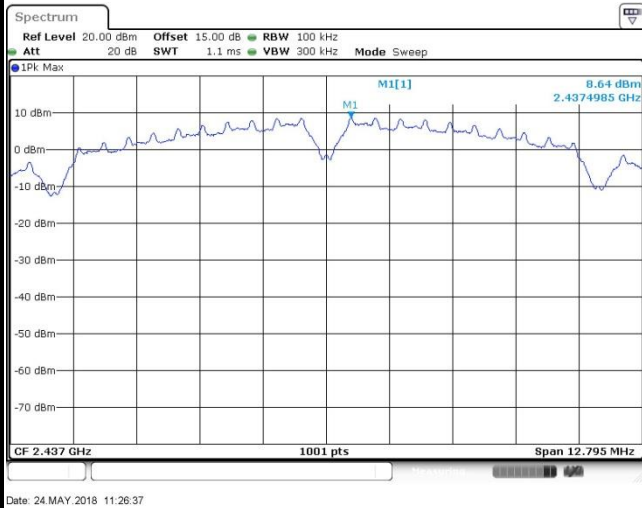
Test Mode :	802.11b	Test Channel :	01
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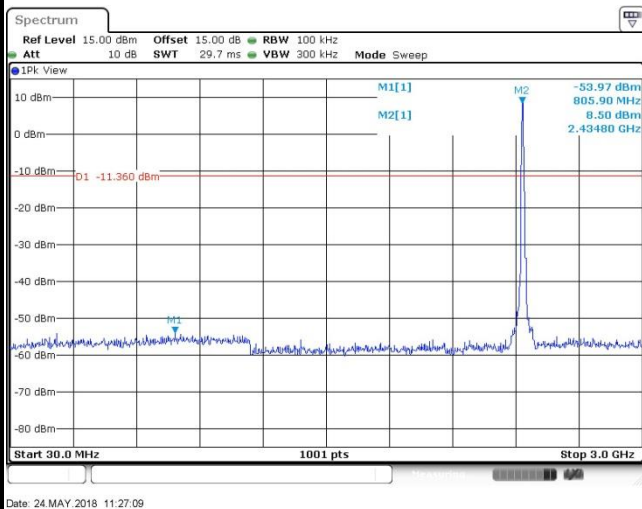


Test Mode :	802.11b	Test Channel :	06
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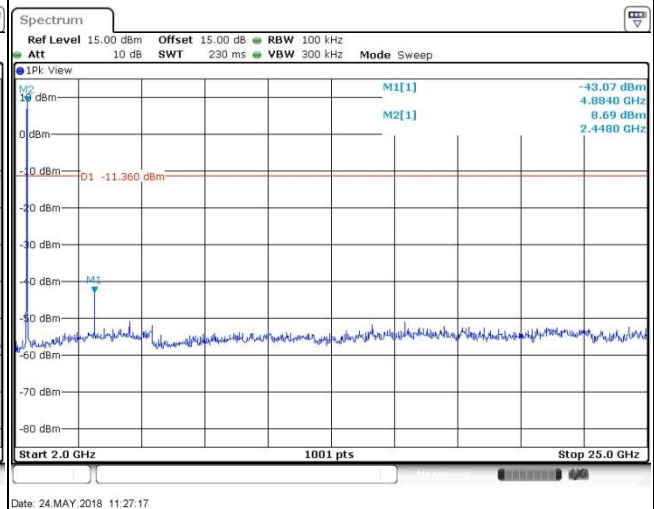
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

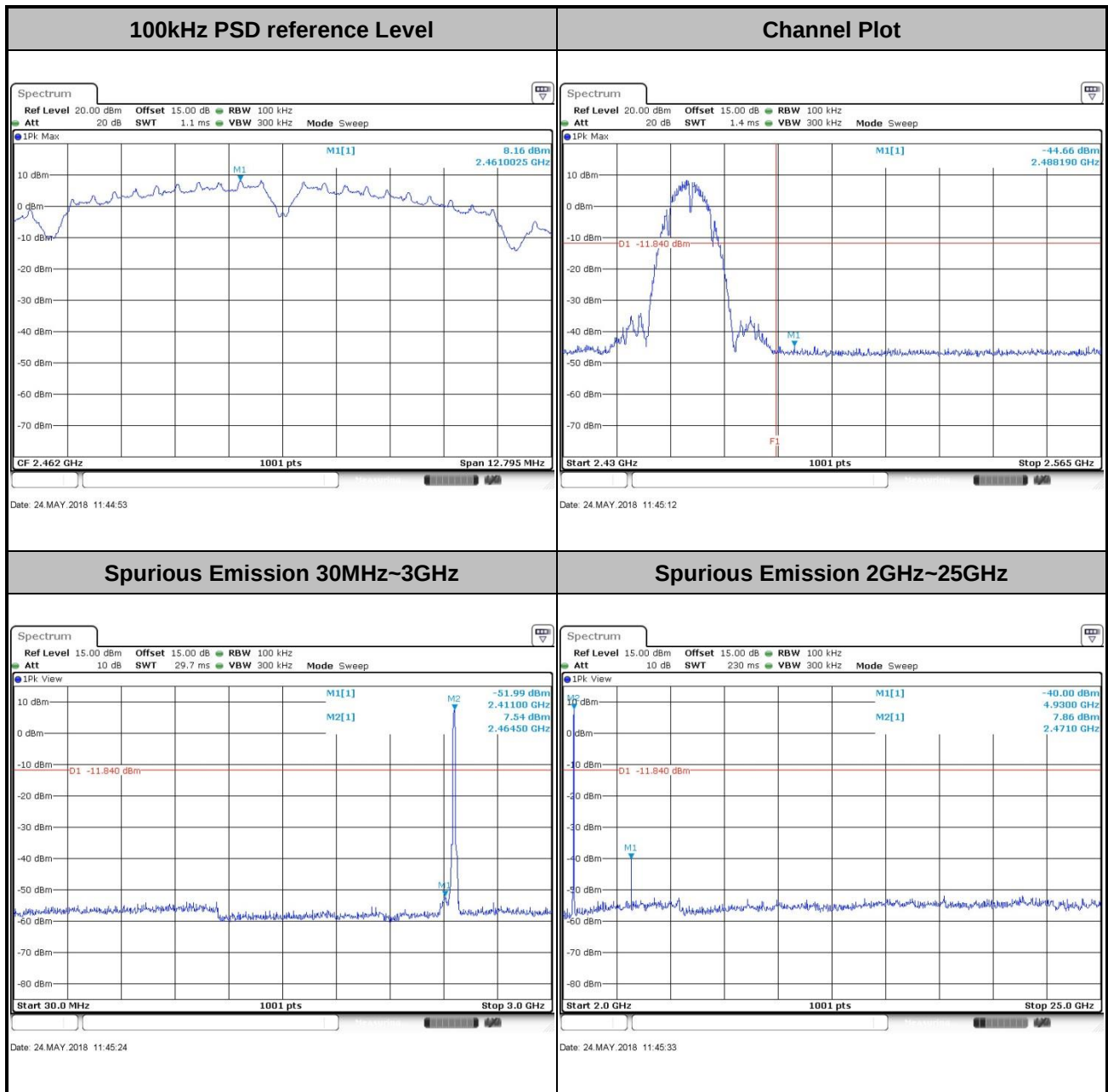


Spurious Emission 2GHz~25GHz



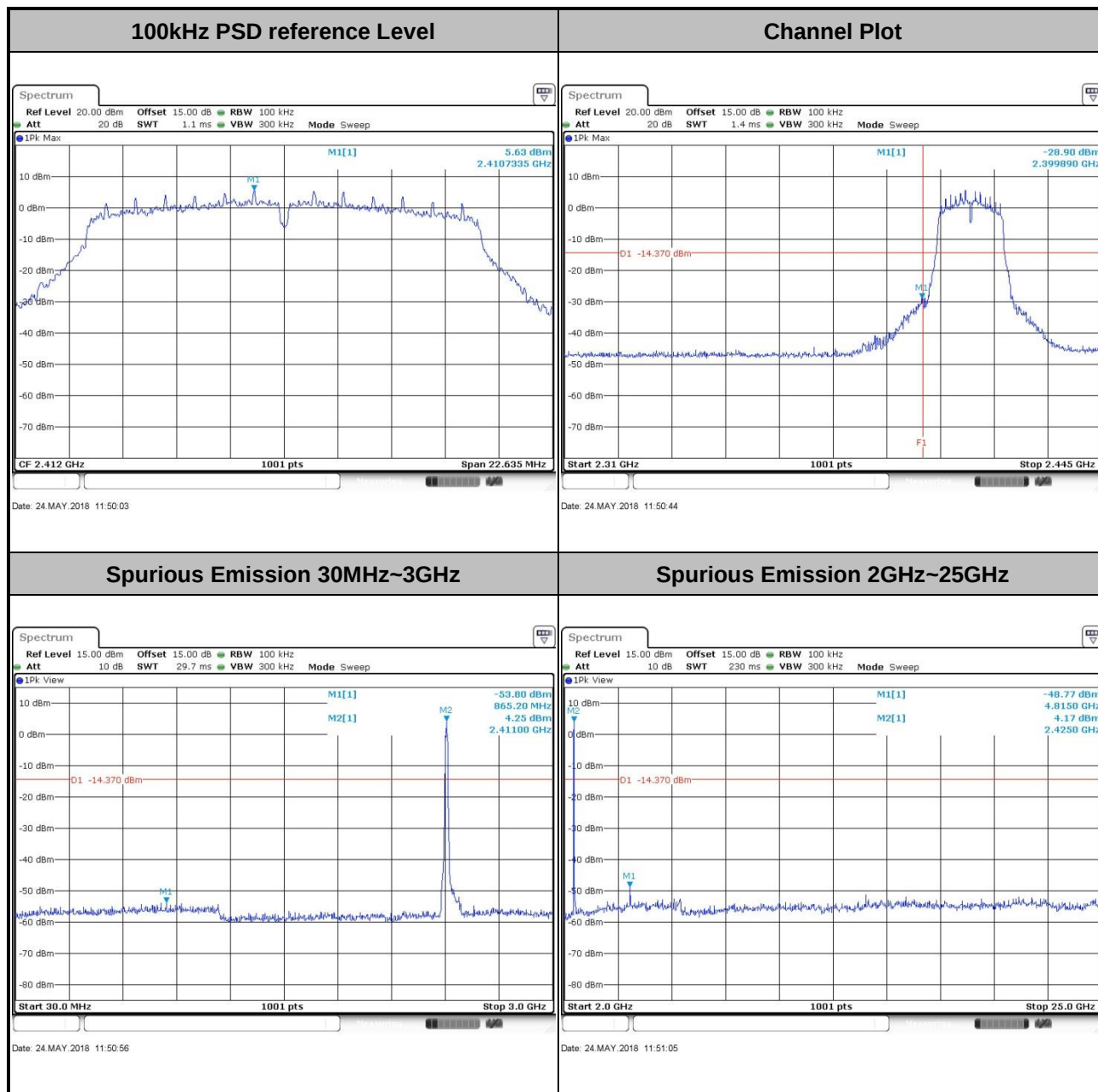


Test Mode :	802.11b	Test Channel :	11
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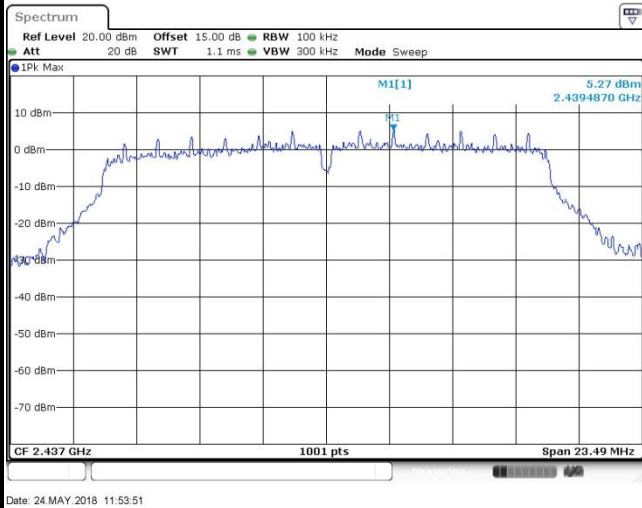
Test Mode :	802.11g	Test Channel :	01
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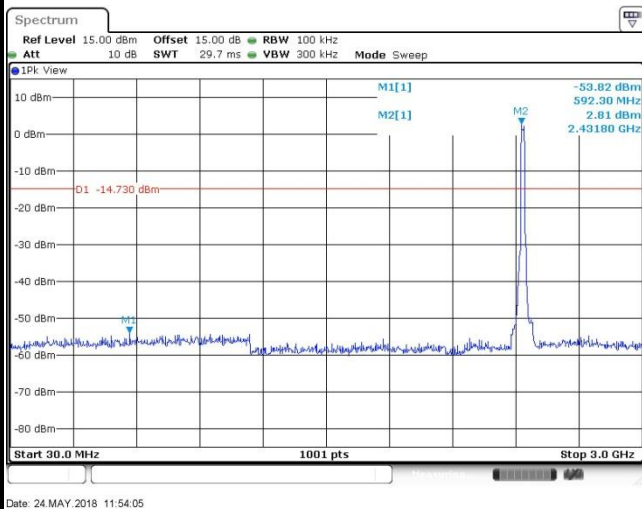


Test Mode :	802.11g	Test Channel :	06
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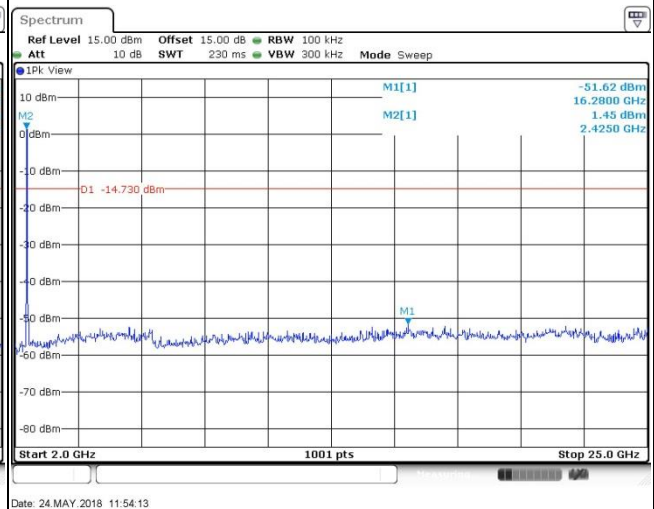
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz

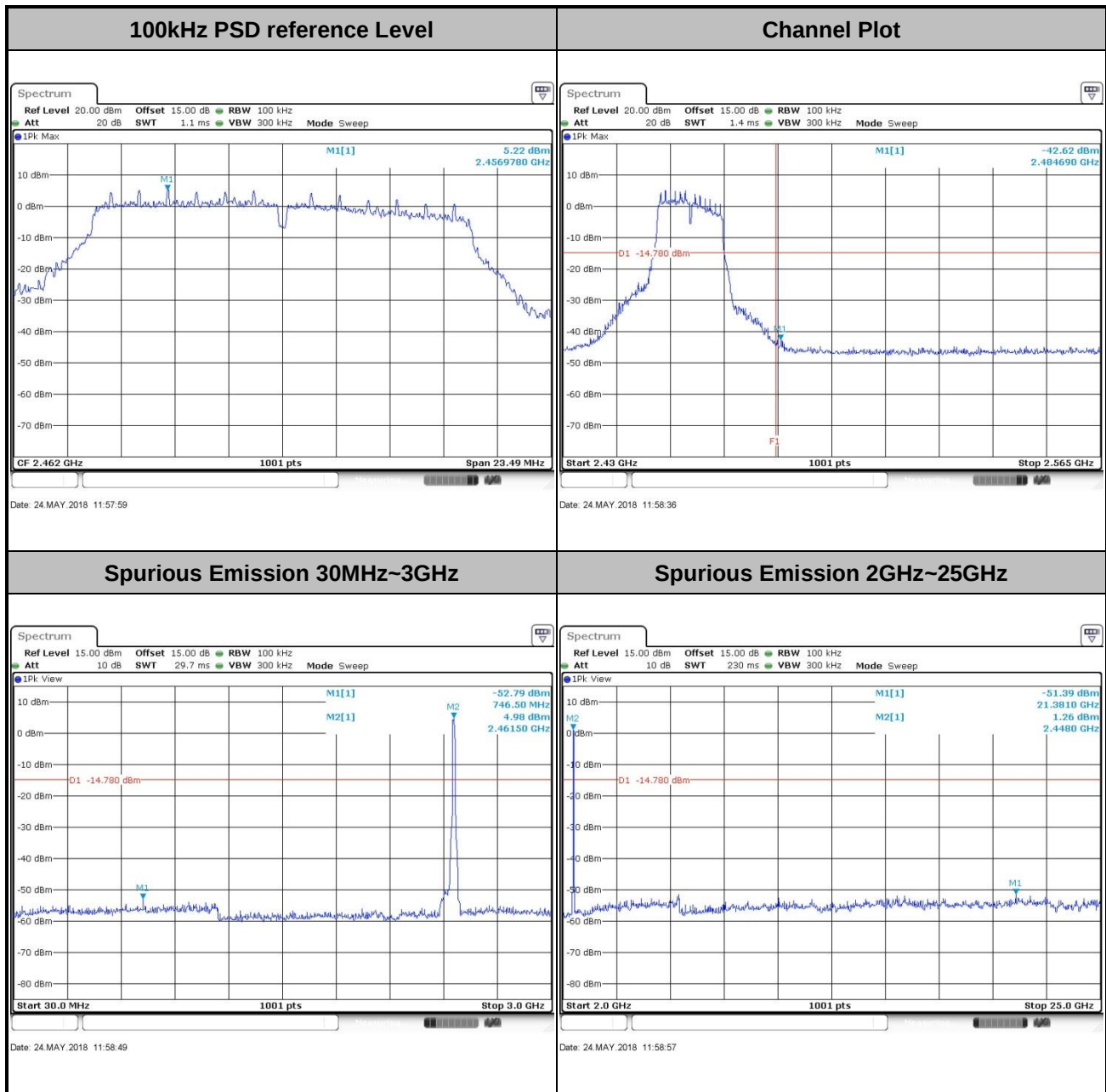


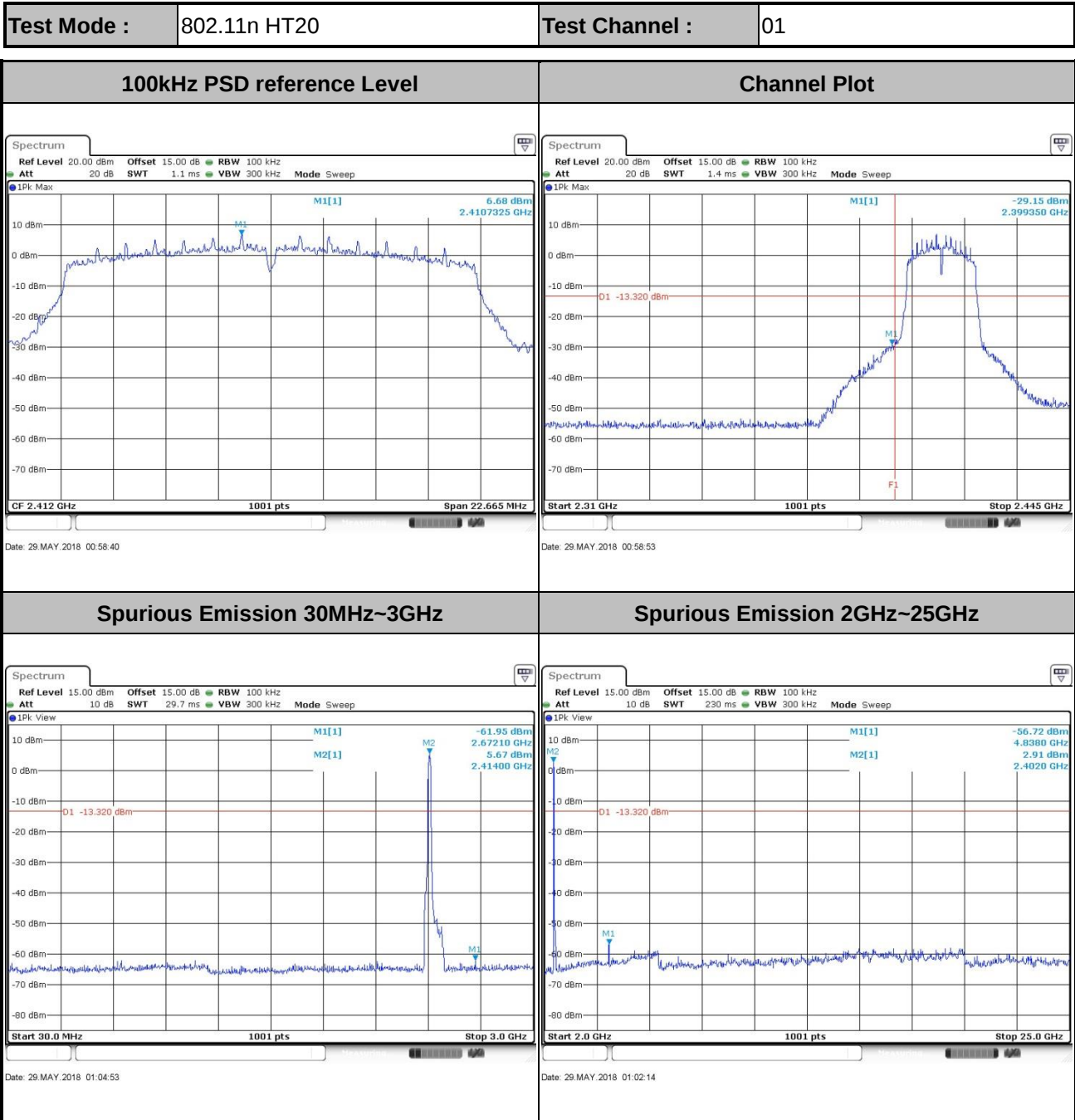
Spurious Emission 2GHz~25GHz





Test Mode :	802.11g	Test Channel :	11
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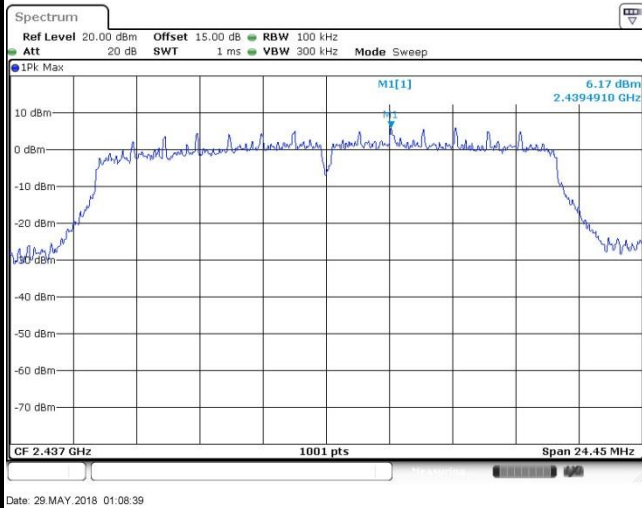




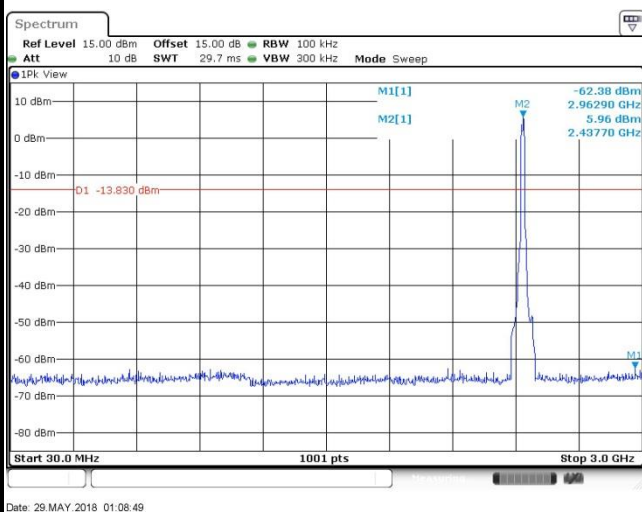


Test Mode :	802.11n HT20	Test Channel :	06
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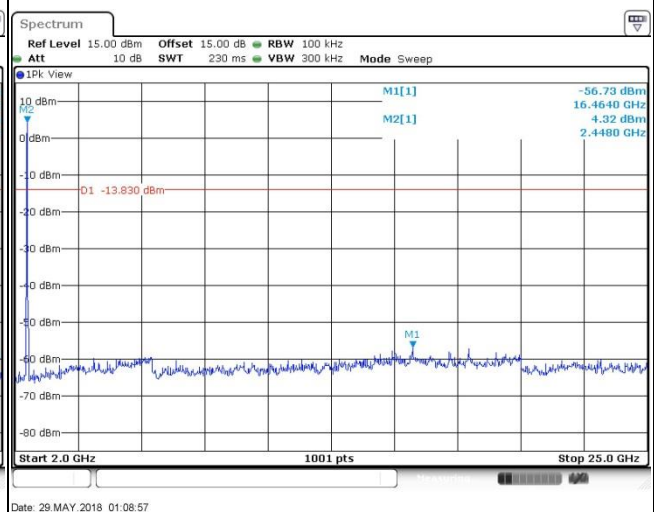
100kHz PSD reference Level

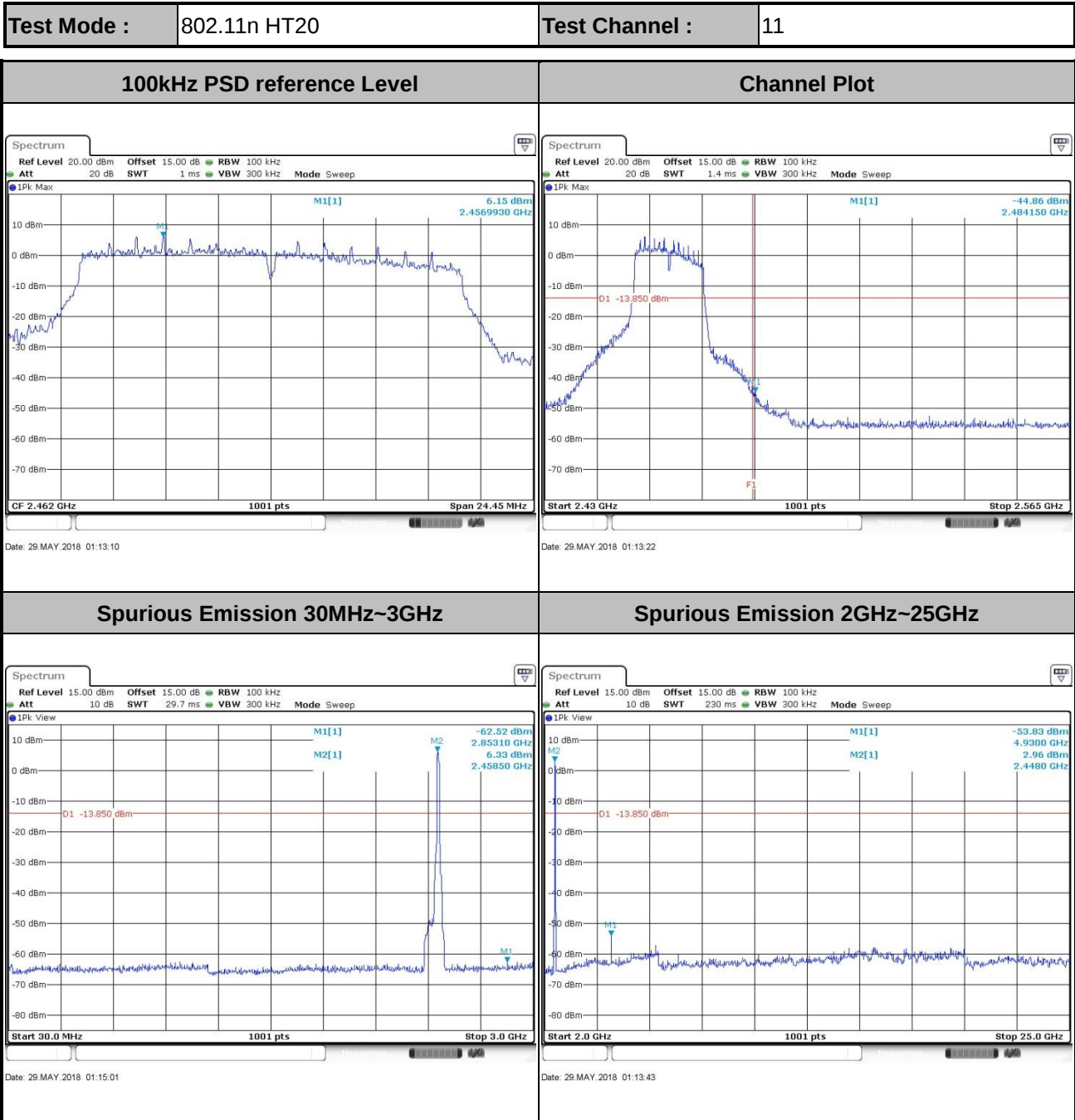


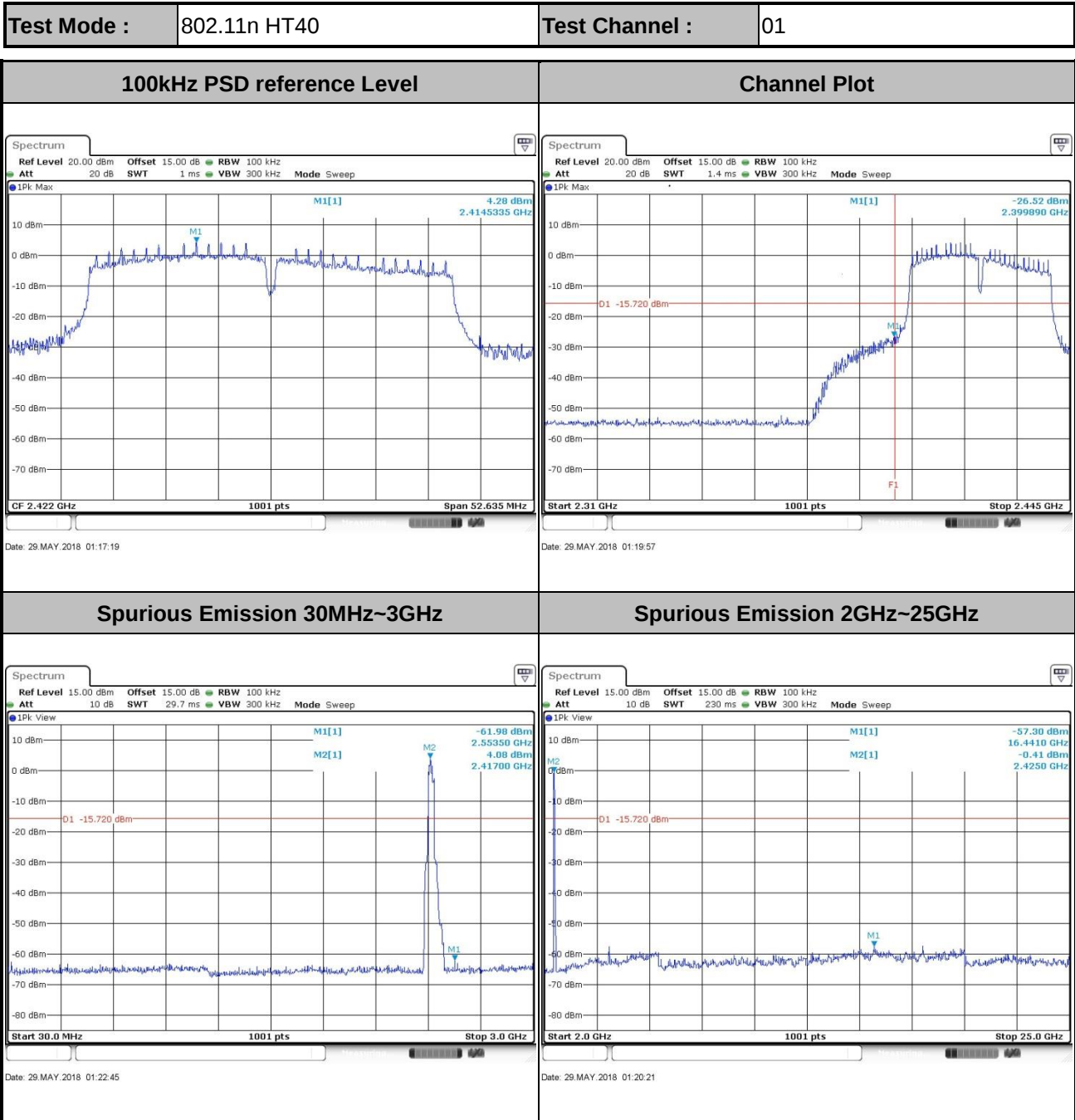
Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



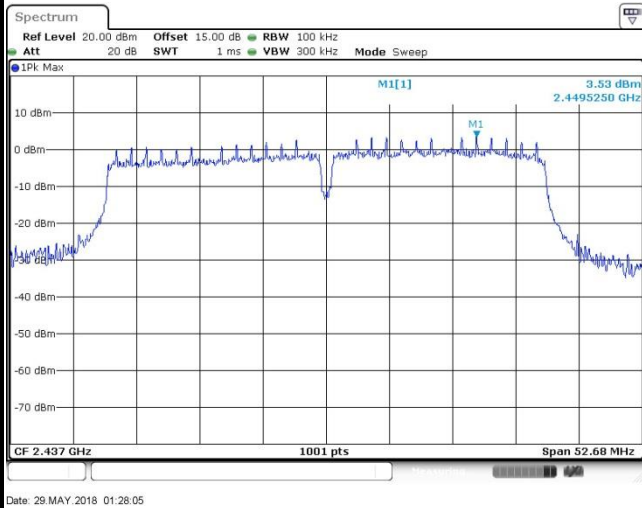




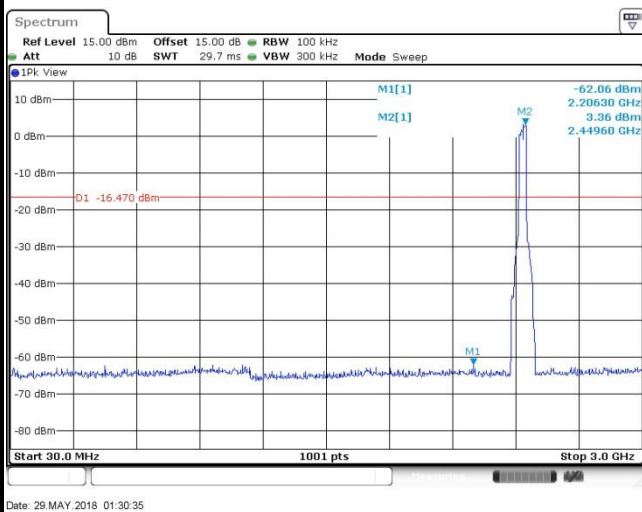


Test Mode :	802.11n HT40	Test Channel :	06
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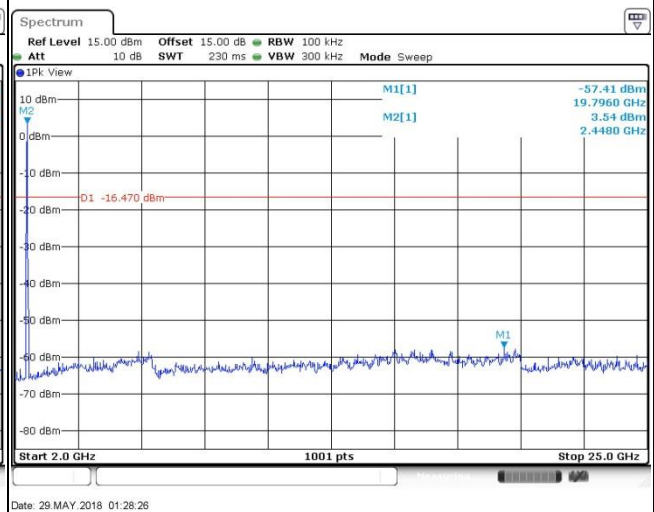
100kHz PSD reference Level

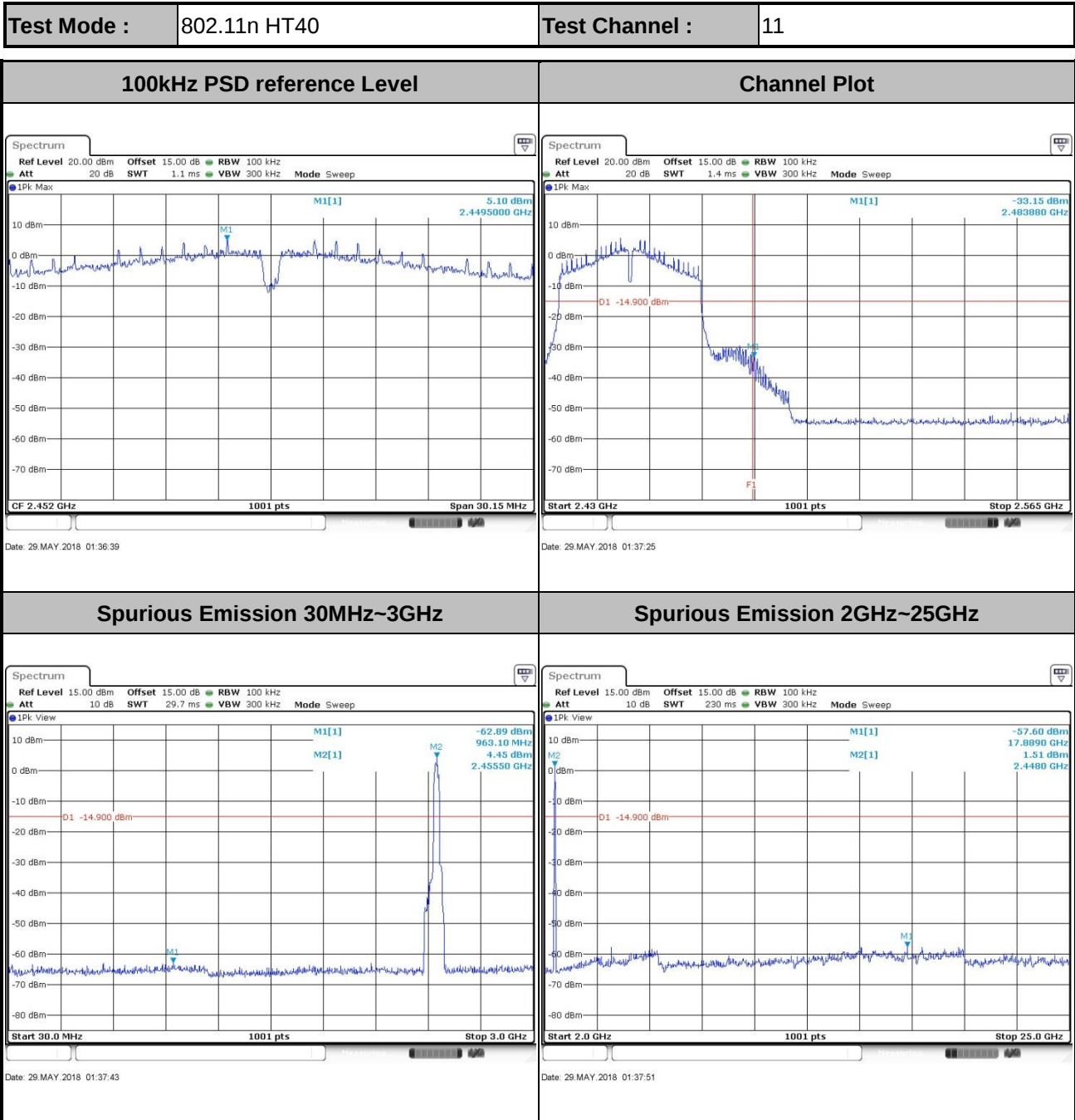


Spurious Emission 30MHz~3GHz



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 limits as below.

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

3.5.2 Measuring Instruments

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

3.5.3 Test Procedures

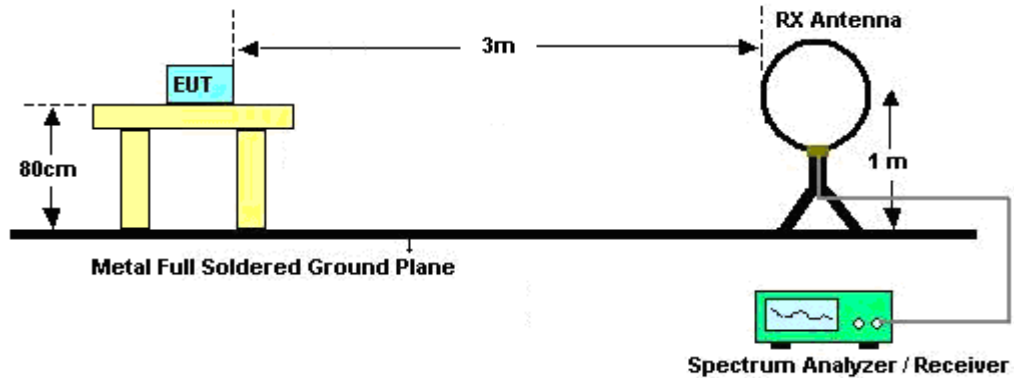
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
 - (1) Span shall wide enough to fully capture the emission being measured;
 - (2) Set RBW=100 kHz for $f < 1$ GHz; VBW $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

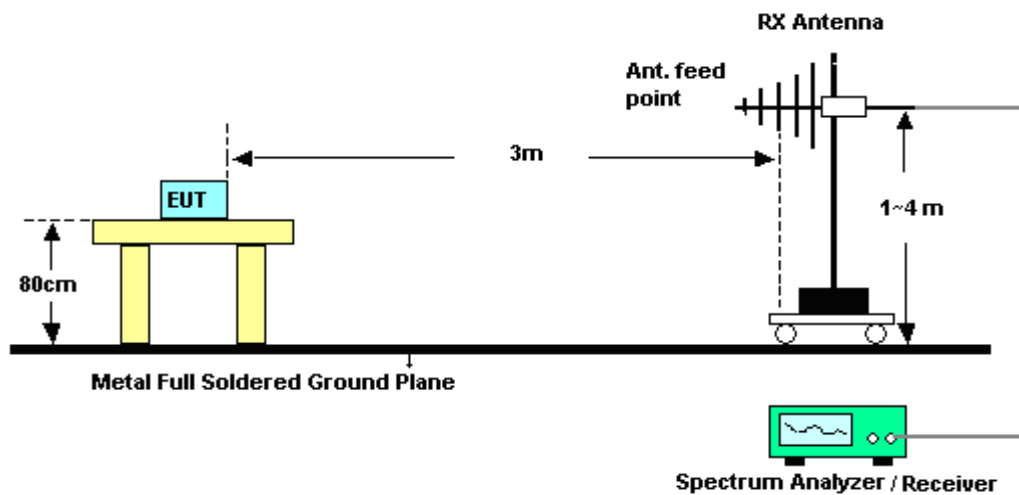
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

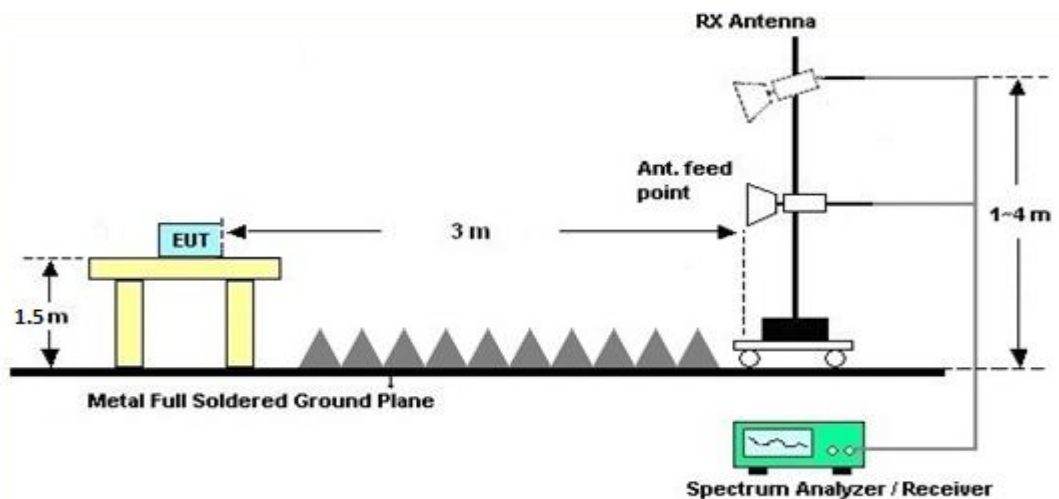
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



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

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

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

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

Please refer to Appendix C.

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.

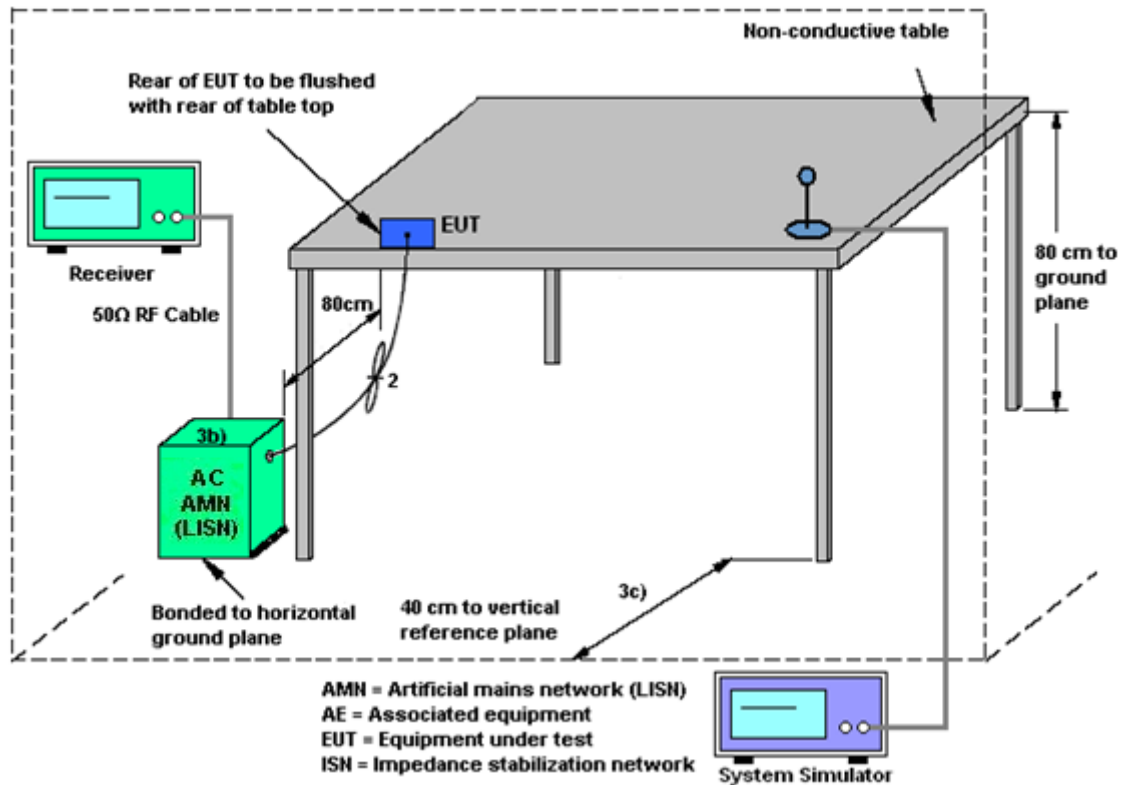
3.6.2 Measuring Instruments

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

Please refer to Appendix B.



3.7 Antenna Requirements

3.7.1 Standard Applicable

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

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

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



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	9kHz~40GHz	Apr. 19, 2018	May 24, 2018~ May 29, 2018	Apr. 18, 2019	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2017	May 24, 2018~ May 29, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2017	May 24, 2018~ May 29, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY5445008 3	20Hz~8.4GHz	Apr. 19, 2018	Jun. 05, 2018	Apr. 18, 2019	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY5515024 6	10Hz~44GHz;	Apr. 19, 2018	Jun. 05, 2018	Apr. 18, 2019	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2018	Jun. 05, 2018	May 13, 2019	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Apr. 19, 2018	Jun. 05, 2018	Apr. 18, 2019	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Mar. 29, 2018	Jun. 05, 2018	Mar. 28, 2019	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 18, 2017	Jun. 05, 2018	Jul. 17, 2018	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz-40GHz	Mar. 30, 2018	Jun. 05, 2018	Mar. 29, 2019	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 19, 2017	Jun. 05, 2018	Oct. 18, 2018	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-001 01800-30-10 P-R	1943528	1GHz~18GHz	Oct. 19, 2017	Jun. 05, 2018	Oct. 18, 2018	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY3950130 2	500MHz~26.5G Hz	Dec. 27, 2017	Jun. 05, 2018	Dec. 26, 2018	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	6160100019 85	N/A	NCR	Jun. 05, 2018	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Jun. 05, 2018	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Jun. 05, 2018	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2017	May 24, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Dec. 26, 2017	May 24, 2018	Dec. 25, 2018	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	MessTec	3816/2SH	00103892	9kHz~30MHz	Nov. 01, 2017	May 24, 2018	Oct. 31, 2018	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	6160200008 91	100Vac~250Vac	Jul. 19, 2017	May 24, 2018	Jul. 18, 2018	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.6dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
--	-------

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8dB
--	-------

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

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



Appendix A. Conducted Test Results

A1 - DTS Part

Test Engineer:	Wilson Chen	Temperature:	24~26	°C
Test Date:	2018/5/24~2018/5/29	Relative Humidity:	50~53	%

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	12.79	8.07	0.50	Pass
11b	1Mbps	1	6	2437	13.44	8.53	0.50	Pass
11b	1Mbps	1	11	2462	13.44	8.53	0.50	Pass
11g	6Mbps	1	1	2412	17.58	15.09	0.50	Pass
11g	6Mbps	1	6	2437	18.28	15.66	0.50	Pass
11g	6Mbps	1	11	2462	18.18	15.66	0.50	Pass
HT20	MCS0	1	1	2412	18.08	15.11	0.50	Pass
HT20	MCS0	1	6	2437	18.73	16.30	0.50	Pass
HT20	MCS0	1	11	2462	18.63	16.30	0.50	Pass
HT40	MCS0	1	3	2422	36.46	35.09	0.50	Pass
HT40	MCS0	1	6	2437	36.96	35.13	0.50	Pass
HT40	MCS0	1	9	2452	35.56	20.10	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	20.87	30.00	-0.20	20.67	36.00	Pass
11b	1Mbps	1	6	2437	21.01	30.00	-0.20	20.81	36.00	Pass
11b	1Mbps	1	11	2462	20.55	30.00	-0.20	20.35	36.00	Pass
11g	6Mbps	1	1	2412	25.30	30.00	-0.20	25.10	36.00	Pass
11g	6Mbps	1	6	2437	25.55	30.00	-0.20	25.35	36.00	Pass
11g	6Mbps	1	11	2462	24.77	30.00	-0.20	24.57	36.00	Pass
HT20	MCS0	1	1	2412	25.78	30.00	-0.20	25.58	36.00	Pass
HT20	MCS0	1	6	2437	26.03	30.00	-0.20	25.83	36.00	Pass
HT20	MCS0	1	11	2462	25.21	30.00	-0.20	25.01	36.00	Pass
HT40	MCS0	1	3	2422	25.11	30.00	-0.20	24.91	36.00	Pass
HT40	MCS0	1	6	2437	25.76	30.00	-0.20	25.56	36.00	Pass
HT40	MCS0	1	9	2452	25.60	30.00	-0.20	25.40	36.00	Pass

TEST RESULTS DATA
Average Power Table
(Reporting Only)

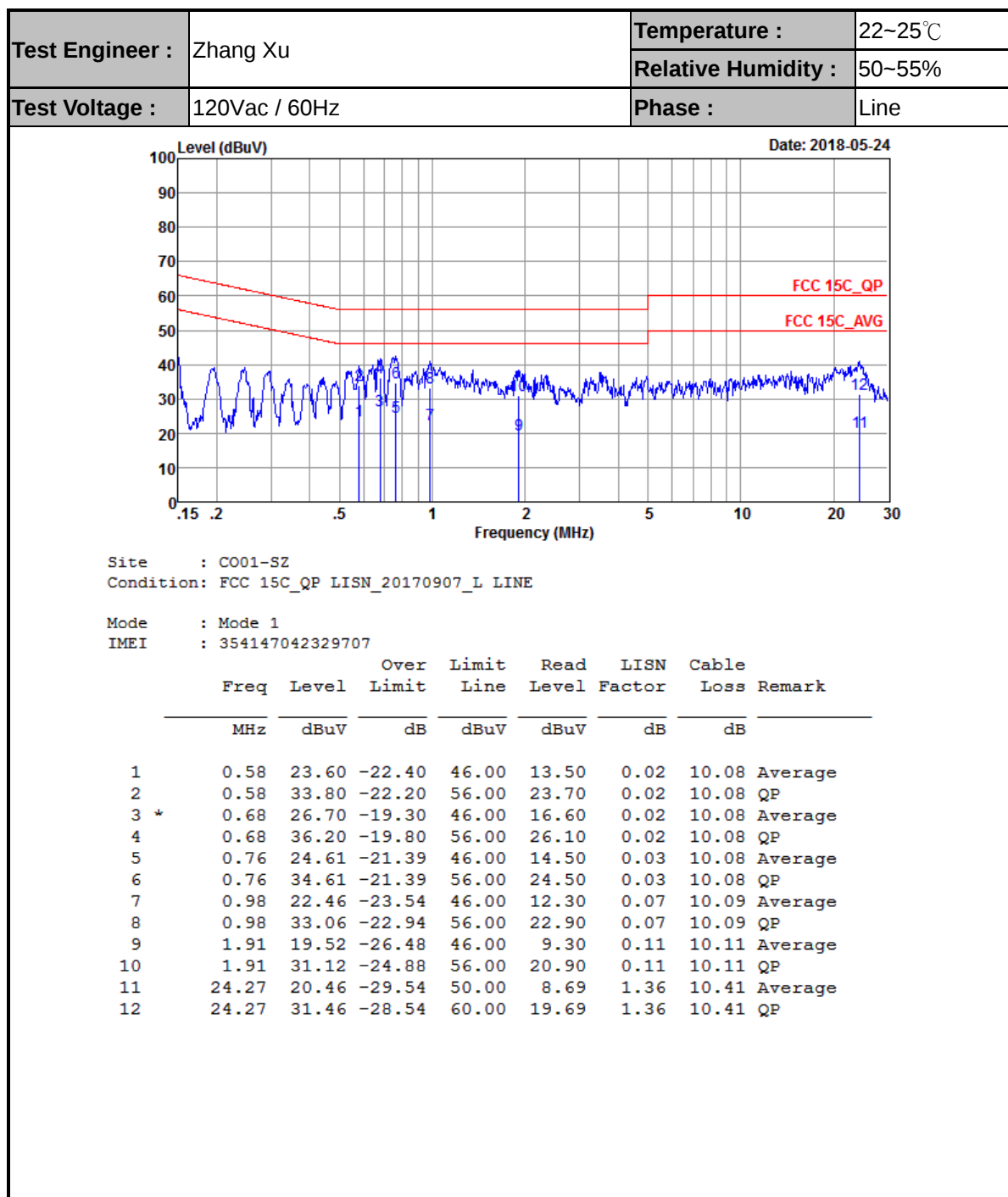
2.4GHz Band						
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)	Average Conducted Power (dBm)
11b	1Mbps	1	1	2412	0.00	18.40
11b	1Mbps	1	6	2437	0.00	18.73
11b	1Mbps	1	11	2462	0.00	18.48
11g	6Mbps	1	1	2412	0.11	16.04
11g	6Mbps	1	6	2437	0.11	16.43
11g	6Mbps	1	11	2462	0.11	16.06
HT20	MCS0	1	1	2412	0.12	15.93
HT20	MCS0	1	6	2437	0.12	16.39
HT20	MCS0	1	11	2462	0.12	16.00
HT40	MCS0	1	3	2422	0.23	14.08
HT40	MCS0	1	6	2437	0.23	16.37
HT40	MCS0	1	9	2452	0.23	15.95

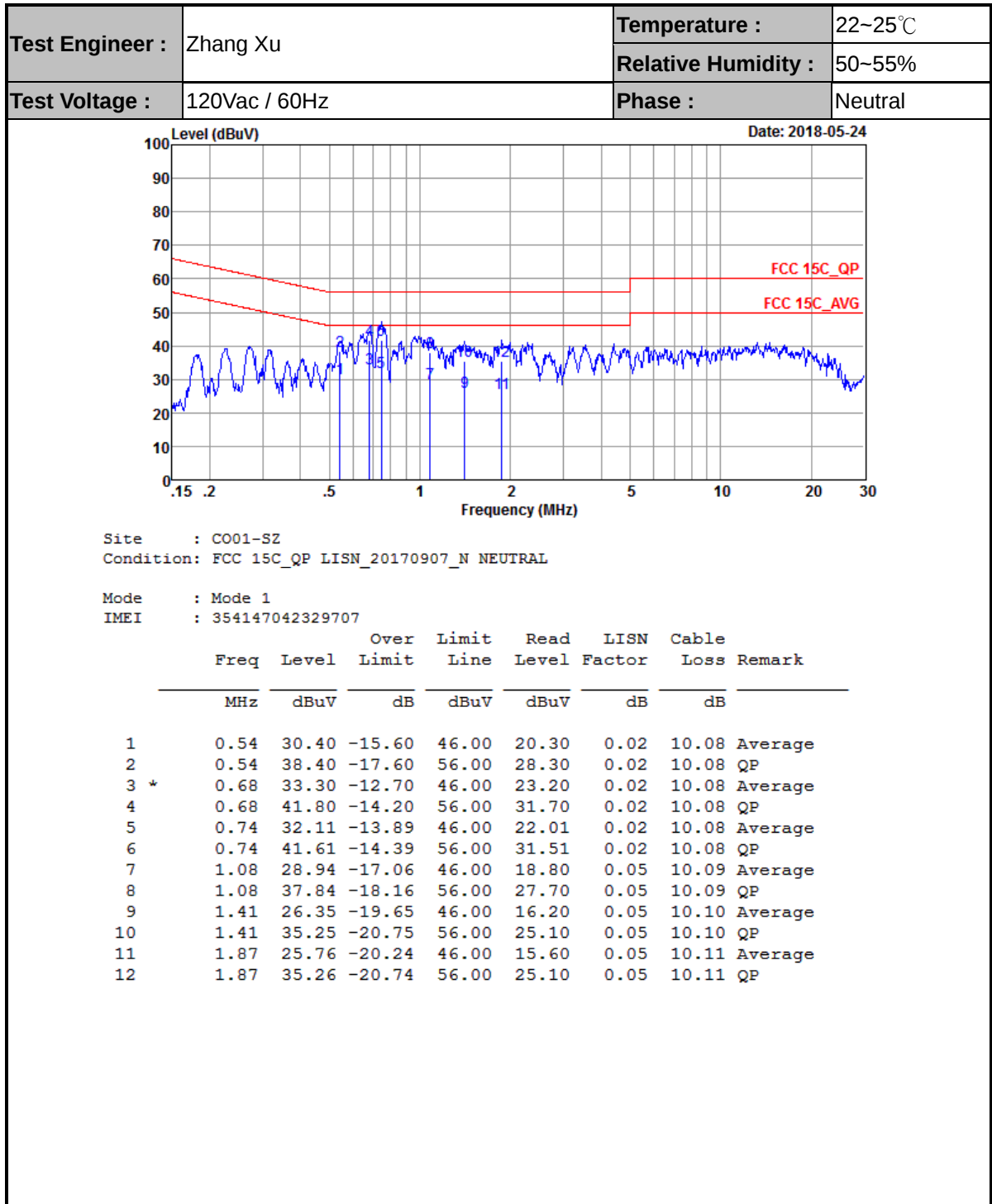
TEST RESULTS DATA
Peak Power Density

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	-8.30	-0.20	8.00	Pass
11b	1Mbps	1	6	2437	-6.64	-0.20	8.00	Pass
11b	1Mbps	1	11	2462	-6.36	-0.20	8.00	Pass
11g	6Mbps	1	1	2412	-9.54	-0.20	8.00	Pass
11g	6Mbps	1	6	2437	-9.93	-0.20	8.00	Pass
11g	6Mbps	1	11	2462	-10.09	-0.20	8.00	Pass
HT20	MCS0	1	1	2412	-8.07	-0.20	8.00	Pass
HT20	MCS0	1	6	2437	-7.14	-0.20	8.00	Pass
HT20	MCS0	1	11	2462	-9.24	-0.20	8.00	Pass
HT40	MCS0	1	3	2422	-10.19	-0.20	8.00	Pass
HT40	MCS0	1	6	2437	-11.60	-0.20	8.00	Pass
HT40	MCS0	1	9	2452	-9.93	-0.20	8.00	Pass



Appendix B. AC Conducted Emission Test Results







Appendix C. Radiated Spurious Emission

Test Engineer :	Zhongmin Zhang	Temperature :	23~25°C
		Relative Humidity :	48~52%



For Adapter mode:

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.91	50.16	-23.84	74	52.07	27.23	5.06	34.2	234	141	P	H
		2387.16	40.6	-13.4	54	42.53	27.23	5.06	34.22	234	141	A	H
	*	2412	107.76	-	-	109.62	27.28	5.06	34.2	234	141	P	H
	*	2412	104.57	-	-	106.43	27.28	5.06	34.2	234	141	A	H
		2312.52	49.43	-24.57	74	51.73	27.01	4.98	34.29	342	79	P	V
		2387.16	38.96	-15.04	54	40.89	27.23	5.06	34.22	342	79	A	V
	*	2412	104.01	-	-	105.87	27.28	5.06	34.2	342	79	P	V
	*	2412	100.84	-	-	102.7	27.28	5.06	34.2	342	79	A	V
802.11b CH 06 2437MHz		2387.7	49.53	-24.47	74	51.46	27.23	5.06	34.22	203	142	P	H
		2389.94	39.38	-14.62	54	41.29	27.23	5.06	34.2	203	142	A	H
	*	2437	107.46	-	-	109.15	27.37	5.12	34.18	203	142	P	H
	*	2437	104.31	-	-	106	27.37	5.12	34.18	203	142	A	H
		2483.76	49.7	-24.3	74	51.18	27.46	5.19	34.13	203	142	P	H
		2483.5	39.88	-14.12	54	41.36	27.46	5.19	34.13	203	142	A	H
		2376.08	48.88	-25.12	74	50.89	27.19	5.02	34.22	400	77	P	V
		2389.94	38.42	-15.58	54	40.33	27.23	5.06	34.2	400	77	A	V
	*	2437	103.56	-	-	105.25	27.37	5.12	34.18	400	77	P	V
	*	2437	100.45	-	-	102.14	27.37	5.12	34.18	400	77	A	V
		2499.51	49.84	-24.16	74	51.26	27.5	5.19	34.11	400	77	P	V
		2483.62	38.92	-15.08	54	40.4	27.46	5.19	34.13	400	77	A	V



802.11b CH 11 2462MHz	*	2462	107.11	-	-	108.73	27.41	5.12	34.15	183	311	P	H
	*	2462	104.05	-	-	105.67	27.41	5.12	34.15	183	311	A	H
		2483.56	50.44	-23.56	74	51.92	27.46	5.19	34.13	183	311	P	H
		2483.52	40.72	-13.28	54	42.2	27.46	5.19	34.13	183	311	A	H
	*	2462	104.88	-	-	106.5	27.41	5.12	34.15	355	260	P	V
	*	2462	101.87	-	-	103.49	27.41	5.12	34.15	355	260	A	V
		2490.44	50.02	-23.98	74	51.46	27.5	5.19	34.13	355	260	P	V
		2483.52	39.88	-14.12	54	41.36	27.46	5.19	34.13	355	260	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	48.55	-25.45	74	66.57	31.73	8.59	58.34	167	65	P	H
		4824	43.63	-30.37	74	61.65	31.73	8.59	58.34	140	60	P	V
802.11b CH 06 2437MHz		4874	47.33	-26.67	74	65.28	31.78	8.6	58.33	150	70	P	H
		7311	45.18	-28.82	74	58.68	35.66	10.24	59.4	150	70	P	H
		4874	42.76	-31.24	74	60.71	31.78	8.6	58.33	174	100	P	V
		7311	45.38	-28.62	74	58.88	35.66	10.24	59.4	174	100	P	V
802.11b CH 11 2462MHz		4924	49.15	-24.85	74	67.01	31.83	8.64	58.33	160	70	P	H
		7386	44.84	-29.16	74	58.27	35.81	10.2	59.44	160	70	P	H
		4924	44.5	-29.5	74	62.36	31.83	8.64	58.33	145	274	P	V
		7386	44.34	-29.66	74	57.77	35.81	10.2	59.44	145	274	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		2390	56.31	-17.69	74	58.22	27.23	5.06	34.2	131	309	P	H
		2389.905	45.14	-8.86	54	47.05	27.23	5.06	34.2	131	309	A	H
	*	2412	106.7	-	-	108.56	27.28	5.06	34.2	131	309	P	H
	*	2412	98.86	-	-	100.72	27.28	5.06	34.2	131	309	A	H
		2390	49.94	-24.06	74	51.85	27.23	5.06	34.2	100	111	P	V
		2390	40.28	-13.72	54	42.19	27.23	5.06	34.2	100	111	A	V
	*	2412	99.4	-	-	101.26	27.28	5.06	34.2	100	111	P	V
	*	2412	89.98	-	-	91.84	27.28	5.06	34.2	100	111	A	V
802.11g CH 06 2437MHz		2386.86	50.19	-23.81	74	52.12	27.23	5.06	34.22	155	307	P	H
		2388.54	40.55	-13.45	54	42.48	27.23	5.06	34.22	155	307	A	H
	*	2437	106.28	-	-	107.97	27.37	5.12	34.18	155	307	P	H
	*	2437	98.82	-	-	100.51	27.37	5.12	34.18	155	307	A	H
		2489.43	50.5	-23.5	74	51.94	27.5	5.19	34.13	155	307	P	H
		2483.5	41.52	-12.48	54	43	27.46	5.19	34.13	155	307	A	H
		2380.84	50.14	-23.86	74	52.15	27.19	5.02	34.22	115	263	P	V
		2388.12	39.25	-14.75	54	41.18	27.23	5.06	34.22	115	263	A	V
	*	2437	100	-	-	101.69	27.37	5.12	34.18	115	263	P	V
	*	2437	91.34	-	-	93.03	27.37	5.12	34.18	115	263	A	V
		2499.79	50.04	-23.96	74	51.46	27.5	5.19	34.11	115	263	P	V
		2487.89	39.85	-14.15	54	41.29	27.5	5.19	34.13	115	263	A	V



802.11g CH 11 2462MHz	*	2462	107.35	-	-	108.97	27.41	5.12	34.15	132	305	P	H
	*	2462	99.96	-	-	101.58	27.41	5.12	34.15	132	305	A	H
		2484.96	55.97	-18.03	74	57.45	27.46	5.19	34.13	132	305	P	H
		2483.56	45.79	-8.21	54	47.27	27.46	5.19	34.13	132	305	A	H
	*	2462	101.34	-	-	102.96	27.41	5.12	34.15	280	261	P	V
	*	2462	93.67	-	-	95.29	27.41	5.12	34.15	280	261	A	V
		2484.96	52.61	-21.39	74	54.09	27.46	5.19	34.13	280	261	P	V
		2483.6	42.12	-11.88	54	43.6	27.46	5.19	34.13	280	261	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	40.68	-33.32	74	58.7	31.73	8.59	58.34	130	95	P	H
		4824	39.91	-34.09	74	57.93	31.73	8.59	58.34	163	70	P	V
802.11g CH 06 2437MHz		4874	40.67	-33.33	74	58.62	31.78	8.6	58.33	160	66	P	H
		7311	45.13	-28.87	74	58.63	35.66	10.24	59.4	160	66	P	H
		4874	40.48	-33.52	74	58.43	31.78	8.6	58.33	174	100	P	V
		7311	44.93	-29.07	74	58.43	35.66	10.24	59.4	174	100	P	V
802.11g CH 11 2462MHz		4924	41.44	-32.56	74	59.3	31.83	8.64	58.33	145	274	P	H
		7386	45.18	-28.82	74	58.61	35.81	10.2	59.44	145	274	P	H
		4924	40.98	-33.02	74	58.84	31.83	8.64	58.33	160	35	P	V
		7386	45.27	-28.73	74	58.7	35.81	10.2	59.44	160	35	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		2388.33	63.39	-10.61	74	65.32	27.23	5.06	34.22	221	311	P	H
		2389.91	47.53	-6.47	54	49.44	27.23	5.06	34.2	221	311	A	H
	*	2412	106.42	-	-	108.28	27.28	5.06	34.2	221	311	P	H
	*	2412	98.6	-	-	100.46	27.28	5.06	34.2	221	311	A	H
		2388.12	56.59	-17.41	74	58.52	27.23	5.06	34.22	100	111	P	V
		2389.91	41.26	-12.74	54	43.17	27.23	5.06	34.2	100	111	A	V
	*	2412	102.3	-	-	104.16	27.28	5.06	34.2	100	111	P	V
	*	2412	94.69	-	-	96.55	27.28	5.06	34.2	100	111	A	V
802.11n HT20 CH 06 2437MHz		2321.76	49.67	-24.33	74	51.9	27.05	4.98	34.26	153	312	P	H
		2387.84	40.66	-13.34	54	42.59	27.23	5.06	34.22	153	312	A	H
	*	2437	106.33	-	-	108.02	27.37	5.12	34.18	153	312	P	H
	*	2437	98.35	-	-	100.04	27.37	5.12	34.18	153	312	A	H
		2483.55	50.95	-23.05	74	52.43	27.46	5.19	34.13	153	312	P	H
		2483.9	41.86	-12.14	54	43.34	27.46	5.19	34.13	153	312	A	H
		2373.98	49.39	-24.61	74	51.4	27.19	5.02	34.22	351	265	P	V
		2388.4	39.41	-14.59	54	41.34	27.23	5.06	34.22	351	265	A	V
	*	2437	102.4	-	-	104.09	27.37	5.12	34.18	351	265	P	V
	*	2437	94.72	-	-	96.41	27.37	5.12	34.18	351	265	A	V
		2489.57	50.38	-23.62	74	51.82	27.5	5.19	34.13	351	265	P	V
		2483.9	41.12	-12.88	54	42.6	27.46	5.19	34.13	351	265	A	V



802.11n HT20 CH 11 2462MHz	*	2462	106.52	-	-	108.14	27.41	5.12	34.15	161	311	P	H
	*	2462	98.83	-	-	100.45	27.41	5.12	34.15	161	311	A	H
		2483.52	60.82	-13.18	74	62.3	27.46	5.19	34.13	161	311	P	H
		2483.52	47.56	-6.44	54	49.04	27.46	5.19	34.13	161	311	A	H
	*	2462	104.54	-	-	106.16	27.41	5.12	34.15	354	262	P	V
	*	2462	96.9	-	-	98.52	27.41	5.12	34.15	354	262	A	V
		2484.4	58.23	-15.77	74	59.71	27.46	5.19	34.13	354	262	P	V
		2483.56	45.64	-8.36	54	47.12	27.46	5.19	34.13	354	262	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	43.02	-30.98	74	61.04	31.73	8.59	58.34	175	97	P	H
		4824	39.87	-34.13	74	57.89	31.73	8.59	58.34	198	350	P	V
802.11n HT20 CH 06 2437MHz		4874	41.58	-32.42	74	59.53	31.78	8.6	58.33	174	100	P	H
		7311	45.87	-28.13	74	59.37	35.66	10.24	59.4	174	100	P	H
		4874	40.4	-33.6	74	58.35	31.78	8.6	58.33	130	60	P	V
		7311	45.2	-28.8	74	58.7	35.66	10.24	59.4	130	60	P	V
802.11n HT20 CH 11 2462MHz		4924	42.51	-31.49	74	60.37	31.83	8.64	58.33	163	85	P	H
		7386	44.38	-29.62	74	57.81	35.81	10.2	59.44	163	85	P	H
		4924	41.06	-32.94	74	58.92	31.83	8.64	58.33	135	83	P	V
		7386	44.13	-29.87	74	57.56	35.81	10.2	59.44	135	83	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		2388.26	65.4	-8.6	74	67.33	27.23	5.06	34.22	178	324	P	H
		2389.66	50.68	-3.32	54	52.61	27.23	5.06	34.22	178	324	A	H
	*	2422	101	-	-	102.8	27.32	5.06	34.18	178	324	P	H
	*	2422	93.48	-	-	95.28	27.32	5.06	34.18	178	324	A	H
		2484.18	50.35	-23.65	74	51.83	27.46	5.19	34.13	178	324	P	H
		2483.76	41.7	-12.3	54	43.18	27.46	5.19	34.13	178	324	A	H
		2388.12	62.23	-11.77	74	64.16	27.23	5.06	34.22	400	278	P	V
		2389.66	49.08	-4.92	54	51.01	27.23	5.06	34.22	400	278	A	V
	*	2422	99.52	-	-	101.32	27.32	5.06	34.18	400	278	P	V
	*	2422	91.96	-	-	93.76	27.32	5.06	34.18	400	278	A	V
		2483.55	50.06	-23.94	74	51.54	27.46	5.19	34.13	400	278	P	V
		2492.93	40.86	-13.14	54	42.28	27.5	5.19	34.11	400	278	A	V
802.11n HT40 CH 06 2437MHz		2389.52	56.39	-17.61	74	58.32	27.23	5.06	34.22	149	321	P	H
		2389.66	44.31	-9.69	54	46.24	27.23	5.06	34.22	149	321	A	H
	*	2437	105.44	-	-	107.13	27.37	5.12	34.18	149	321	P	H
	*	2437	96.73	-	-	98.42	27.37	5.12	34.18	149	321	A	H
		2483.55	56.69	-17.31	74	58.17	27.46	5.19	34.13	149	321	P	H
		2483.5	47.3	-6.7	54	48.78	27.46	5.19	34.13	149	321	A	H
		2389.94	52.41	-21.59	74	54.32	27.23	5.06	34.2	393	246	P	V
		2389.94	41.43	-12.57	54	43.34	27.23	5.06	34.2	393	246	A	V
	*	2437	101.35	-	-	103.04	27.37	5.12	34.18	393	246	P	V
	*	2437	93.61	-	-	95.3	27.37	5.12	34.18	393	246	A	V
		2483.5	53.54	-20.46	74	55.02	27.46	5.19	34.13	393	246	P	V
		2483.5	44.79	-9.21	54	46.27	27.46	5.19	34.13	393	246	A	V



802.11n HT40 CH 09 2452MHz		2388.68	57.28	-16.72	74	59.21	27.23	5.06	34.22	183	322	P	H
		2388.4	43.35	-10.65	54	45.28	27.23	5.06	34.22	183	322	A	H
	*	2452	105.28	-	-	106.94	27.37	5.12	34.15	183	322	P	H
	*	2452	98.07	-	-	99.73	27.37	5.12	34.15	183	322	A	H
		2483.5	66.39	-7.61	74	67.87	27.46	5.19	34.13	183	322	P	H
		2483.5	51.85	-2.15	54	53.33	27.46	5.19	34.13	183	322	A	H
		2388.12	52.54	-21.46	74	54.47	27.23	5.06	34.22	385	280	P	V
		2389.8	40.7	-13.3	54	42.61	27.23	5.06	34.22	385	280	A	V
	*	2452	102.02	-	-	103.68	27.37	5.12	34.15	385	280	P	V
	*	2452	94.85	-	-	96.51	27.37	5.12	34.15	385	280	A	V
		2483.5	62.31	-11.69	74	63.79	27.46	5.19	34.13	385	280	P	V
		2483.55	48.14	-5.86	54	49.62	27.46	5.19	34.13	385	280	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		4844	40.31	-33.69	74	58.31	31.74	8.6	58.34	110	90	P	H
HT40		7266	45.33	-28.67	74	58.86	35.6	10.25	59.38	110	90	P	H
CH 03		4844	40.69	-33.31	74	58.69	31.74	8.6	58.34	130	140	P	V
2422MHz		7266	46.7	-27.3	74	60.23	35.6	10.25	59.38	130	140	P	V
802.11n		4874	41.27	-32.73	74	59.22	31.78	8.6	58.33	167	40	P	H
HT40		7311	45.81	-28.19	74	59.31	35.66	10.24	59.4	167	40	P	H
CH 06		4874	41.73	-32.27	74	59.68	31.78	8.6	58.33	180	65	P	V
2437MHz		7311	45.52	-28.48	74	59.02	35.66	10.24	59.4	180	65	P	V
802.11n		4904	40.34	-33.66	74	58.24	31.81	8.62	58.33	140	70	P	H
HT40		7356	43.97	-30.03	74	57.43	35.75	10.22	59.43	140	70	P	H
CH 09		4904	38.35	-35.65	74	56.25	31.81	8.62	58.33	251	0	P	V
2452MHz		7356	43.51	-30.49	74	56.97	35.75	10.22	59.43	251	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



Emission below 1GHz

2.4GHz WIFI 802.11n HT40(LF)

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)
2.4GHz 802.11n HT40 LF		30	24.52	-15.48	40	31.36	25.2	0.56	32.6	130	70	P	H
		97.9	24.44	-19.06	43.5	38.78	16.54	1.02	31.9	-	-	P	H
		272.5	29.49	-16.51	46	40.46	19.35	1.73	32.05	-	-	P	H
		309.36	30.05	-15.95	46	40.57	19.61	1.85	31.98	-	-	P	H
		575.14	29.22	-16.78	46	33.21	24.95	2.61	31.55	-	-	P	H
		899.12	29.74	-16.26	46	30.93	26.79	3.32	31.3	-	-	P	H
		30	34.11	-5.89	40	40.95	25.2	0.56	32.6	-	-	P	V
		52.31	35.11	-4.89	40	52.93	13.94	0.74	32.5	170	90	P	V
		95.96	24.82	-18.68	43.5	39.33	16.18	1.01	31.7	-	-	P	V
		175.5	24.24	-19.26	43.5	39.08	15.53	1.35	31.72	-	-	P	V
		322.94	24.06	-21.94	46	34.21	19.91	1.89	31.95	-	-	P	V
		575.14	29.37	-16.63	46	33.36	24.95	2.61	31.55	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



For wireless charging mode:

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 09 2452MHz		2389.24	54.23	-19.77	74	56.16	27.23	5.06	34.22	155	293	P	H
		2389.38	41.93	-12.07	54	43.86	27.23	5.06	34.22	155	293	A	H
	*	2452	104.85	-	-	106.51	27.37	5.12	34.15	155	293	P	H
	*	2452	97.68	-	-	99.34	27.37	5.12	34.15	155	293	A	H
		2483.69	64.56	-9.44	74	66.04	27.46	5.19	34.13	155	293	P	H
		2483.5	51.51	-2.49	54	52.99	27.46	5.19	34.13	155	293	A	H
		2386.3	50.26	-23.74	74	52.19	27.23	5.06	34.22	348	267	P	V
		2387.56	40.59	-13.41	54	42.52	27.23	5.06	34.22	348	267	A	V
	*	2452	100.03	-	-	101.69	27.37	5.12	34.15	348	267	P	V
	*	2452	94.18	-	-	95.84	27.37	5.12	34.15	348	267	A	V
		2483.5	63.39	-10.61	74	64.87	27.46	5.19	34.13	348	267	P	V
		2483.5	49.43	-4.57	54	50.91	27.46	5.19	34.13	348	267	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 09 2452MHz		4904	39.85	-34.15	74	58.36	31.2	8.62	58.33	115	60	P	H
		7356	44.49	-29.51	74	57.51	36.19	10.22	59.43	115	60	P	H
		4904	37.82	-36.18	74	56.33	31.2	8.62	58.33	161	30	P	V
		7356	44.09	-29.91	74	57.11	36.19	10.22	59.43	161	30	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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)

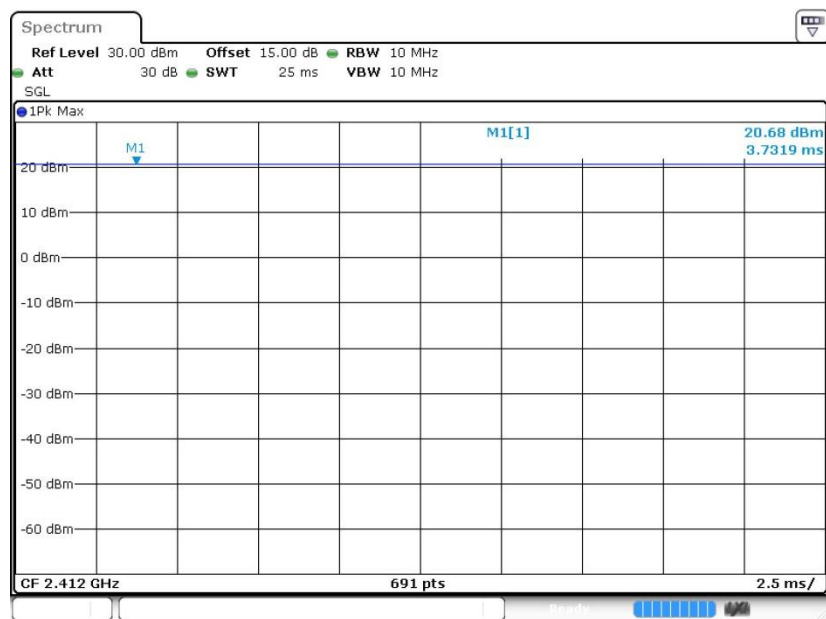
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

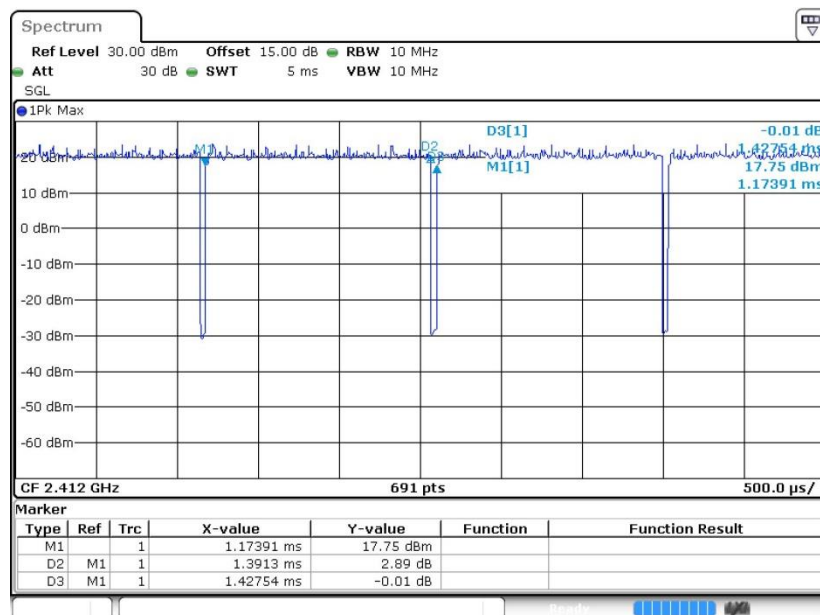
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	97.46	1.391	0.719	1kHz
802.11n HT20	97.28	1.297	0.771	1kHz
802.11n HT40	94.90	0.648	1.544	3kHz

802.11b

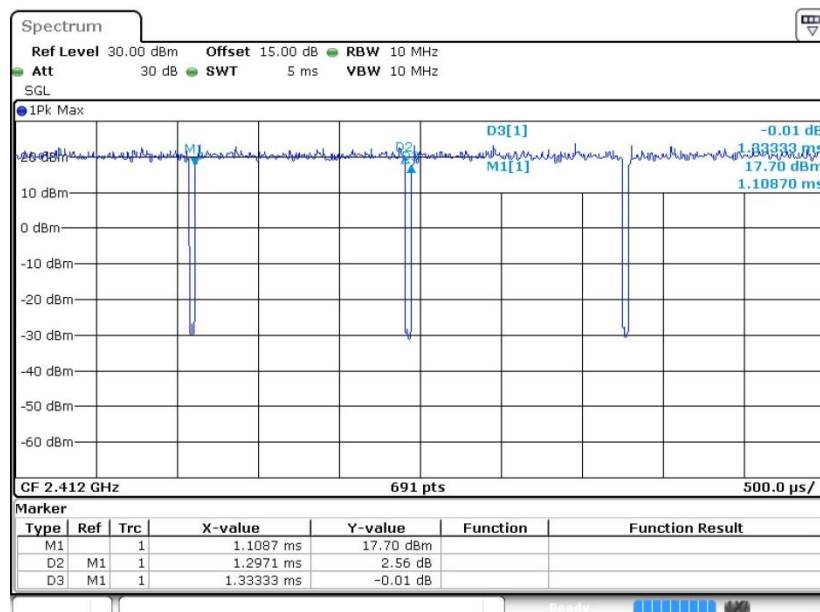




802.11g



802.11n HT20





802.11n HT40

