



FCC RADIO TEST REPORT

FCC ID : 2ABVH-INARI8B2
Equipment : Tablet
Brand Name : AAVA
Model Name : INARI8B-LTG-1
Applicant : Aava Mobile Oy
NAHKATEHTAANKATU 2 90130 OULU FINLAND
Manufacturer : Aava Mobile Oy
NAHKATEHTAANKATU 2 90130 OULU FINLAND
Standard : FCC Part 15 Subpart C §15.247

The product was received on Sep. 06, 2018 and testing was started from Sep. 29, 2018 and completed on Oct. 09, 2018. We, SPORTON INTERNATIONAL 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Jones Tsai

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FR890633C	01	Initial issue of report	Jan. 08, 2019



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
-	15.247(a)(2)	6dB Bandwidth	Not Required	-
-	2.1049	99% Occupied Bandwidth	Not Required	-
3.1	15.247(b)	Power Output Measurement	Pass	-
-	15.247(e)	Power Spectral Density	Not Required	-
-	15.247(d)	Conducted Band Edges	Not Required	-
		Conducted Spurious Emission	Not Required	-
3.2	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 8.24 dB at 2390.000 MHz
-	15.207	AC Conducted Emission	Not Required	-
3.3	15.203 & 15.247(b)	Antenna Requirement	Pass	-
Remark:				
<ol style="list-style-type: none"> Not required means after assessing, test items are not necessary to carry out. This is a variant report by adding WWAN module. All the test cases were performed on original report which can be referred to Sporton Report Number FR860615C as appendix E. Based on the original report, the test cases were verified. 				

Reviewed by: Wii Chang

Report Producer: Maggie Chiang



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet
Brand Name	AAVA
Model Name	INARI8B-LTG-1
FCC ID	2ABVH-INARI8B2
EUT supports Radios application	WCDMA/HSPA/LTE/NFC/GNSS WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	DV1
SW Version	Windows 10
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer.

Specification of Accessories				
AC Adapter	Brand Name	PHIHONG	Model Name	AQ18A-59CFA
Battery	Brand Name	Aava	Model Name	AMME3735
USB Cable	Brand Name	PHIHONG	Model Name	UES-1001A160-R

1.2 Product Specification of Equipment Under Test

Standards-related Product Specification										
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz									
Maximum Output Power to antenna	<p><Ant 1> 802.11b : 15.80 dBm (0.0380 W) 802.11g : 18.76 dBm (0.0752 W) 802.11n HT20 : 18.74 dBm (0.0748 W) 802.11n HT40 : 17.30 dBm (0.0537 W)</p> <p><Ant 2> 802.11b : 15.52 dBm (0.0356 W) 802.11g : 18.11 dBm (0.0647 W) 802.11n HT20 : 18.18 dBm (0.0658 W) 802.11n HT40 : 16.25 dBm (0.0422 W)</p> <p>MIMO <Ant. 1 + 2> 802.11b : 18.20 dBm (0.0661 W) 802.11g : 20.98 dBm (0.1253 W) 802.11n HT20 : 20.88 dBm (0.1225 W) 802.11n HT40 : 19.26 dBm (0.0843 W)</p>									
Antenna Type / Gain	<p><Ant. 1>: Ceramic Antenna with gain 2.70 dBi <Ant. 2>: Ceramic Antenna with gain 0.90 dBi</p>									
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)									
Antenna Function for Transmitter	<table border="1"> <thead> <tr> <th></th> <th>Ant. 1</th> <th>Ant. 2</th> </tr> </thead> <tbody> <tr> <td>802.11 b/g/n</td> <td>V</td> <td>V</td> </tr> <tr> <td>802.11 b/g/n MIMO</td> <td>V</td> <td>V</td> </tr> </tbody> </table>		Ant. 1	Ant. 2	802.11 b/g/n	V	V	802.11 b/g/n MIMO	V	V
	Ant. 1	Ant. 2								
802.11 b/g/n	V	V								
802.11 b/g/n MIMO	V	V								

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.

1.3 Modification of EUT

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



1.4 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 and TW0007 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	Sporton Site No.
	TH05-HY

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

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	Sporton Site No.
	03CH12-HY

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

1.5 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 v05
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ 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: radiation 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 (Z 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 modes are considering the modulation and worse data rates as below table.

MIMO Mode

Modulation	Data Rate
802.11g	6 Mbps



<Ant. 1>

802.11b mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		1M
Duty Cycle (%)		100.00
CH 01	2412	13.14

802.11b mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		1M
CH 01	2412	15.80

802.11g mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
Duty Cycle (%)		96.24
CH 01	2412	13.34

802.11g mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 01	2412	18.76



802.11n HT20 mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
Duty Cycle (%)		95.97
CH 01	2412	13.18

802.11n HT20 mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 01	2412	18.74

802.11n HT40 mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
Duty Cycle (%)		94.31
CH 03	2422	13.21

802.11n HT40 mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 03	2422	17.30



<Ant. 2>

802.11b mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		1M
Duty Cycle (%)		100.00
CH 01	2412	12.70

802.11b mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		1M
CH 01	2412	15.52

802.11g mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
Duty Cycle (%)		96.24
CH 01	2412	12.82

802.11g mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 01	2412	18.11



802.11n HT20 mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
Duty Cycle (%)		96.75
CH 01	2412	12.64

802.11n HT20 mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 01	2412	18.18

802.11n HT40 mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
Duty Cycle (%)		94.35
CH 03	2422	12.35

802.11n HT40 mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 03	2422	16.25



MIMO<Ant. 1 + 2>

802.11b mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		1M
CH 01	2412	15.43

802.11b mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		1M
CH 01	2412	18.20

802.11g mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 01	2412	15.66

802.11g mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	Data Rate (bps)
		6M
CH 01	2412	20.98



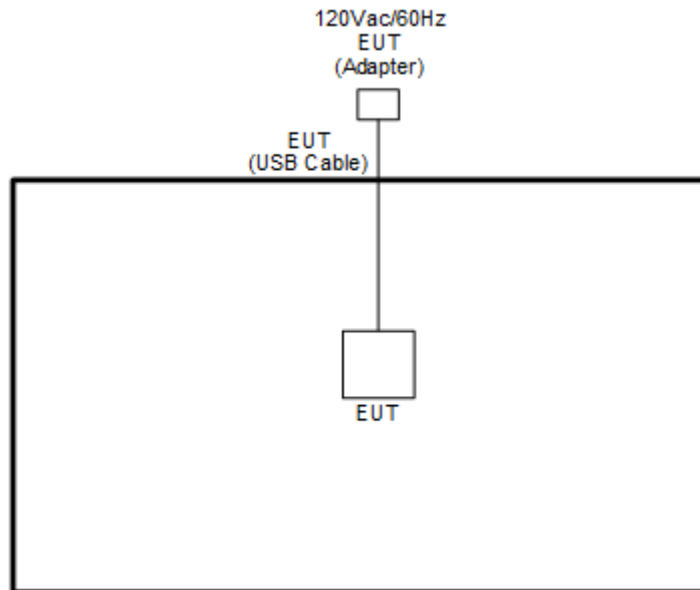
802.11n HT20 mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 01	2412	15.35

802.11n HT20 mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 01	2412	20.88

802.11n HT40 mode		
Average Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 03	2422	15.19

802.11n HT40 mode		
Peak Power vs. Channel		
Channel	Frequency (MHz)	MCS Index
		MCS0
CH 03	2422	19.26

2.3 Connection Diagram of Test System



2.4 EUT Operation Test Setup

The RF test items, utility “DRTU” was installed in EUT which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

3 Test Result

3.1 Output Power Measurement

3.1.1 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 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.

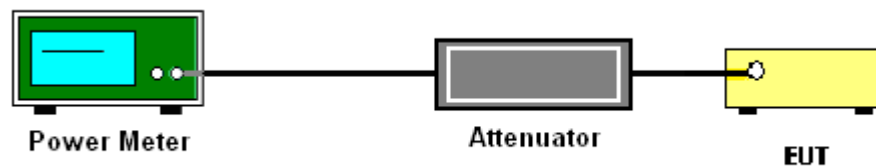
3.1.2 Measuring Instruments

See list of measuring equipment of this test report.

3.1.3 Test Procedures

1. For Peak Power, the testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v05 section 9.1.3 PKPM1 Peak power meter method.
2. For Average Power, the testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v05 section 9.2.3.1 Method AVGPM.
3. 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.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Measure the conducted output power and record the results in the test report.
6. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.1.4 Test Setup





3.1.5 Test Result of Peak Output Power

Test Engineer :	Shiming Liu	Temperature :	21~25°C
		Relative Humidity :	51~54%

2.4GHz Band																
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	15.80	15.52	-	30.00	30.00	2.70	0.90	18.50	16.42	36.00	36.00	Pass
11g	6Mbps	1	1	2412	18.76	18.11	-	30.00	30.00	2.70	0.90	21.46	19.01	36.00	36.00	Pass
HT20	MCS0	1	1	2412	18.74	18.18	-	30.00	30.00	2.70	0.90	21.44	19.08	36.00	36.00	Pass
HT40	MCS0	1	3	2422	17.30	16.25	-	30.00	30.00	2.70	0.90	20.00	17.15	36.00	36.00	Pass
11b	1Mbps	2	1	2412	14.92	15.44	18.20	30.00		2.70		20.90		36.00		Pass
11g	6Mbps	2	1	2412	17.83	18.10	20.98	30.00		2.70		23.68		36.00		Pass
HT20	MCS0	2	1	2412	17.65	18.07	20.88	30.00		2.70		23.58		36.00		Pass
HT40	MCS0	2	3	2422	16.20	16.30	19.26	30.00		2.70		21.96		36.00		Pass

3.1.6 Test Result of Average output Power (Reporting Only)

Test Engineer :	Shiming Liu	Temperature :	21~25°C
		Relative Humidity :	51~54%

2.4GHz Band										
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)			
					Ant 1	Ant 2	Ant 1	Ant 2	SUM	
11b	1Mbps	1	1	2412	0.00	0.00	13.14	12.70	-	
11g	6Mbps	1	1	2412	0.17	0.17	13.34	12.82		
HT20	MCS0	1	1	2412	0.18	0.14	13.18	12.64		
HT40	MCS0	1	3	2422	0.25	0.25	13.21	12.35		
11b	1Mbps	2	1	2412	0.00	0.00	12.00	12.80	15.43	
11g	6Mbps	2	1	2412	0.13	0.10	12.45	12.85	15.66	
HT20	MCS0	2	1	2412	0.14	0.13	12.11	12.56	15.35	
HT40	MCS0	2	3	2422	0.18	0.18	11.98	12.38	15.19	



3.2 Radiated Band Edges and Spurious Emission Measurement

3.2.1 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

3.2.2 Measuring Instruments

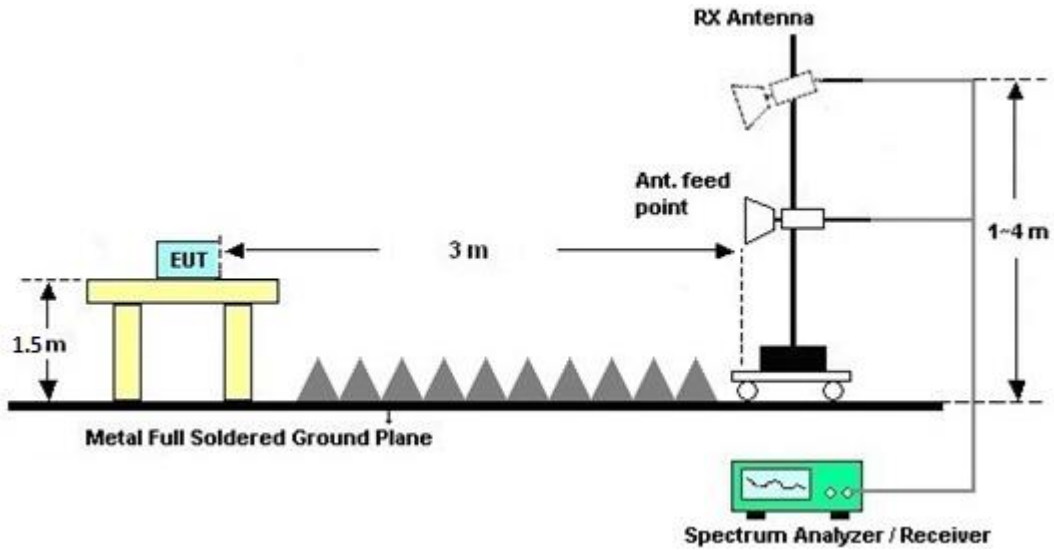
See list of measuring equipment of this test report.



3.2.3 Test Procedures

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v05.
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.

3.2.4 Test Setup



3.2.5 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix A and B.

3.2.6 Duty Cycle

Please refer to Appendix C.

3.2.7 Test Result of Radiated Spurious Emission

Please refer to Appendix A and B.



3.3 Antenna Requirements

3.3.1 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.

3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.3.3 Antenna Gain

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>				
	Ant. 1	Ant. 2	DG for Power	Power Limit Reduction
	(dBi)	(dBi)	(dBi)	(dB)
2.4 GHz	2.70	0.90	2.70	0.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1132003	N/A	Aug. 16, 2018	Sep. 29, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1126017	300MHz~40GHz	Aug. 16, 2018	Sep. 29, 2018	Aug. 15, 2019	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2017	Sep. 29, 2018	Nov. 20, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Sep. 29, 2018	Feb. 28, 2019	Conducted (TH05-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100488	9 kHz~30 MHz	Nov. 23, 2017	Oct. 08, 2018~ Oct. 09, 2018	Nov. 22, 2018	Radiation (03CH12-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	37059&01	30MHz~1GHz	Oct. 14, 2017	Oct. 08, 2018~ Oct. 09, 2018	Oct. 13, 2018	Radiation (03CH12-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1328	1GHz ~ 18GHz	Oct. 20, 2017	Oct. 08, 2018~ Oct. 09, 2018	Oct. 19, 2018	Radiation (03CH12-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170584	18GHz ~ 40GHz	Nov. 27, 2017	Oct. 08, 2018~ Oct. 09, 2018	Nov. 26, 2018	Radiation (03CH12-HY)
Preamplifier	COM-POWER	PA-103	161075	10MHz~1GHz	Mar. 26, 2018	Oct. 08, 2018~ Oct. 09, 2018	Mar. 25, 2019	Radiation (03CH12-HY)
Preamplifier	Keysight	83017A	MY53270148	1GHz~26.5GHz	Jan. 15, 2018	Oct. 08, 2018~ Oct. 09, 2018	Jan. 14, 2019	Radiation (03CH12-HY)
Preamplifier	MITEQ	AMF-7D-00101 800-30-10P	1590074	1GHz~18GHz	May 21, 2018	Oct. 08, 2018~ Oct. 09, 2018	May 20, 2019	Radiation (03CH12-HY)
Preamplifier	EMEC	EM18G40G	060715	18GHz ~ 40GHz	Dec. 05, 2017	Oct. 08, 2018~ Oct. 09, 2018	Dec. 04, 2018	Radiation (03CH12-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100390	20Hz~26.5GHz	Dec. 25, 2017	Oct. 08, 2018~ Oct. 09, 2018	Dec. 24, 2018	Radiation (03CH12-HY)
Filter	Wainwright	WHKX12-2700 -3000-18000-6 0ST	SN2	3 GHz Highpass	Mar. 21, 2018	Oct. 08, 2018~ Oct. 09, 2018	Mar. 20, 2019	Radiation (03CH12-HY)
Filter	Wainwright	WLJ4-1000-15 30-6000-40ST	SN3	1.53 GHz Lowpass	Mar. 21, 2018	Oct. 08, 2018~ Oct. 09, 2018	Mar. 20, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 104	MY15539/4	30M-18G	Mar. 14, 2018	Oct. 08, 2018~ Oct. 09, 2018	Mar. 13, 2019	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	505134/2	30M~40GHz	Oct. 17, 2017	Oct. 08, 2018~ Oct. 09, 2018	Oct. 16, 2018	Radiation (03CH12-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	800740/2	30M~40GHz	Oct. 17, 2017	Oct. 08, 2018~ Oct. 09, 2018	Oct. 16, 2018	Radiation (03CH12-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1m~4m	N/A	Oct. 08, 2018~ Oct. 09, 2018	N/A	Radiation (03CH12-HY)
Turn Table	EMEC	TT2000	N/A	0~360 Degree	N/A	Oct. 08, 2018~ Oct. 09, 2018	N/A	Radiation (03CH12-HY)
Software	Audix	E3 6.2009-8-24	RK-000989	N/A	N/A	Oct. 08, 2018~ Oct. 09, 2018	N/A	Radiation (03CH12-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.2
---	-----

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

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



Appendix A. Radiated Spurious Emission

Test Engineer :	Jack Cheng, Lance Chiang, and Peter Liao	Temperature :	21~25°C
		Relative Humidity :	56~62%

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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)	
802.11g CH 01 2412MHz		2362.29	57.43	-16.57	74	45.3	27.07	16.64	31.58	221	344	P	H	
		2390	45.42	-8.58	54	33.15	27.15	16.69	31.57	221	344	A	H	
	*	2412	104.01	-	-	91.67	27.19	16.72	31.57	221	344	P	H	
	*	2412	94.12	-	-	81.78	27.19	16.72	31.57	221	344	A	H	
													H	
														H
			2389.695	58.77	-15.23	74	46.52	27.15	16.68	31.58	250	286	P	V
			2390	45.76	-8.24	54	33.49	27.15	16.69	31.57	250	286	A	V
	*		2412	105.09	-	-	92.75	27.19	16.72	31.57	250	286	P	V
	*		2412	95.1	-	-	82.76	27.19	16.72	31.57	250	286	A	V
														V
													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. 2	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11g CH 01 2412MHz		4824	40.77	-33.23	74	56.53	31.36	10.43	57.55	100	0	P	H	
													H	
													H	
													H	
			4824	40.77	-33.23	74	56.53	31.36	10.43	57.55	100	0	P	V
														V
														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	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	Path	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =
Antenna Factor(dB/m) + Path Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)
3. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)
= Antenna Factor(dB/m) + Path 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) + Path 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 B. Radiated Spurious Emission Plots

Test Engineer :	Jack Cheng, Lance Chiang, and Peter Liao	Temperature :	21~25°C
		Relative Humidity :	56~62%

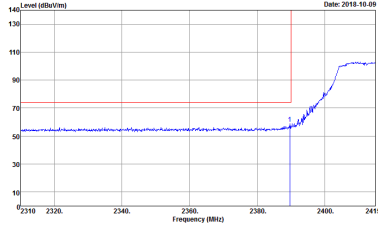
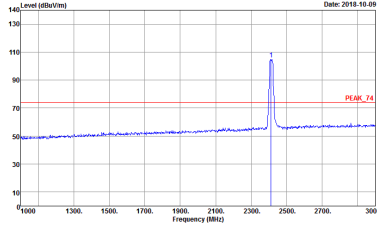
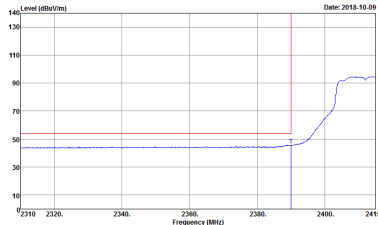
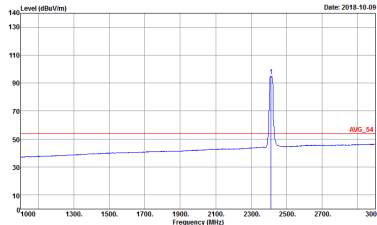


2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
Ant.	802.11g CH01 2412MHz	
2	Horizontal	Fundamental
Peak	<p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_91200_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>
Avg.	<p>Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_91200_1328 HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>	<p>Site : 03CH12-HY Condition : AVG_54 3m HORN_91200_1328 HORIZONTAL RBW:1000.000KHz VBW:1000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>



WIFI	2.4GHz 2400~2483.5MHz Band Edge @ 3m	
Ant.	802.11g CH01 2412MHz	
2	Vertical	Fundamental
Peak	 <p>Site : 03CH12-HY Condition : PEAK_BE_74 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>	 <p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:3000.000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>
Avg.	 <p>Site : 03CH12-HY Condition : AVG_BE_54 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>	 <p>Site : 03CH12-HY Condition : AVG_54 3m HORN_9120D_1328 VERTICAL RBW:1000.000KHz VBW:1.000KHz SWT:Auto Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>



2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI	2.4GHz 2400~2483.5MHz Harmonic @ 3m	
Ant.	802.11g CH01 2412MHz	
2	Horizontal	Vertical
Peak Avg.	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 HORIZONTAL Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>	<p>Site : 03CH12-HY Condition : PEAK_74 3m HORN_91200_1328 VERTICAL Detector : Peak Project : 890633 Mode : 3 Setting : 12.75</p>

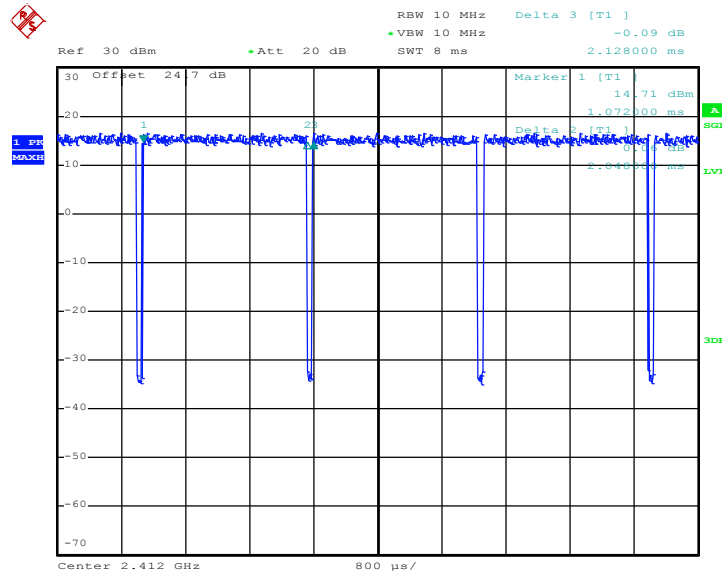


Appendix C. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(us)	1/T(kHz)	VBW Setting	Duty Factor(dB)
2	802.11g	96.24	2048.000	0.49	1kHz	0.17

<Ant. 2>

802.11g



Date: 29.SEP.2018 06:47:06



Appendix E. Original Report

Please refer to Sporton report number FR860615C as below.



FCC RADIO TEST REPORT

FCC ID : 2ABVH-INARI8B1
Equipment : Tablet
Brand Name : AAVA
Model Name : INARI8B-WIG-1
Applicant : Aava Mobile Oy
NAHKATEHTAANKATU 2 90130 OULU FINLAND
Manufacturer : Aava Mobile Oy
NAHKATEHTAANKATU 2 90130 OULU FINLAND
Standard : FCC Part 15 Subpart C §15.247

The product was received on Jun. 06, 2018 and testing was started from Jun. 13, 2018 and completed on Aug. 24, 2018. We, SPORTON INTERNATIONAL 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Joseph Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



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Appendix A. AC Conducted Emission Test Result

Appendix B. Radiated Spurious Emission

Appendix C. Radiated Spurious Emission Plots

Appendix D. Duty Cycle Plots

Appendix E. Setup Photographs



History of this test report

Report No.	Version	Description	Issued Date
FR860615C	01	Initial issue of report	Sep. 11, 2018



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(a)(2)	6dB Bandwidth	Pass	-
3.1	2.1049	99% Occupied Bandwidth	Reporting only	-
3.2	15.247(b)	Power Output Measurement	Pass	-
3.3	15.247(e)	Power Spectral Density	Pass	-
3.4	15.247(d)	Conducted Band Edges	Pass	-
		Conducted Spurious Emission	Pass	-
3.5	15.247(d)	Radiated Band Edges and Radiated Spurious Emission	Pass	Under limit 1.03 dB at 2390.000 MHz
3.6	15.207	AC Conducted Emission	Pass	Under limit 8.81 dB at 0.688 MHz
3.7	15.203 & 15.247(b)	Antenna Requirement	Pass	-

Reviewed by: Wii Chang

Report Producer: Nancy Yang



1 General Description

1.1 Product Feature of Equipment Under Test

Product Feature	
Equipment	Tablet
Brand Name	AAVA
Model Name	INARI8B-WIG-1
FCC ID	2ABVH-INARI8B1
EUT supports Radios application	NFC/GNSS WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE
HW Version	RU
SW Version	Windows 10
MFD	2018-04-26
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer.

Specification of Accessories				
AC Adapter	Brand Name	PHIHONG	Model Name	AQ18A-59CFA
Battery	Brand Name	Aava	Model Name	AMME3735
USB Cable	Brand Name	PHIHONG	Model Name	UES-1001A160-R



1.2 Product Specification of Equipment Under Test

Standards-related Product Specification										
Tx/Rx Channel Frequency Range	802.11b/g/n : 2412 MHz ~ 2462 MHz									
Maximum Output Power to antenna	<p><Ant 1> 802.11b : 15.97 dBm (0.0395 W) 802.11g : 18.79 dBm (0.0757 W) 802.11n HT20 : 18.62 dBm (0.0728 W) 802.11n HT40 : 16.91 dBm (0.0491 W)</p> <p><Ant 2> 802.11b : 15.15 dBm (0.0327 W) 802.11g : 17.88 dBm (0.0614 W) 802.11n HT20 : 17.86 dBm (0.0611 W) 802.11n HT40 : 16.19 dBm (0.0416 W)</p> <p>MIMO <Ant. 1 + 2> 802.11b : 18.04 dBm (0.0637 W) 802.11g : 20.64 dBm (0.1159 W) 802.11n HT20 : 20.69 dBm (0.1172 W) 802.11n HT40 : 19.22 dBm (0.0836 W)</p>									
99% Occupied Bandwidth	<p><Ant 1> 802.11b : 14.80MHz 802.11g : 16.70MHz 802.11n HT20 : 17.85MHz 802.11n HT40 : 36.40MHz</p> <p><Ant 2> 802.11b : 14.10MHz 802.11g : 16.70MHz 802.11n HT20 : 17.85MHz 802.11n HT40 : 36.60MHz</p> <p>MIMO <Ant 1> 802.11b : 13.75MHz 802.11g : 16.65MHz 802.11n HT20 : 17.85MHz 802.11n HT40 : 36.40MHz</p> <p>MIMO <Ant 2> 802.11b : 13.65MHz 802.11g : 16.70MHz 802.11n HT20 : 17.80MHz 802.11n HT40 : 36.30MHz</p>									
Antenna Type / Gain	<p><Ant. 1>: Ceramic Antenna with gain 2.70 dBi <Ant. 2>: Ceramic Antenna with gain 0.90 dBi</p>									
Type of Modulation	802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM)									
Antenna Function for Transmitter	<table border="1"> <thead> <tr> <th></th> <th>Ant. 1</th> <th>Ant. 2</th> </tr> </thead> <tbody> <tr> <td>802.11 b/g/n</td> <td>V</td> <td>V</td> </tr> <tr> <td>802.11 b/g/n MIMO</td> <td>V</td> <td>V</td> </tr> </tbody> </table>		Ant. 1	Ant. 2	802.11 b/g/n	V	V	802.11 b/g/n MIMO	V	V
	Ant. 1	Ant. 2								
802.11 b/g/n	V	V								
802.11 b/g/n MIMO	V	V								

Note: MIMO Ant. 1+2 is a calculated result from sum of the power MIMO Ant. 1 and MIMO Ant. 2.



1.3 Modification of EUT

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

1.4 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		
	TH05-HY	CO05-HY	03CH07-HY

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

1.5 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
- ♦ FCC KDB 662911 D01 Multiple Transmitter Output v02r01.
- ♦ 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

- a. 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: conduction emission (150 kHz to 30 MHz), radiation 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 (Y Plane for Ant. 1, X Plane for Ant. 2 and Ant. 1+2) were recorded in this report.

- b. AC power line Conducted Emission was tested under maximum output power.

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 modes are considering the modulation and worse data rates as below table.

Single Antenna

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

MIMO Antenna

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: WLAN (2.4GHz) Link + Bluetooth Link + USB Cable (Type C) + Adapter + GPS Rx + NFC On



<Ant. 1>

802.11b mode						
Power vs. Channel			Average Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
Duty Cycle (%)		98.56		98.73	98.36	97.01
CH 01	2412	13.21	CH 06	13.10	13.17	13.23
CH 06	2437	13.24				
CH 11	2462	13.20				

802.11b mode						
Power vs. Channel			Peak Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
CH 01	2412	15.86	CH 06	15.86	15.95	15.96
CH 06	2437	15.97				
CH 11	2462	15.85				

802.11g mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
Duty Cycle (%)		97.14		97.16	97.20	95.05	94.29	92.78	89.47	81.33
CH 01	2412	13.23	CH 01	13.18	13.20	13.22	11.91	11.98	11.54	11.16
CH 06	2437	13.14								
CH 11	2462	13.22								

802.11g mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
CH 01	2412	18.79	CH 01	18.65	18.61	18.60	18.68	18.75	18.71	18.74
CH 06	2437	18.54								
CH 11	2462	18.52								



802.11n HT20 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)		97.94		97.03	94.29	93.98	91.58	90.67	89.71	87.30
CH 01	2412	13.14	CH 01	13.09	13.13	11.95	11.91	11.45	10.71	7.49
CH 06	2437	13.02								
CH 11	2462	13.07								

802.11n HT20 mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	18.62	CH 01	18.50	18.61	18.61	18.61	18.61	18.60	18.61
CH 06	2437	18.45								
CH 11	2462	18.54								

802.11n HT40 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)		96.91		94.57	91.21	89.04	86.79	84.27	80.95	80.00
CH 03	2422	13.17	CH 03	11.44	11.60	10.47	10.38	9.88	8.98	6.83
CH 06	2437	13.05								
CH 09	2452	13.12								

802.11n HT40 mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	16.91	CH 03	16.68	16.81	16.75	16.90	16.75	16.70	16.70
CH 06	2437	16.78								
CH 09	2452	14.58								



<Ant. 2>

802.11b mode						
Power vs. Channel			Average Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
Duty Cycle (%)		98.56		98.73	98.36	96.99
CH 01	2412	12.40	CH 01	12.28	12.37	12.38
CH 06	2437	12.34				
CH 11	2462	12.37				

802.11b mode						
Power vs. Channel			Peak Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
CH 01	2412	15.15	CH 01	15.14	15.14	15.14
CH 06	2437	15.02				
CH 11	2462	15.14				

802.11g mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
Duty Cycle (%)		97.14		97.16	97.20	95.89	94.29	91.84	90.67	88.41
CH 01	2412	12.38	CH 01	12.24	12.17	12.23	11.01	10.92	10.51	9.78
CH 06	2437	12.27								
CH 11	2462	12.30								

802.11g mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
CH 01	2412	17.88	CH 01	17.70	17.74	17.70	17.70	17.75	17.75	17.74
CH 06	2437	17.33								
CH 11	2462	17.55								



802.11n HT20 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)		97.94		97.00	95.65	94.03	92.47	89.33	88.24	88.19
CH 01	2412	12.33	CH 01	12.11	12.09	10.88	10.90	10.97	9.75	7.00
CH 06	2437	12.15								
CH 11	2462	12.20								

802.11n HT20 mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	17.86	CH 01	17.80	17.76	17.74	17.81	17.81	17.74	17.85
CH 06	2437	17.33								
CH 11	2462	17.66								

802.11n HT40 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
Duty Cycle (%)		95.92		93.80	91.21	90.41	87.04	83.33	82.93	80.77
CH 03	2422	12.27	CH 03	10.64	10.81	9.49	9.15	8.97	8.14	6.45
CH 06	2437	12.03								
CH 09	2452	12.10								

802.11n HT40 mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	16.19	CH 03	16.07	16.18	16.15	16.07	16.05	16.10	16.16
CH 06	2437	15.74								
CH 09	2452	16.11								



MIMO<Ant. 1 + 2>

802.11b mode						
Power vs. Channel			Average Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
CH 01	2412	15.27	CH 01	15.22	15.26	15.26
CH 06	2437	15.16				
CH 11	2462	15.21				

802.11b mode						
Power vs. Channel			Peak Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)		
		1M		2M	5.5M	11M
CH 01	2412	18.04	CH 01	17.96	18.00	18.00
CH 06	2437	17.81				
CH 11	2462	17.90				

802.11g mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
CH 01	2412	15.35	CH 01	15.25	14.68	14.69	13.64	13.72	13.24	12.64
CH 06	2437	15.26								
CH 11	2462	15.33								

802.11g mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
CH 01	2412	20.64	CH 01	20.55	20.22	20.20	20.49	20.55	20.50	20.47
CH 06	2437	20.31								
CH 11	2462	20.59								



802.11n HT20 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	15.27	CH 10	14.63	14.62	13.89	13.67	13.38	12.73	9.51
CH 06	2437	15.07								
CH 11	2462	15.15								

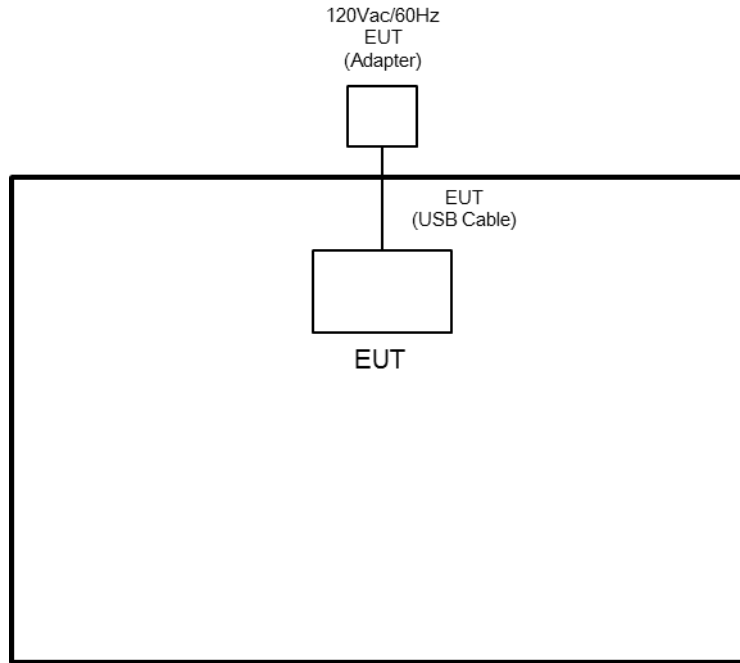
802.11n HT20 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	20.69	CH 10	20.15	20.16	20.67	20.66	20.65	20.63	20.68
CH 06	2437	20.48								
CH 11	2462	20.60								

802.11n HT40 mode										
Power vs. Channel			Average Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	15.08	CH 09	13.35	13.50	12.56	12.50	12.19	11.26	8.80
CH 06	2437	15.13								
CH 09	2452	15.19								

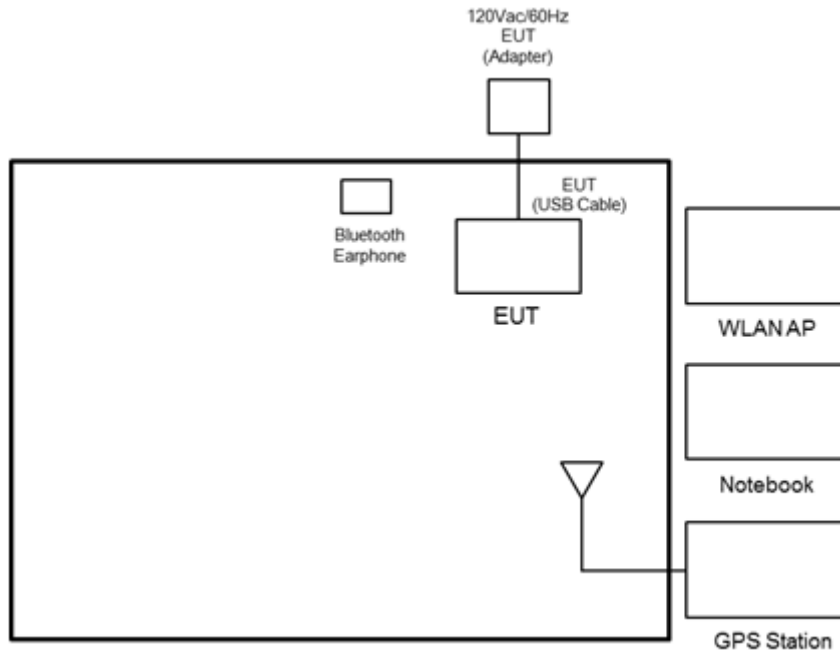
802.11n HT40 mode										
Power vs. Channel			Peak Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index	Channel	MCS Index						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	18.91	CH 09	18.98	19.06	19.20	19.14	19.18	19.18	19.10
CH 06	2437	18.84								
CH 09	2452	19.22								

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.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
2.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
3.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
4.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.5 EUT Operation Test Setup

The RF test items, utility “DRTU” was installed in Notebook which was programmed in order to make the EUT get into the engineering modes to provide channel selection, power level, data rate and the application type and for continuous transmitting signals.

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 4.2 dB and 10dB attenuator.

Offset(dB) = RF cable loss(dB) + attenuator factor(dB).

= 4.2 + 10 = 14.2 (dB)

3 Test Result

3.1 6dB and 99% Bandwidth Measurement

3.1.1 Limit of 6dB and 99% Bandwidth

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

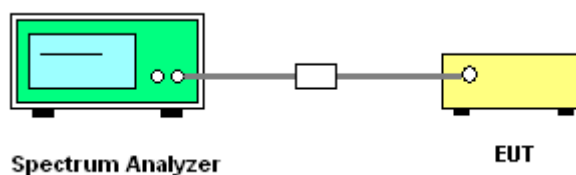
3.1.2 Measuring Instruments

See list of measuring equipment 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. For 99% Bandwidth Measurement, the spectrum analyzer's resolution bandwidth (RBW) is set 1-5% of the emission bandwidth and set the Video bandwidth (VBW) $\geq 3 * RBW$.
6. Measure and record the results in the test report.

3.1.4 Test Setup

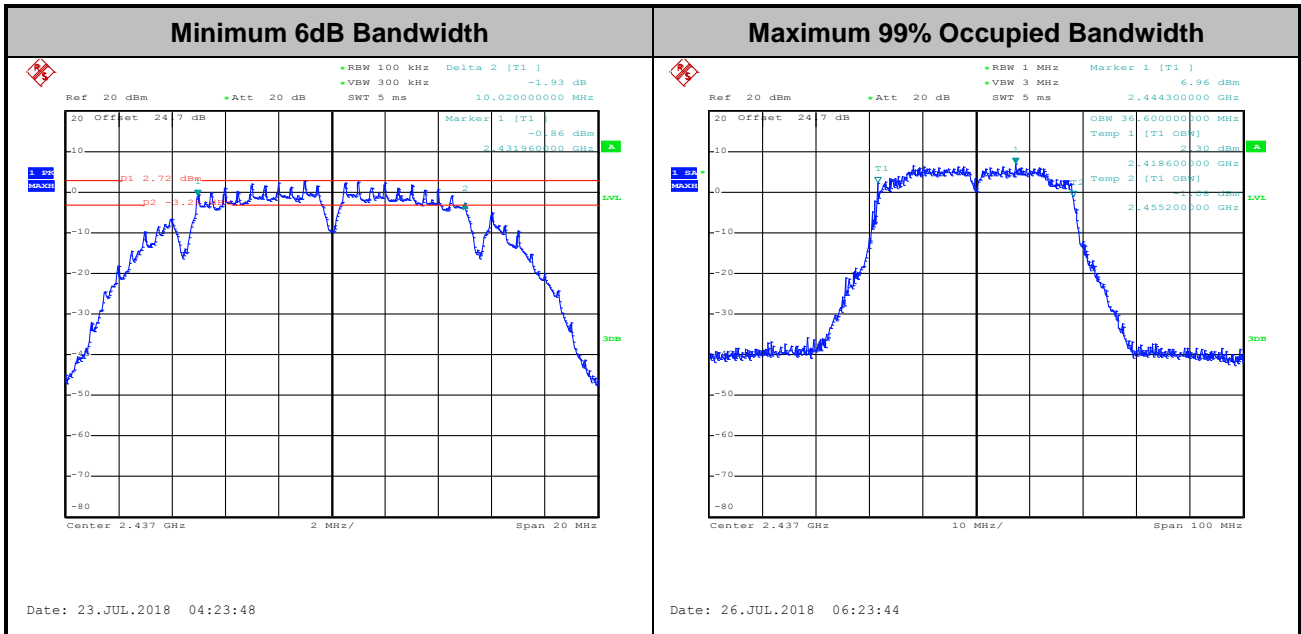




3.1.5 Test Result of 6dB and 99% Occupied Bandwidth

Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu	Temperature :	21~25°C
		Relative Humidity :	51~54%

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)		6dB BW (MHz)		6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 2	Ant 1	Ant 2		
11b	1Mbps	1	1	2412	13.65	13.60	10.08	10.08	0.50	Pass
11b	1Mbps	1	6	2437	13.85	14.10	10.08	10.08	0.50	Pass
11b	1Mbps	1	11	2462	14.80	13.55	10.04	10.08	0.50	Pass
11g	6Mbps	1	1	2412	16.60	16.65	15.24	15.11	0.50	Pass
11g	6Mbps	1	6	2437	16.70	16.70	15.28	15.08	0.50	Pass
11g	6Mbps	1	11	2462	16.60	16.50	15.04	15.42	0.50	Pass
HT20	MCS0	1	1	2412	17.85	17.80	15.12	15.92	0.50	Pass
HT20	MCS0	1	6	2437	17.80	17.85	15.28	15.04	0.50	Pass
HT20	MCS0	1	11	2462	17.70	17.70	15.06	15.28	0.50	Pass
HT40	MCS0	1	3	2422	36.30	36.20	33.84	32.59	0.50	Pass
HT40	MCS0	1	6	2437	36.40	36.60	35.00	35.12	0.50	Pass
HT40	MCS0	1	9	2452	36.20	36.20	35.10	33.90	0.50	Pass
11b	1Mbps	2	1	2412	13.60	13.60	11.04	10.08	0.50	Pass
11b	1Mbps	2	6	2437	13.75	13.65	10.02	10.04	0.50	Pass
11b	1Mbps	2	11	2462	13.50	13.55	10.08	10.08	0.50	Pass
11g	6Mbps	2	1	2412	16.65	16.65	15.32	15.04	0.50	Pass
11g	6Mbps	2	6	2437	16.65	16.70	15.12	15.12	0.50	Pass
11g	6Mbps	2	11	2462	16.55	16.60	15.31	15.13	0.50	Pass
HT20	MCS0	2	1	2412	17.80	17.75	15.88	15.08	0.50	Pass
HT20	MCS0	2	6	2437	17.85	17.80	15.08	15.52	0.50	Pass
HT20	MCS0	2	11	2462	17.70	17.75	15.13	13.88	0.50	Pass
HT40	MCS0	2	3	2422	36.30	36.20	33.84	32.56	0.50	Pass
HT40	MCS0	2	6	2437	36.40	36.30	35.04	35.08	0.50	Pass
HT40	MCS0	2	9	2452	36.20	36.30	33.78	33.80	0.50	Pass



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 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.

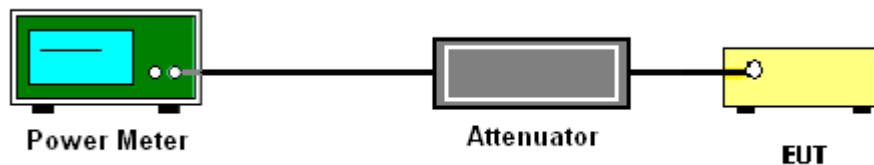
3.2.2 Measuring Instruments

See list of measuring equipment of this test report.

3.2.3 Test Procedures

1. For Peak Power, the testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.1.3 PKPM1 Peak power meter method.
2. For Average Power, the testing follows the Measurement Procedure of FCC KDB No. 558074 DTS D01 Meas. Guidance v04 section 9.2.3.1 Method AVGPM.
3. 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.
4. Set to the maximum power setting and enable the EUT transmit continuously.
5. Measure the conducted output power and record the results in the test report.
6. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

3.2.4 Test Setup





3.2.5 Test Result of Peak Output Power (Reporting Only)

Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu	Temperature :	21~25°C
		Relative Humidity :	51~54%

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)	
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2
11b	1Mbps	1	1	2412	15.86	15.15	-	30.00	30.00	2.70	0.90	18.56	16.05	36.00	36.00
11b	1Mbps	1	6	2437	15.97	15.02	-	30.00	30.00	2.70	0.90	18.67	15.92	36.00	36.00
11b	1Mbps	1	11	2462	15.85	15.14	-	30.00	30.00	2.70	0.90	18.55	16.04	36.00	36.00
11g	6Mbps	1	1	2412	18.79	17.88	-	30.00	30.00	2.70	0.90	21.49	18.78	36.00	36.00
11g	6Mbps	1	6	2437	18.54	17.33	-	30.00	30.00	2.70	0.90	21.24	18.23	36.00	36.00
11g	6Mbps	1	11	2462	18.52	17.55	-	30.00	30.00	2.70	0.90	21.22	18.45	36.00	36.00
HT20	MCS0	1	1	2412	18.62	17.86	-	30.00	30.00	2.70	0.90	21.32	18.76	36.00	36.00
HT20	MCS0	1	6	2437	18.45	17.33	-	30.00	30.00	2.70	0.90	21.15	18.23	36.00	36.00
HT20	MCS0	1	11	2462	18.54	17.66	-	30.00	30.00	2.70	0.90	21.24	18.56	36.00	36.00
HT40	MCS0	1	3	2422	16.91	16.19	-	30.00	30.00	2.70	0.90	19.61	17.09	36.00	36.00
HT40	MCS0	1	6	2437	16.78	15.74	-	30.00	30.00	2.70	0.90	19.48	16.64	36.00	36.00
HT40	MCS0	1	9	2452	14.58	16.11	-	30.00	30.00	2.70	0.90	17.28	17.01	36.00	36.00
11b	1Mbps	2	1	2412	15.06	14.94	18.01	30.00	30.00	2.70	0.90	20.71	18.01	36.00	36.00
11b	1Mbps	2	6	2437	14.72	14.88	17.81	30.00	30.00	2.70	0.90	20.51	17.81	36.00	36.00
11b	1Mbps	2	11	2462	14.83	15.00	17.93	30.00	30.00	2.70	0.90	20.63	17.93	36.00	36.00
11g	6Mbps	2	1	2412	17.54	17.72	20.64	30.00	30.00	2.70	0.90	23.34	20.64	36.00	36.00
11g	6Mbps	2	6	2437	17.33	17.26	20.31	30.00	30.00	2.70	0.90	23.01	20.31	36.00	36.00
11g	6Mbps	2	11	2462	17.51	17.64	20.59	30.00	30.00	2.70	0.90	23.29	20.59	36.00	36.00
HT20	MCS0	2	1	2412	17.50	17.85	20.69	30.00	30.00	2.70	0.90	23.39	20.69	36.00	36.00
HT20	MCS0	2	6	2437	17.39	17.54	20.48	30.00	30.00	2.70	0.90	23.18	20.48	36.00	36.00
HT20	MCS0	2	11	2462	17.58	17.60	20.60	30.00	30.00	2.70	0.90	23.30	20.60	36.00	36.00
HT40	MCS0	2	3	2422	15.75	16.04	18.91	30.00	30.00	2.70	0.90	21.61	18.91	36.00	36.00
HT40	MCS0	2	6	2437	15.66	16.00	18.84	30.00	30.00	2.70	0.90	21.54	18.84	36.00	36.00
HT40	MCS0	2	9	2452	16.06	16.36	19.22	30.00	30.00	2.70	0.90	21.92	19.22	36.00	36.00



3.2.6 Test Result of Average output Power

Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu	Temperature :	21~25°C
		Relative Humidity :	51~54%

2.4GHz Band									
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.06	0.06	13.21	12.40	
11b	1Mbps	1	6	2437	0.06	0.06	13.24	12.34	
11b	1Mbps	1	11	2462	0.06	0.06	13.20	12.37	
11g	6Mbps	1	1	2412	0.13	0.13	13.23	12.38	
11g	6Mbps	1	6	2437	0.13	0.13	13.14	12.27	
11g	6Mbps	1	11	2462	0.13	0.13	13.22	12.30	
HT20	MCS0	1	1	2412	0.09	0.09	13.14	12.33	
HT20	MCS0	1	6	2437	0.09	0.09	13.02	12.15	
HT20	MCS0	1	11	2462	0.09	0.09	13.07	12.20	
HT40	MCS0	1	3	2422	0.14	0.18	13.17	12.27	
HT40	MCS0	1	6	2437	0.14	0.18	13.05	12.03	
HT40	MCS0	1	9	2452	0.14	0.18	13.12	12.10	
11b	1Mbps	2	1	2412	0.04	0.06	12.18	12.34	15.27
11b	1Mbps	2	6	2437	0.04	0.06	12.02	12.27	15.16
11b	1Mbps	2	11	2462	0.04	0.06	12.10	12.30	15.21
11g	6Mbps	2	1	2412	0.13	0.13	12.32	12.36	15.33
11g	6Mbps	2	6	2437	0.13	0.13	12.24	12.26	15.26
11g	6Mbps	2	11	2462	0.13	0.13	12.29	12.34	15.35
HT20	MCS0	2	1	2412	0.09	0.14	12.12	12.39	15.27
HT20	MCS0	2	6	2437	0.09	0.14	12.02	12.09	15.07
HT20	MCS0	2	11	2462	0.09	0.14	12.10	12.18	15.15
HT40	MCS0	2	3	2422	0.18	0.18	11.92	12.21	15.08
HT40	MCS0	2	6	2437	0.18	0.18	11.98	12.25	15.13
HT40	MCS0	2	9	2452	0.18	0.18	12.03	12.33	15.19



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

See list of measuring equipment 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.
7. For MIMO mode, calculation method follows FCC KDB 662911 D01 Multiple Transmitter Output v02r01.

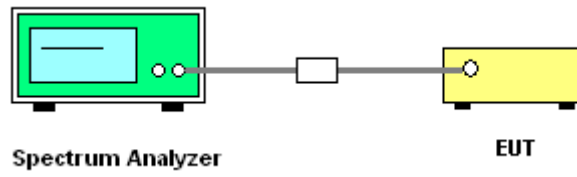
If measurements performed using method (2) plus $10 \log(N)$ exceeds the emission limit, the test should choose method (1) before declaring that the device fails the emission limit.

Method (1): Measure and sum the spectra across the outputs.

The total final Power Spectral Density is from a device with 2 transmitter outputs. The spectrum measurements of the individual outputs are all performed with the same span and number of points, the spectrum value in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 to obtain the value for the first frequency bin of the summed spectrum.

Method (2): Measure and add $10 \log(N)$ dB, where N is the number of outputs. (N=2)

3.3.4 Test Setup

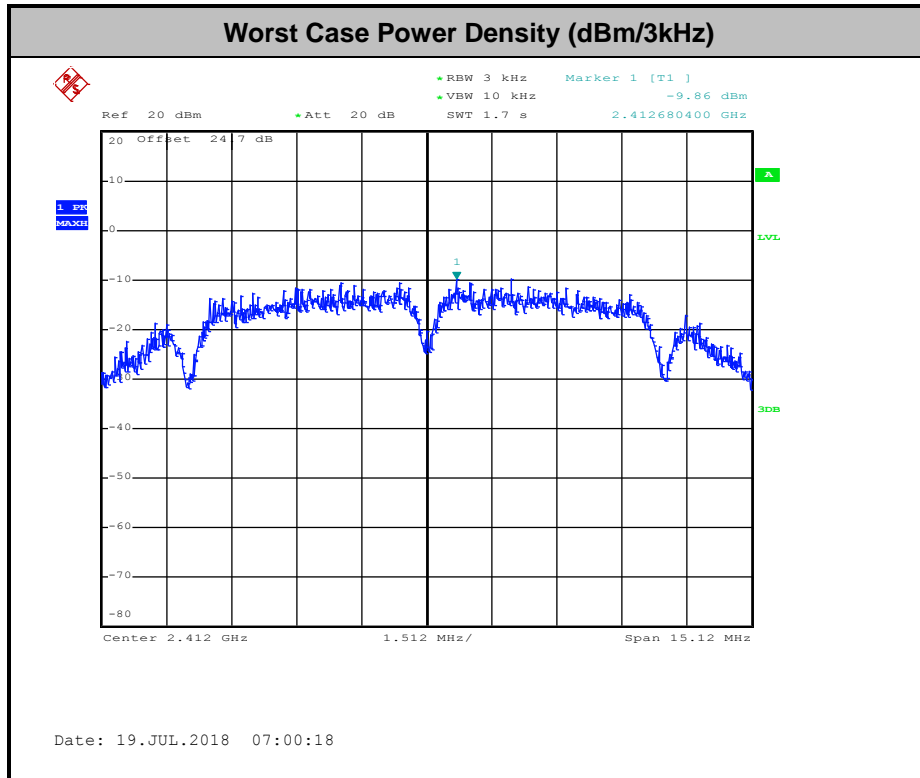




3.3.5 Test Result of Power Spectral Density

Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu	Temperature :	21~25°C
		Relative Humidity :	51~54%

2.4GHz Band												
Mod.	Data Rate	NTx	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	-9.86	-10.64	-	2.70	0.90	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-10.07	-10.54	-	2.70	0.90	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-10.28	-11.21	-	2.70	0.90	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-11.76	-13.00	-	2.70	0.90	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-12.24	-13.11	-	2.70	0.90	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-10.99	-12.13	-	2.70	0.90	8.00	8.00	Pass
HT20	MCS0	1	1	2412	-12.38	-13.23	-	2.70	0.90	8.00	8.00	Pass
HT20	MCS0	1	6	2437	-12.77	-13.08	-	2.70	0.90	8.00	8.00	Pass
HT20	MCS0	1	11	2462	-12.07	-13.00	-	2.70	0.90	8.00	8.00	Pass
HT40	MCS0	1	3	2422	-14.46	-16.17	-	2.70	0.90	8.00	8.00	Pass
HT40	MCS0	1	6	2437	-16.24	-16.42	-	2.70	0.90	8.00	8.00	Pass
HT40	MCS0	1	9	2452	-15.74	-16.08	-	2.70	0.90	8.00	8.00	Pass
11b	1Mbps	2	1	2412	-11.87	-10.43	-7.42	4.86		8.00		Pass
11b	1Mbps	2	6	2437	-11.26	-10.40	-7.39	4.86		8.00		Pass
11b	1Mbps	2	11	2462	-11.84	-10.33	-7.32	4.86		8.00		Pass
11g	6Mbps	2	1	2412	-12.81	-12.84	-9.80	4.86		8.00		Pass
11g	6Mbps	2	6	2437	-13.21	-12.07	-9.06	4.86		8.00		Pass
11g	6Mbps	2	11	2462	-12.33	-13.49	-9.32	4.86		8.00		Pass
HT20	MCS0	2	1	2412	-13.07	-12.31	-9.30	4.86		8.00		Pass
HT20	MCS0	2	6	2437	-12.87	-13.01	-9.86	4.86		8.00		Pass
HT20	MCS0	2	11	2462	-13.33	-13.35	-10.32	4.86		8.00		Pass
HT40	MCS0	2	3	2422	-16.06	-15.76	-12.75	4.86		8.00		Pass
HT40	MCS0	2	6	2437	-16.97	-16.90	-13.89	4.86		8.00		Pass
HT40	MCS0	2	9	2452	-15.08	-16.15	-12.07	4.86		8.00		Pass



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.

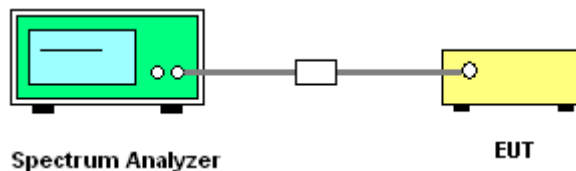
3.4.2 Measuring Instruments

See list of measuring equipment 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 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

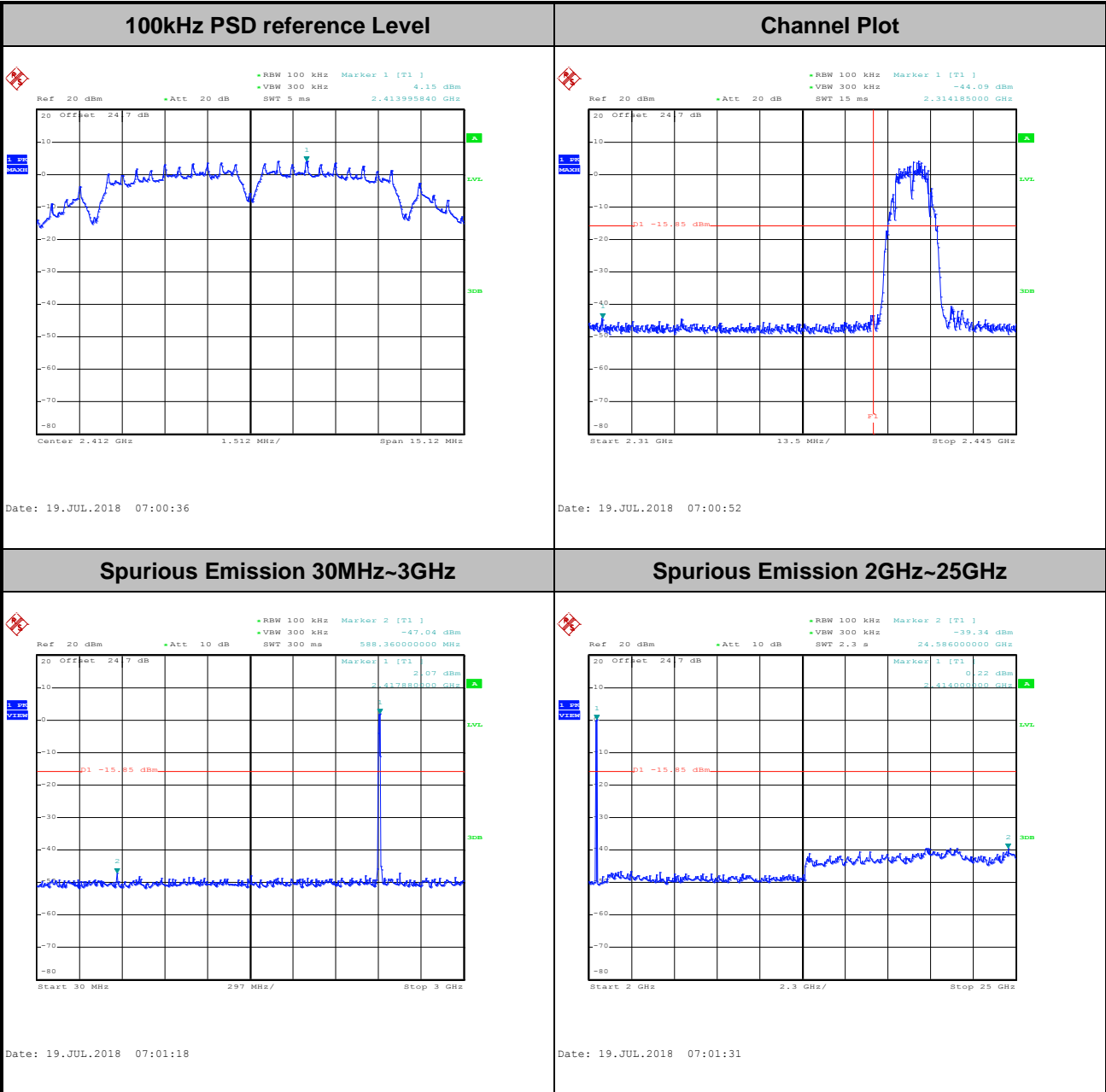




3.4.5 Test Result of Conducted Band Edges and Spurious Emission

Number of TX = 1, Ant. 1 (Measured)

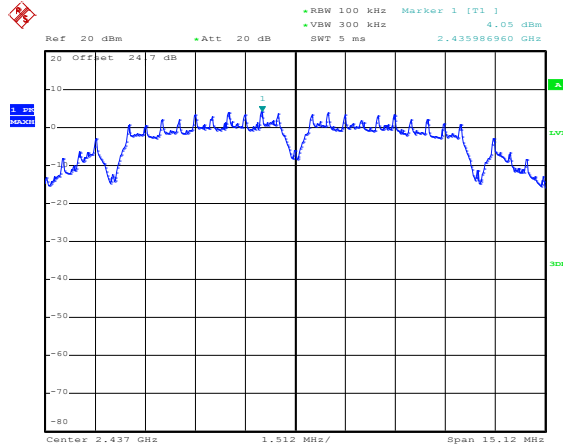
Number of TX	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





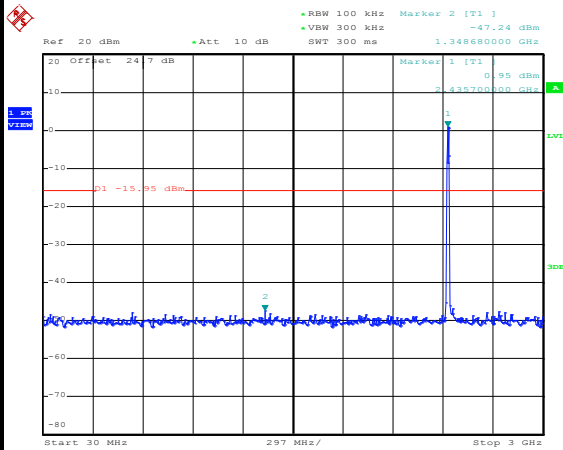
Number of TX	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



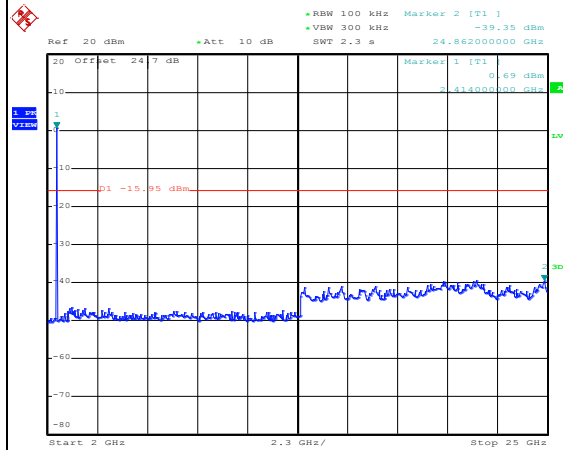
Date: 19.JUL.2018 07:05:20

Spurious Emission 30MHz~3GHz



Date: 19.JUL.2018 07:07:28

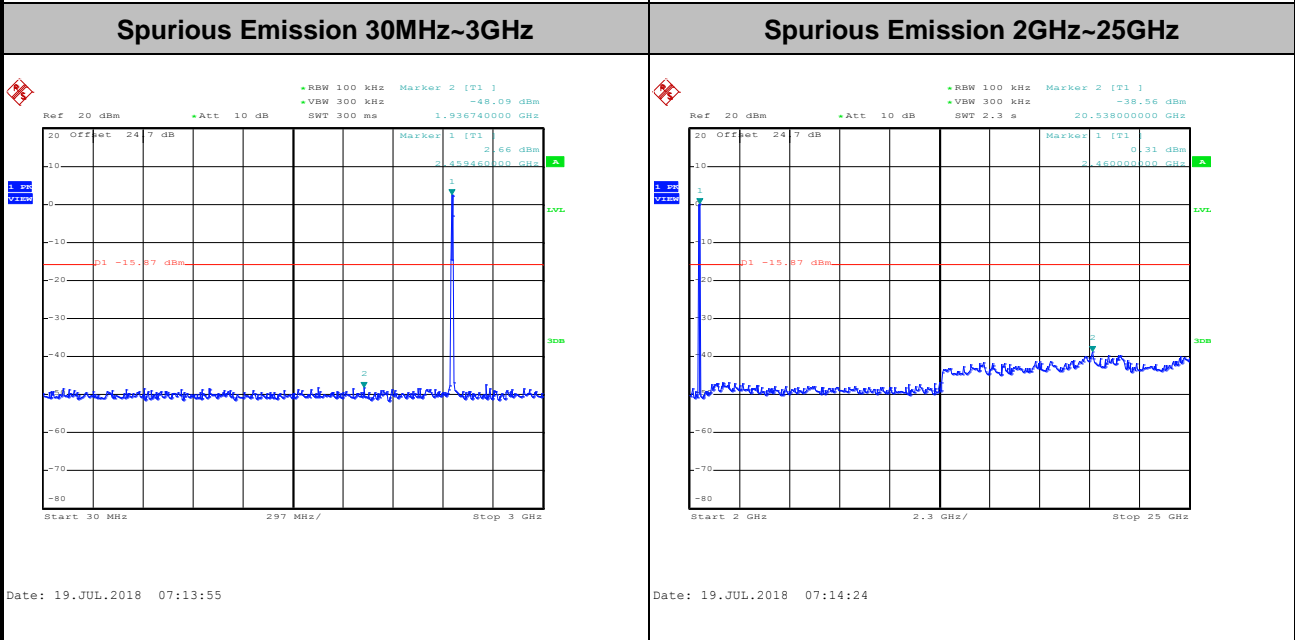
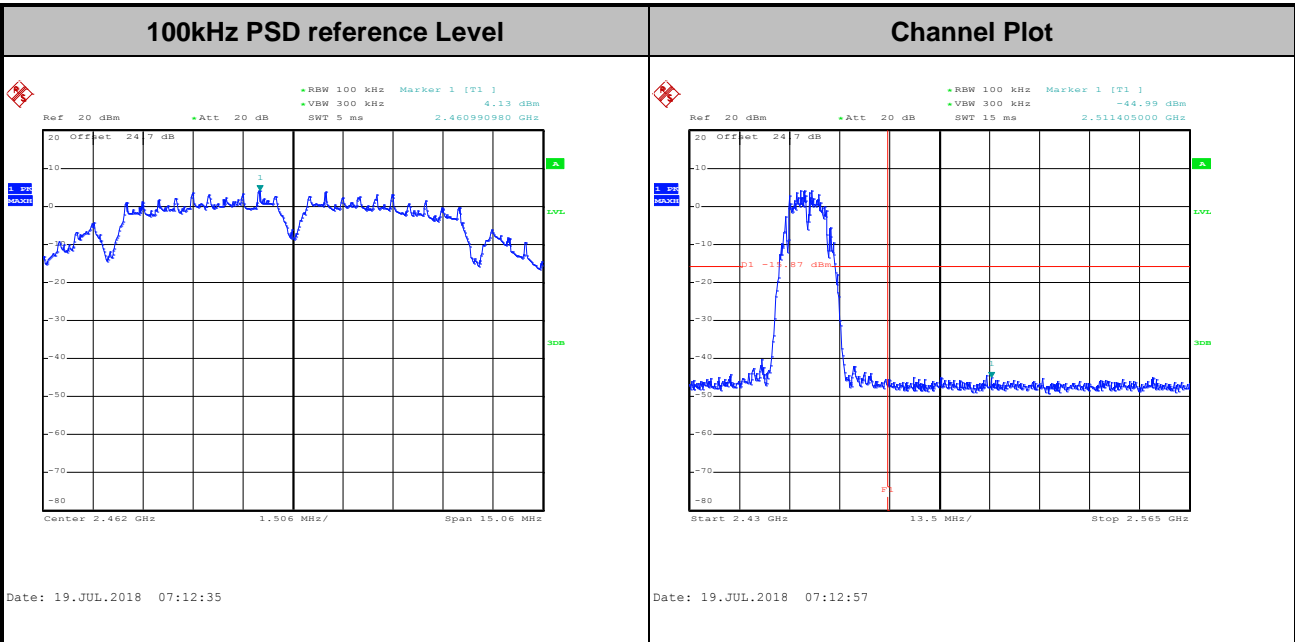
Spurious Emission 2GHz~25GHz



Date: 19.JUL.2018 07:08:14

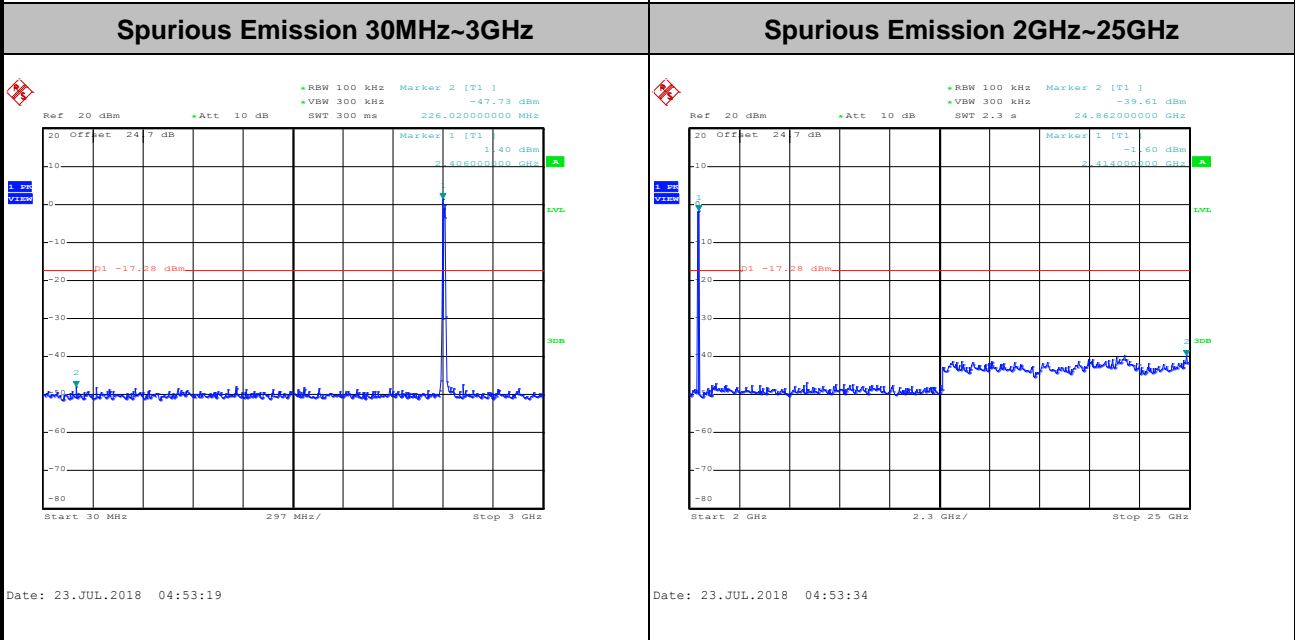
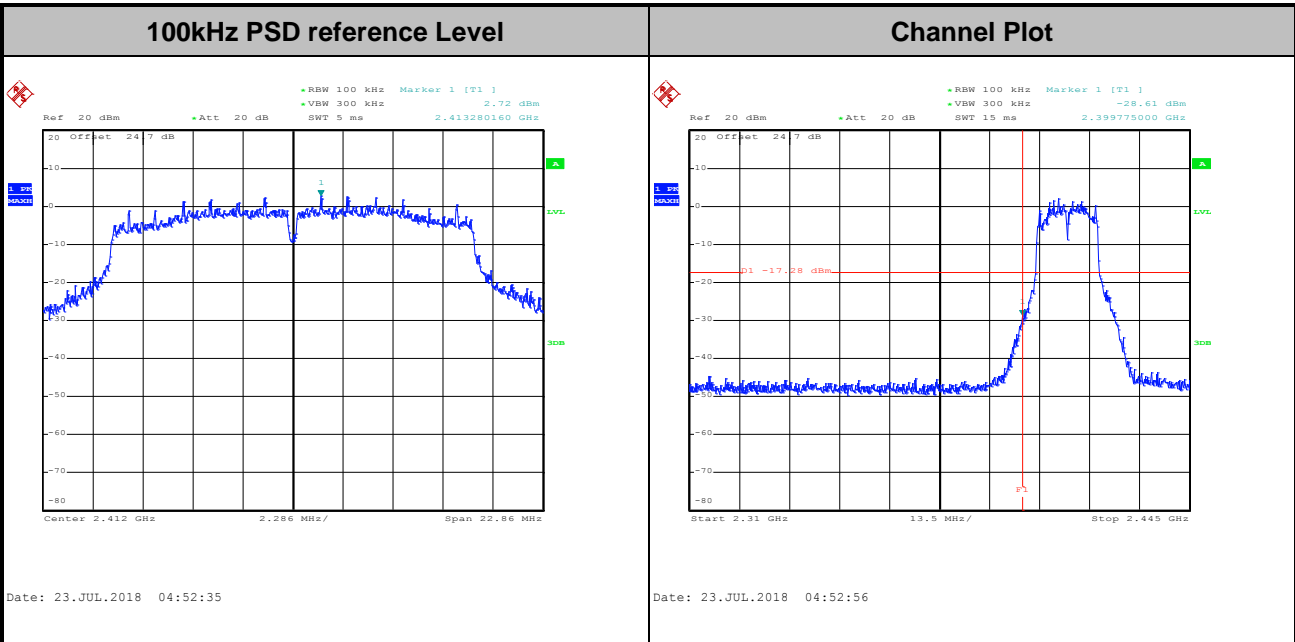


Number of TX	1	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





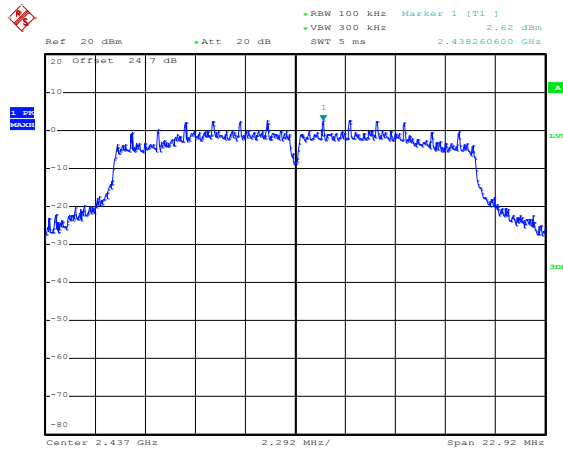
Number of TX	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





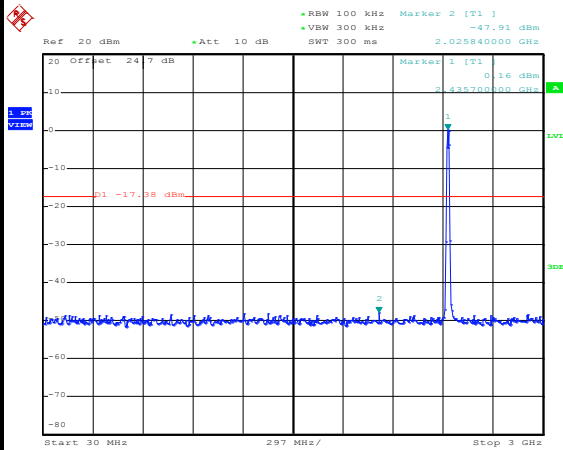
Number of TX	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



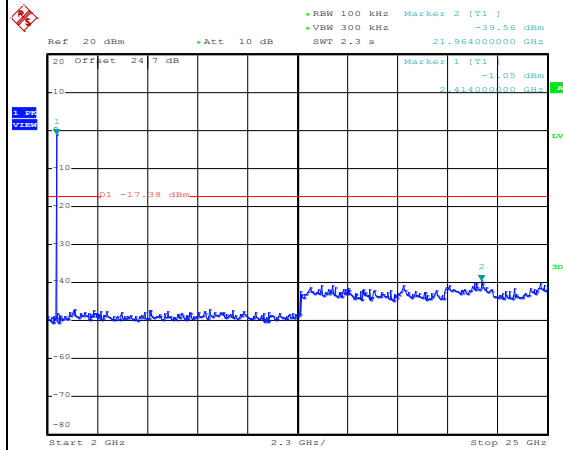
Date: 23.JUL.2018 04:57:39

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 04:57:59

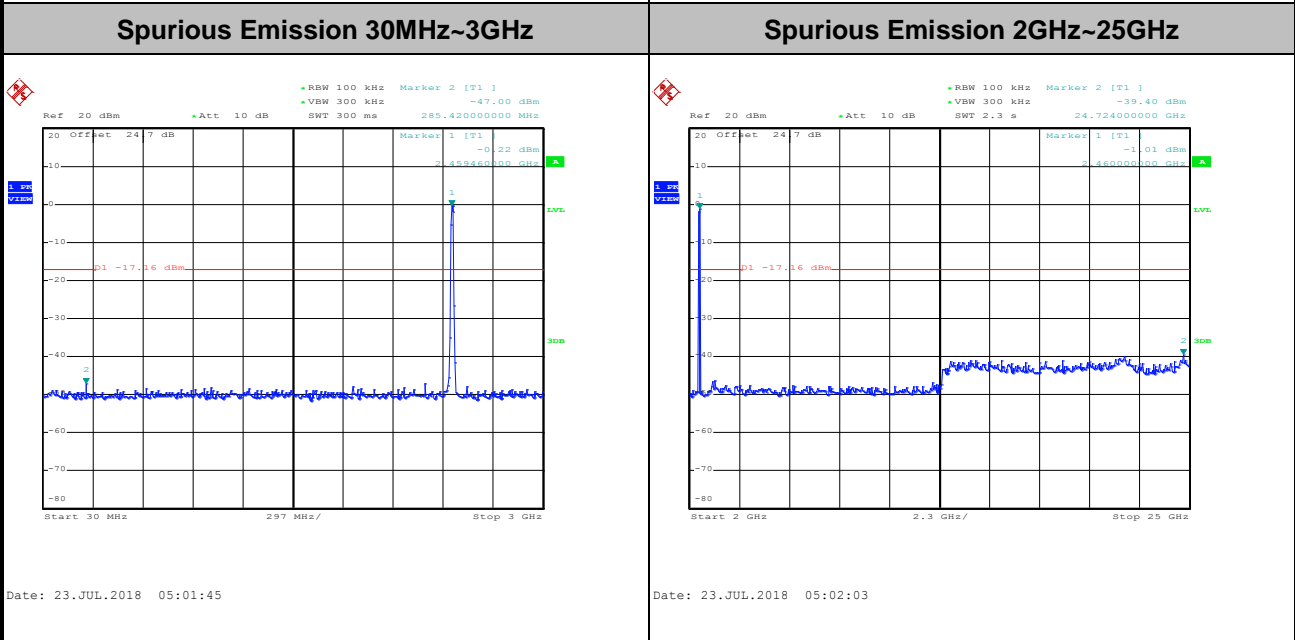
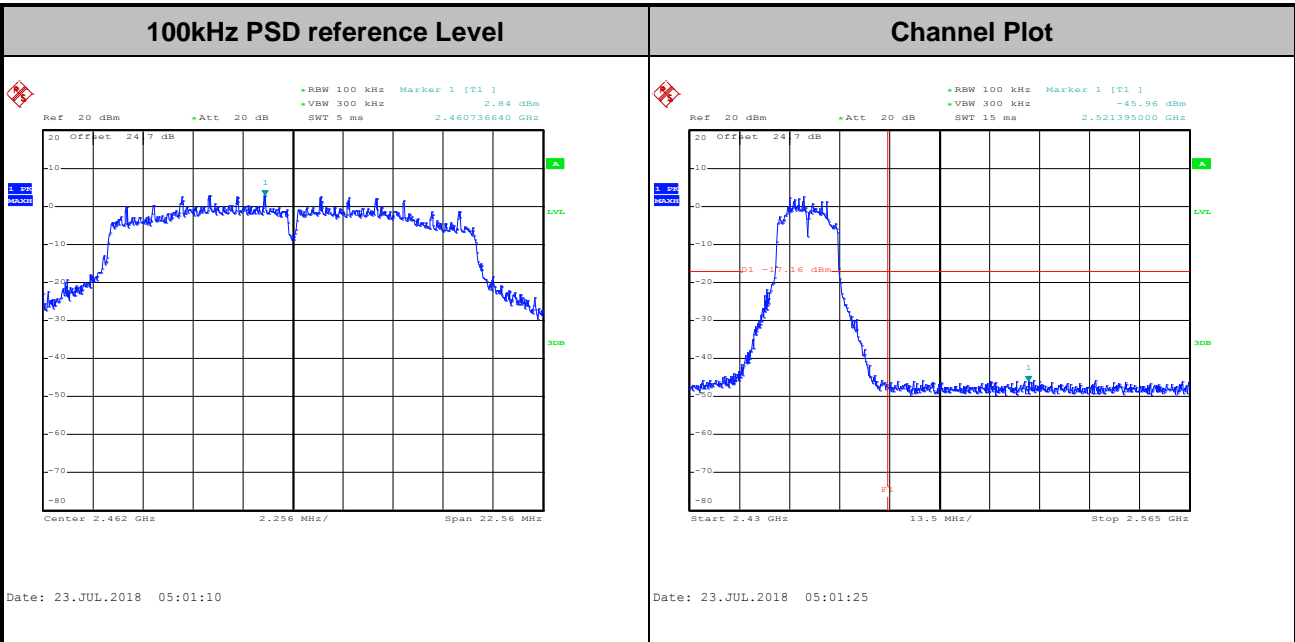
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 04:58:14

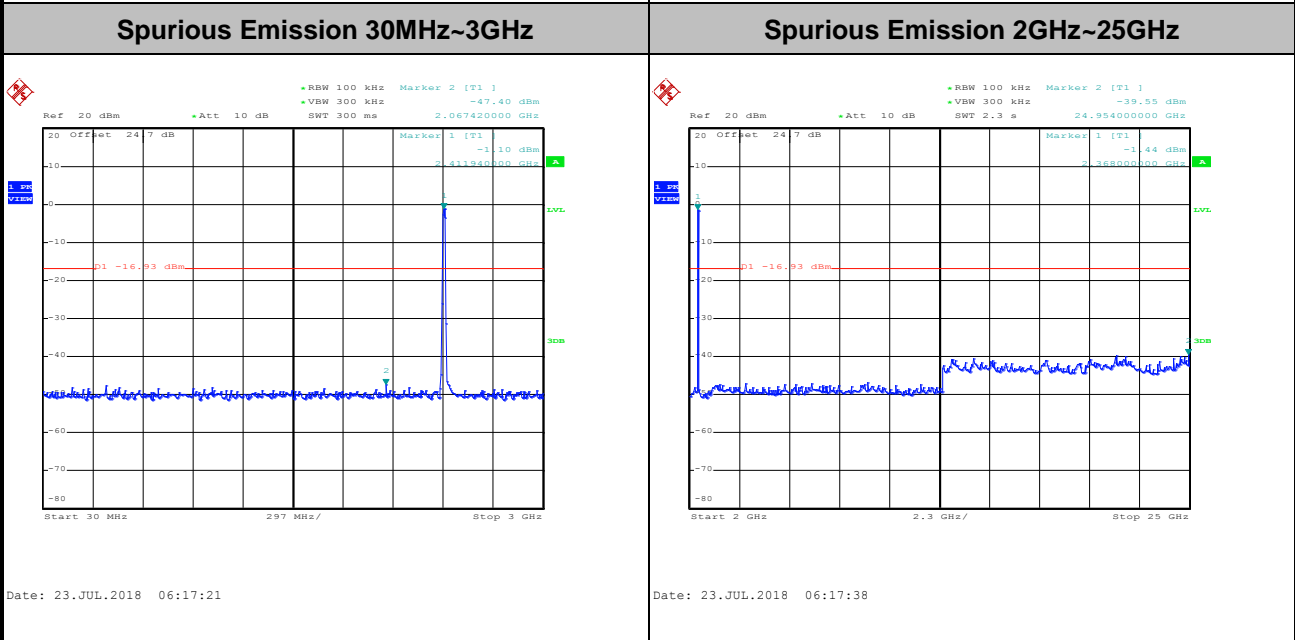
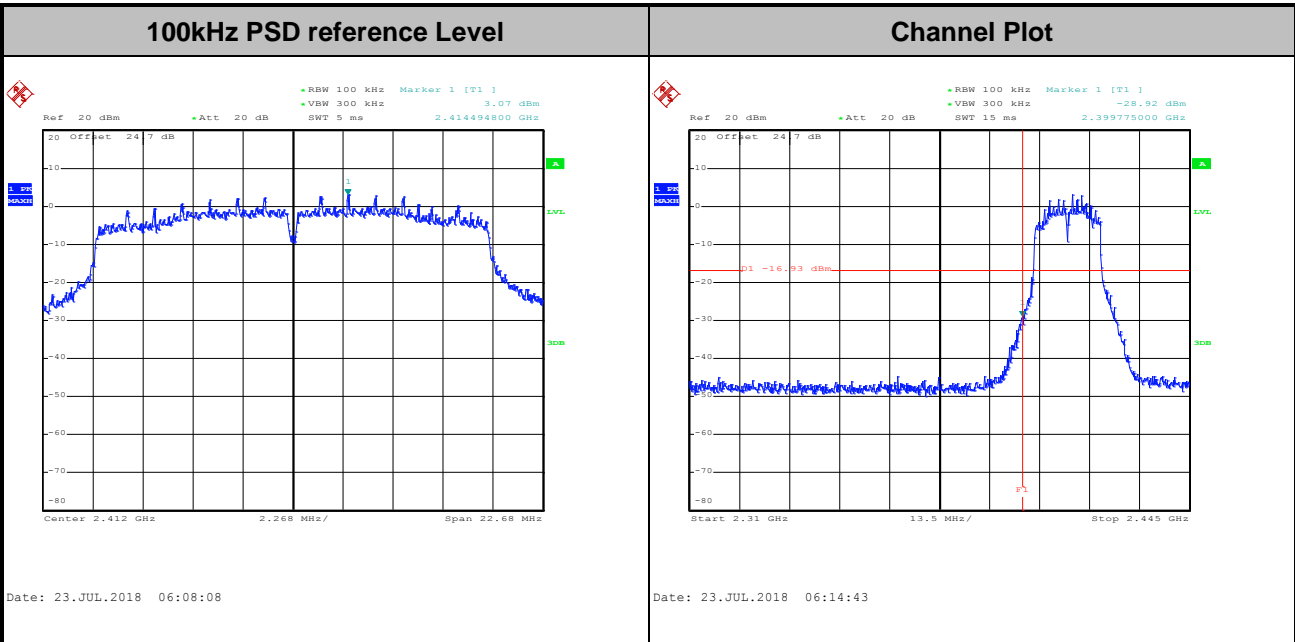


Number of TX	1	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



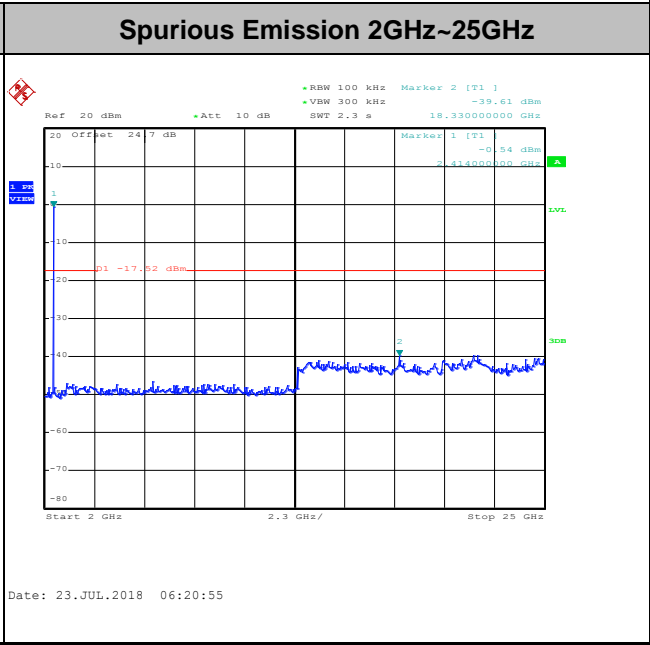
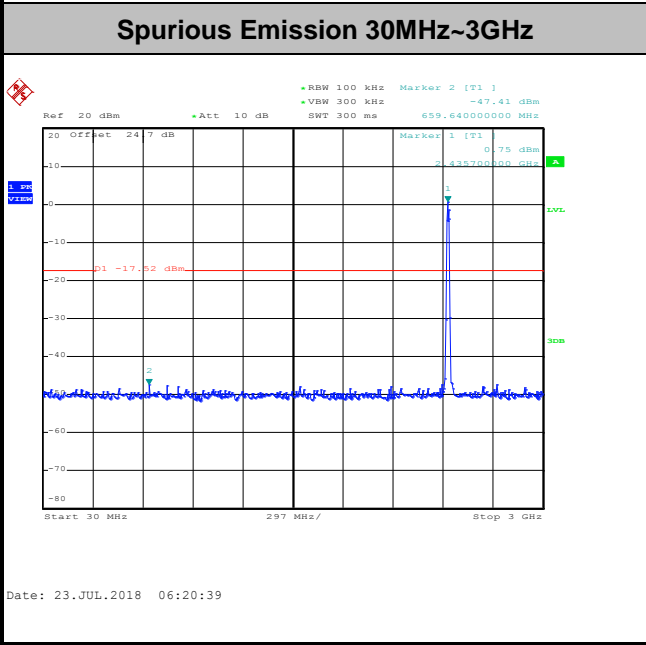
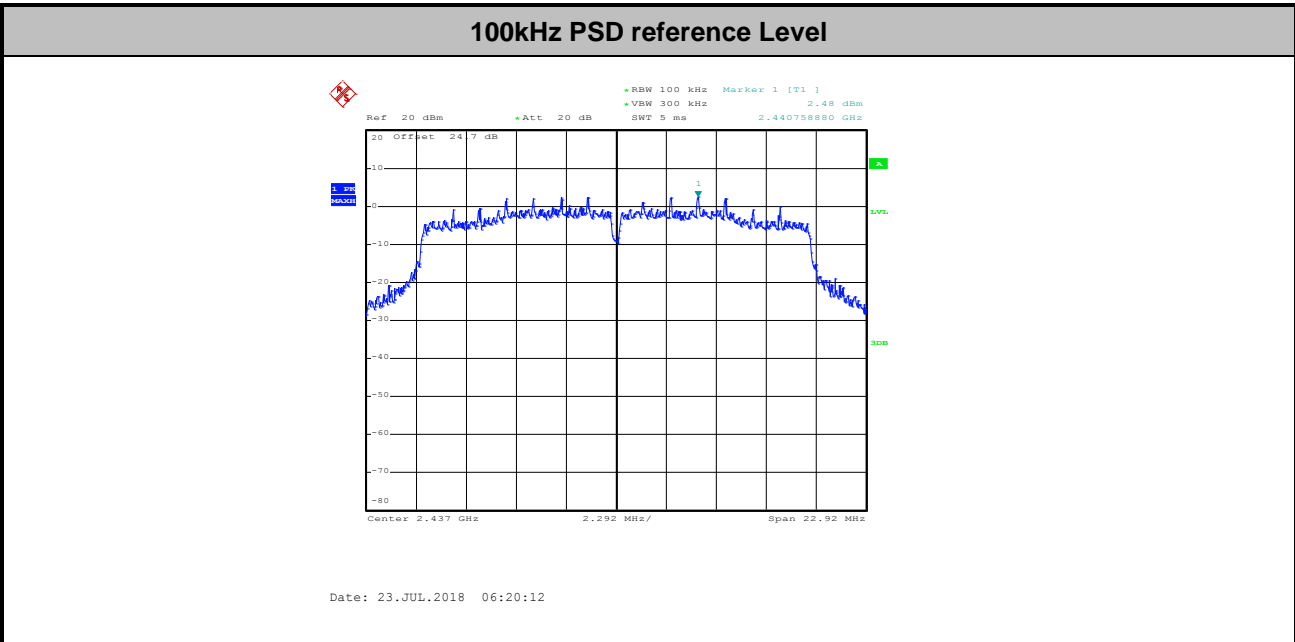


Number of TX	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



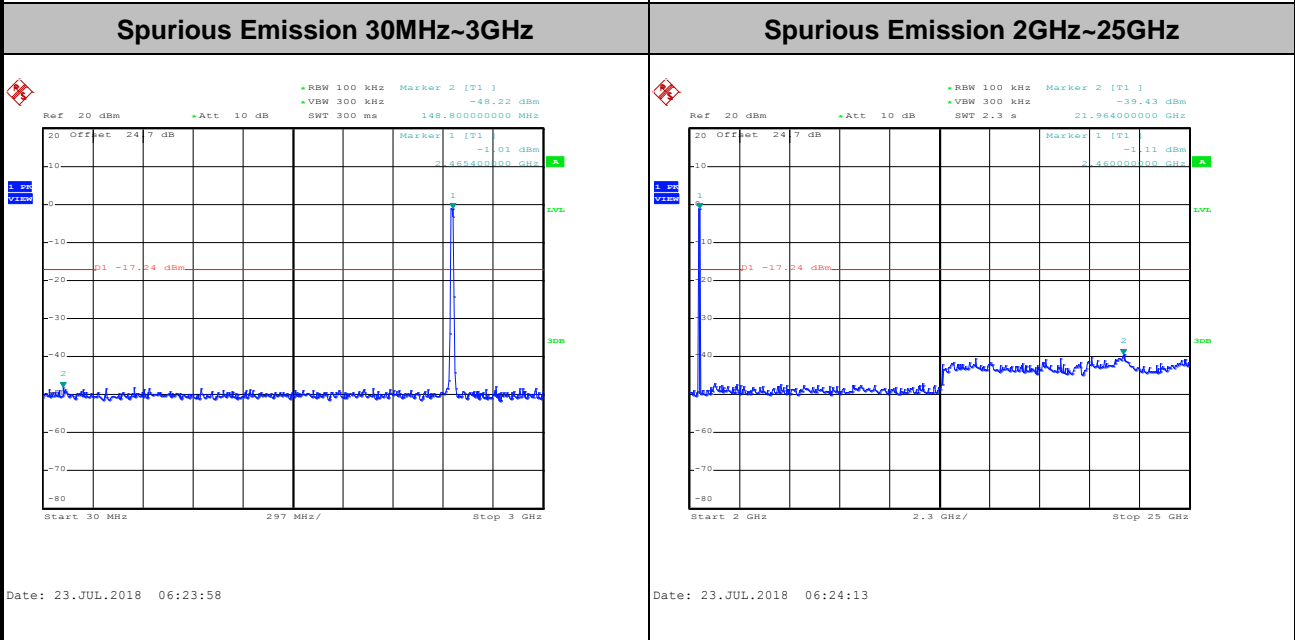
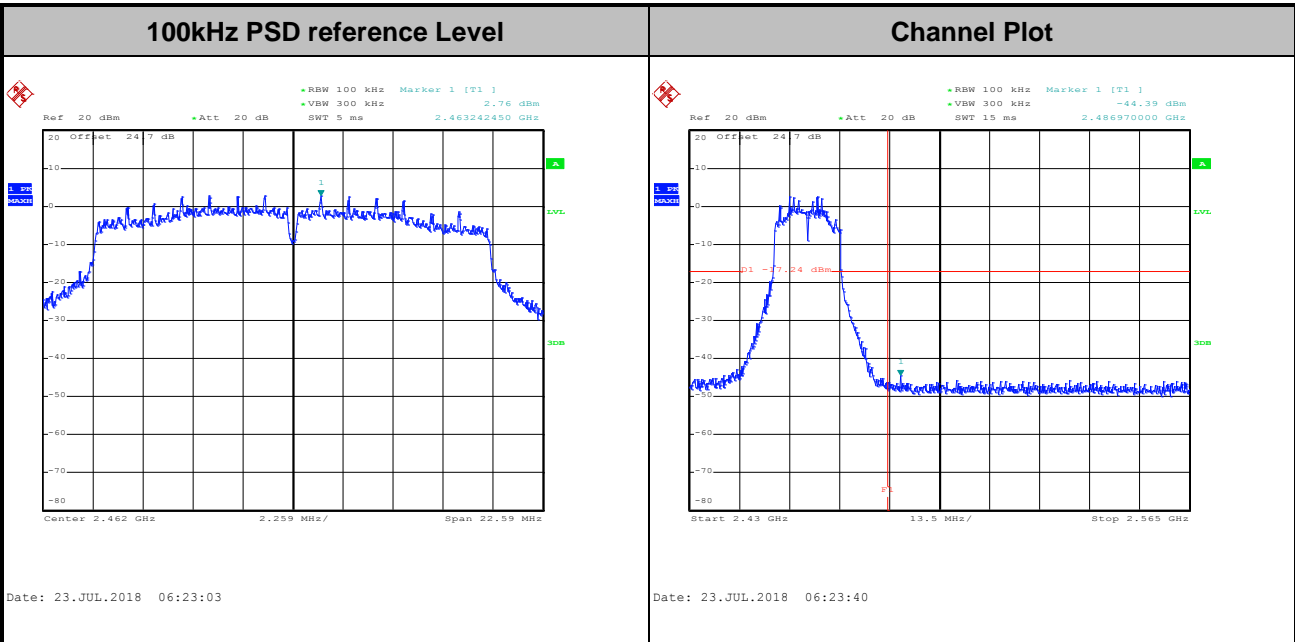


Number of TX	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



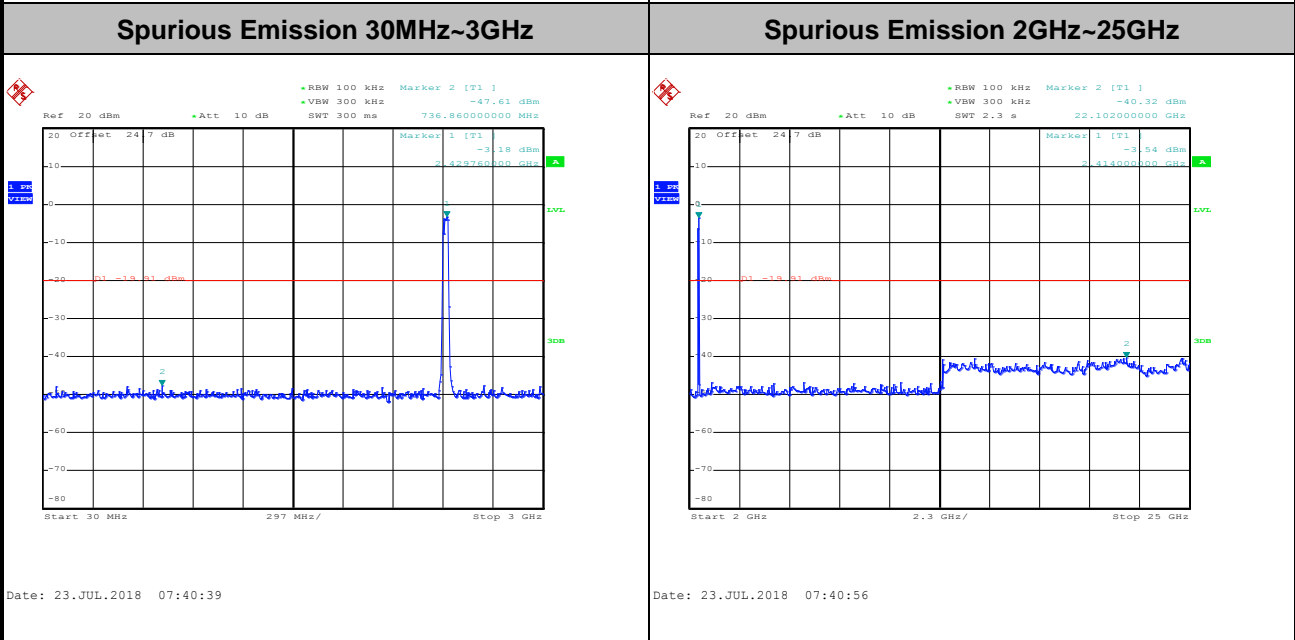
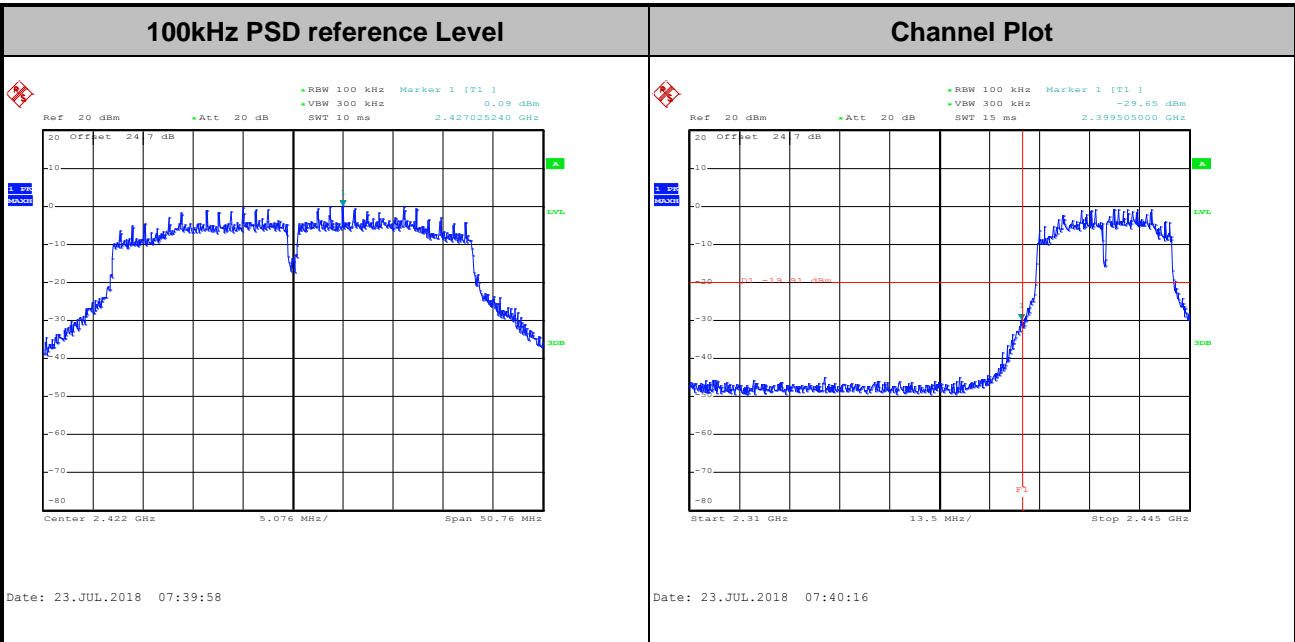


Number of TX	1	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





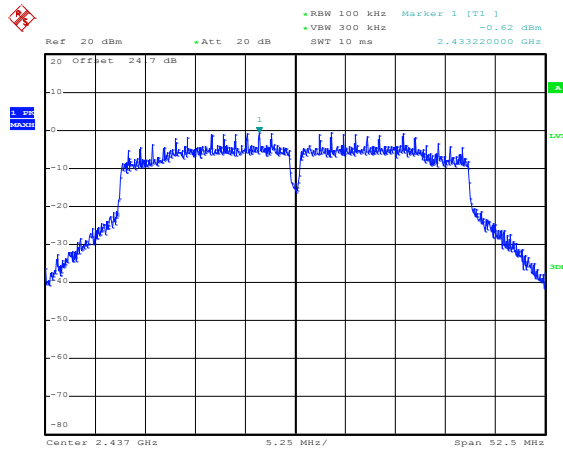
Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	03	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





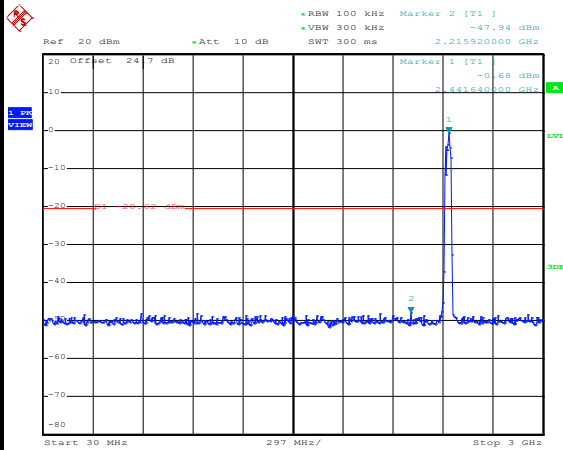
Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



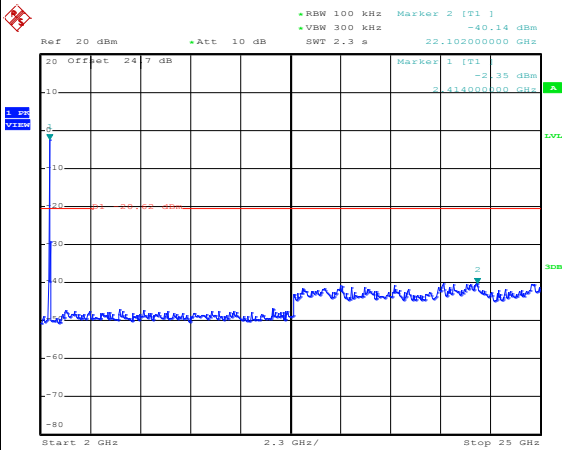
Date: 23.JUL.2018 07:43:04

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 07:43:39

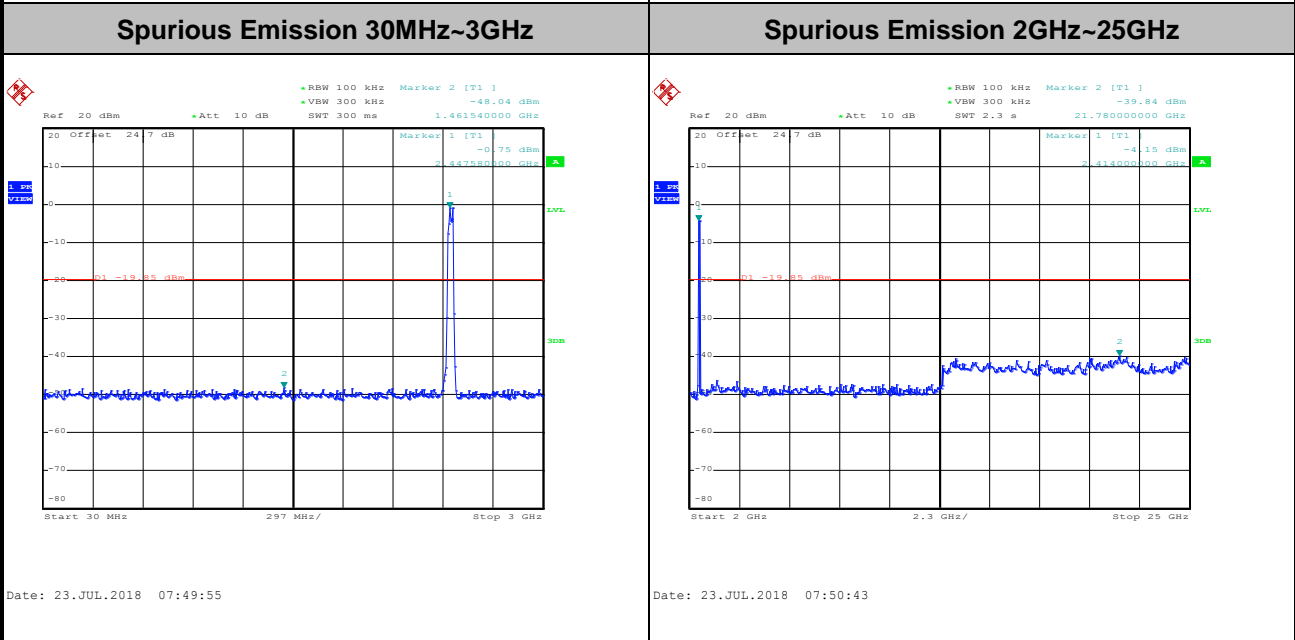
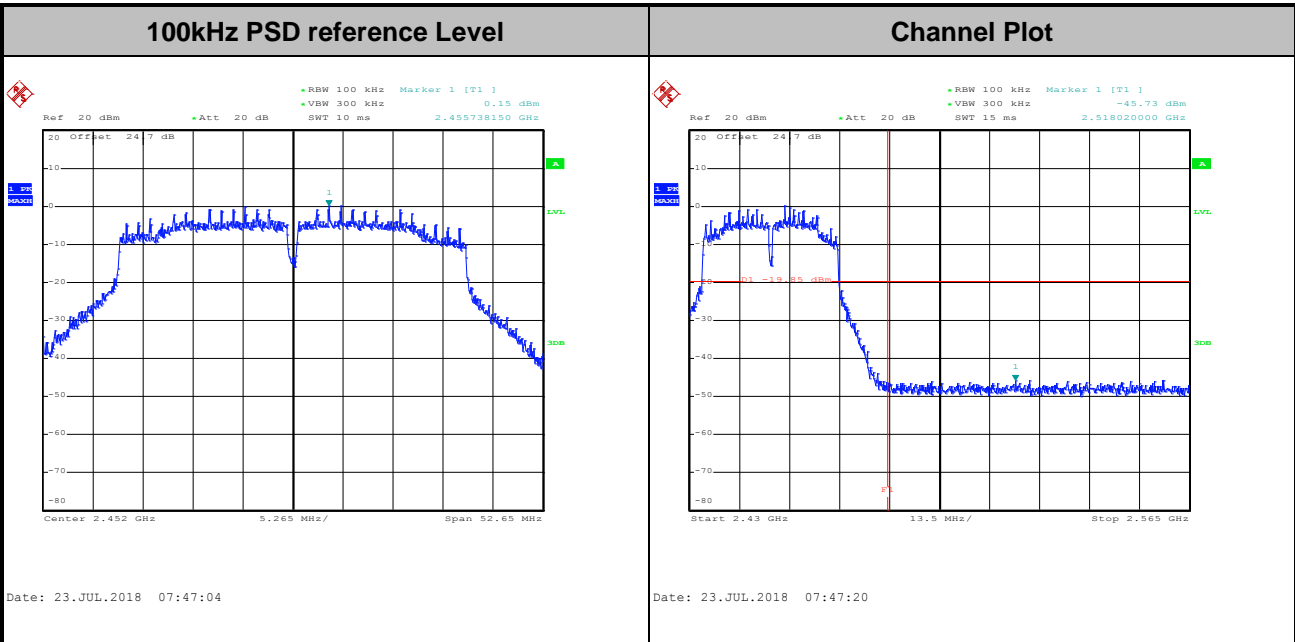
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 07:43:55



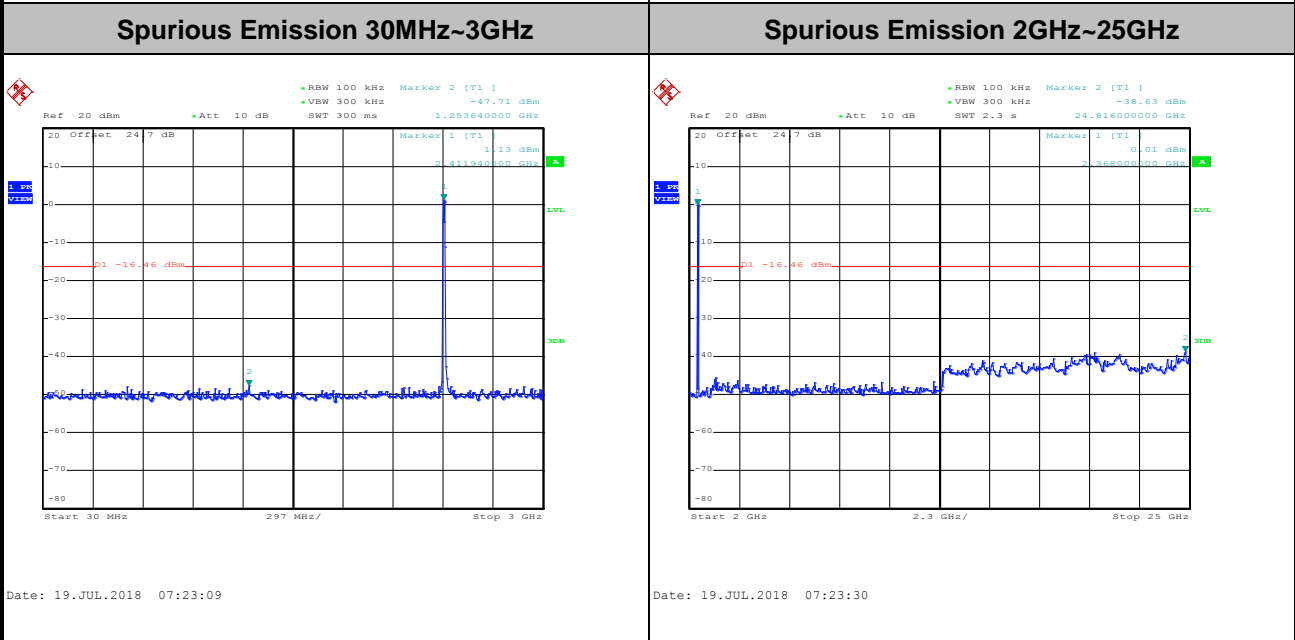
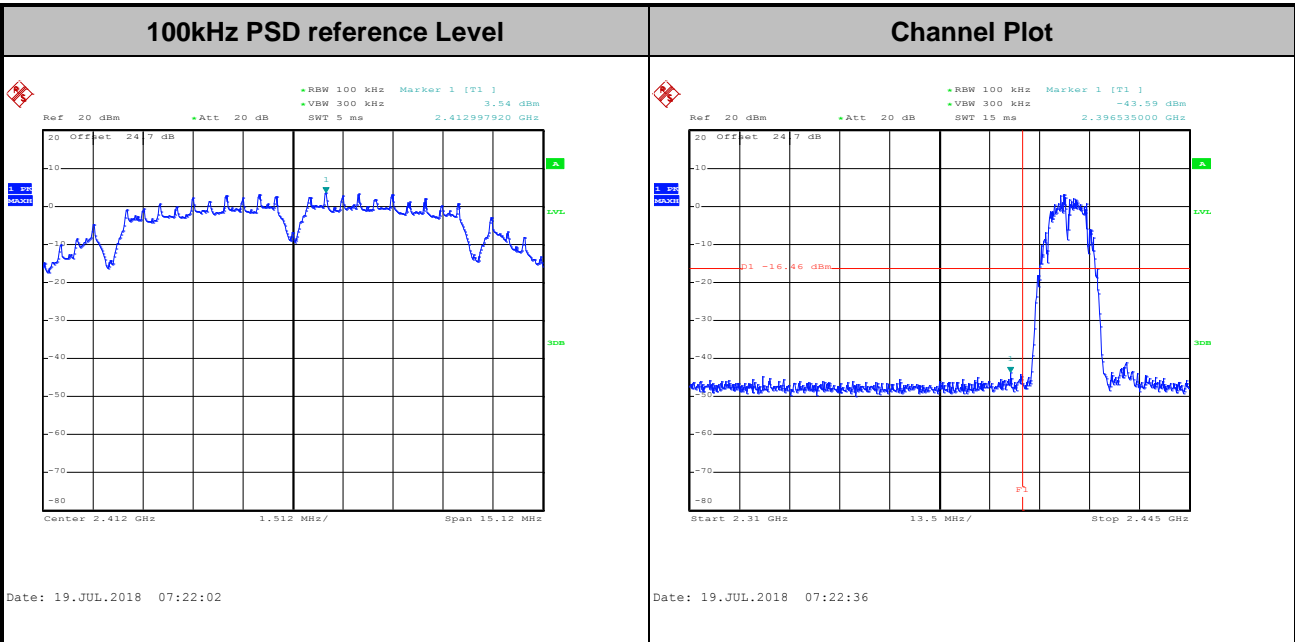
Number of TX :	1	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	09	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





Number of TX = 1, Ant. 2 (Measured)

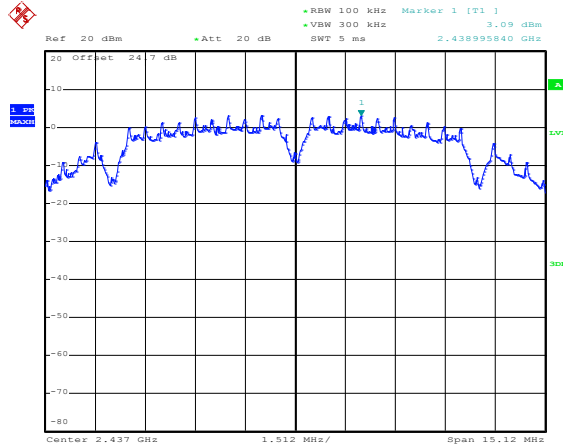
Number of TX	1	Ant. :	2
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





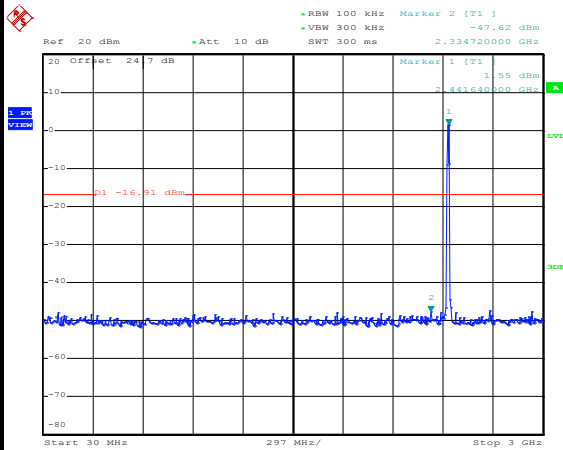
Number of TX	1	Ant. :	2
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



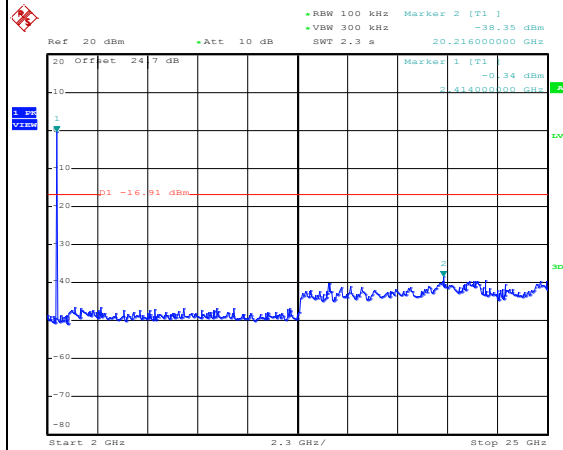
Date: 19.JUL.2018 07:27:57

Spurious Emission 30MHz~3GHz



Date: 19.JUL.2018 07:29:12

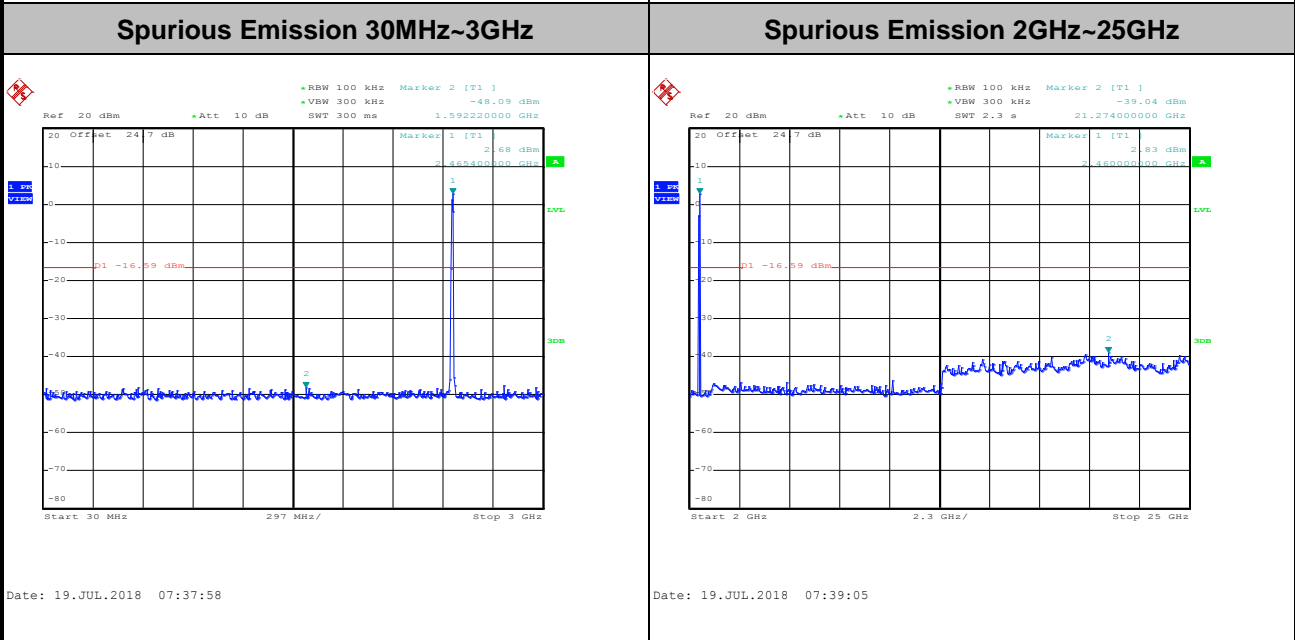
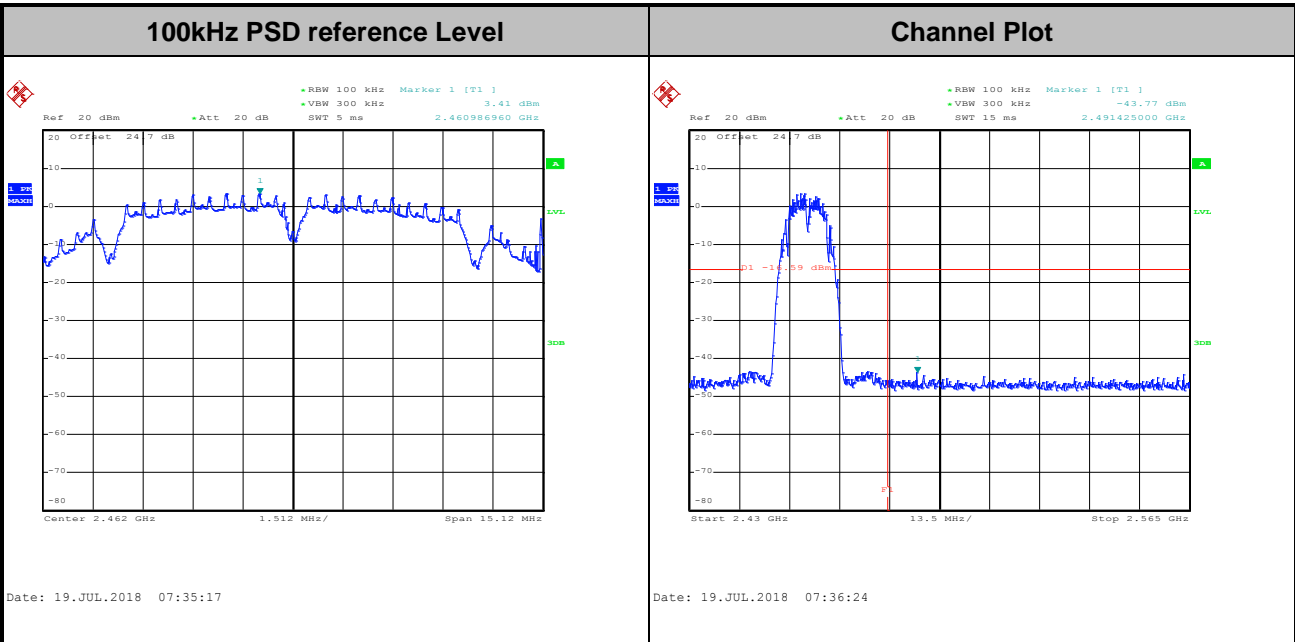
Spurious Emission 2GHz~25GHz



Date: 19.JUL.2018 07:29:40

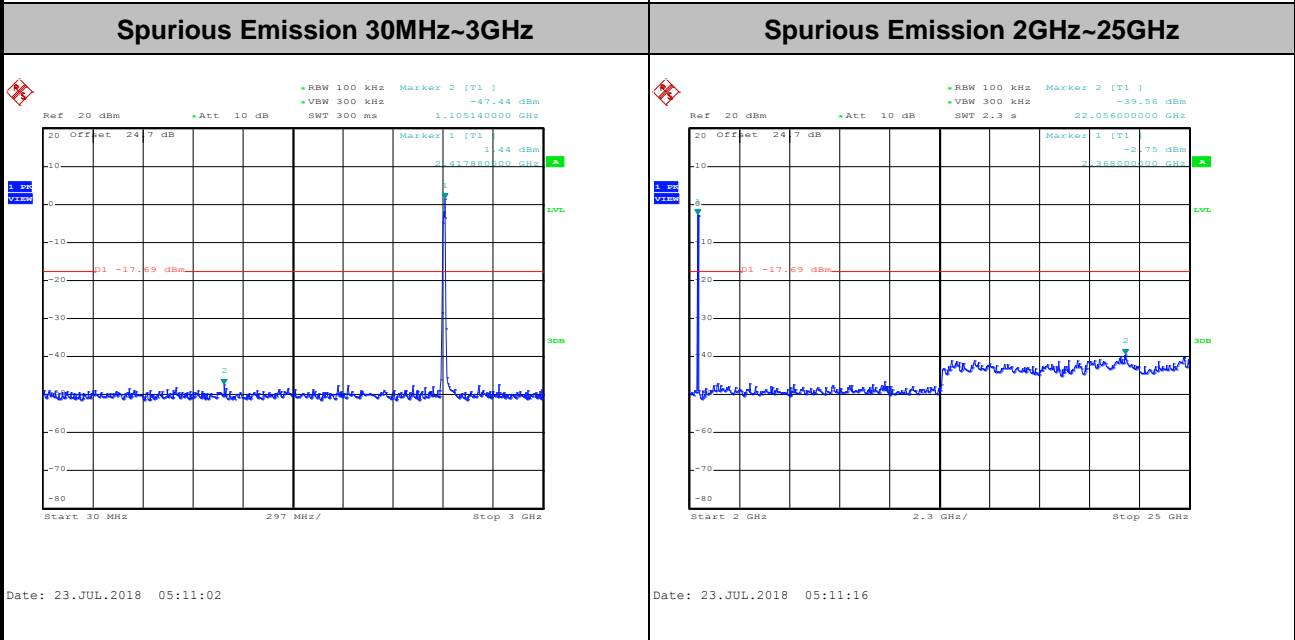
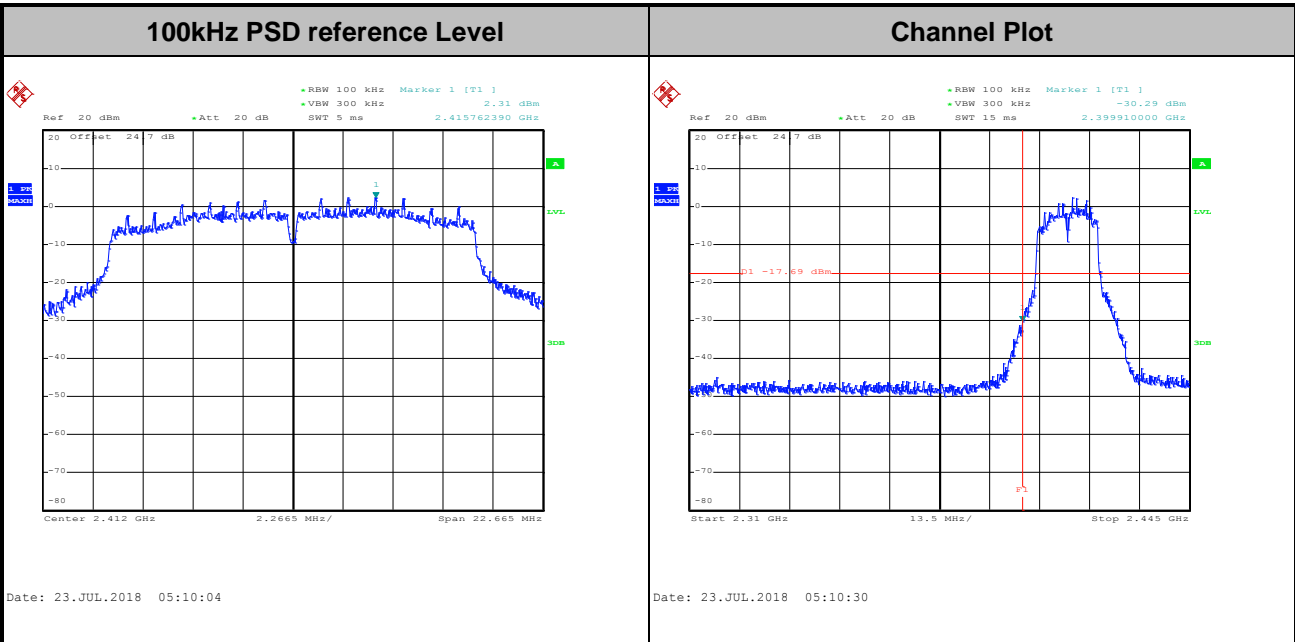


Number of TX	1	Ant. :	2
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





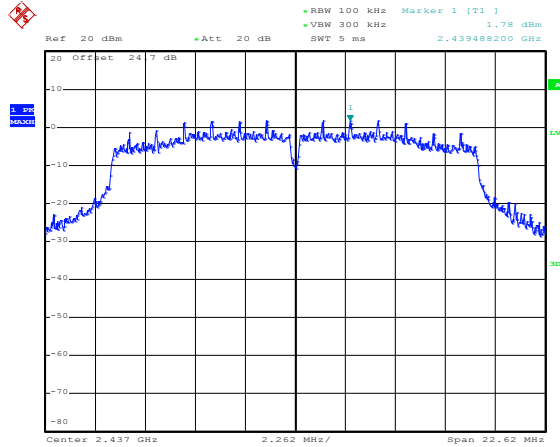
Number of TX	1	Ant. :	2
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





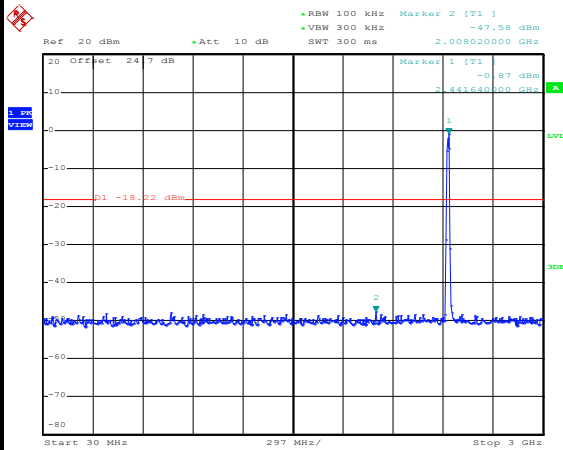
Number of TX	1	Ant. :	2
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



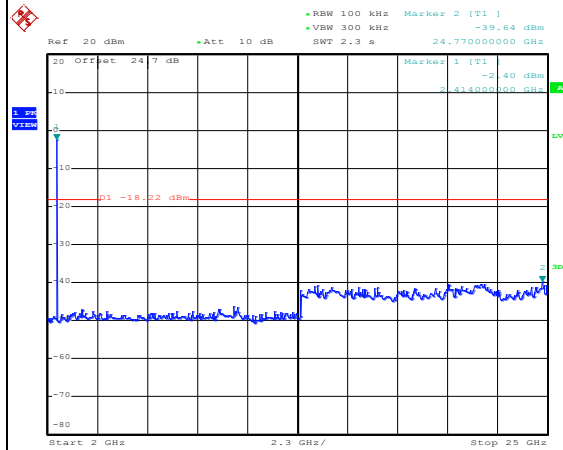
Date: 23.JUL.2018 05:14:14

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 05:14:49

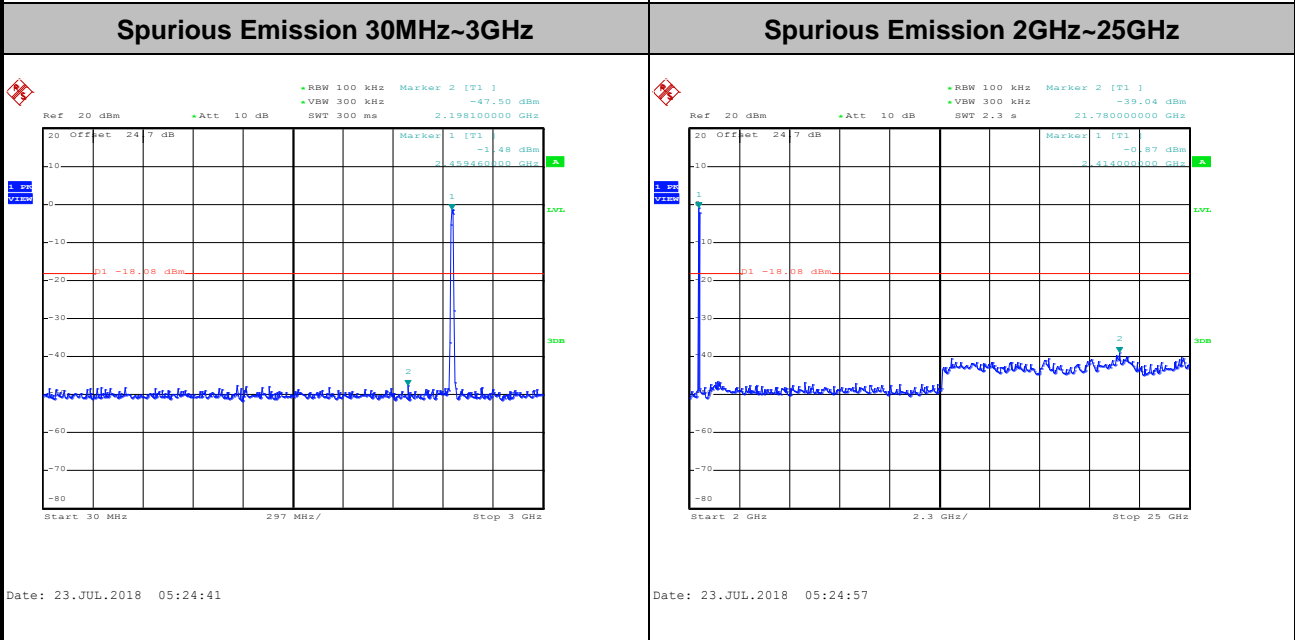
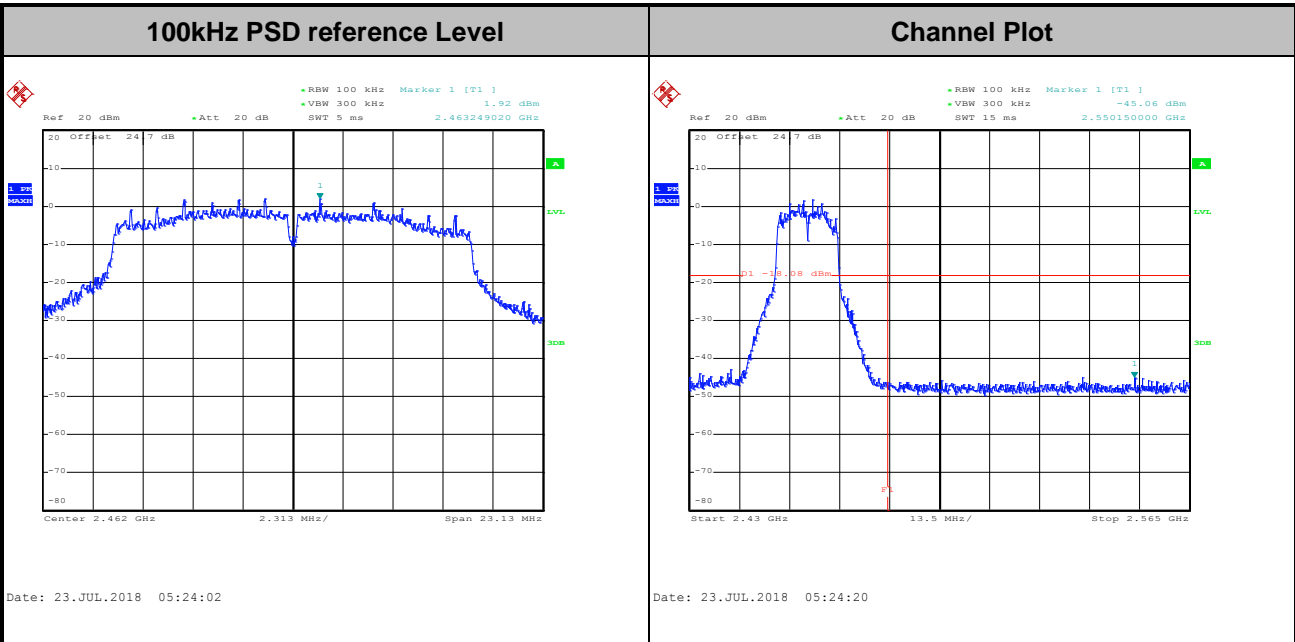
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 05:15:04

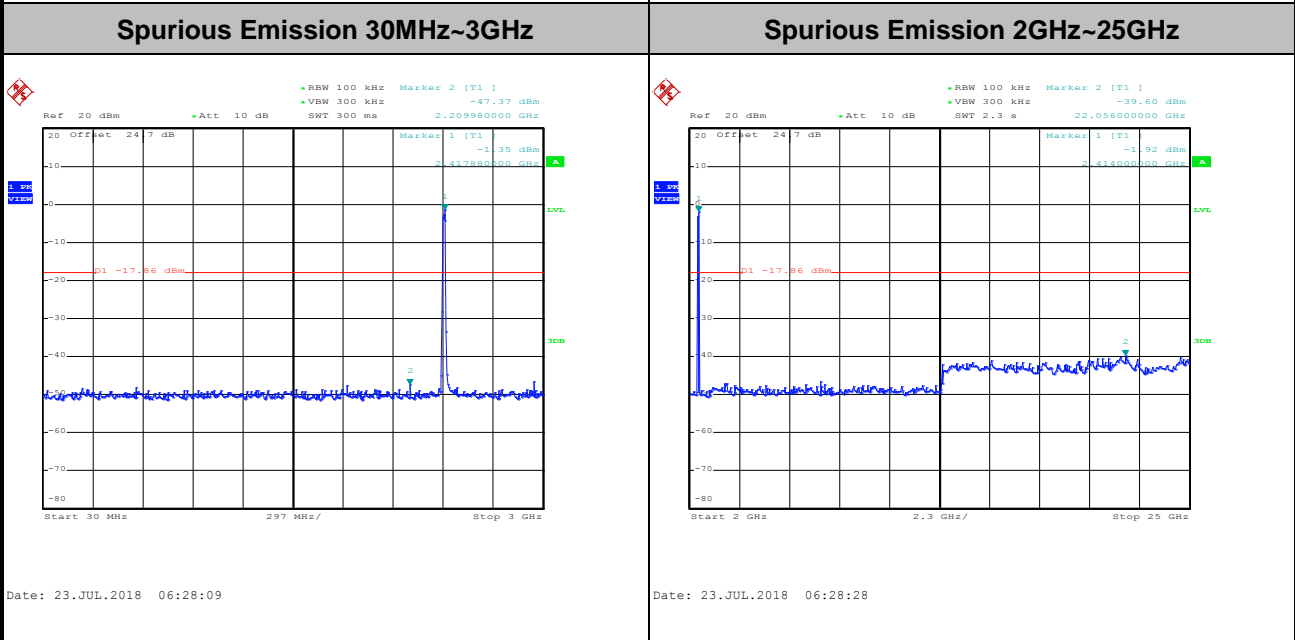
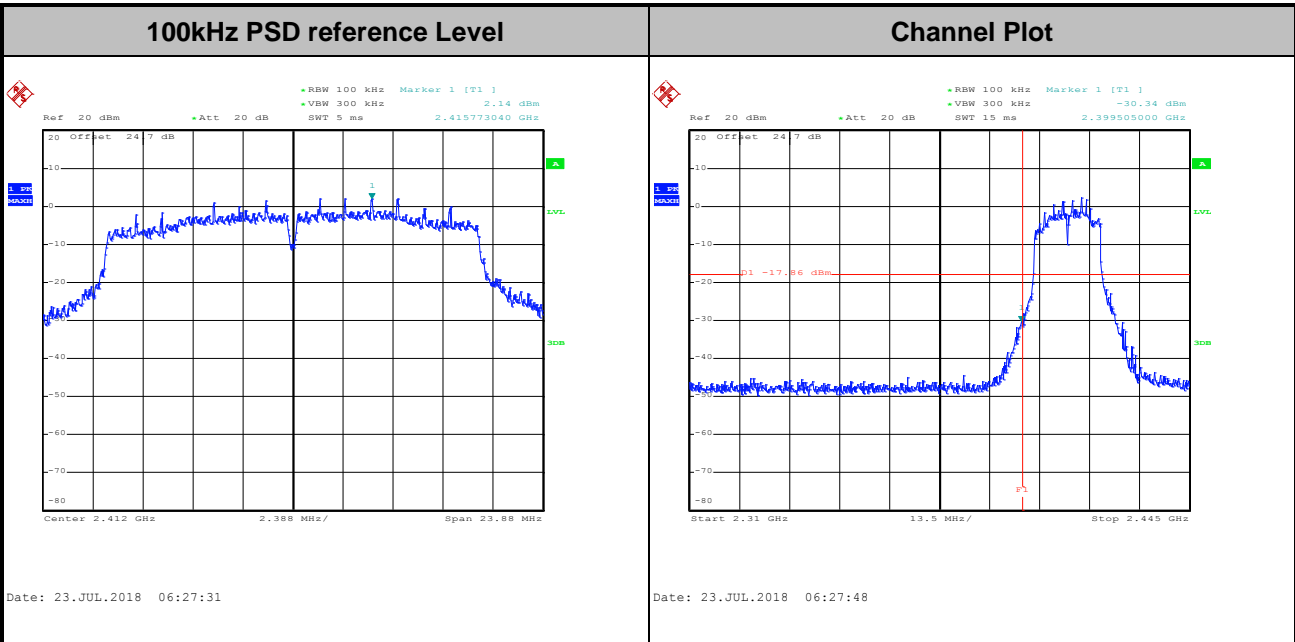


Number of TX	1	Ant. :	2
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





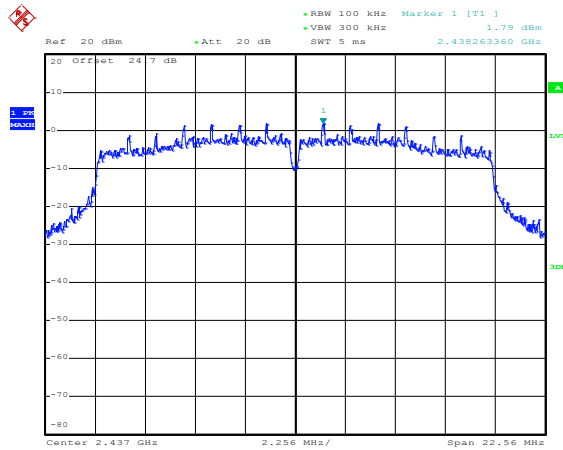
Number of TX	1	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





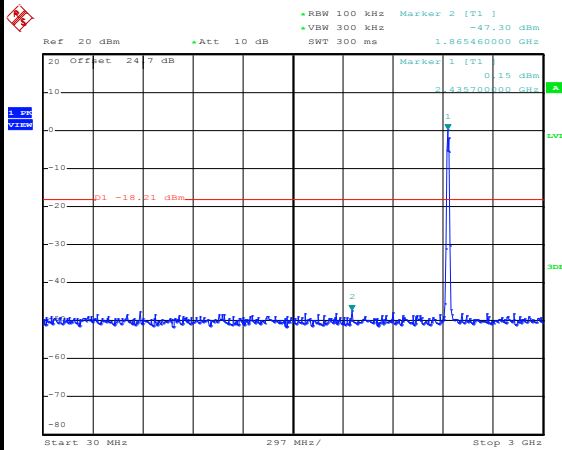
Number of TX	1	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



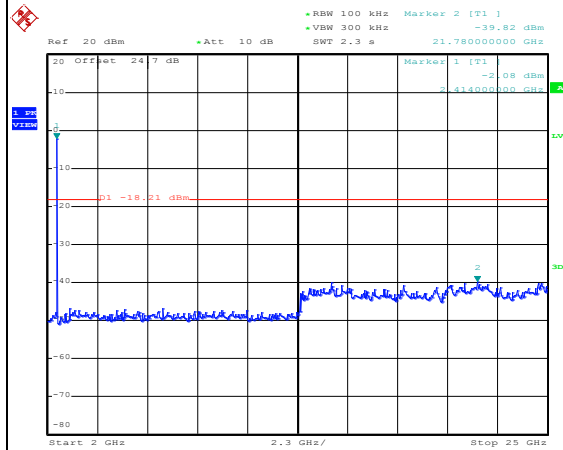
Date: 23.JUL.2018 06:30:38

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 06:31:13

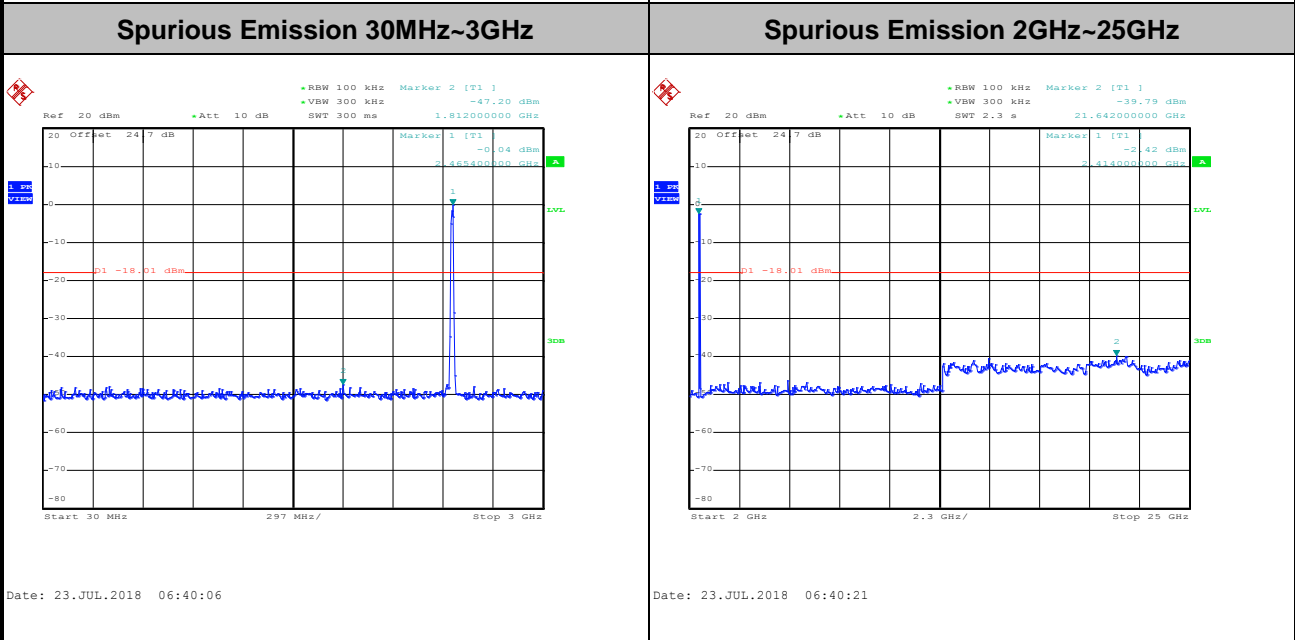
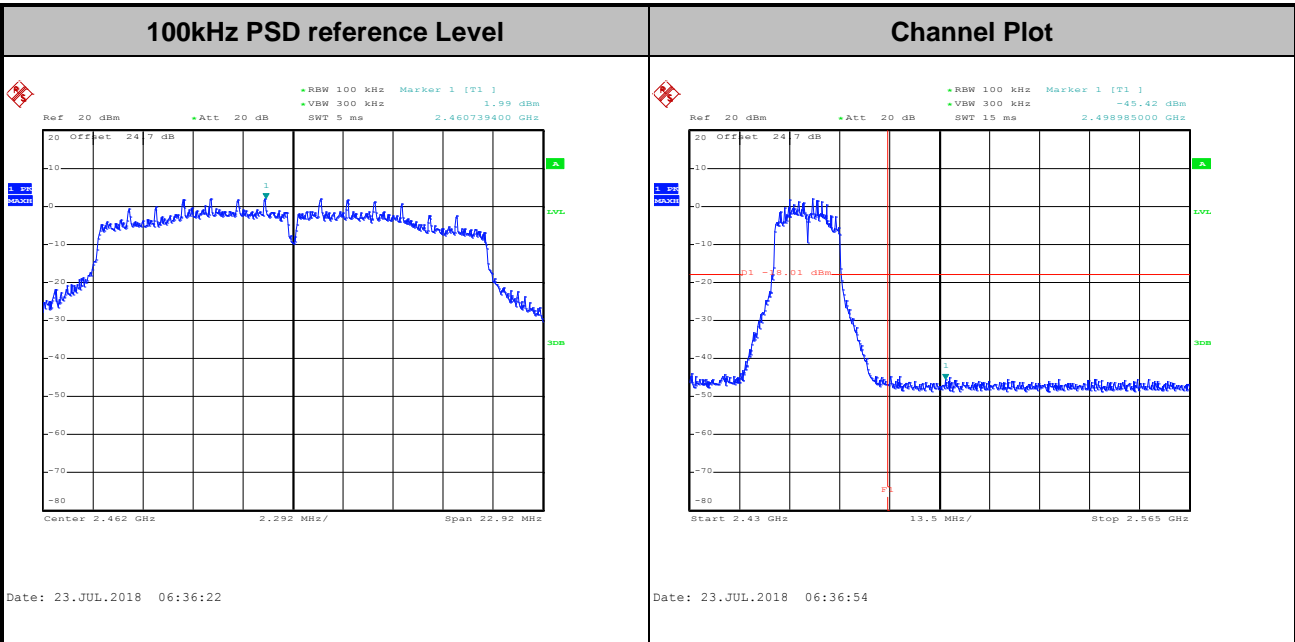
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 06:31:33

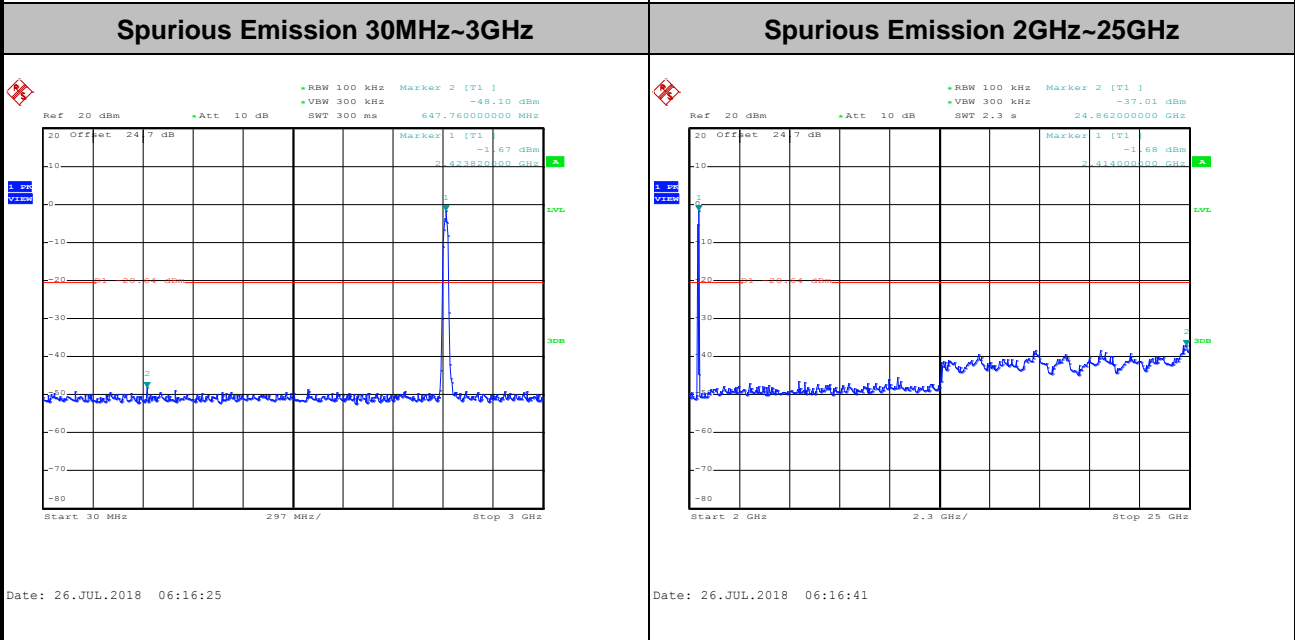
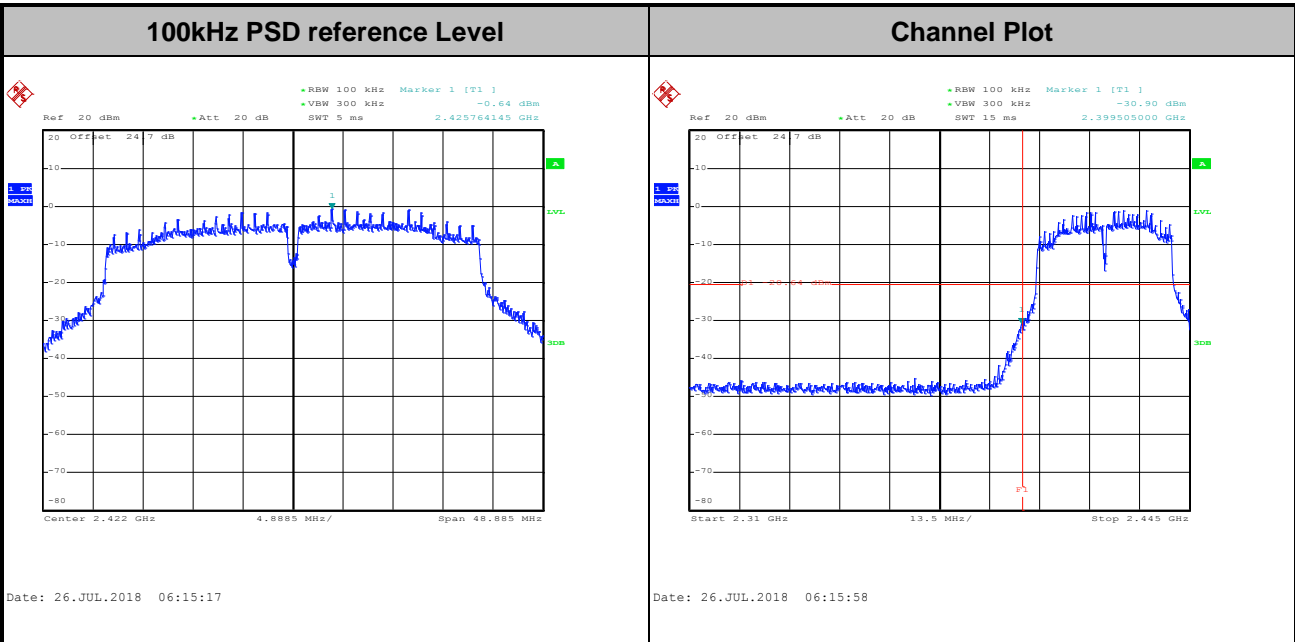


Number of TX	1	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





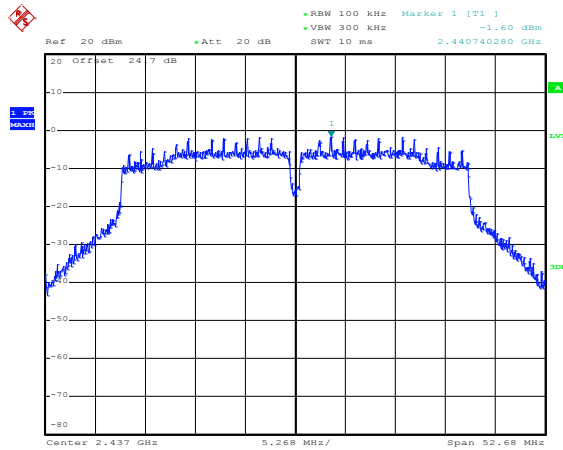
Number of TX :	1	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	03	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





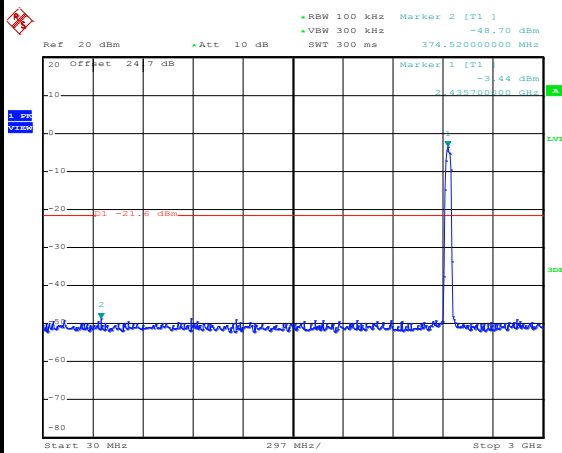
Number of TX :	1	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



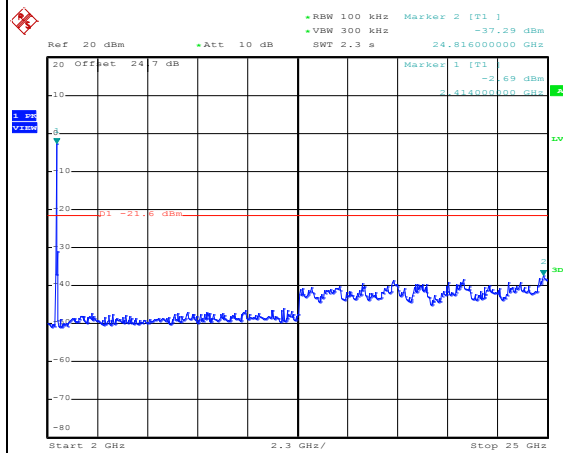
Date: 26.JUL.2018 06:21:30

Spurious Emission 30MHz~3GHz



Date: 26.JUL.2018 06:22:32

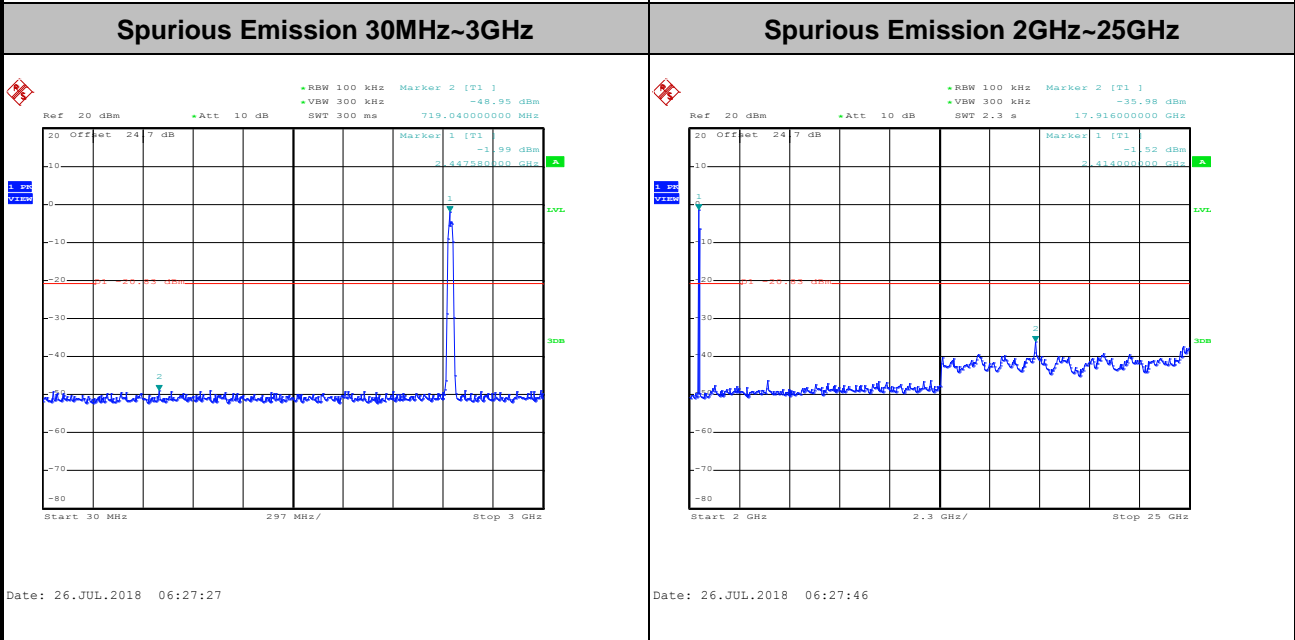
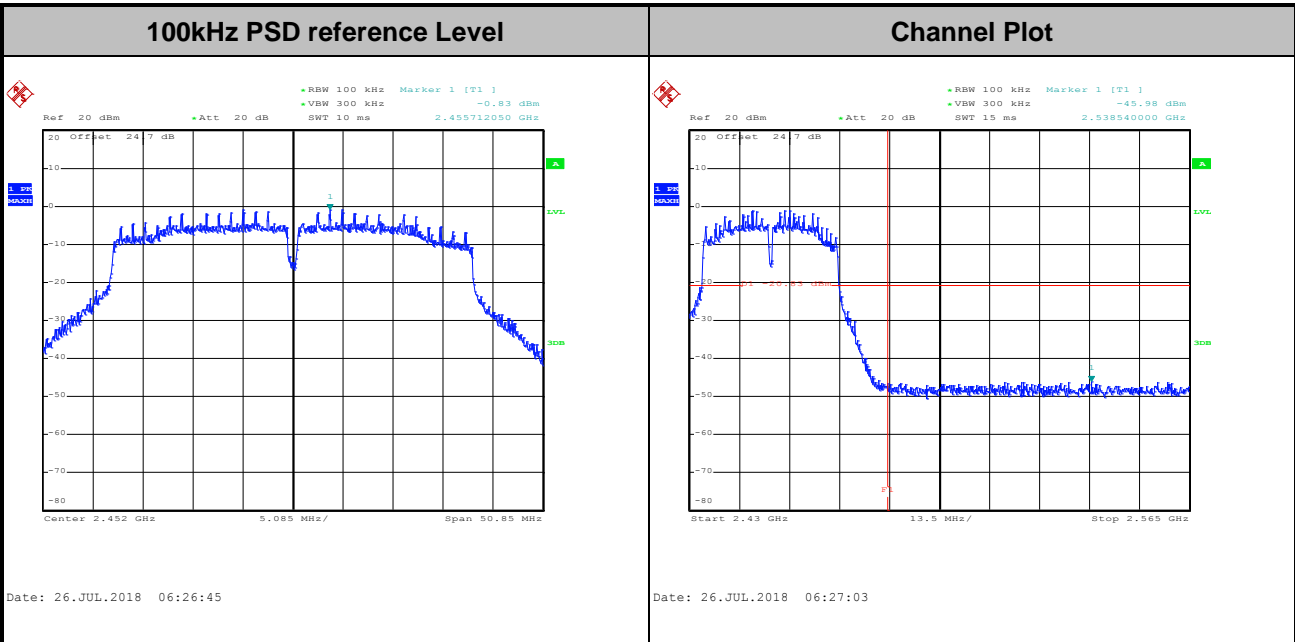
Spurious Emission 2GHz~25GHz



Date: 26.JUL.2018 06:22:50



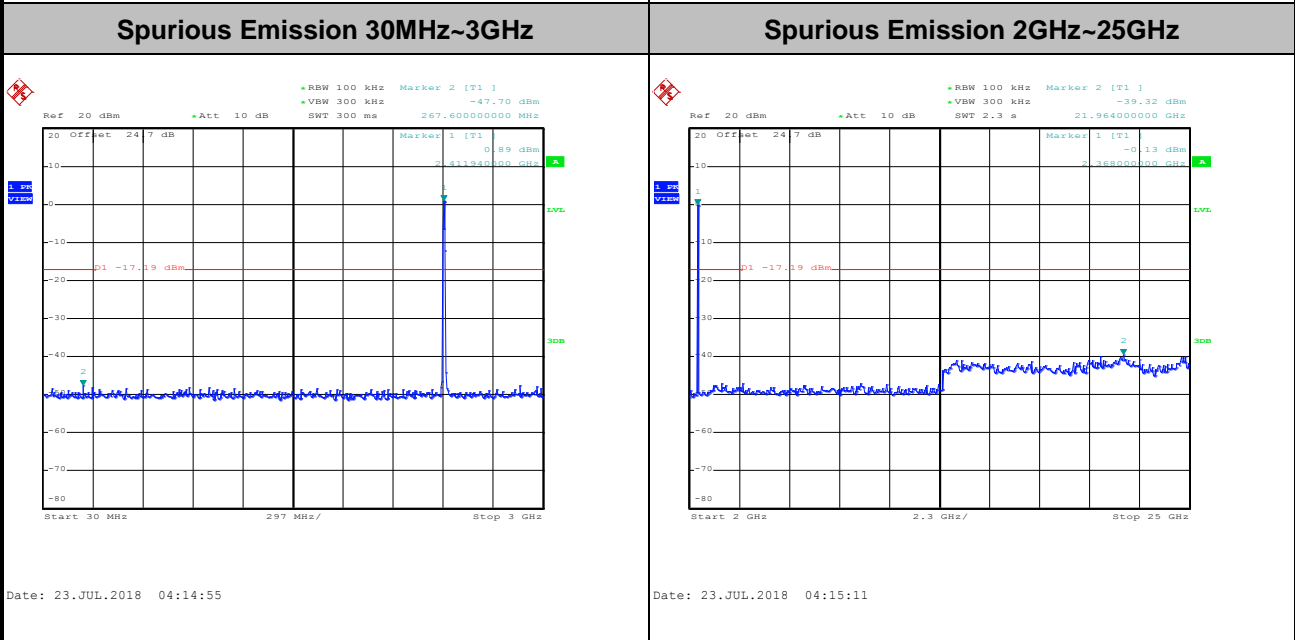
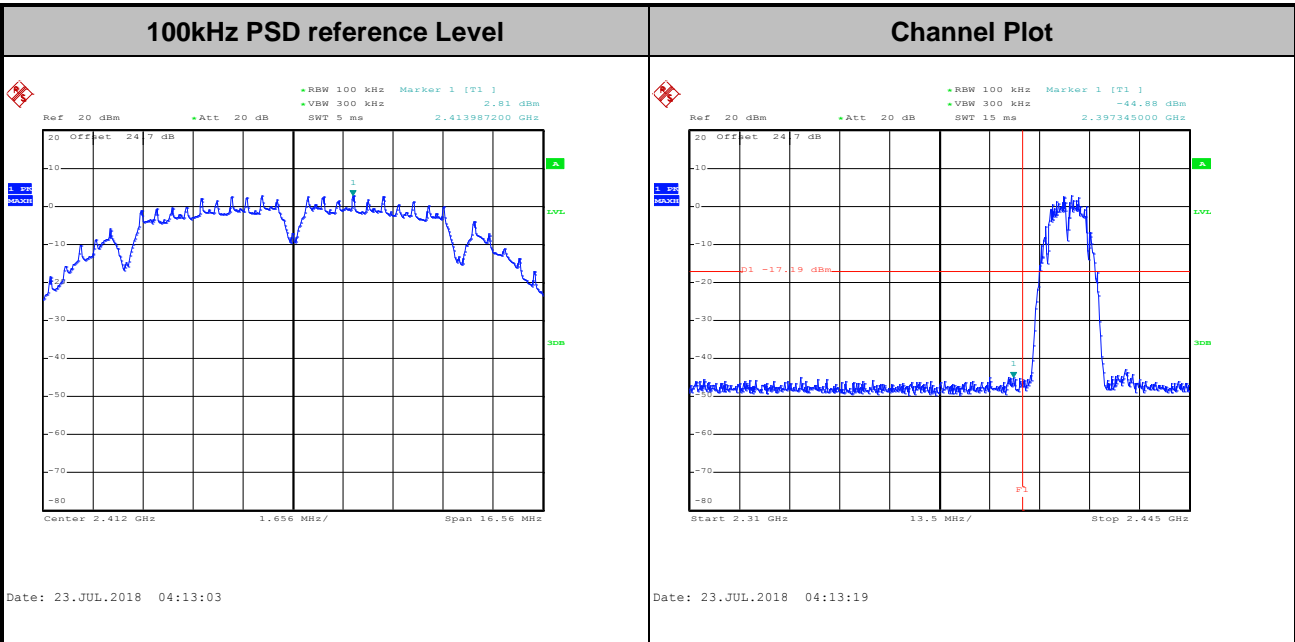
Number of TX :	1	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	09	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





Number of TX = 2, Ant. 1 (Measured)

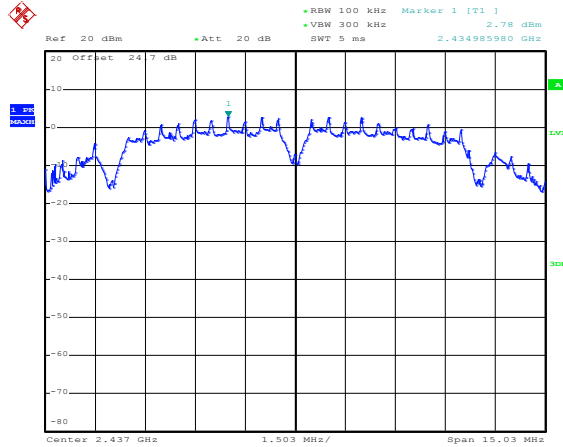
Number of TX	2	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





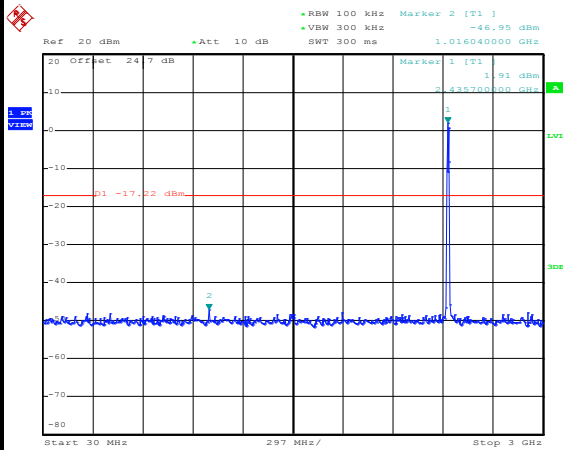
Number of TX	2	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



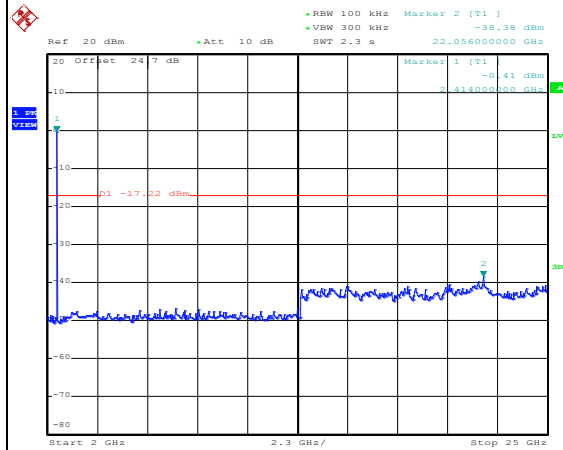
Date: 23.JUL.2018 04:24:18

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 04:24:52

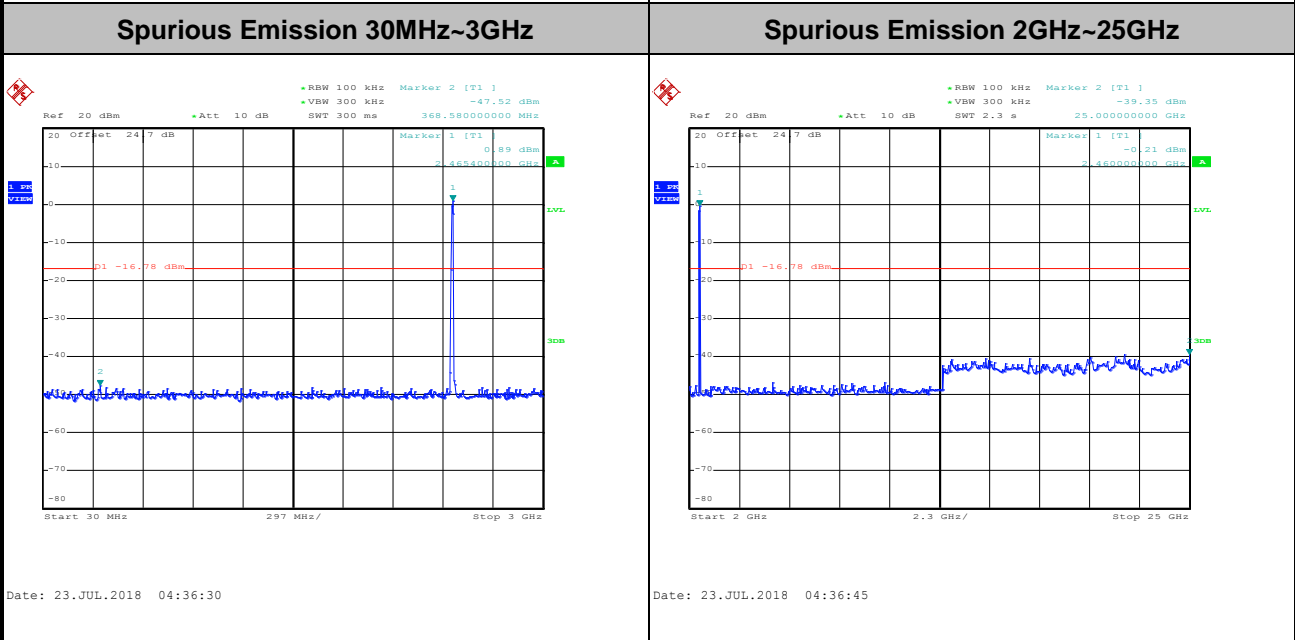
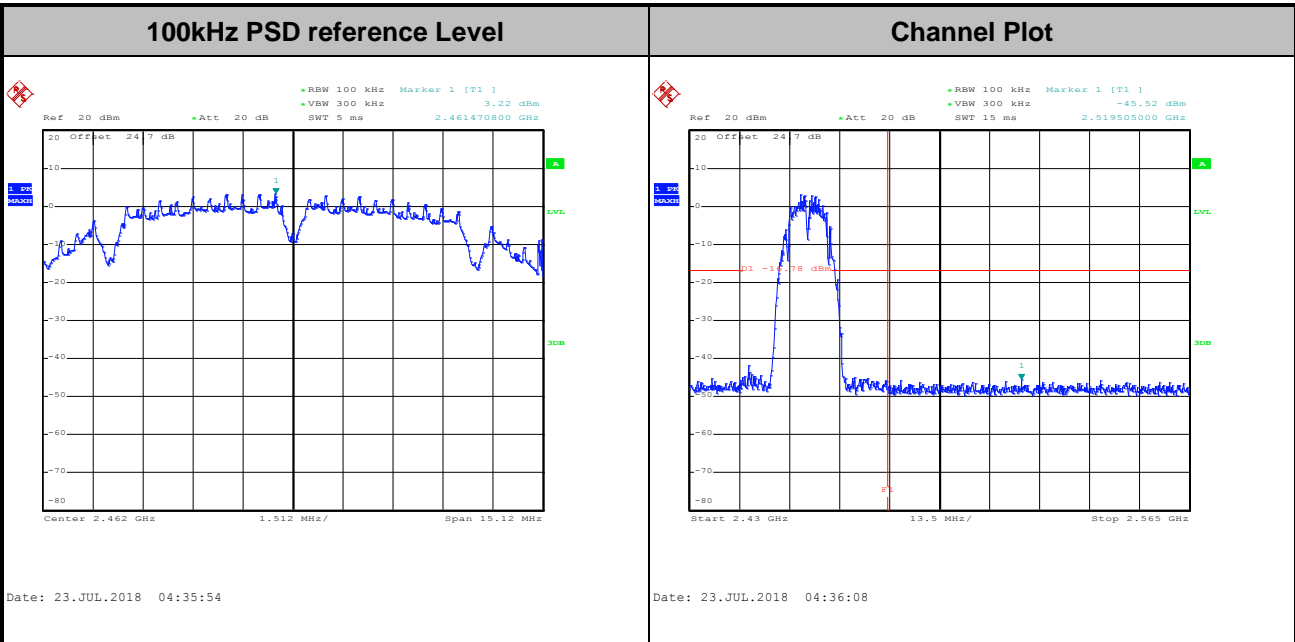
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 04:25:10

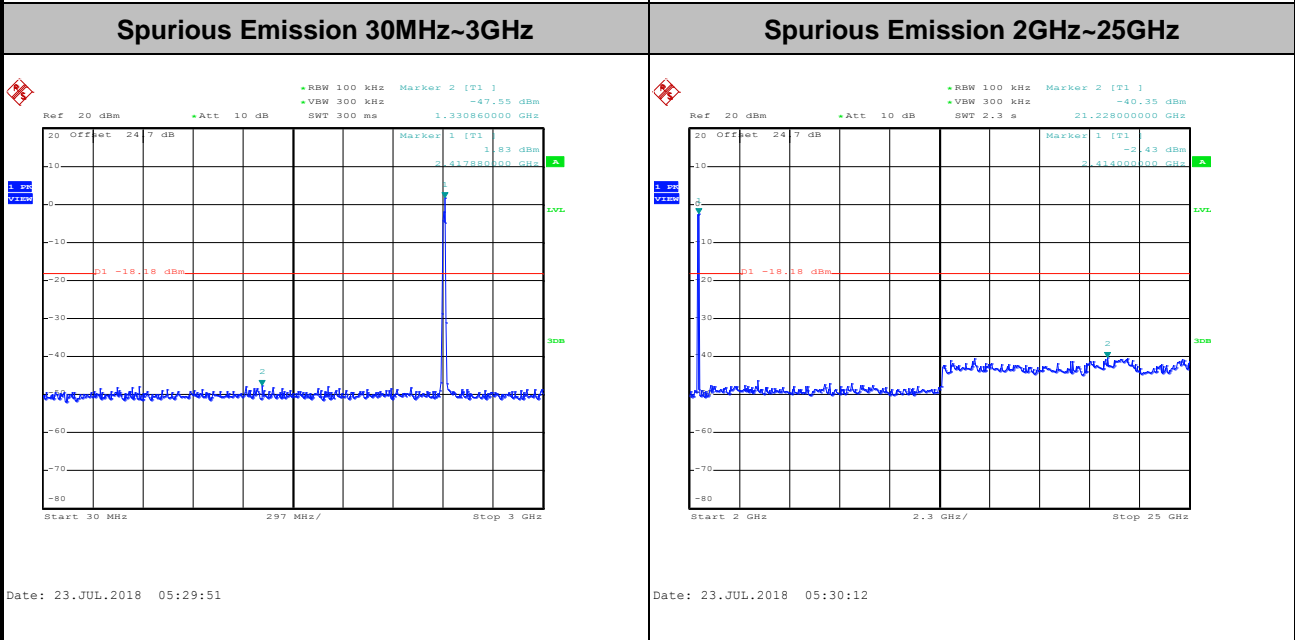
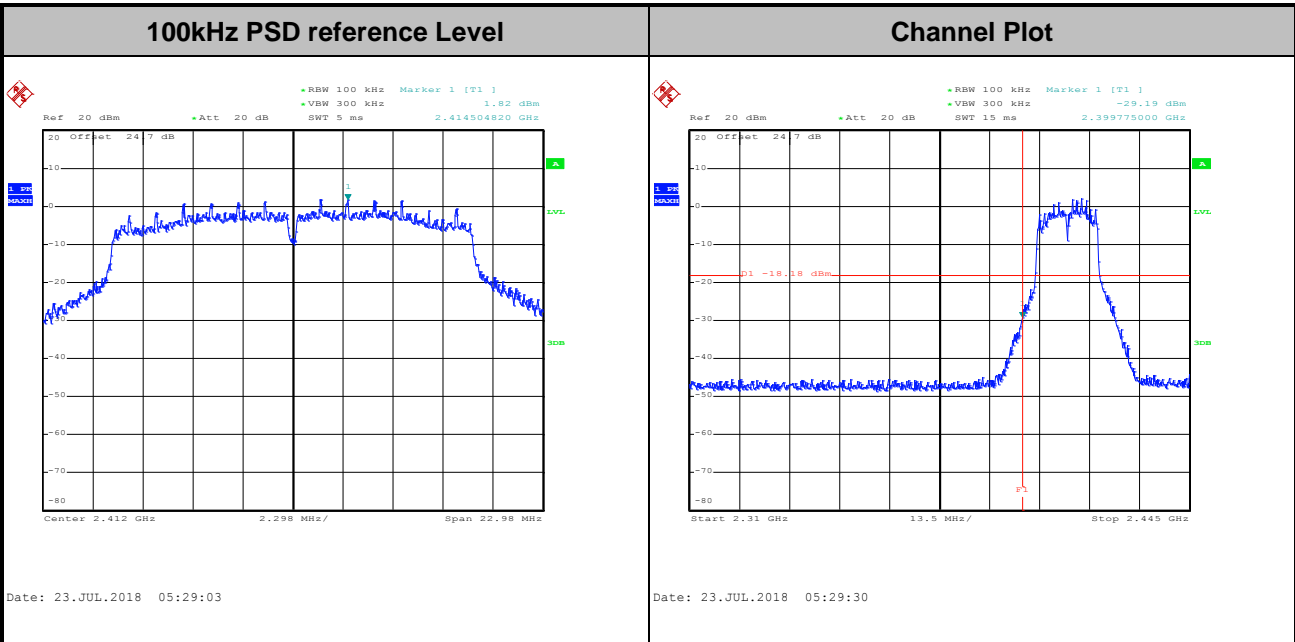


Number of TX	2	Ant. :	1
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



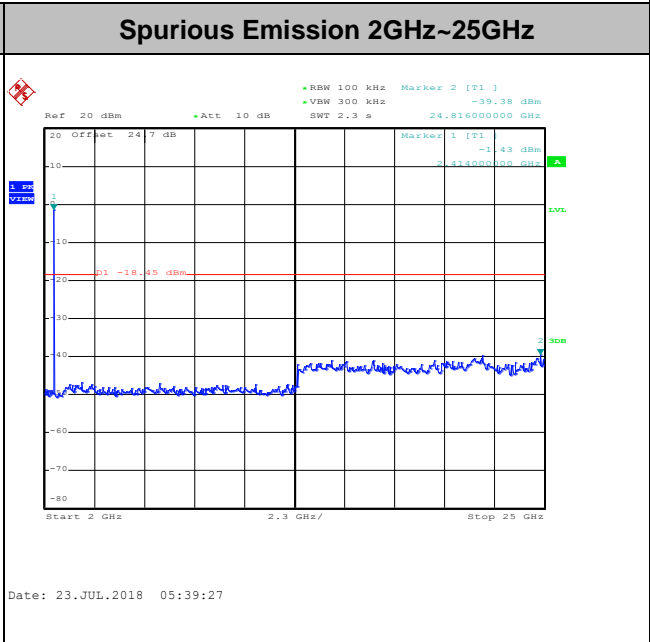
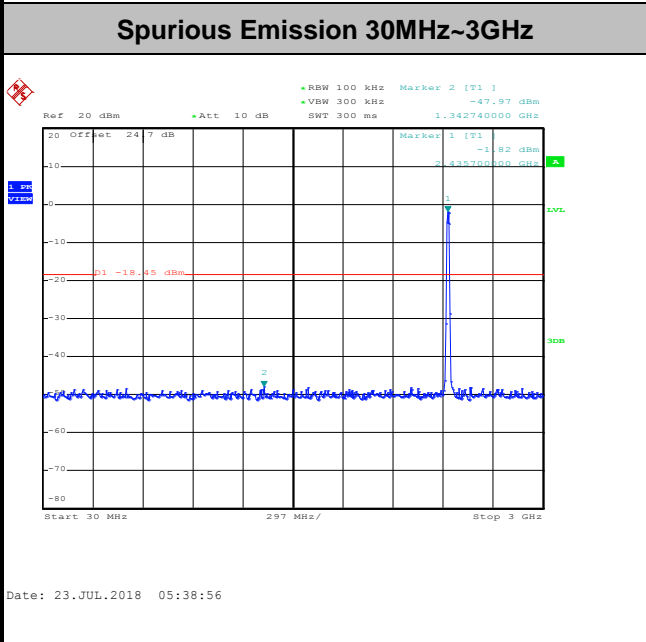
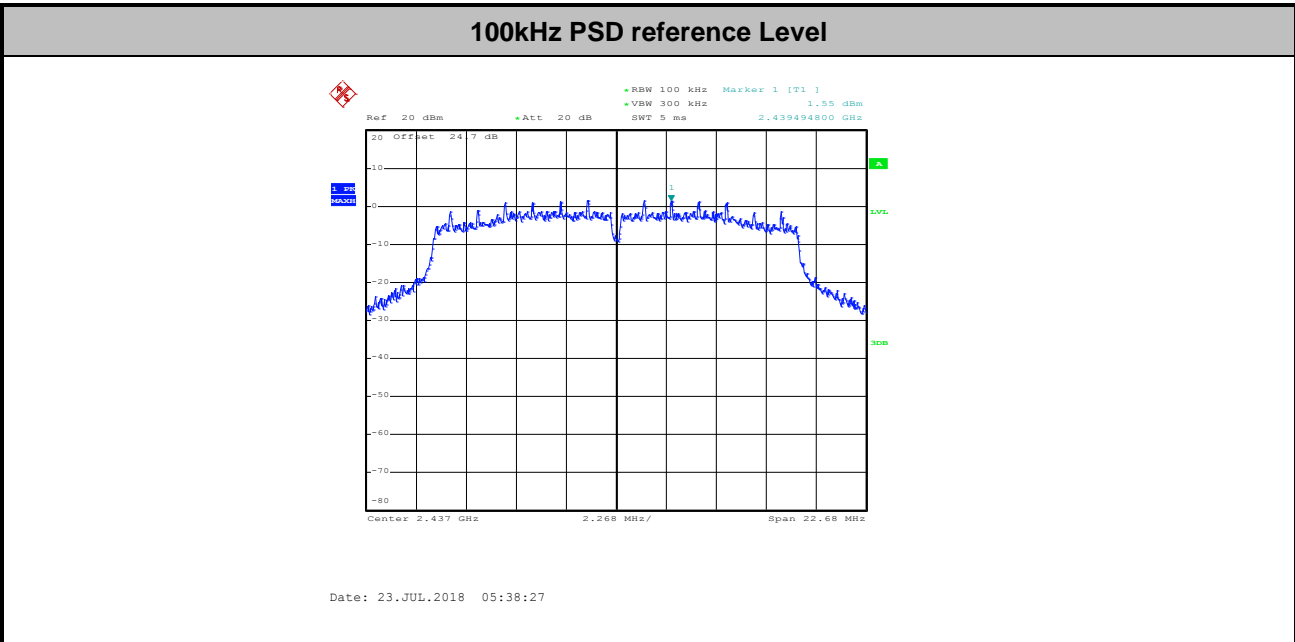


Number of TX	2	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



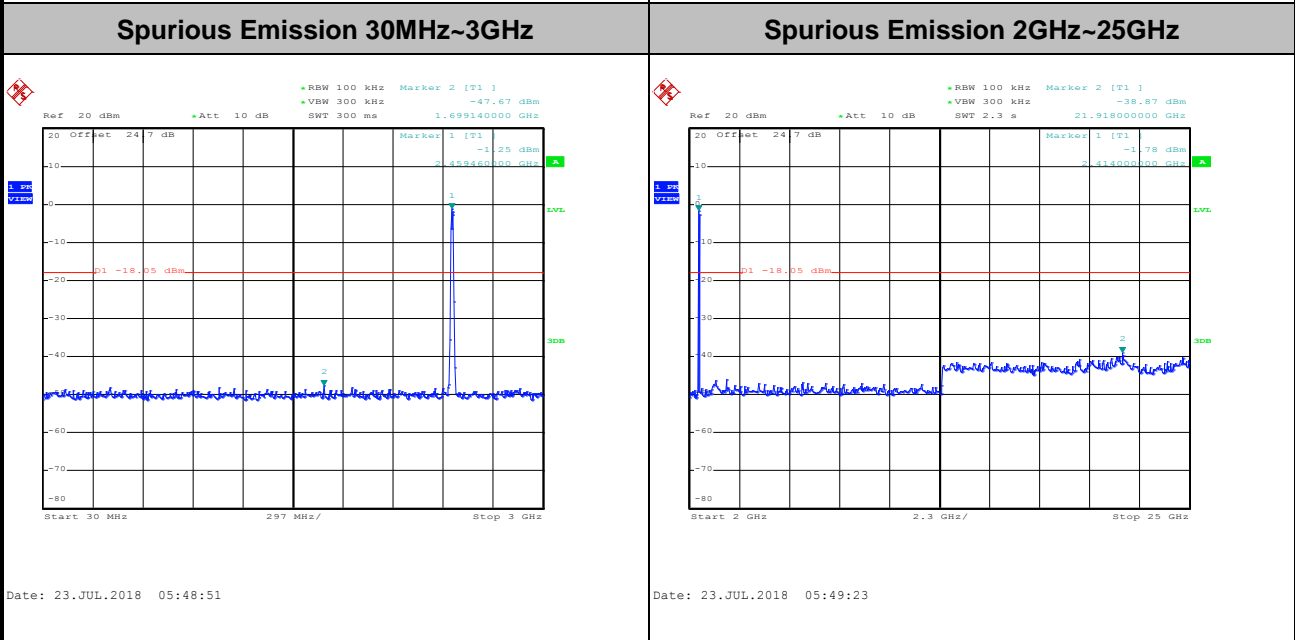
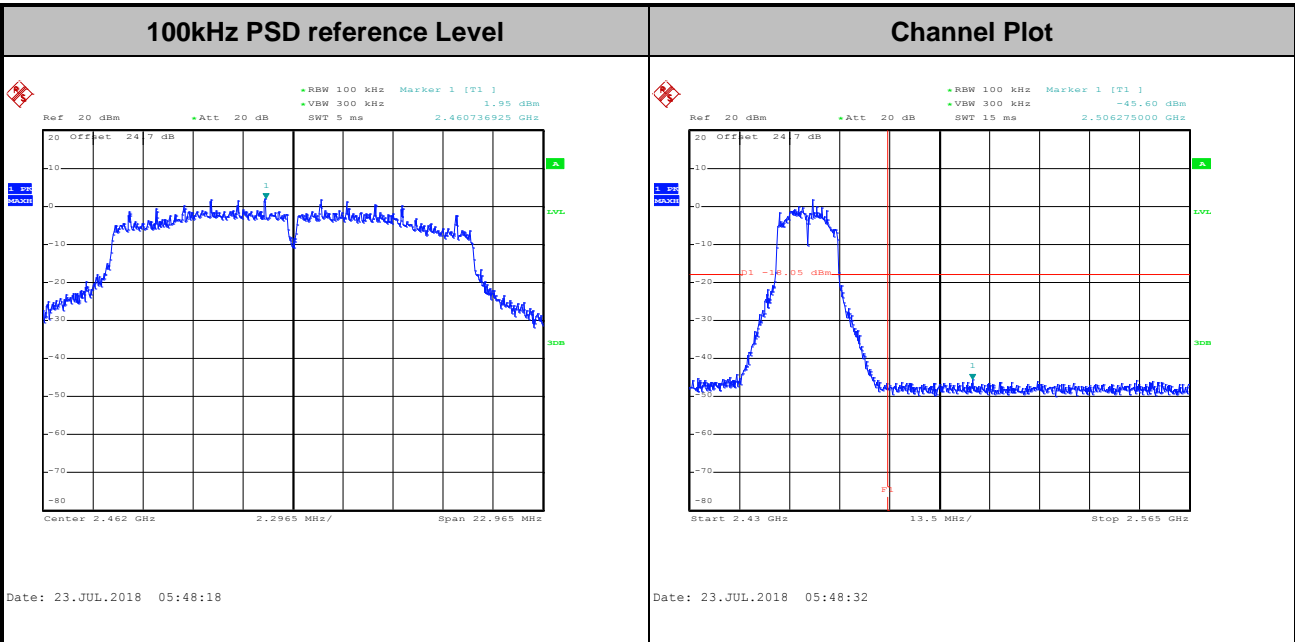


Number of TX	2	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



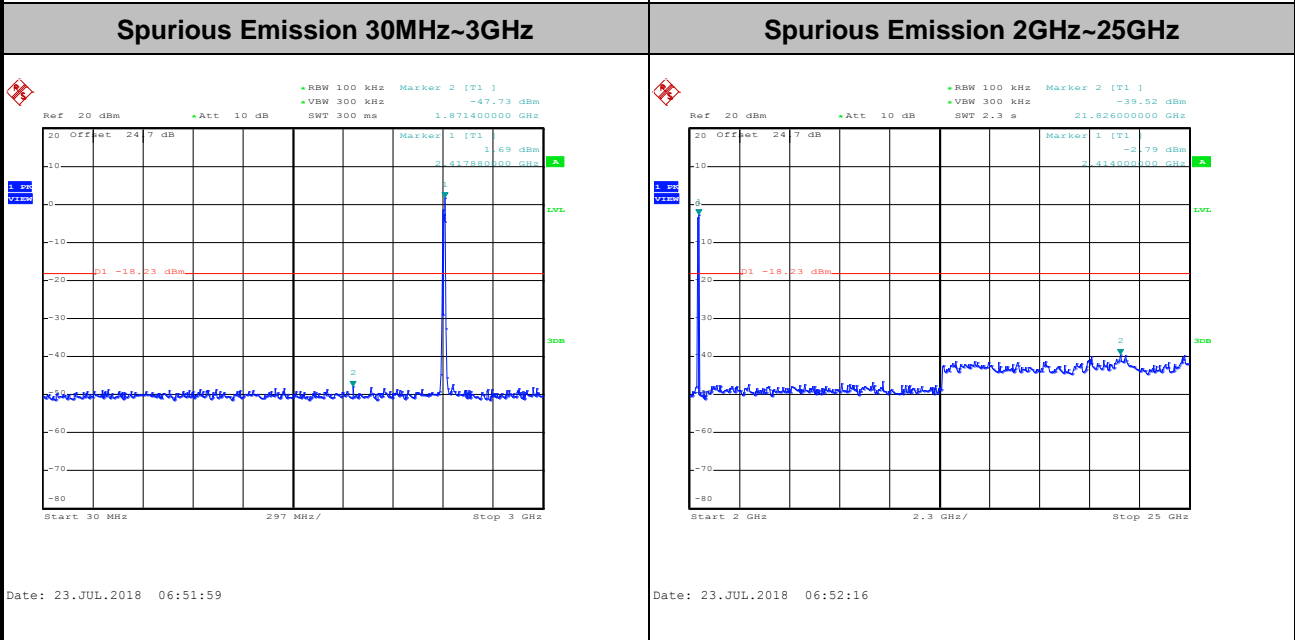
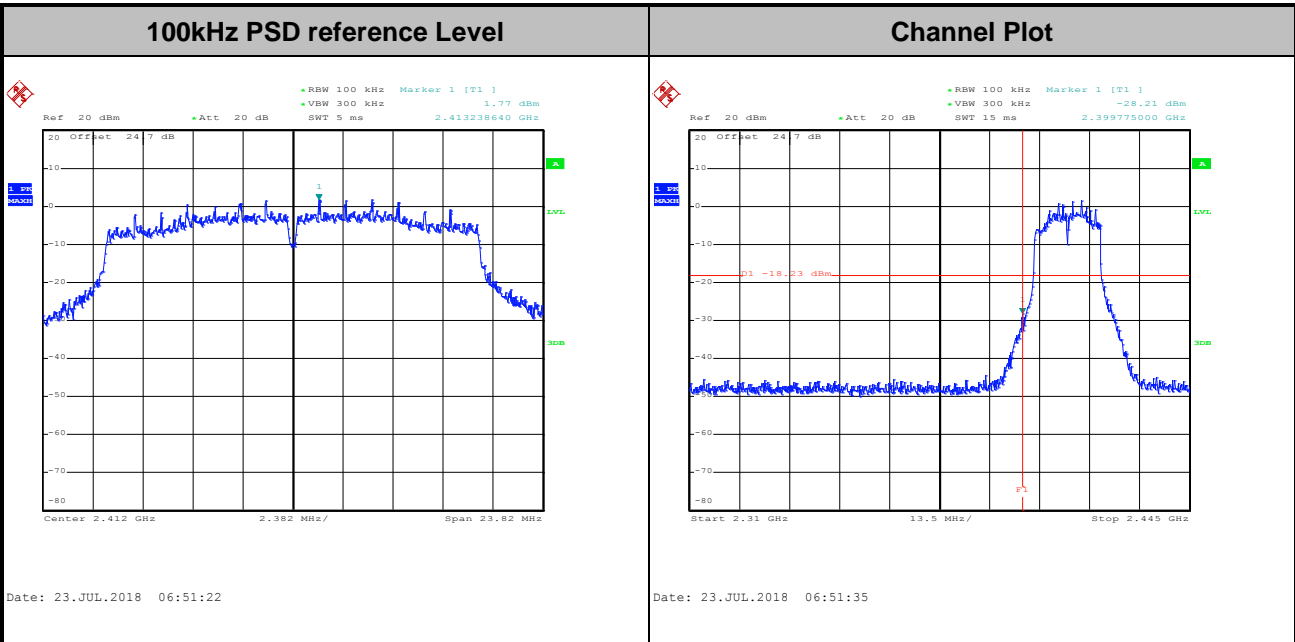


Number of TX	2	Ant. :	1
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





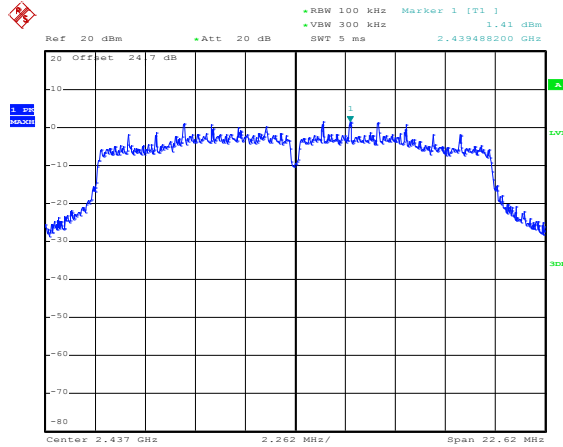
Number of TX	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





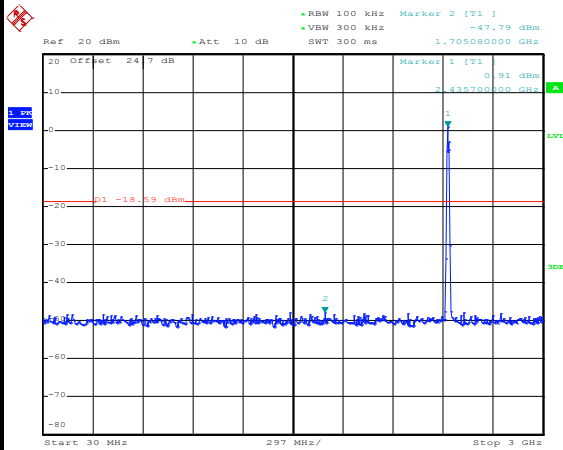
Number of TX	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



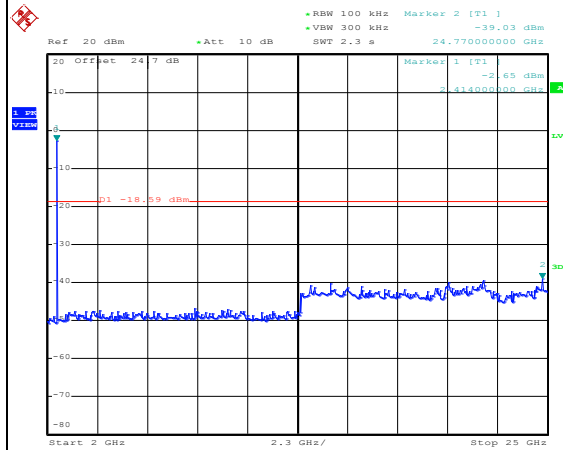
Date: 23.JUL.2018 07:00:57

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 07:01:16

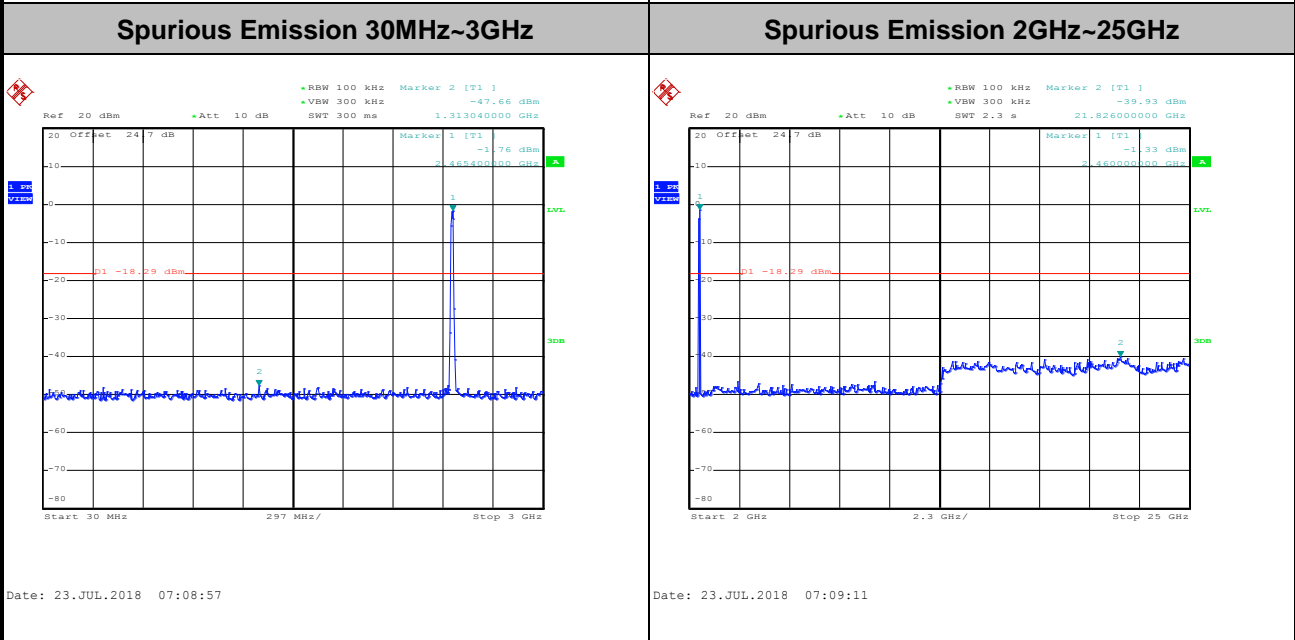
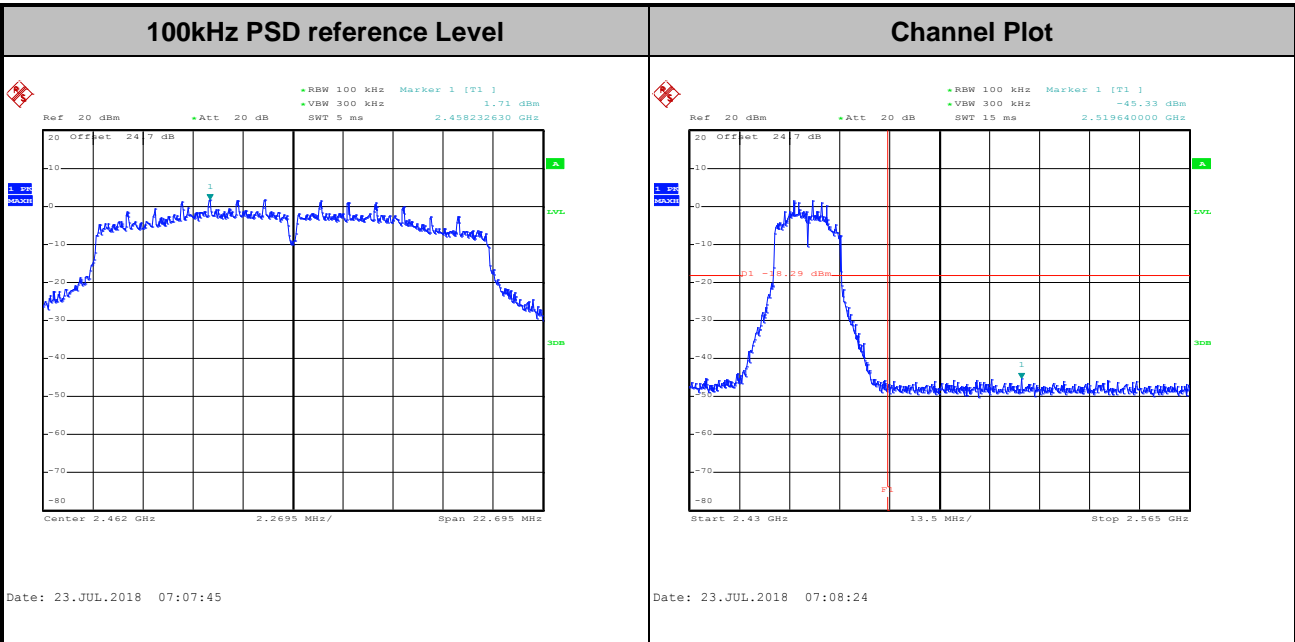
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 07:01:31

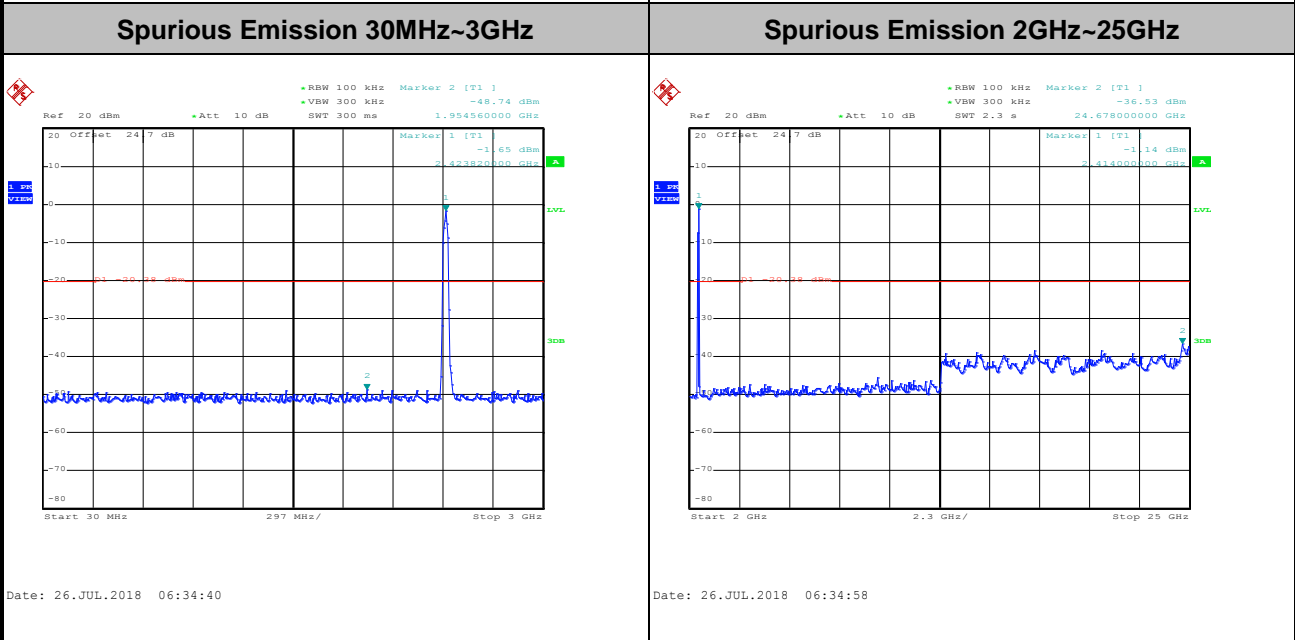
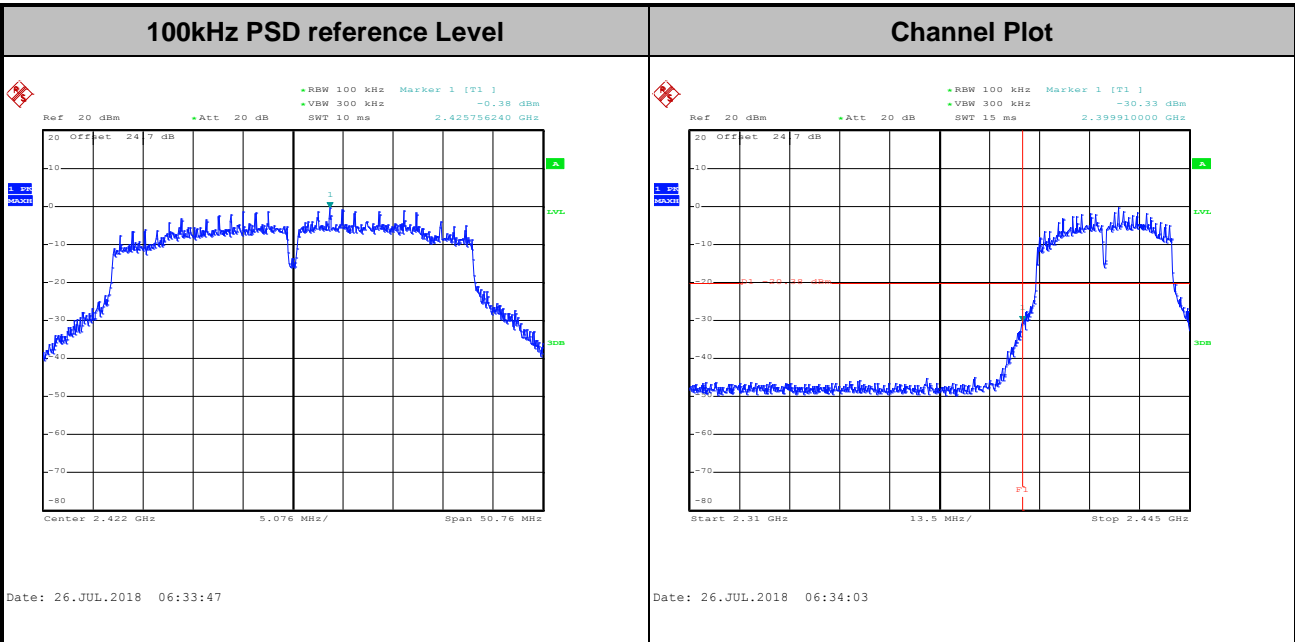


Number of TX	2	Ant. :	1
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



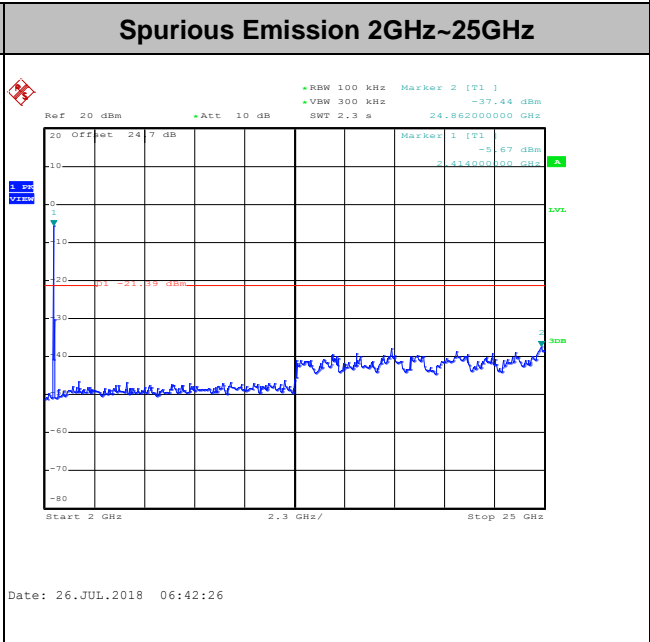
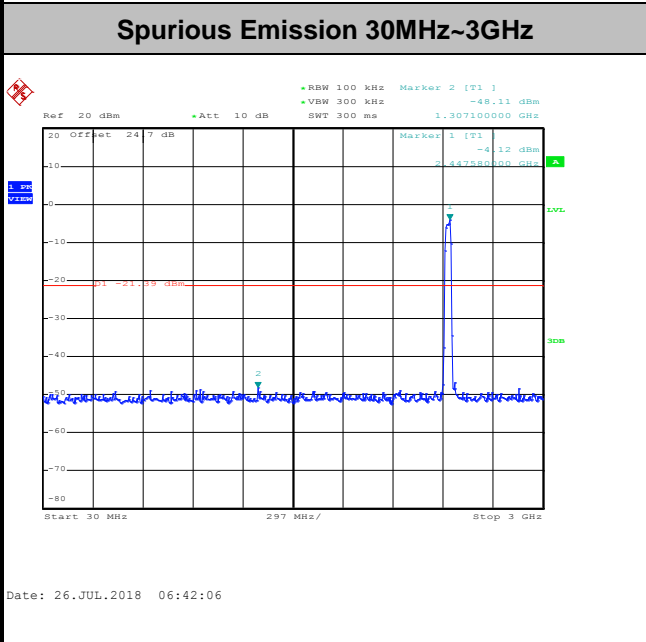
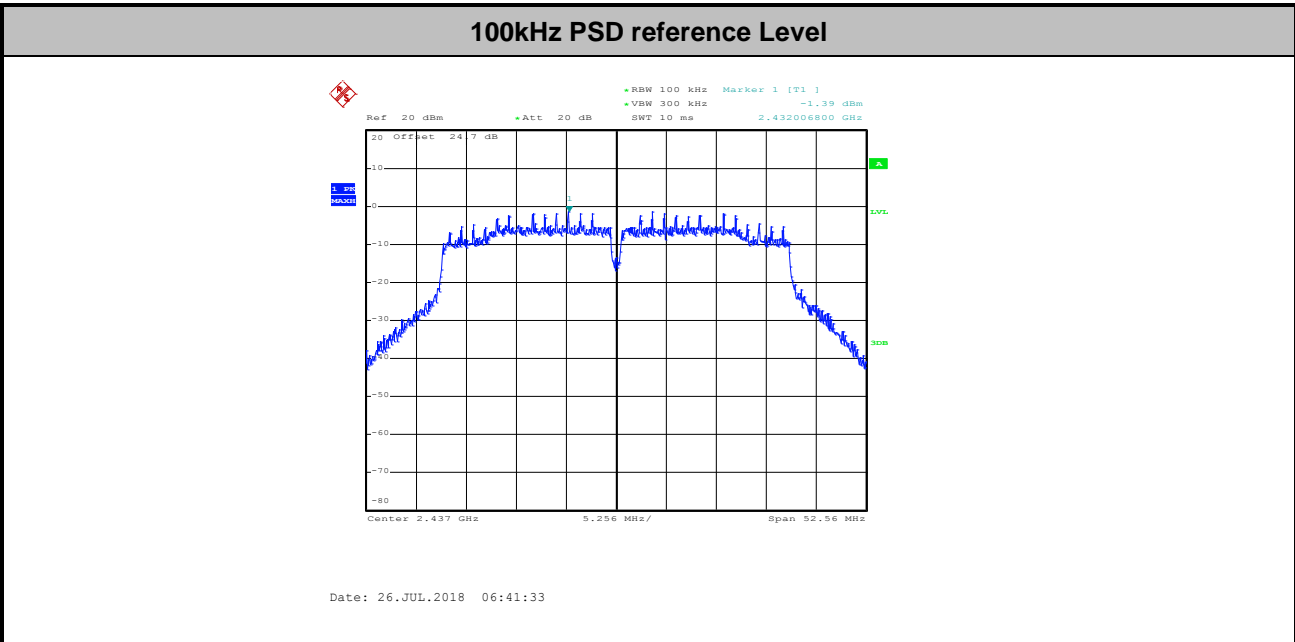


Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	03	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu



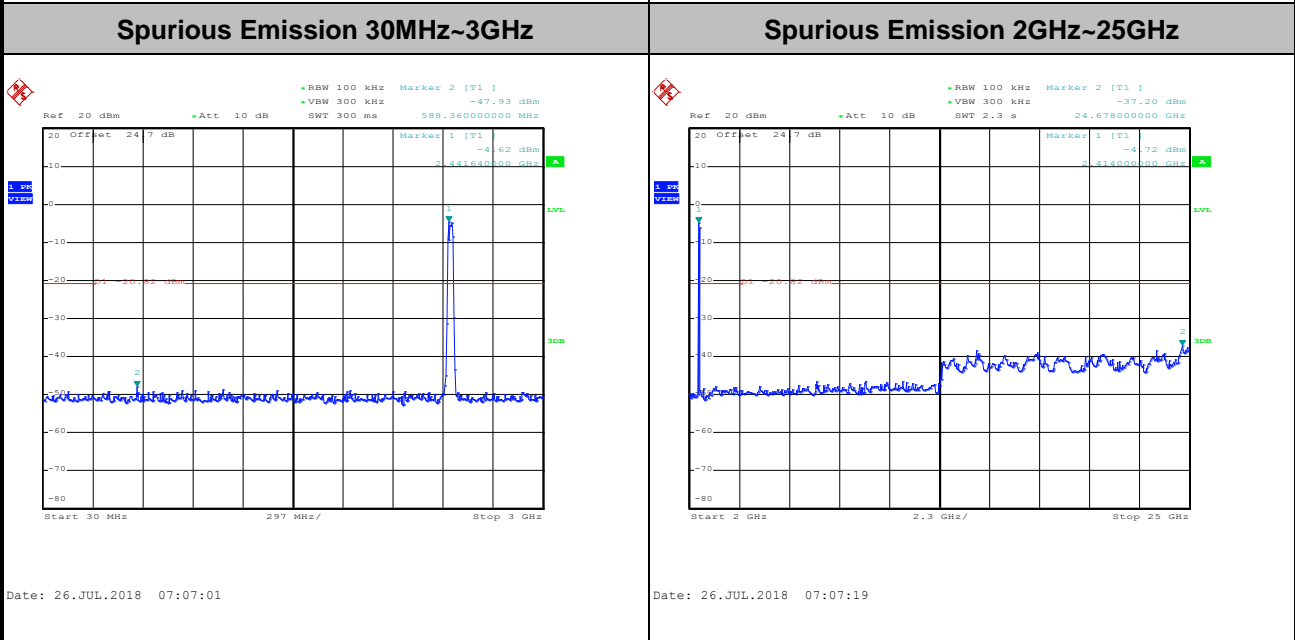
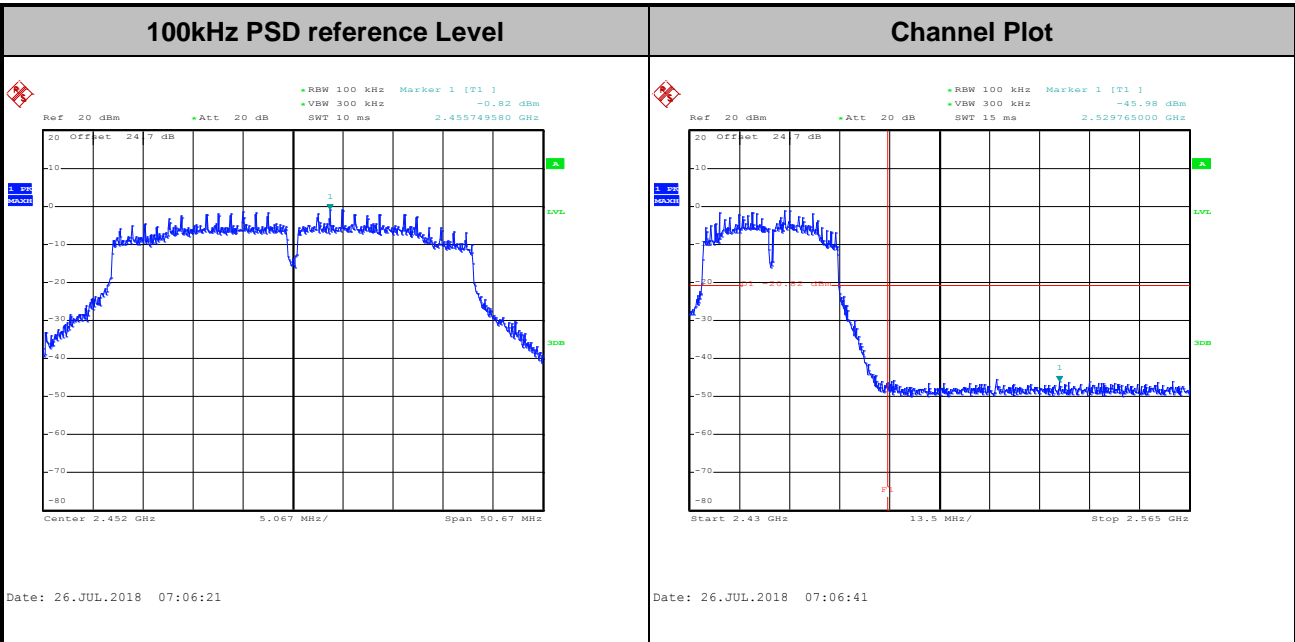


Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





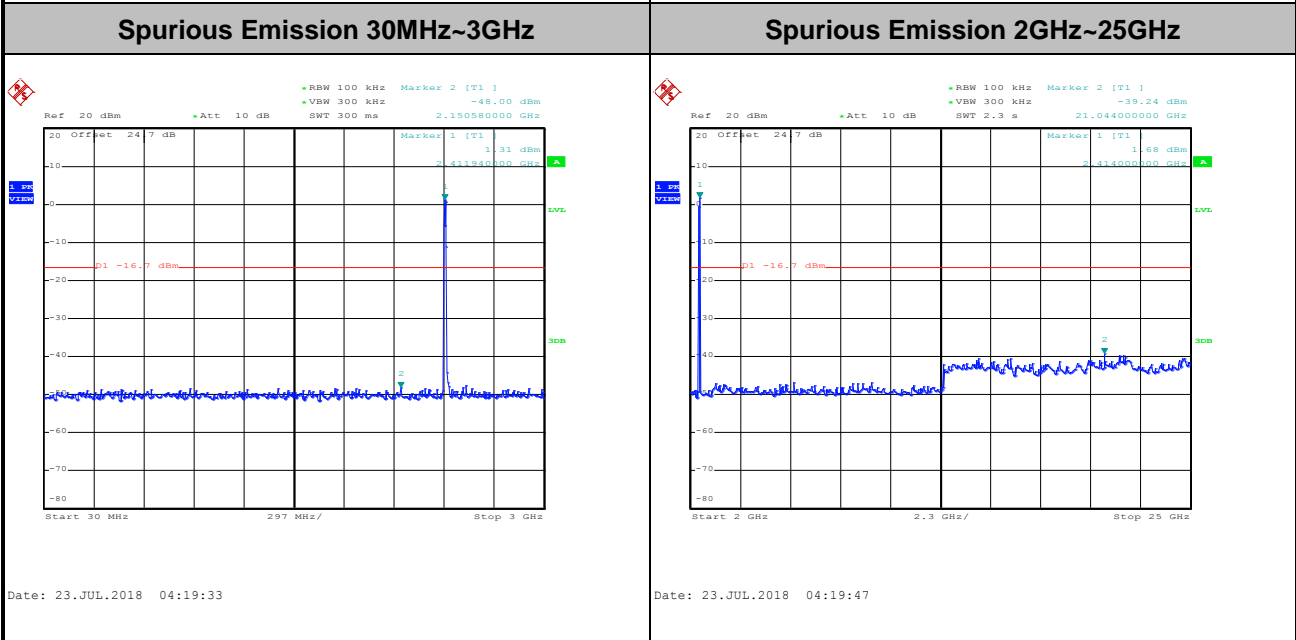
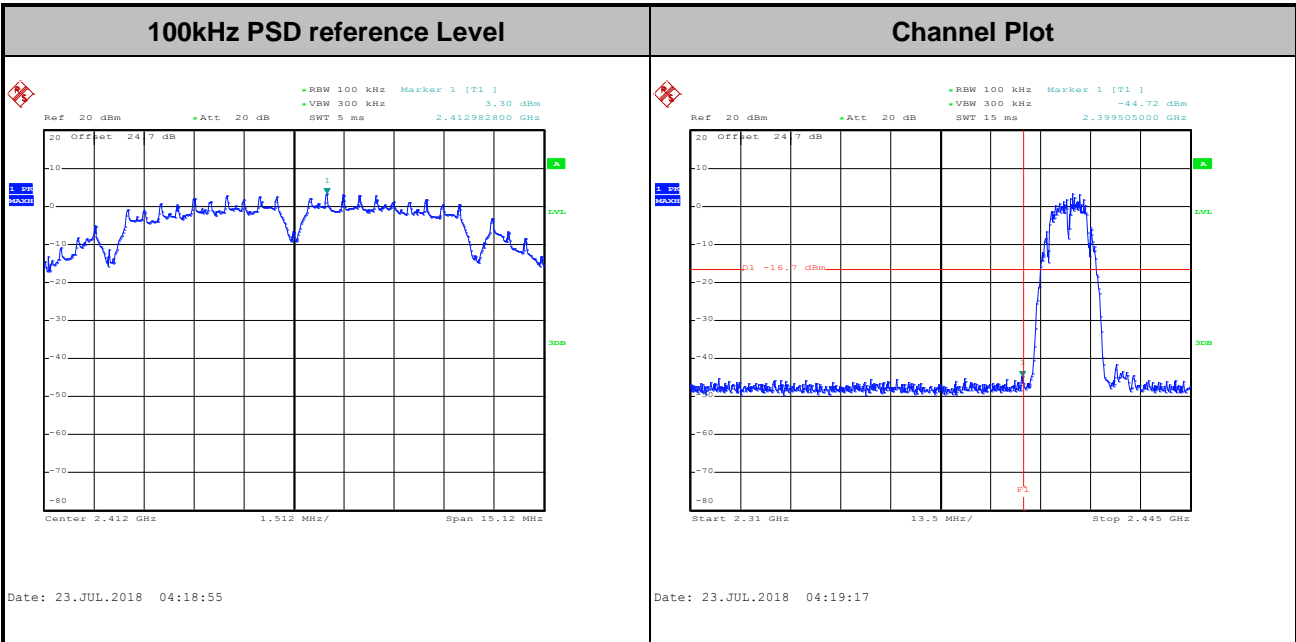
Number of TX :	2	Ant. :	1
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	09	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





Number of TX = 2, Ant. 2 (Measured)

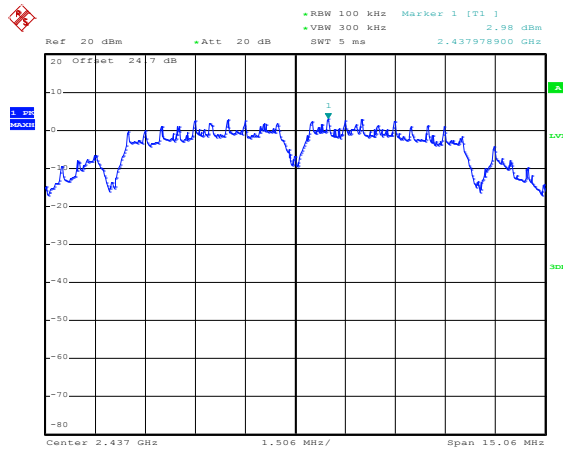
Number of TX :	2	Ant. :	2
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





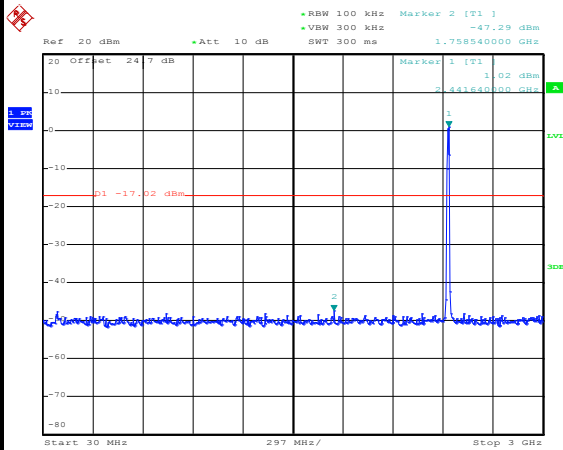
Number of TX :	2	Ant. :	2
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



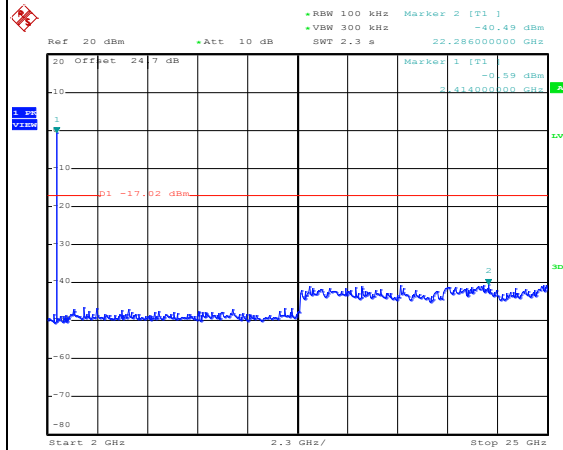
Date: 23.JUL.2018 04:27:21

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 04:27:40

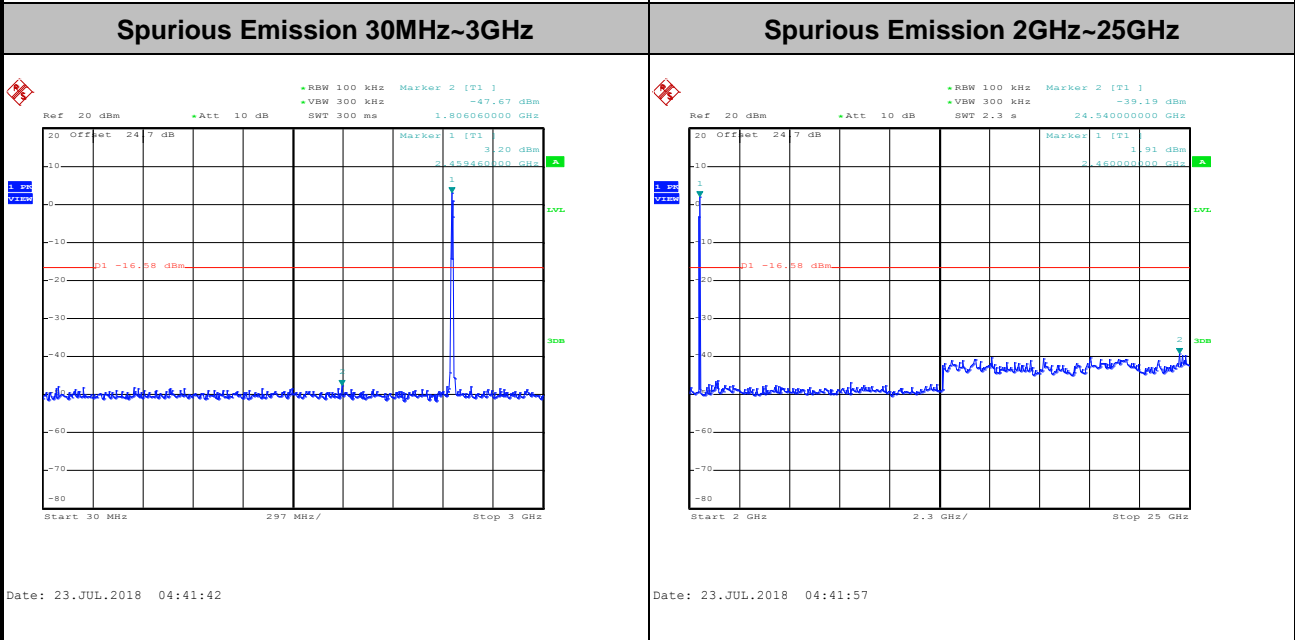
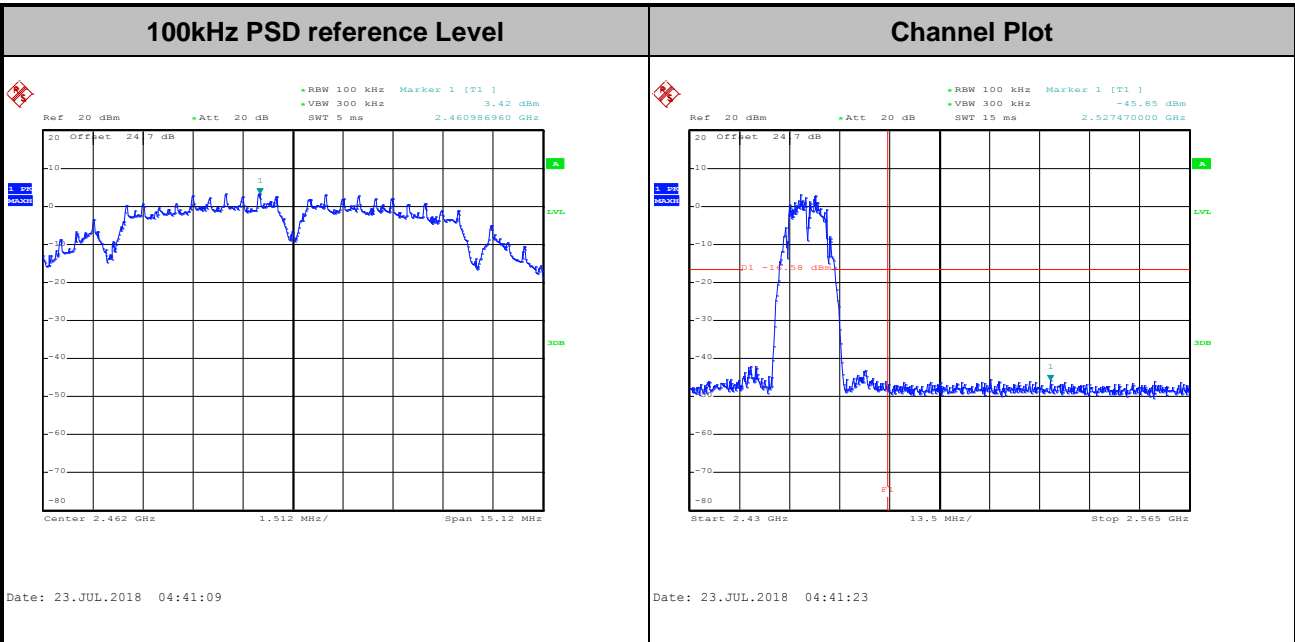
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 04:27:59

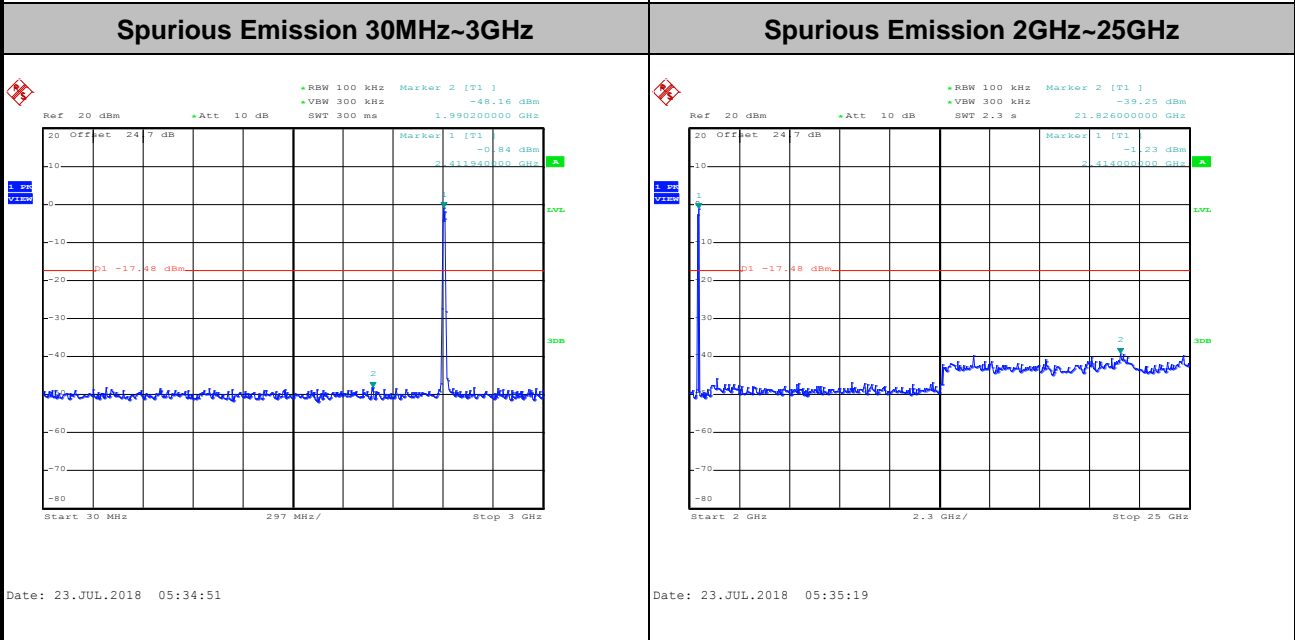
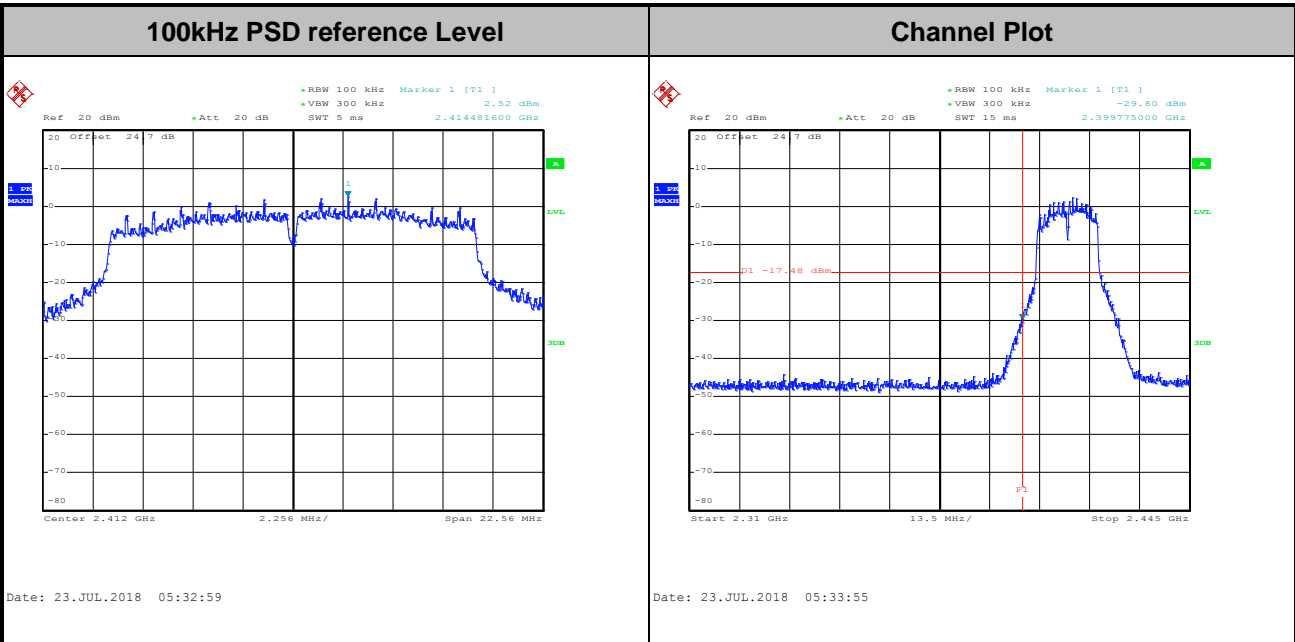


Number of TX :	2	Ant. :	2
Test Mode :	802.11b	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





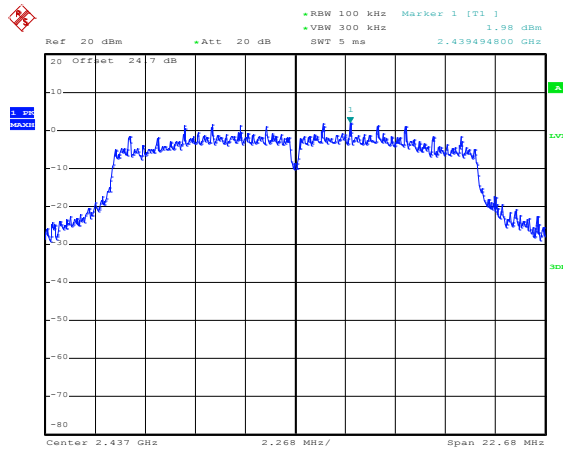
Number of TX :	2	Ant. :	2
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





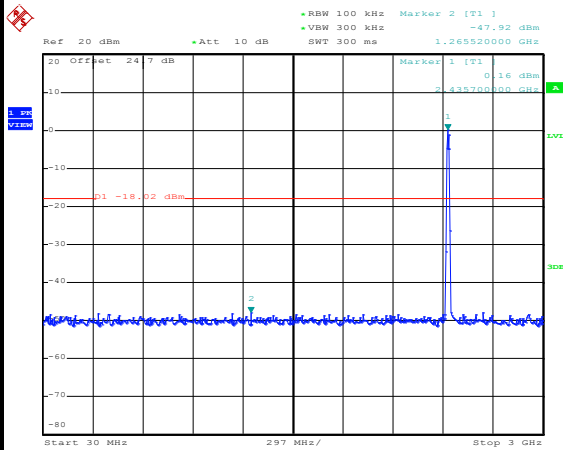
Number of TX :	2	Ant. :	2
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



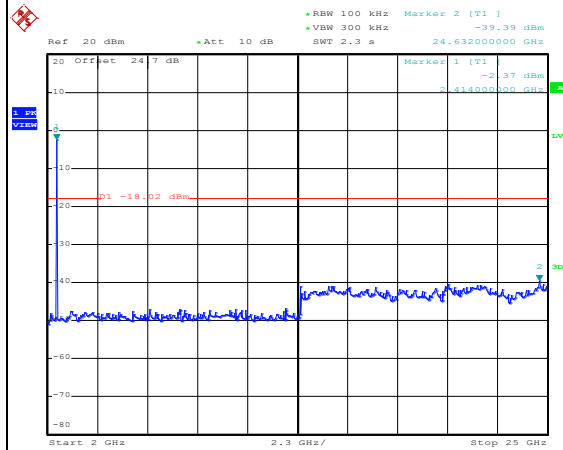
Date: 23.JUL.2018 05:41:43

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 05:42:01

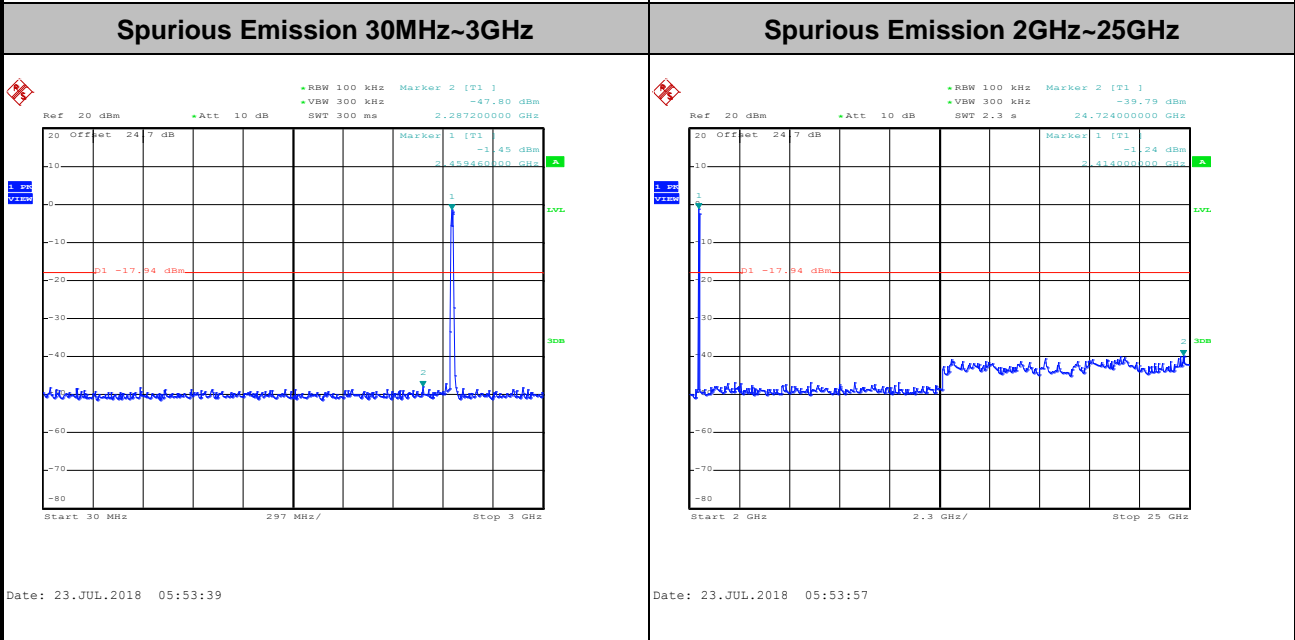
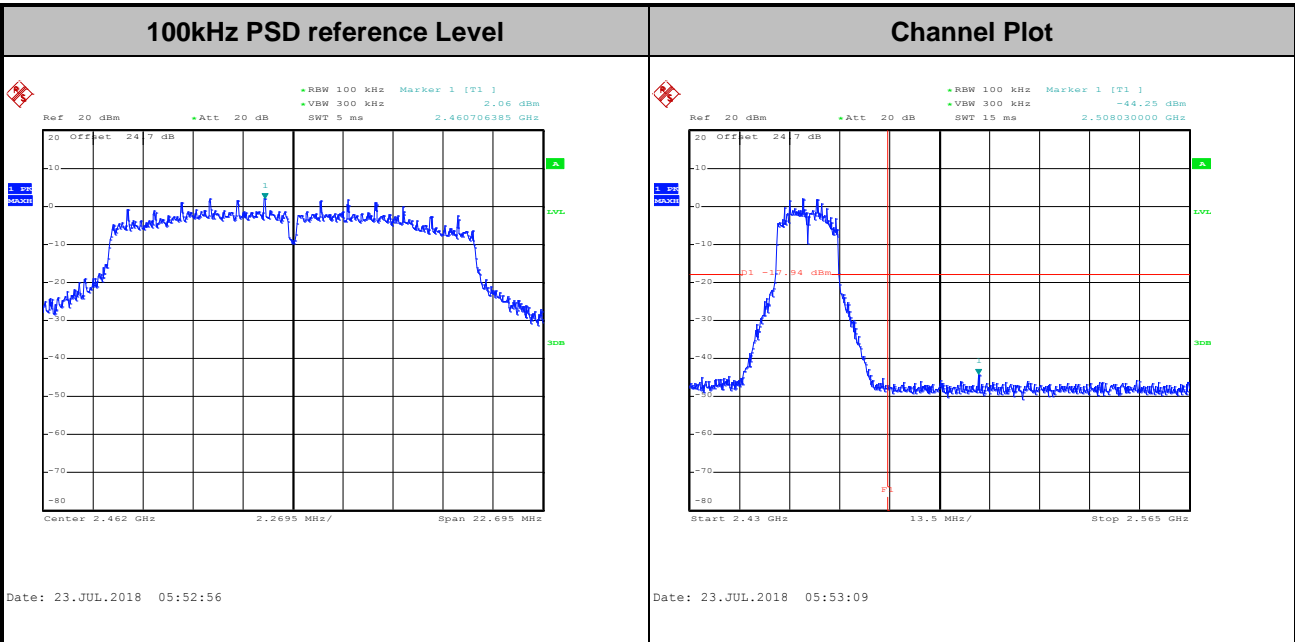
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 05:42:32

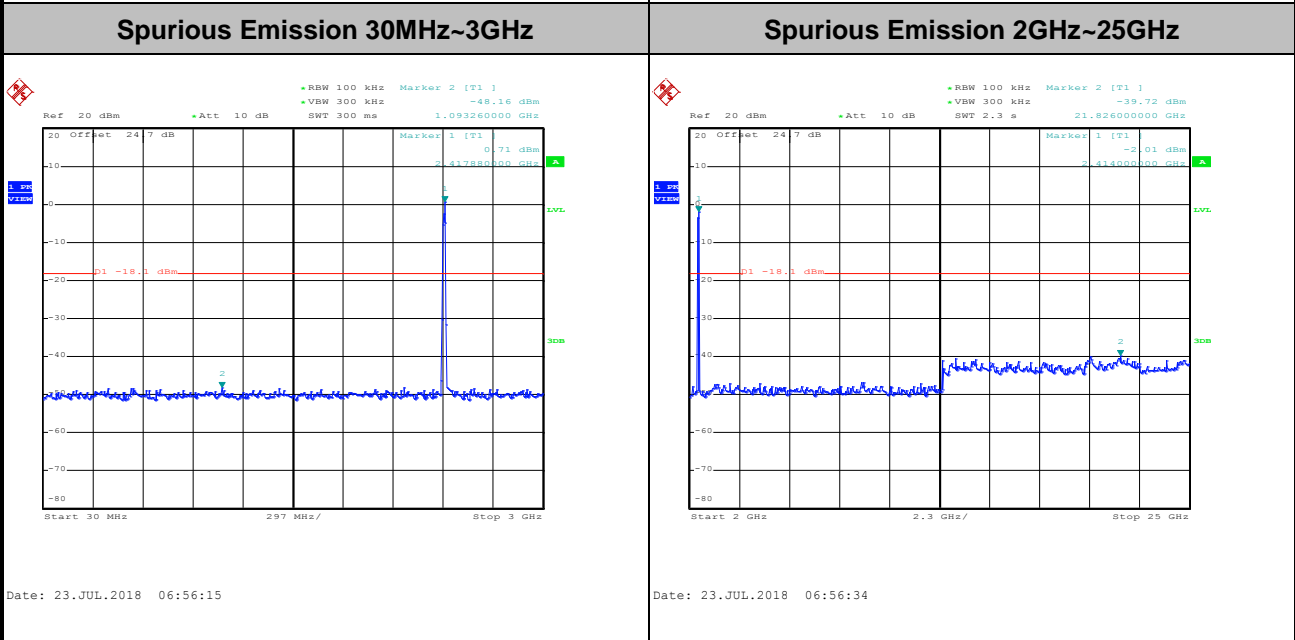
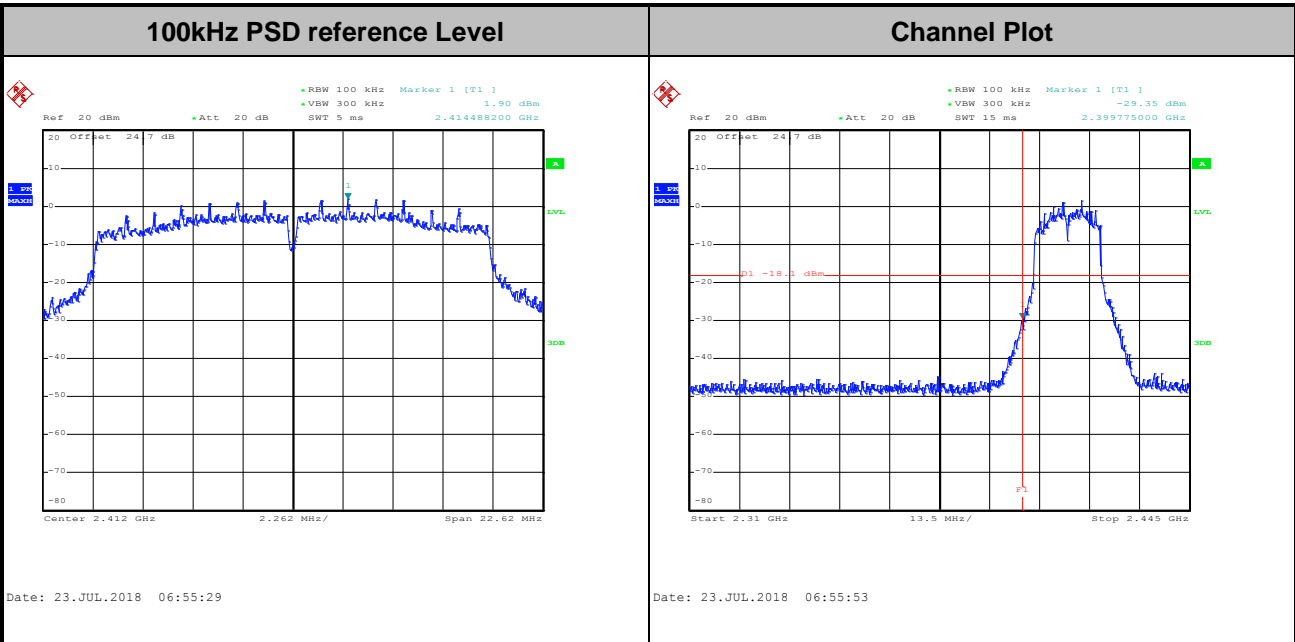


Number of TX :	2	Ant. :	2
Test Mode :	802.11g	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





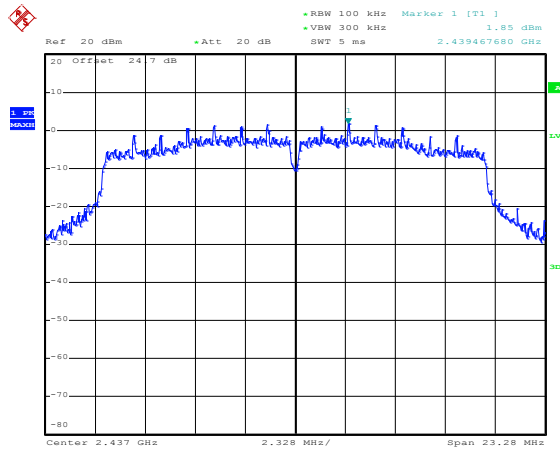
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	01	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





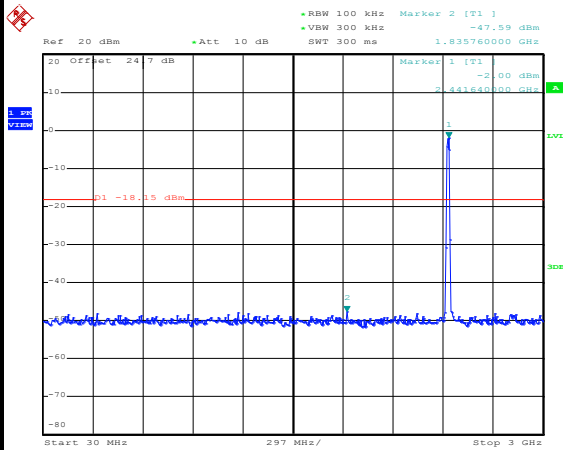
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz Mid	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



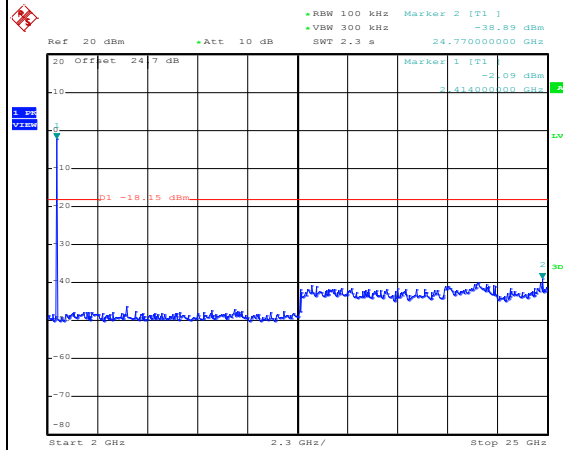
Date: 23.JUL.2018 07:03:51

Spurious Emission 30MHz~3GHz



Date: 23.JUL.2018 07:04:12

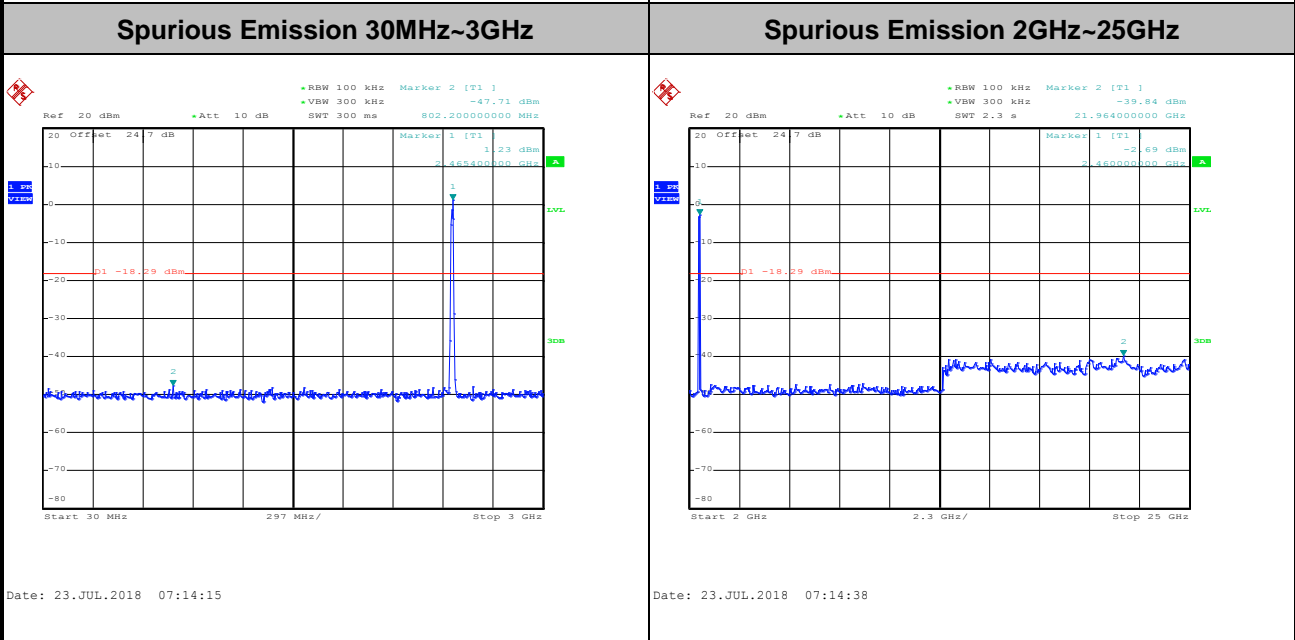
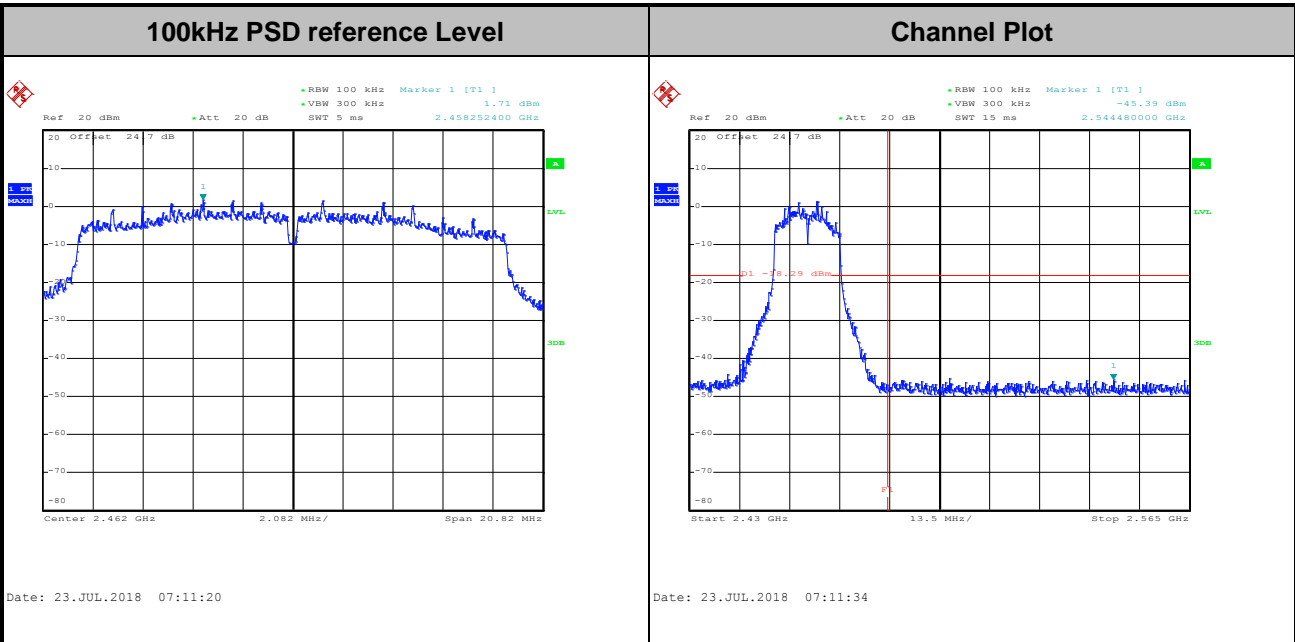
Spurious Emission 2GHz~25GHz



Date: 23.JUL.2018 07:04:28

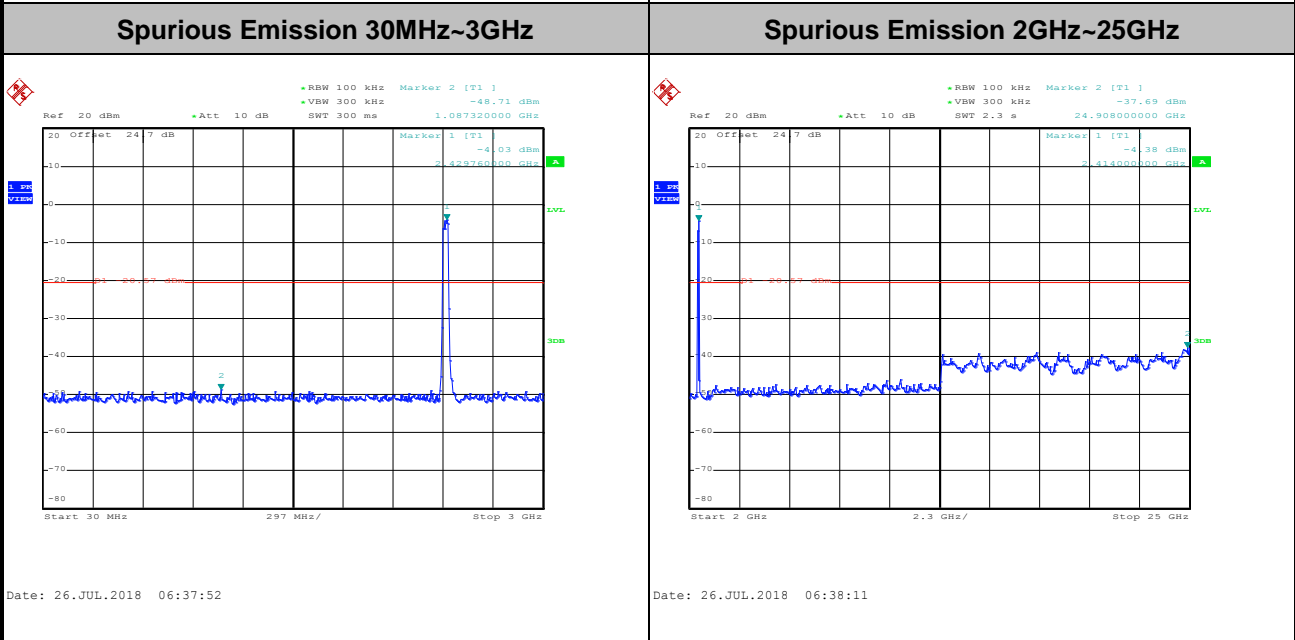
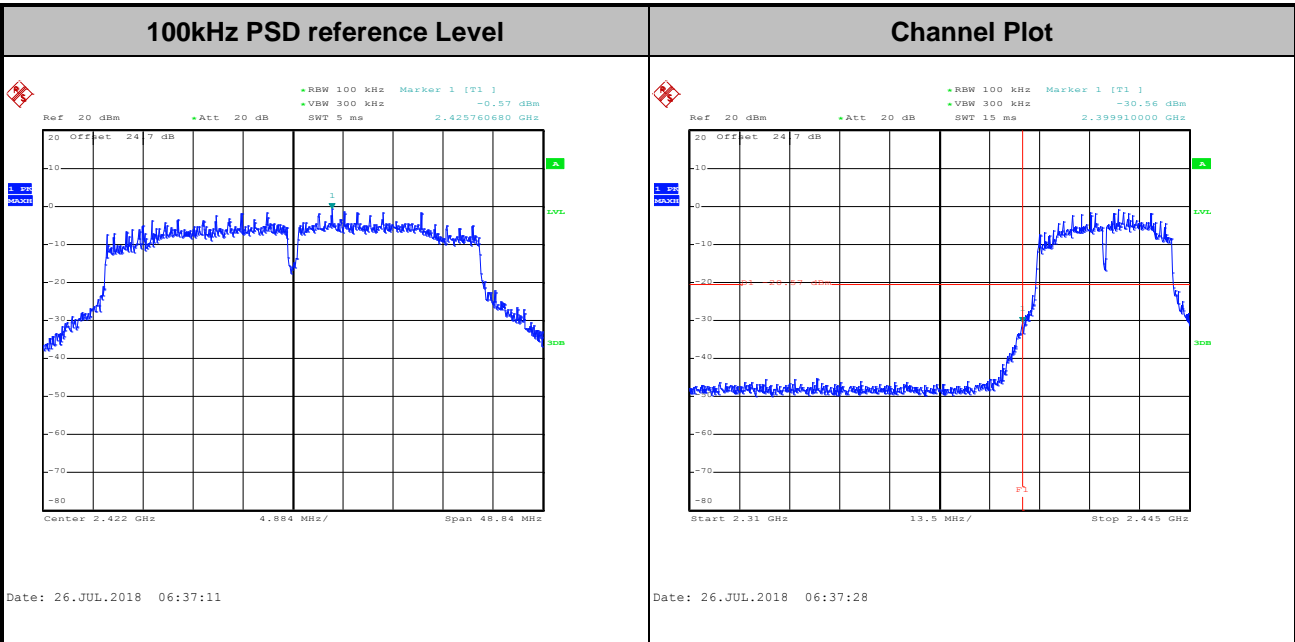


Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT20	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	11	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





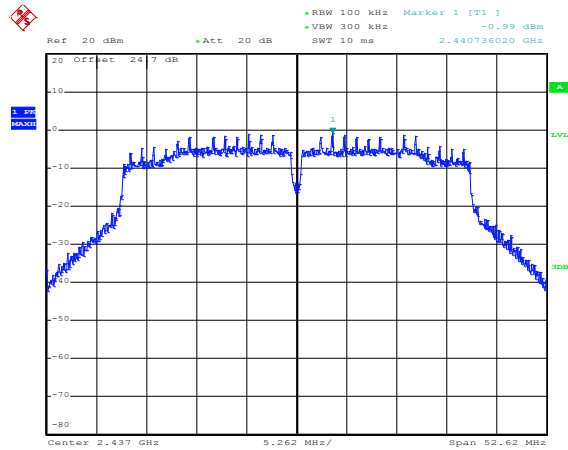
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	03	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





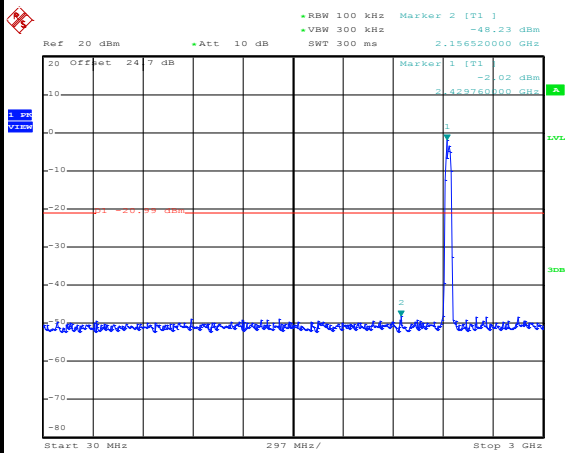
Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz Low	Relative Humidity :	51~54%
Test Channel :	06	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu

100kHz PSD reference Level



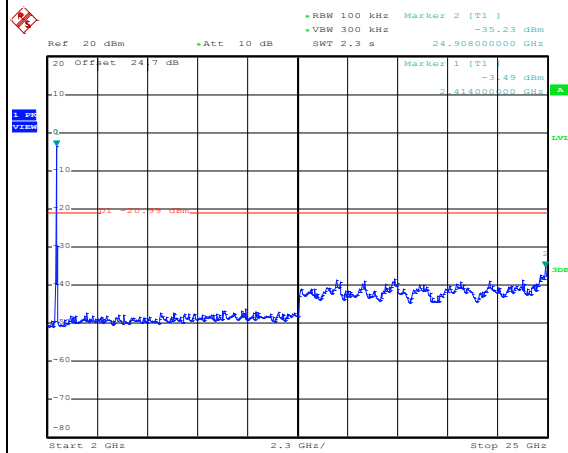
Date: 26.JUL.2018 06:51:28

Spurious Emission 30MHz~3GHz



Date: 26.JUL.2018 06:54:55

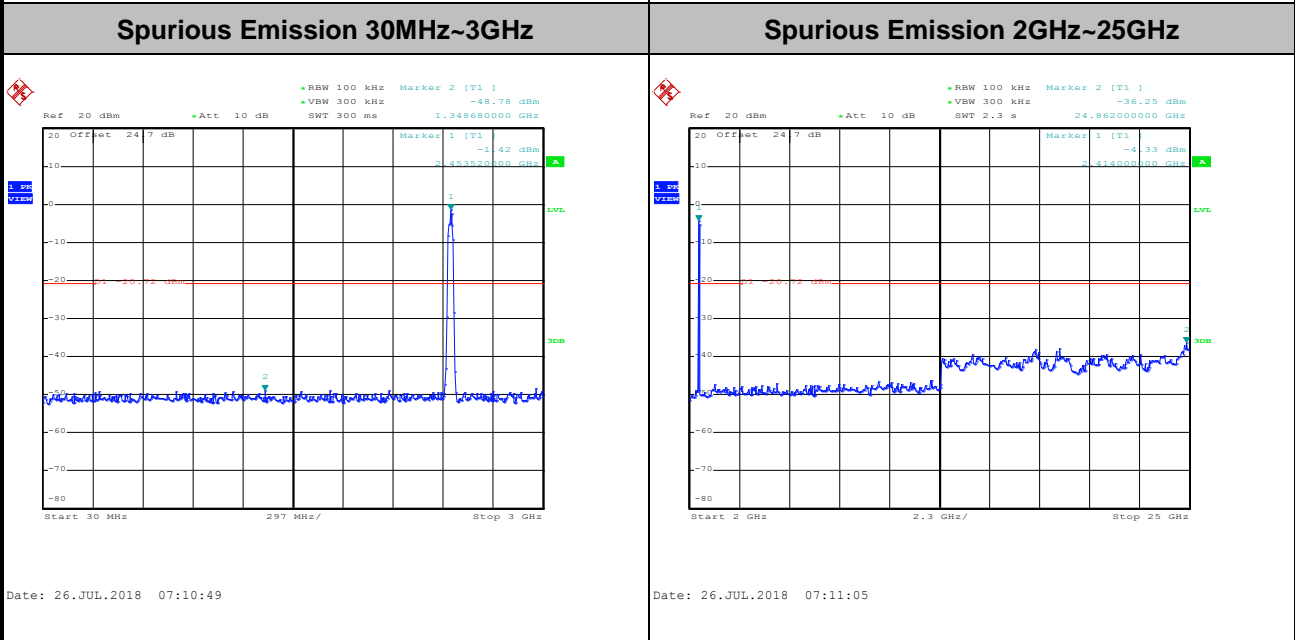
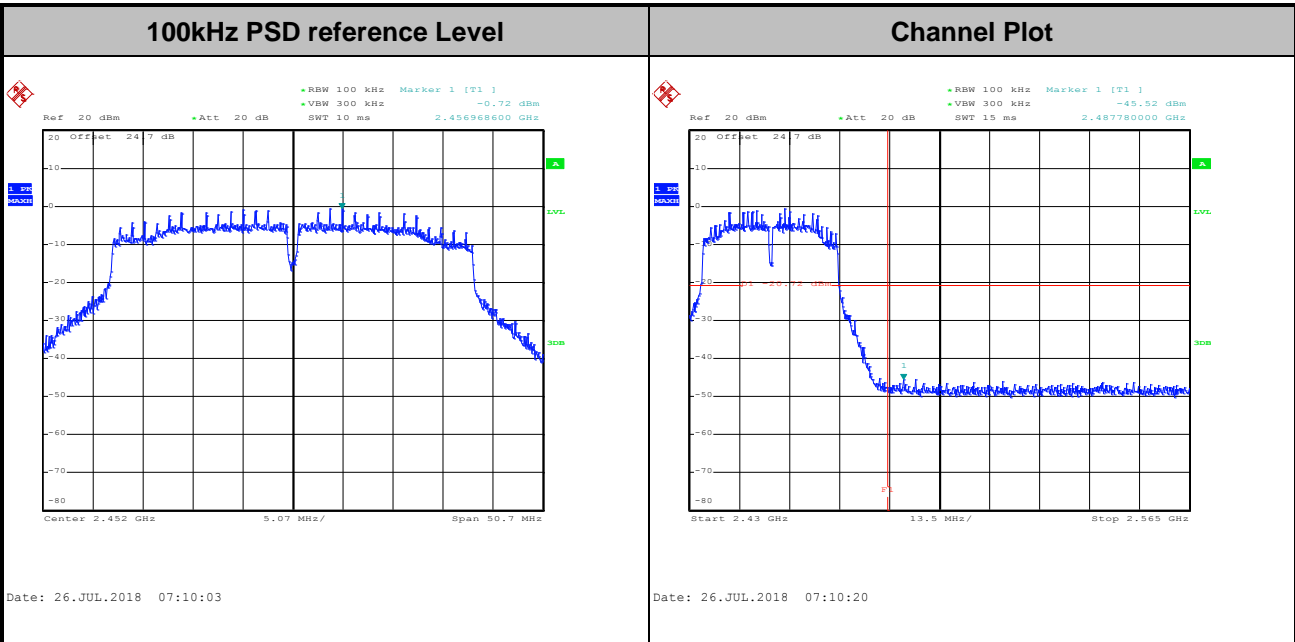
Spurious Emission 2GHz~25GHz



Date: 26.JUL.2018 06:57:09



Number of TX :	2	Ant. :	2
Test Mode :	802.11n HT40	Temperature :	21~25°C
Test Band :	2.4GHz High	Relative Humidity :	51~54%
Test Channel :	09	Test Engineer :	Rebecca Li, Luffy Lin, and Derek Hsu





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

See list of measuring equipment of this test report.

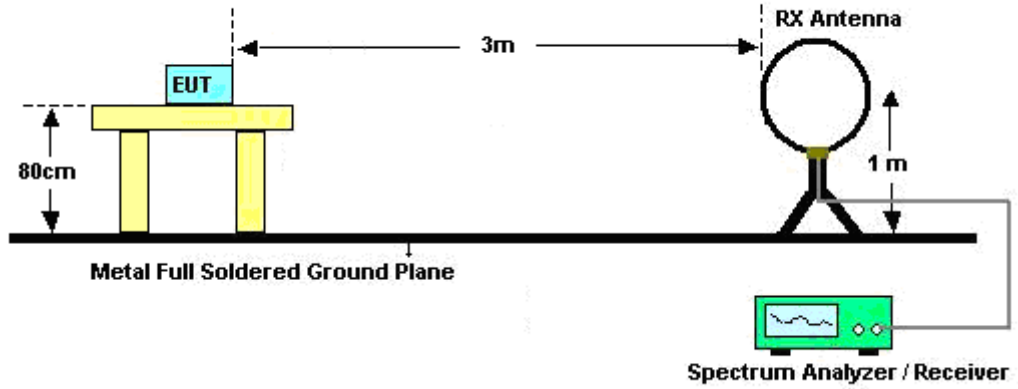


3.5.3 Test Procedures

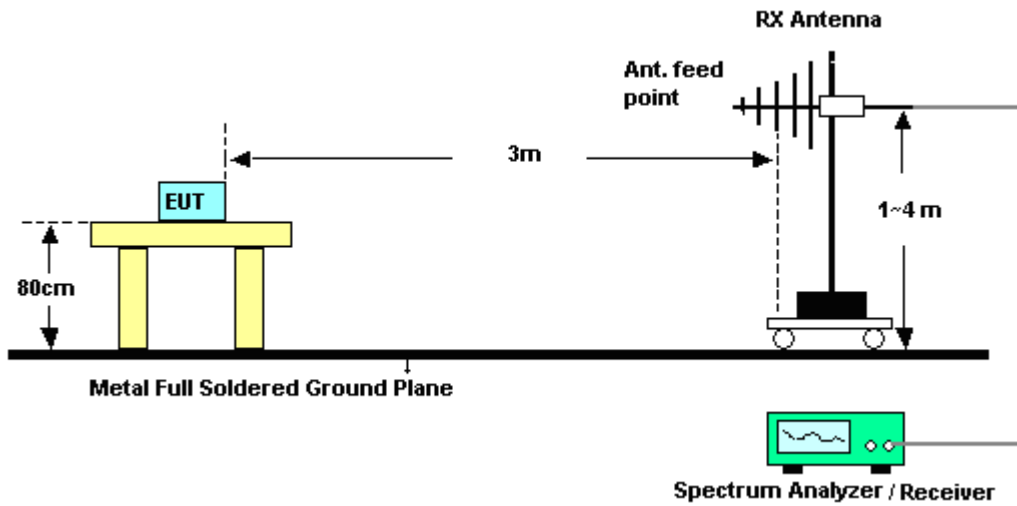
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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

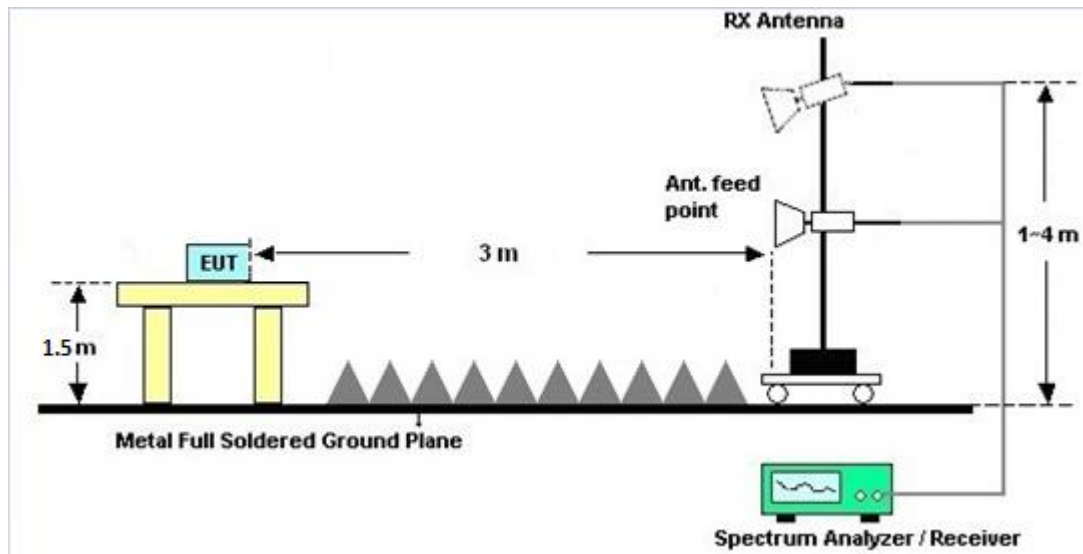
For radiated emissions below 30MHz



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.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix B and 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 B and 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.

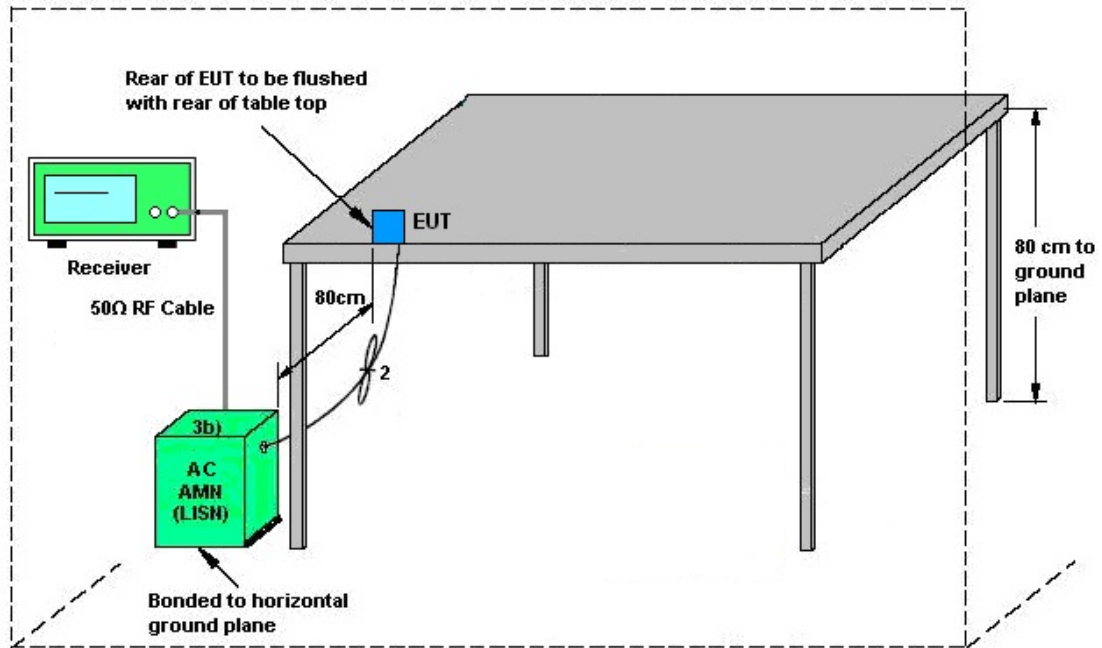
3.6.2 Measuring Instruments

See list of measuring equipment 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



AMN = Artificial mains network (LISH)
 AE = Associated equipment
 EUT = Equipment under test
 ISN = Impedance stabilization network

3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix A.



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.

FCC KDB 662911 D01 Multiple Transmitter Output **v02r01**

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 **v02r01**.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	2.70	0.90	2.70	4.86	0.00	0.00

$Power\ Limit\ Reduction = DG(Power) - 6dBi, (min = 0)$

$PSD\ Limit\ Reduction = DG(PSD) - 6dBi, (min = 0)$



4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Power Meter	Anritsu	ML2495A	1240001	N/A	Sep. 07, 2017	Jun. 13, 2018~ Aug. 24, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Power Sensor	Anritsu	MA2411B	1207349	300MHz~40GHz z	Sep. 07, 2017	Jun. 13, 2018~ Jul. 26, 2018	Sep. 06, 2018	Conducted (TH05-HY)
Spectrum Analyzer	Rohde & Schwarz	FSP40	100057	9kHz-40GHz	Nov. 21, 2017	Jun. 13, 2018~ Aug. 24, 2018	Nov. 20, 2018	Conducted (TH05-HY)
Switch Box & RF Cable	Burgeon	ETF-058	EC1300484	N/A	Mar. 01, 2018	Jun. 13, 2018~ Aug. 24, 2018	Feb. 28, 2019	Conducted (TH05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Jun. 20, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Jun. 20, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Jun. 20, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Jun. 20, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Jun. 20, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Jun. 20, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Bilog Antenna	TESEQ	CBL 6111D&00800 N1D01N-06	35419&03	30MHz to 1GHz	Dec. 18, 2017	Jun. 25, 2018~ Jul. 03, 2018	Dec. 17, 2018	Radiation (03CH07-HY)
Double Ridge Horn Antenna	ESCO	3117	00075962	1GHz ~ 18GHz	Aug. 23, 2017	Jun. 25, 2018~ Jul. 03, 2018	Aug. 22, 2018	Radiation (03CH07-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	100315	9 kHz~30 MHz	Nov. 10, 2017	Jun. 25, 2018~ Jul. 03, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1590075	1GHz ~ 18GHz	Apr. 25, 2018	Jun. 25, 2018~ Jul. 03, 2018	Apr. 24, 2019	Radiation (03CH07-HY)
Preamplifier	COM-POWER	PA-103A	161241	10MHz-1GHz	May 21, 2018	Jun. 25, 2018~ Jul. 03, 2018	May 20, 2019	Radiation (03CH07-HY)
Preamplifier	Agilent	8449B	3008A02362	1GHz~ 26.5GHz	Oct. 30, 2017	Jun. 25, 2018~ Jul. 03, 2018	Oct. 29, 2018	Radiation (03CH07-HY)
Spectrum Analyzer	Agilent	N9010A	MY53470118	10Hz~44GHz	Apr. 17, 2018	Jun. 25, 2018~ Jul. 03, 2018	Apr. 16, 2019	Radiation (03CH07-HY)
Antenna Mast	Max-Full	MFA520BS	N/A	1m~4m	N/A	Jun. 25, 2018~ Jul. 03, 2018	N/A	Radiation (03CH07-HY)
Turn Table	ChainTek	Chaintek 3000	N/A	0~360 Degree	N/A	Jun. 25, 2018~ Jul. 03, 2018	N/A	Radiation (03CH07-HY)
Amplifier	MITEQ	TTA1840- 35-HG	1871923	18GHz~40GHz, VSWR : 2.5:1 max	Jul. 18, 2017	Jun. 25, 2018~ Jul. 03, 2018	Jul. 17, 2018	Radiation (03CH07-HY)
SHF-EHF Horn Antenna	SCHWARZBE CK	BBHA 9170	BBHA917025 1	18GHz- 40GHz	Nov. 10, 2017	Jun. 25, 2018~ Jul. 03, 2018	Nov. 09, 2018	Radiation (03CH07-HY)
EMI Test Receiver	Agilent	N9038A (MXE)	MY53290053	20Hz to 26.5GHz	Jan. 16, 2018	Jun. 25, 2018~ Jul. 03, 2018	Jan. 15, 2019	Radiation (03CH07-HY)
Software	Audix	E3 6.2009- 8-24	80504004656 H	N/A	N/A	Jun. 25, 2018~ Jul. 03, 2018	N/A	Radiation (03CH07-HY)



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	2.70
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.70
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.50
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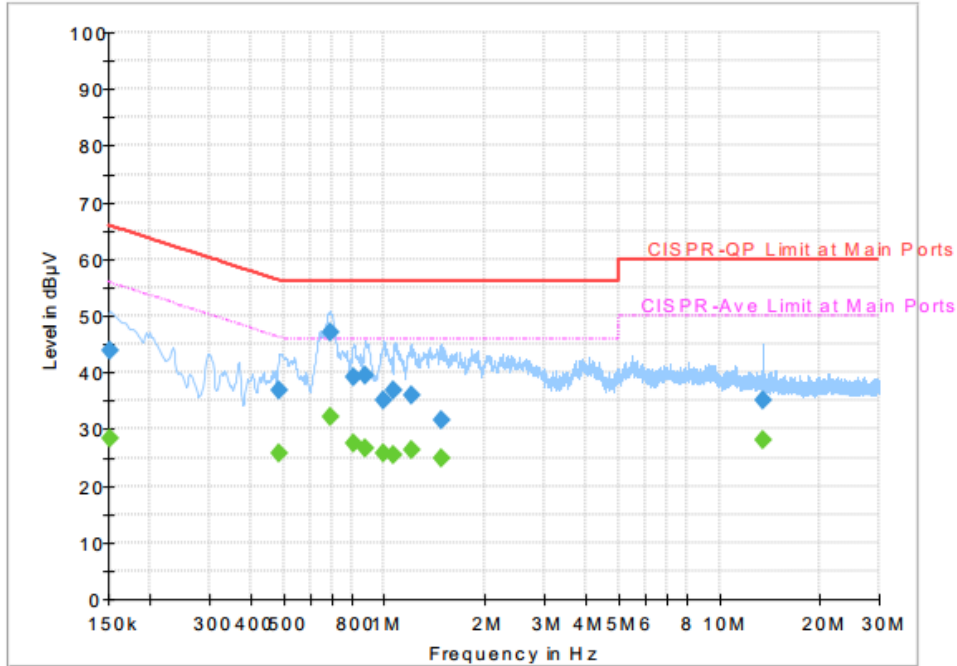
Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.20
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Appendix A. AC Conducted Emission Test Results

Test Engineer :	Kai-Chun Chu	Temperature :	21~25°C
		Relative Humidity :	51~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line

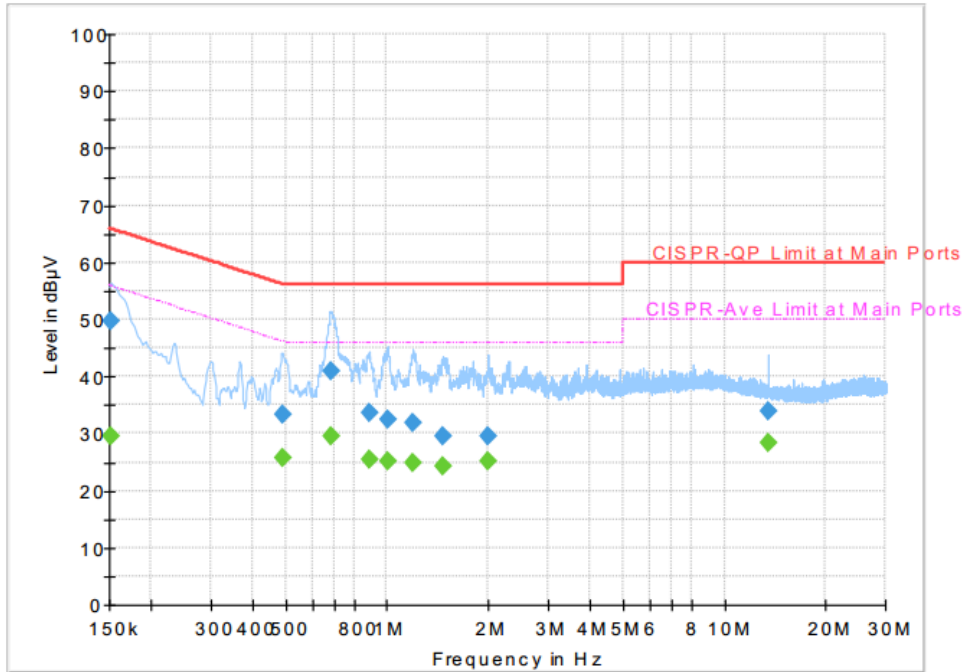


Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	28.44	55.88	27.44	L1	OFF	19.5
0.152250	43.82	---	65.88	22.06	L1	OFF	19.5
0.485250	---	25.74	46.25	20.51	L1	OFF	19.5
0.485250	36.82	---	56.25	19.43	L1	OFF	19.5
0.687750	---	32.18	46.00	13.82	L1	OFF	19.6
0.687750	47.19	---	56.00	8.81	L1	OFF	19.6
0.811500	---	27.54	46.00	18.46	L1	OFF	19.6
0.811500	39.28	---	56.00	16.72	L1	OFF	19.6
0.874500	---	26.61	46.00	19.39	L1	OFF	19.6
0.874500	39.57	---	56.00	16.43	L1	OFF	19.6
0.998250	---	25.88	46.00	20.12	L1	OFF	19.6
0.998250	35.11	---	56.00	20.89	L1	OFF	19.6
1.070250	---	25.44	46.00	20.56	L1	OFF	19.6
1.070250	36.91	---	56.00	19.09	L1	OFF	19.6
1.200750	---	26.17	46.00	19.83	L1	OFF	19.6
1.200750	35.98	---	56.00	20.02	L1	OFF	19.6
1.475250	---	24.91	46.00	21.09	L1	OFF	19.6
1.475250	31.48	---	56.00	24.52	L1	OFF	19.6
13.560000	---	28.07	50.00	21.93	L1	OFF	20.0
13.560000	34.95	---	60.00	25.05	L1	OFF	20.0



Test Engineer :	Kai-Chun Chu	Temperature :	21~25°C
		Relative Humidity :	51~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	29.61	55.88	26.27	N	OFF	19.5
0.152250	49.66	---	65.88	16.22	N	OFF	19.5
0.489750	---	25.60	46.17	20.57	N	OFF	19.5
0.489750	33.34	---	56.17	22.83	N	OFF	19.5
0.683250	---	29.54	46.00	16.46	N	OFF	19.6
0.683250	40.93	---	56.00	15.07	N	OFF	19.6
0.883500	---	25.55	46.00	20.45	N	OFF	19.6
0.883500	33.57	---	56.00	22.43	N	OFF	19.6
1.000500	---	25.03	46.00	20.97	N	OFF	19.6
1.000500	32.44	---	56.00	23.56	N	OFF	19.6
1.189500	---	24.76	46.00	21.24	N	OFF	19.6
1.189500	31.79	---	56.00	24.21	N	OFF	19.6
1.459500	---	24.16	46.00	21.84	N	OFF	19.6
1.459500	29.45	---	56.00	26.55	N	OFF	19.6
1.995000	---	25.20	46.00	20.80	N	OFF	19.6
1.995000	29.66	---	56.00	26.34	N	OFF	19.6
13.560000	---	28.30	50.00	21.70	N	OFF	20.1
13.560000	33.97	---	60.00	26.03	N	OFF	20.1



Appendix B. Radiated Spurious Emission

Test Engineer :	Jesse Wang, Stan Hsieh, and Nick Yu	Temperature :	24~26°C
		Relative Humidity :	51~53%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Path	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 CH 01 2412MHz		2388.855	55.28	-18.72	74	40.94	31.95	17.43	35.04	296	36	P	H	
		2390	47.51	-6.49	54	33.18	31.95	17.43	35.05	296	36	A	H	
	*	2412	106.06	-	-	91.69	31.99	17.43	35.05	296	36	P	H	
	*	2412	102.64	-	-	88.27	31.99	17.43	35.05	296	36	A	H	
													H	
														H
			2386.44	56.75	-17.25	74	42.41	31.95	17.43	35.04	220	301	P	V
			2387.385	51.24	-2.76	54	36.9	31.95	17.43	35.04	220	301	P	V
	*		2412	110.28	-	-	95.91	31.99	17.43	35.05	220	301	P	V
	*		2412	106.89	-	-	92.52	31.99	17.43	35.05	220	301	A	V
														V
														V
802.11b CH 06 2437MHz		2389.1	54.33	-19.67	74	39.99	31.95	17.43	35.04	361	23	P	H	
		2388.4	44.65	-9.35	54	30.31	31.95	17.43	35.04	361	23	A	H	
	*	2437	110.89	-	-	96.38	32.08	17.49	35.06	361	23	P	H	
	*	2437	107.46	-	-	92.95	32.08	17.49	35.06	361	23	A	H	
			2500	55.05	-18.95	74	40.38	32.2	17.55	35.08	361	23	P	H
			2485.44	45.05	-8.95	54	30.41	32.16	17.55	35.07	361	23	A	H
			2329.04	55.23	-18.77	74	41.15	31.79	17.31	35.02	328	268	P	V
			2388.68	44.46	-9.54	54	30.12	31.95	17.43	35.04	328	268	A	V
	*		2437	112.65	-	-	98.14	32.08	17.49	35.06	328	268	P	V
	*		2437	109.49	-	-	94.98	32.08	17.49	35.06	328	268	A	V
			2484.25	55.29	-18.71	74	40.65	32.16	17.55	35.07	328	268	P	V
			2483.62	45.83	-8.17	54	31.19	32.16	17.55	35.07	328	268	A	V



802.11b CH 11 2462MHz	*	2462	103.51	-	-	88.9	32.12	17.55	35.06	306	26	P	H
	*	2462	100.33	-	-	85.72	32.12	17.55	35.06	306	26	A	H
		2484.24	54.63	-19.37	74	39.99	32.16	17.55	35.07	306	26	P	H
		2484.56	44.46	-9.54	54	29.82	32.16	17.55	35.07	306	26	A	H
													H
													H
	*	2462	107	-	-	92.39	32.12	17.55	35.06	234	282	P	V
	*	2462	103.98	-	-	89.37	32.12	17.55	35.06	234	282	A	V
		2496.32	54.66	-19.34	74	39.99	32.2	17.55	35.08	234	282	P	V
		2484.44	46.34	-7.66	54	31.7	32.16	17.55	35.07	234	282	A	V
													V
													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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11b CH 01 2412MHz		4824	46.97	-27.03	74	60.96	34.23	11.12	59.34	100	0	P	H	
													H	
													H	
													H	
			4824	53.09	-20.91	74	67.08	34.23	11.12	59.34	186	266	P	V
			4824	50.87	-3.13	54	64.86	34.23	11.12	59.34	186	266	A	V
														V
802.11b CH 06 2437MHz		4874	43.68	-30.32	74	57.54	34.22	11.16	59.24	100	0	P	H	
		7311	47.12	-26.88	74	55.93	35.71	13.61	58.13	100	0	P	H	
													H	
													H	
			4874	46.48	-27.52	74	60.34	34.22	11.16	59.24	100	0	P	V
			7311	47.84	-26.16	74	56.65	35.71	13.61	58.13	100	0	P	V
														V
802.11b CH 11 2462MHz		4924	45.87	-28.13	74	59.58	34.21	11.22	59.14	100	0	P	H	
													H	
													H	
													H	
			4924	52.96	-21.04	74	66.67	34.21	11.22	59.14	267	176	P	V
			4924	50.83	-3.17	54	64.54	34.21	11.22	59.14	267	176	A	V
														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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11g CH 01 2412MHz		2389.8	66.31	-7.69	74	51.98	31.95	17.43	35.05	295	24	P	H	
		2390	51.2	-2.8	54	36.87	31.95	17.43	35.05	295	24	A	H	
	*	2412	110.29	-	-	95.92	31.99	17.43	35.05	295	24	P	H	
	*	2412	102.73	-	-	88.36	31.99	17.43	35.05	295	24	A	H	
													H	
													H	
			2389.905	66.3	-7.7	74	51.97	31.95	17.43	35.05	219	296	P	V
			2390	50.55	-3.45	54	36.22	31.95	17.43	35.05	219	296	A	V
	*		2412	111.93	-	-	97.56	31.99	17.43	35.05	219	296	P	V
	*		2412	103.93	-	-	89.56	31.99	17.43	35.05	219	296	A	V
													V	
													V	
802.11g CH 06 2437MHz		2389.24	57.62	-16.38	74	43.28	31.95	17.43	35.04	363	23	P	H	
		2389.94	48.55	-5.45	54	34.22	31.95	17.43	35.05	363	23	A	H	
	*	2437	113.18	-	-	98.67	32.08	17.49	35.06	363	23	P	H	
	*	2437	105.61	-	-	91.1	32.08	17.49	35.06	363	23	A	H	
			2483.69	59.4	-14.6	74	44.76	32.16	17.55	35.07	363	23	P	H
			2483.5	47.56	-6.44	54	32.92	32.16	17.55	35.07	363	23	A	H
			2387	56.62	-17.38	74	42.28	31.95	17.43	35.04	327	268	P	V
			2387	46.88	-7.12	54	32.54	31.95	17.43	35.04	327	268	A	V
	*		2437	115.35	-	-	100.89	32.03	17.49	35.06	327	268	P	V
	*		2437	107.4	-	-	92.94	32.03	17.49	35.06	327	268	A	V
			2484.81	61.26	-12.74	74	46.62	32.16	17.55	35.07	327	268	P	V
			2483.62	49.68	-4.32	54	35.04	32.16	17.55	35.07	327	268	A	V



802.11g CH 11 2462MHz	*	2462	109.37	-	-	94.76	32.12	17.55	35.06	316	23	P	H
	*	2462	101.52	-	-	86.91	32.12	17.55	35.06	316	23	A	H
		2483.6	56.65	-17.35	74	42.01	32.16	17.55	35.07	316	23	P	H
		2483.68	47.6	-6.4	54	32.96	32.16	17.55	35.07	316	23	A	H
													H
													H
	*	2462	112.49	-	-	97.88	32.12	17.55	35.06	181	292	P	V
	*	2462	104.37	-	-	89.76	32.12	17.55	35.06	181	292	A	V
		2484.36	60.72	-13.28	74	46.08	32.16	17.55	35.07	181	292	P	V
		2483.52	51.12	-2.88	54	36.48	32.16	17.55	35.07	181	292	A	V
													V
													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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11g CH 01 2412MHz		4824	42.68	-31.32	74	56.67	34.23	11.12	59.34	100	0	P	H	
													H	
													H	
													H	
			4824	45.67	-28.33	74	59.66	34.23	11.12	59.34	100	0	P	V
														V
														V
802.11g CH 06 2437MHz		4874	41.15	-32.85	74	55.01	34.22	11.16	59.24	100	0	P	H	
		7311	45.5	-28.5	74	54.31	35.71	13.61	58.13	100	0	P	H	
													H	
													H	
			4874	42.31	-31.69	74	56.17	34.22	11.16	59.24	100	0	P	V
			7311	45.56	-28.44	74	54.37	35.71	13.61	58.13	100	0	P	V
														V
802.11g CH 11 2462MHz		4924	43.06	-30.94	74	56.77	34.21	11.22	59.14	100	0	P	H	
		7386	42.95	-31.05	74	51.86	35.66	13.69	58.26	100	0	P	H	
													H	
													H	
			4924	48.27	-25.73	74	61.98	34.21	11.22	59.14	100	0	P	V
			7386	47.76	-26.24	74	56.67	35.66	13.69	58.26	100	0	P	V
														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)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)	
802.11n HT20 CH 01 2412MHz		2389.8	61.9	-12.1	74	47.57	31.95	17.43	35.05	353	34	P	H	
		2389.905	48.17	-5.83	54	33.84	31.95	17.43	35.05	353	34	A	H	
	*	2412	108.1	-	-	93.73	31.99	17.43	35.05	353	34	P	H	
	*	2412	100.35	-	-	85.98	31.99	17.43	35.05	353	34	A	H	
													H	
													H	
			2389.905	66.95	-7.05	74	52.62	31.95	17.43	35.05	206	359	P	V
			2390	52.72	-1.28	54	38.39	31.95	17.43	35.05	206	359	P	V
		*	2412	110.05	-	-	95.68	31.99	17.43	35.05	206	359	P	V
		*	2412	102.6	-	-	88.23	31.99	17.43	35.05	206	359	A	V
													V	
													V	
802.11n HT20 CH 06 2437MHz		2389.8	55.95	-18.05	74	41.62	31.95	17.43	35.05	390	27	P	H	
		2389.66	45.86	-8.14	54	31.52	31.95	17.43	35.04	390	27	A	H	
	*	2437	111.05	-	-	96.54	32.08	17.49	35.06	390	27	P	H	
	*	2437	103.65	-	-	89.14	32.08	17.49	35.06	390	27	A	H	
			2485.37	56.72	-17.28	74	42.08	32.16	17.55	35.07	390	27	P	H
			2483.55	46.69	-7.31	54	32.05	32.16	17.55	35.07	390	27	A	H
			2389.94	57.64	-16.36	74	43.31	31.95	17.43	35.05	228	294	P	V
			2389.94	47.62	-6.38	54	33.29	31.95	17.43	35.05	228	294	A	V
		*	2437	114.3	-	-	99.79	32.08	17.49	35.06	228	294	P	V
		*	2437	106.73	-	-	92.22	32.08	17.49	35.06	228	294	A	V
		2483.52	63.57	-10.43	74	48.93	32.16	17.55	35.07	228	294	P	V	
		2483.55	50.9	-3.1	54	36.26	32.16	17.55	35.07	228	294	A	V	