

FCC Test Report

FCC ID : VQK-F03F

Equipment: Mobile Phone

Model No. : F-03F

Brand Name : FUJITSU

Applicant : FUJITSU LIMITED

Address : 1-1, Kamikodanaka 4-chome, Nakahara-ku,

Kawasaki 211-8588, Japan

Standard : 47 CFR FCC Part 15.247

Received Date : Sep. 13, 2013

Tested Date : Oct. 04 ~ Oct. 16, 2013

We, International Certification Corp., would like to declare that the tested sample has been evaluated and in compliance with the requirement of the above standards. The test results contained in this report refer exclusively to the product. It may be duplicated completely for legal use with the approval of the applicant. It shall not be reproduced except in full without the written approval of our laboratory.

Approved & Reviewed by:

Gary Chang / Manager

Iac-MRA



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Release Record

Report No.	Version	Description	Issued Date
FR391304AC	Rev. 01	Initial issue	Oct. 21, 2013

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 3.107MHz 33.15 (Margin -12.85dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 2483.50 71.82 (Margin -2.18dB) - PK	Pass
15.247(b)(3) Fundamental Emission Output Power		Power [dBm]: 11b: 14.57 11g: 16.24 HT20: 15.95	Pass
15.247(a)(2)	6dB Bandwidth	Meet the requirement of limit	Pass
15.247(e) Power Spectral Density		Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

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1 General Description

1.1 Information

1.1.1 Product Details

Product Name	Mobile Phone
Brand Name FUJITSU	
Model Name F-03F	
IMEI Code	353704050015387, 353704050015494, 353704050000330
H/W Version	V2.1.0
S/W Version	R17.1e

1.1.2 Specification of the Equipment under Test (EUT)

RF General Information						
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS	
2400-2483.5	b	2412-2462	1-11 [11]	1	1-11 Mbps	
2400-2483.5	g	2412-2462	1-11 [11]	1	6-54 Mbps	
2400-2483.5	n (HT20)	2412-2462	1-11 [11]	1	MCS 0-7	

Note 1: RF output power specifies that Maximum Peak Conducted Output Power.

Note 2: 802.11b uses a combination of DSSS-DBPSK, DQPSK, CCK modulation.

Note 3: 802.11g/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.3 Antenna Details

Ant. No.	Туре	Gain (dBi)	Connector	Remark
1	λ/4 Monopole	0		

1.1.4 EUT Operational Condition

Supply Voltage	△ AC mains	□ DC	
Type of DC Source	☐ Internal DC supp	y External DC adapter	□ Battery

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1.1.5 Accessories

	Accessories				
No. Equipment Description					
		Brand Name: Fujitsu limited			
1	Battery	Model Name: CA54310-0045			
		Power Rating: O/P: 3.8Vdc, 2600mA			
		Brand Name: Fujitsu limited			
2	Cradle	Model Name: F44			
		Power Rating: O/P: 5.0Vdc, 1.5A			

1.1.6 Channel List

Frequency band (MHz)					
802.11 b / g / n HT20					
Channel Frequency(MHz)					
1	2412				
2	2417				
3	2422				
4	2427				
5	2432				
6	2437				
7	2442				
8	2447				
9	2452				
10	2457				
11	2462				

1.1.7 Test Tool and Duty Cycle

Test Tool	QRCT, Ver 3.0.6.0				
	Mode	Duty cycle (%)	Duty factor (dB)		
Duty Cycle and Duty Footer	11b	98.62%	0.06		
Duty Cycle and Duty Factor	11g	88.37%	0.54		
	HT20	87.69%	0.57		

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1.1.8 Power Setting

Channel	Frequency(MHz)	11b	11g	HT20
1	2412	10/0	11/1	9/-1
6	2437	10/0	11/1	11/-1
11	2462	10/-2	11/-1	8/2

1.2 Local Support Equipment List

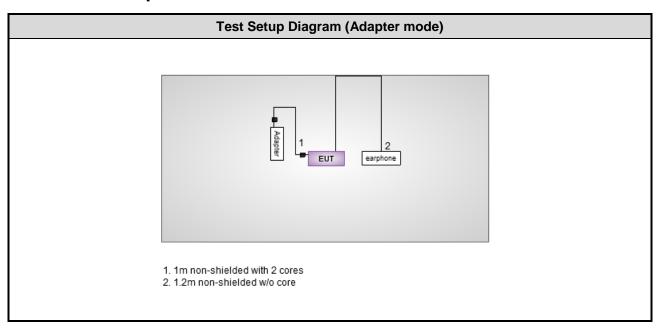
	Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)	
1	Adapter	NTT docomo	AC Adaptor 04			1m non-shielded with 2 cores	
2	Earphone	Apple	MD827FE/A			1.2m non-shielded w/o core	

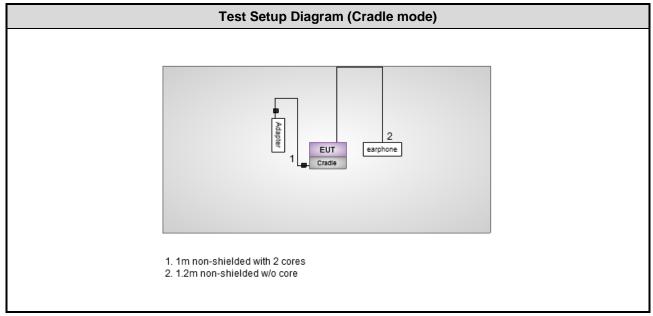
Note: Item 1 was provided by client.

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1.3 Test Setup Chart





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1.4 The Equipment List

Test Item	Radiated Emission above 1GHz							
Test Site	966 chamber1 / (03CH01-WS)							
Instrument	Manufacturer	anufacturer Model No. Serial No. Calibration Date Calibratio						
3m semi-anechoic chamber	CHAMPRO	SAC-03	03CH01-WS	Jan. 04, 2013	Jan. 03, 2014			
Spectrum Analyzer	R&S	FSV40	101498	Jan. 24, 2013	Jan. 23, 2014			
Receiver	R&S	ESR3	101658	Jan. 28, 2013	Jan. 27, 2014			
Bilog Antenna	SCHWARZBECK	VULB9168	VULB9168-522	Jan. 11, 2013	Jan. 10, 2014			
Horn Antenna 1G-18G	SCHWARZBECK	BBHA 9120 D	BBHA 9120 D 1096	Feb. 18, 2013	Feb. 17, 2014			
Horn Antenna 18G-40G	SCHWARZBECK	BBHA 9170	BBHA 9170517	Jan. 14, 2013	Jan. 13, 2014			
Amplifier	Burgeon	BPA-530	100219	Nov. 28, 2012	Nov. 27, 2013			
Amplifier	Agilent	83017A	MY39501308	Dec. 18, 2012	Dec. 17, 2013			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16014/4	Dec. 25, 2012	Dec. 24, 2013			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16019/4	Dec. 25, 2012	Dec. 24, 2013			
RF Cable	HUBER+SUHNER	SUCOFLEX104	MY16139/4	Dec. 25, 2012	Dec. 24, 2013			
RF Cable-R03m	Woken	CFD400NL-LW	CFD400NL-001	Dec. 25, 2012	Dec. 24, 2013			
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-002	Dec. 25, 2012	Dec. 24, 2013			
control	EM Electronics	EM1000	60612	N/A	N/A			

Loop Antenna	R&S	HFH2-Z2	100330	Nov. 15, 2012	Nov. 14, 2014			
Amplifier	Amplifier MITEQ		AMF-6F-260400 9121372		Apr. 18, 2015			
Note: Calibration Interval of instruments listed above is two year.								

Test Item	RF Conducted	RF Conducted							
Test Site	(TH01-WS)	(TH01-WS)							
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until				
Spectrum Analyzer	R&S	FSV 40	101063	Feb. 18, 2013	Feb. 17, 2014				
TEMP&HUMIDITY CHAMBER	GIANT FORCE	GCT-225-40-SP-SD	MAF1212-002	Nov. 29, 2012	Nov. 28, 2013				
Power Meter	Anritsu	ML2495A	1218007	Oct. 22, 2012	Oct. 21, 2013				
Power Sensor	Anritsu	MA2411B	1207367	Oct. 22, 2012	Oct. 21, 2013				
Signal Generator	R&S	SMB100A	175727	Jan. 14, 2013	Jan. 13, 2014				
Note: Calibration Inter	val of instruments listed	d above is one year.							

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Test Item	Conducted Emission	Conducted Emission							
Test Site	Conduction room 1 / (CO01-WS)								
Instrument	Manufacturer Model No. Serial No. Calibration Date Calibration U								
EMC Receiver	R&S	ESCS 30	100169	Oct. 15, 2013	Oct. 14, 2014				
LISN	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-667	Dec. 04, 2012	Dec. 03, 2013				
LISN (Support Unit)	SCHWARZBECK MESS-ELEKTRONIK	Schwarzbeck 8127	8127-666	Dec. 04, 2012	Dec. 03, 2013				
ISN	TESEQ	ISN T800	34406	Apr. 08, 2013	Apr. 07, 2014				
ISN	TESEQ	ISN T200A	30494	Apr. 09, 2013	Apr. 08, 2014				
ISN	TESEQ	ISN ST08	22589	Jan. 24, 2013	Jan. 23, 2014				
RF Current Probe	FCC	F-33-4	121630	Dec. 04, 2012	Dec. 03, 2013				
RF Cable-CON	Woken	CFD200-NL	CFD200-NL-001	Dec. 25, 2012	Dec. 24, 2013				
ESH3-Z6 V-Network(+)	R&S	ESH3-Z6	100920	Nov. 21, 2012	Nov. 20, 2013				
ESH3-Z6 V-Network(-)	R&S	ESH3-Z6	100951	Jan. 30, 2013	Jan. 29, 2014				
Two-Line V-Network	R&S	ENV216	101579	Jan. 07, 2013	Jan. 06, 2014				
50 ohm terminal	NA	50	01	Apr. 22, 2013	Apr. 21, 2014				
50 ohm terminal (Support Unit)	NA	50	04	Apr. 22, 2013	Apr. 21, 2014				
Note: Calibration Inter	val of instruments listed a	above is one year.		1	<u> </u>				

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1.5 Test Standards

According to the specification of EUT, the EUT must comply with following standards and KDB documents.

47 CFR FCC Part 15.247 ANSI C63.10-2009 FCC KDB 558074 D01 DTS Meas Guidance v03r01

Note: The EUT has been tested and complied with FCC part 15B requirement. FCC Part 15B test results are issued to another report.

1.6 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Measurement Uncertainty					
Parameters	Uncertainty				
Bandwidth	±35.286 Hz				
Conducted power	±0.536 dB				
Frequency error	±35.286 Hz				
Temperature	±0.3 °C				
Conducted emission	±2.946 dB				
AC conducted emission	±2.43 dB				
Radiated emission	±2.49 dB				

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2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By	Tested Date
AC Conduction	CO01-WS	21°C / 66%	Peter Lin	Oct. 16, 2013
Radiated Emissions	03CH01-WS	21°C / 66%	Peter Lin	Oct. 04~ Oct. 11, 2013
RF Conducted	TH01-WS	24°C / 61%	Brad Wu	Oct. 10, 2013

FCC site registration No.: 657002IC site registration No.: 10807A-1

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Mode	Test Frequency (MHz)	Data rate (Mbps) / MCS	Test Configuration	
Conducted Emissions	11g	2462	6 Mbps	1, 2	
Radiated Emissions < 1GHz	11g	2462	6 Mbps	1, 2	
Radiated Emissions > 1GHz	11b 11g HT20	2412 / 2437 / 2462 2412 / 2437 / 2462 2412 / 2437 / 2462	1 Mbps 6 Mbps MCS 0	1	
Fundamental Emission Output Power	11b	2412 / 2437 / 2462	1 Mbps		
6dB bandwidth	11g	2412 / 2437 / 2462	6 Mbps	1	
Power spectral density	HT20	2412 / 2437 / 2462	MCS 0		

NOTE:

- 1. The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement X, Y, and Z-plane. The **Z-plane** results were found as the worst case and were shown in this report.
- 2. The EUT had been tested by following test configurations for radiated emission below 1GHz.
 - 1) Configuration 1 : Adapter mode
 - 2) Configuration 2: Cradle mode
- 3. Adapter and cradle mode had been pretested for radiated emission above 1GHz and found that the adapter mode was the worst case and was selected for final test.

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3 Transmitter Test Results

3.1 Conducted Emissions

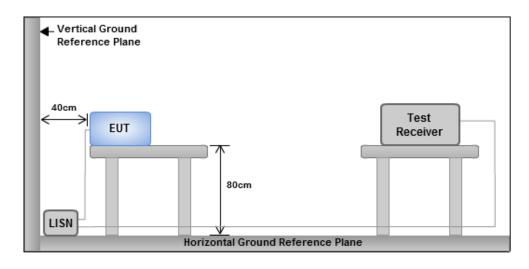
3.1.1 Limit of Conducted Emissions

Conducted Emissions Limit							
Frequency Emission (MHz) Quasi-Peak Average							
0.15-0.5 66 - 56 * 56 - 46 *							
0.5-5	56	46					
5-30 60 50							
Note 1: * Decreases with the logarithm of the frequency.							

3.1.2 Test Procedures

- 1. The device is placed on a test table, raised 80 cm above the reference ground plane. The vertical conducting plane is located 40 cm to the rear of the device.
- 2. The device is connected to line impedance stabilization network (LISN) and other accessories are connected to other LISN. Measured levels of AC power line conducted emission are across the 50 Ω LISN port.
- 3. AC conducted emission measurements is made over frequency range from 150 kHz to 30 MHz.
- 4. This measurement was performed with AC 120V/60Hz

3.1.3 Test Setup



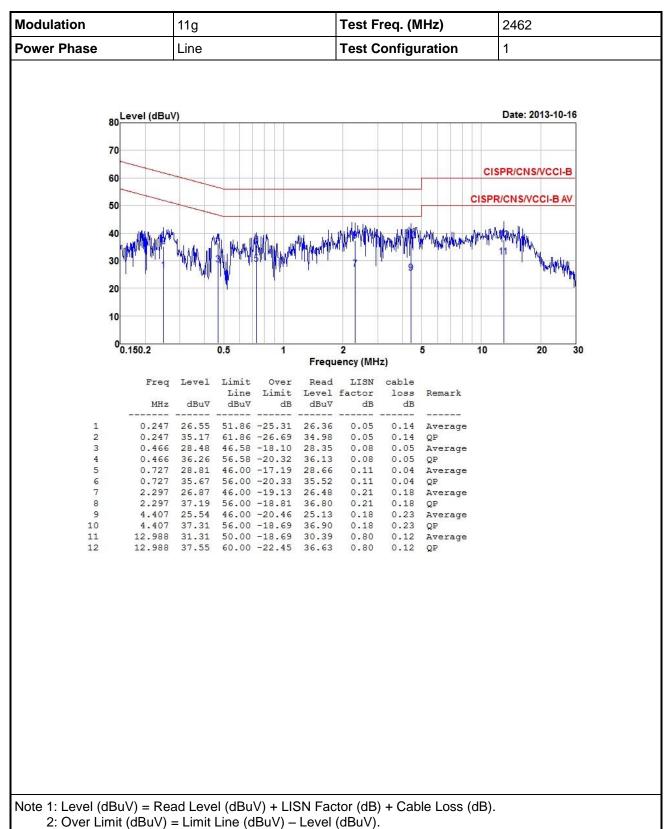
Note: 1. Support units were connected to second LISN.

Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

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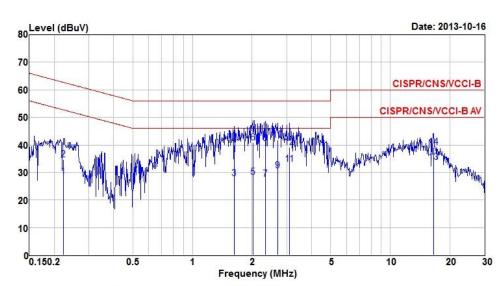
3.1.4 Test Result of Conducted Emissions



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Modulation	11g	Test Freq. (MHz)	2462
Power Phase	Neutral	Test Configuration	1



	Freq	Level			Read		cable	
	MHz	dBuV	Line dBuV	Limit dB	dBuV	factor dB	loss dB	Remark
1	0.223	28.45	52.70	-24.25	28.25	0.04	0.16	Average
2	0.223	34.75		-27.95	34.55		0.16	QP
3	1.628	27.74	46.00	-18.26	27.45	0.17	0.12	Average
4	1.628	39.93	56.00	-16.07	39.64	0.17	0.12	QP
5	2.023	28.42	46.00	-17.58	28.07	0.19	0.16	Average
6	2.023	40.74	56.00	-15.26	40.39	0.19	0.16	QP
7	2.334	27.56	46.00	-18.44	27.20	0.18	0.18	Average
8	2.334	40.57	56.00	-15.43	40.21	0.18	0.18	QP
9	2.692	30.59	46.00	-15.41	30.22	0.18	0.19	Average
10	2.692	41.69	56.00	-14.31	41.32	0.18	0.19	QP
11	3.107	33.15	46.00	-12.85	32.77	0.17	0.21	Average
12	3.107	39.18	56.00	-16.82	38.80	0.17	0.21	QP
13	16.573	33.75	50.00	-16.25	32.43	1.17	0.15	Average
14	16.573	39.26	60.00	-20.74	37.94	1.17	0.15	QP

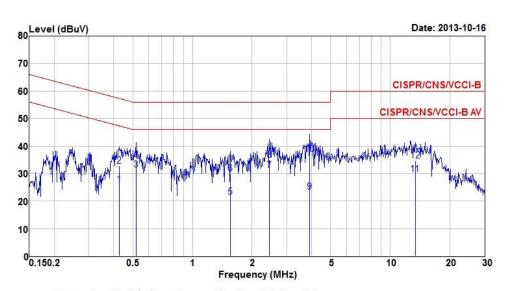
Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

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Modulation	11g	Test Freq. (MHz)	2462
Power Phase	Line	Test Configuration	2



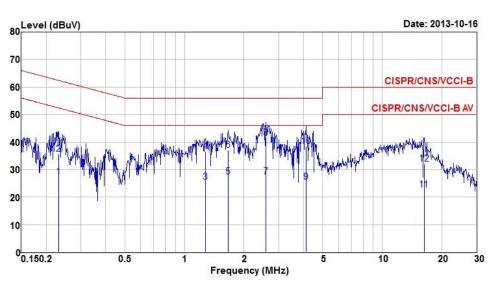
	Freq	Level	Limit	Over	Read	LISN	cable	
			Line	Limit	Level	factor	loss	Remark
	MHz	dBuV	dBuV	dB	dBu∇	dB	dB	
1	0.426	25.98	47.33	-21.35	25.86	0.07	0.05	Average
2	0.426	32.71	57.33	-24.62	32.59	0.07	0.05	QP
3	0.518	31.41	46.00	-14.59	31.28	0.08	0.05	Average
4	0.518	34.52	56.00	-21.48	34.39	0.08	0.05	QP
5	1.560	21.37	46.00	-24.63	21.07	0.18	0.12	Average
6	1.560	29.90	56.00	-26.10	29.60	0.18	0.12	QP
7	2.448	31.13	46.00	-14.87	30.75	0.20	0.18	Average
8	2.448	35.04	56.00	-20.96	34.66	0.20	0.18	QP
9	3.922	23.46	46.00	-22.54	23.06	0.16	0.24	Average
10	3.922	36.97	56.00	-19.03	36.57	0.16	0.24	QP
11	13.408	29.77	50.00	-20.23	28.82	0.83	0.12	Average
12	13.408	34.81	60.00	-25.19	33.86	0.83	0.12	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

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Modulation	11g	Test Freq. (MHz)	2462
Power Phase	Neutral	Test Configuration	2



	Freq MHz	Level dBuV	Limit Line dBuV		Read Level dBuV	LISN factor dB	cable loss dB	Remark
1	0.232	27.47	52.39	-24.92	27.28	0.04	0.15	Average
2	0.232	35.71	62.39	-26.68	35.52	0.04	0.15	QP
3	1.282	25.58	46.00	-20.42	25.34	0.16	0.08	Average
4	1.282	36.56	56.00	-19.44	36.32	0.16	0.08	QP
5	1.662	27.49	46.00	-18.51	27.18	0.18	0.13	Average
6	1.662	37.08	56.00	-18.92	36.77	0.18	0.13	QP
7	2.581	27.47	46.00	-18.53	27.10	0.18	0.19	Average
8	2.581	41.63	56.00	-14.37	41.26	0.18	0.19	QP
9	4.114	25.50	46.00	-20.50	25.11	0.15	0.24	Average
10	4.114	38.54	56.00	-17.46	38.15	0.15	0.24	QP
11	16.312	22.77	50.00	-27.23	21.49	1.13	0.15	Average
12	16.312	32.13	60.00	-27.87	30.85	1.13	0.15	QP

Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB). 2: Over Limit (dBuV) = Limit Line (dBuV) – Level (dBuV).

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3.2 6dB and Occupied Bandwidth

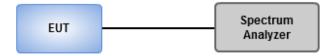
3.2.1 Limit of 6dB Bandwidth

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

3.2.2 Test Procedures

- 1. Set resolution bandwidth (RBW) = 100 kHz, Video bandwidth = 300 kHz.
- 2. Detector = Peak, Trace mode = max hold.
- 3. Sweep = auto couple, Allow the trace to stabilize.
- 4. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6dB relative to the maximum level measured in the fundamental emission.

3.2.3 Test Setup



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3.2.4 Test Result of 6dB and Occupied Bandwidth

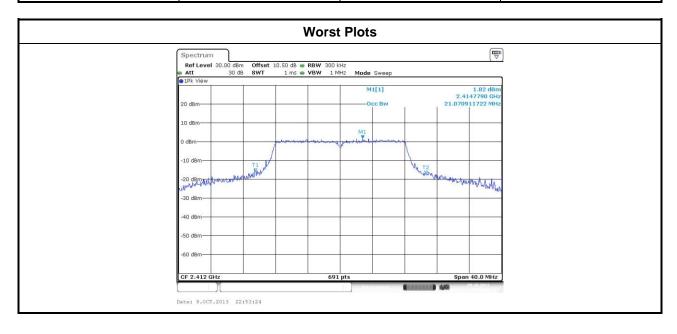
Modulation Mode	Freq. (MHz)	6dB Bandwidth (MHz)	Limit (kHz)
11b	2412	9.04	500
11b	2437	8.58	500
11b	2462	8.57	500
11g	2412	16.35	500
11g	2437	16.35	500
11g	2462	16.35	500
HT20	2412	17.62	500
HT20	2437	17.62	500
HT20	2462	17.62	500



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Modulation Mode	Freq. (MHz)	99% Occupied Bandwidth (MHz)	Limit (kHz)
11b	2412	13.49	-
11b	2437	13.49	-
11b	2462	13.43	-
11g	2412	21.07	-
11g	2437	20.67	-
11g	2462	19.80	-
HT20	2412	18.70	-
HT20	2437	20.96	-
HT20	2462	18.70	-



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3.3 RF Output Power

3.3.1 Limit of RF Output Power

Con	duct	ed po	ower shall not exceed 1Watt.
\boxtimes	Ant	enna	gain <= 6dBi, no any corresponding reduction is in output power limit.
	Ant	enna	gain > 6dBi
		The	n Fixed, point to point operations. e conducted output power from the intentional radiator shall be reduced by the amount in dB the directional gain of the antenna exceeds 6 dB
		Sys Ope	ed, point to point operations tems operations. The same that are used exclusively for fixed, point-to-point erations, maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 that the directional gain of the antenna exceeds 6 dBi.
			tems operating in the 5725–5850 MHz band that are used exclusively for fixed, point-to-point rations ,no any corresponding reduction is in transmitter peak output power
3.3.	2	Test	t Procedures
	Max	kimur	m Peak Conducted Output Power
		Spe	ectrum analyzer
		1.	Set RBW = 1MHz, VBW = 3MHz, Detector = Peak.
		2.	Sweep time = auto, Trace mode = max hold, Allow trace to fully stabilize.
		3.	Use the spectrum analyzer channel power measurement function with the band limits set equal to the DTS bandwidth edges.
	\boxtimes	Pov	ver meter
		1.	A broadband Peak RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission burst for measuring output power.
\boxtimes	Max	kimur	m Conducted Output Power (For reference only)
		Spe	ectrum analyzer
		1.	Set RBW = 1MHz, VBW = 3MHz, Detector = RMS.
		2.	Set the sweep time to: $\geq 10 \text{ x}$ (number of measurement points in sweep) x (maximum data rate per stream).
		3.	Perform the measurement over a single sweep.
		4.	Use the spectrum analyzer's band power measurement function with band limits set equal to the EBW(26dBc) band edges.

A broadband Average RF power meter is used for output power measurement. The video bandwidth of power meter is greater than DTS bandwidth of EUT. If duty cycle of test signal is not 100 %, trigger and gating function of power meter will be enabled to capture transmission

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Nower meter

burst for measuring output power.



3.3.3 Test Setup



3.3.4 Test Result of Maximum Output Power

Modulation Mode	Freq. (MHz)	Peak Power (dBm)	Total Power (mW)	Total Power (dBm)	Limit (dBm)
11b	2412	14.02	25.235	14.02	30
11b	2437	14.57	28.642	14.57	30
11b	2462	14.49	28.119	14.49	30
11g	2412	15.51	35.563	15.51	30
11g	2437	15.92	39.084	15.92	30
11g	2462	16.24	42.073	16.24	30
HT20	2412	15.12	32.509	15.12	30
HT20	2437	15.95	39.355	15.95	30
HT20	2462	15.81	38.107	15.81	30

Modulation Mode	Freq. (MHz)	Average Power (dBm)	Total Power (mW)	Total Power (dBm)	Limit (dBm)
11b	2412	11.51	14.158	11.51	30
11b	2437	12.04	15.996	12.04	30
11b	2462	11.91	15.524	11.91	30
11g	2412	10.34	10.814	10.34	30
11g	2437	10.76	11.912	10.76	30
11g	2462	10.87	12.218	10.87	30
HT20	2412	8.93	7.816	8.93	30
HT20	2437	10.58	11.429	10.58	30
HT20	2462	9.56	9.036	9.56	30

Note: Average power is for reference only

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3.4 Power Spectral Density

3.4.1 Limit of Power Spectral Density

Power spectral density shall not be greater than 8 dBm in any 3 kHz band.

3.4.2 Test Procedures

- Maximum peak conducted output power was used to demonstrate compliance to the fundamental output power limit.
 - 1. Set the RBW = 3kHz, VBW = 10kHz.
 - Detector = Peak, Sweep time = auto couple.
 - 3. Trace mode = max hold, allow trace to fully stabilize.
 - 4. Use the peak marker function to determine the maximum amplitude level.
- Maximum (average) conducted output power was used to demonstrate compliance to the fundamental output power limit.
 - Set the RBW = 100kHz, VBW = 300 kHz.
 - 2. Detector = RMS, Sweep time = auto couple.
 - 3. Set the sweep time to: ≥ 10 x (number of measurement points in sweep) x (maximum data rate per stream).
 - 4. Perform the measurement over a single sweep.
 - 5. Use the peak marker function to determine the maximum amplitude level.\

3.4.3 Test Setup

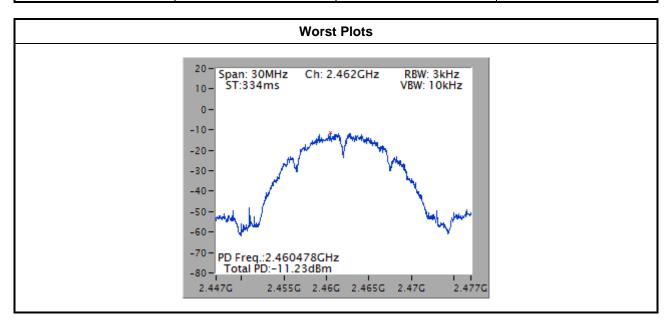


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3.4.4 Test Result of Power Spectral Density

Modulation Mode	Freq. (MHz)	Total Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
11b	2412	-12.09	8
11b	2437	-11.54	8
11b	2462	-11.23	8
11g	2412	-14.70	8
11g	2437	-13.97	8
11g	2462	-14.76	8
HT20	2412	-17.16	8
HT20	2437	-15.60	8
HT20	2462	-17.06	8



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3.5 Unwanted Emissions into Restricted Frequency Bands

3.5.1 Limit of Unwanted Emissions into Restricted Frequency Bands

Restricted Band Emissions Limit							
Frequency Range (MHz)	Measure Distance (m)						
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300				
0.490~1.705	24000/F(kHz)	33.8 - 23	30				
1.705~30.0	30	29	30				
30~88	100	40	3				
88~216	150	43.5	3				
216~960	200	46	3				
Above 960	500	54	3				

Note 1:

Qusai-Peak value is measured for frequency below 1GHz except for 9–90 kHz, 110–490 kHz frequency band. Peak and average value are measured for frequency above 1GHz. The limit on average radio frequency emission is as above table. The limit on peak radio frequency emissions is 20 dB above the maximum permitted average emission limit **Note 2:**

Measurements may be performed at a distance other than what is specified provided. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor as below, Frequency at or above 30 MHz: 20 dB/decade Frequency below 30 MHz: 40 dB/decade.

3.5.2 Test Procedures

- Measurement is made at a semi-anechoic chamber that incorporates a turntable allowing a EUT rotation of 360°. A continuously-rotating, remotely-controlled turntable is installed at the test site to support the EUT and facilitate determination of the direction of maximum radiation for each EUT emission frequency. The EUT is placed at a height of 0.8 m test table above the ground plane.
- 2. Measurement is made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna is varied in height (1m ~ 4m) above the reference ground plane to obtain the maximum signal strength. Distance between EUT and antenna is 3 m.
- 3. This investigation is performed with the EUT rotated 360°, the antenna height scanned between 1 m and 4 m, and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations.

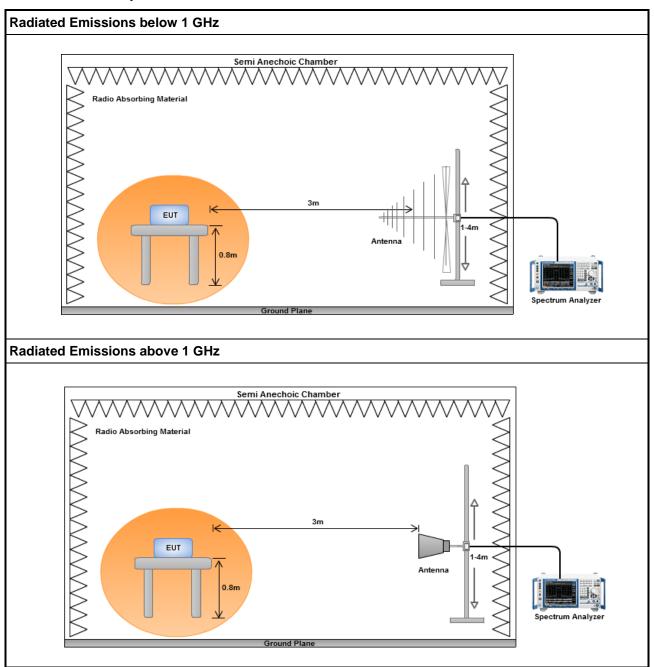
Note:

- 1. 120kHz measurement bandwidth of test receiver and Quasi-peak detector is for radiated emission below 1GHz.
- 2. RBW=1MHz, VBW=3MHz and Peak detector is for peak measured value of radiated emission above 1GHz.
- 3. RBW=1MHz, VBW=1/T and Peak detector is for average measured value of radiated emission above 1GHz.

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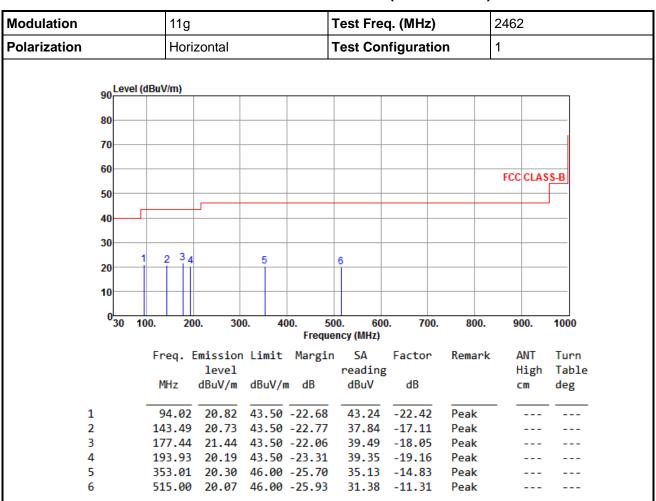
3.5.3 Test Setup



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3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

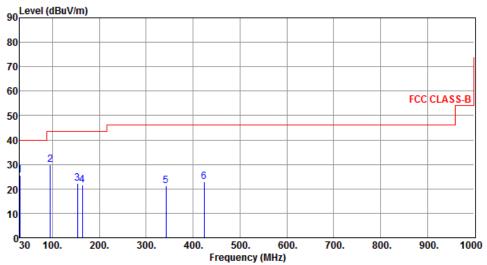
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)		2462	
Polarization	Vertical	Test Configuration		1	
90 Level (dBu\					



	Freq.	Emission level	Limit	Margin	SA reading		Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	30.00	25.58	40.00	-14.42	43.31	-17.73	Peak		
2	94.99	30.04	43.50	-13.46	52.34	-22.30	Peak		
3	153.19	22.23	43.50	-21.27	39.14	-16.91	Peak		
4	163.86	21.52	43.50	-21.98	38.47	-16.95	Peak		
5	342.34	21.30	46.00	-24.70	36.40	-15.10	Peak		
6	423.82	22.78	46.00	-23.22	35.86	-13.08	Peak		

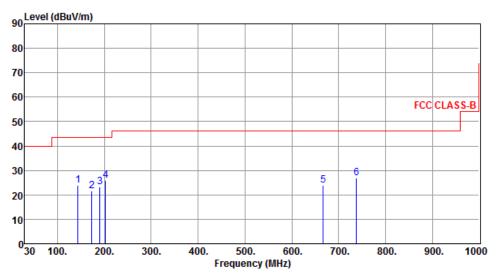
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2462
Polarization	Horizontal	Test Configuration	2



	Freq.	Emission level	Limit	Margin	SA reading		Remark	ANT High	Turn Table
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB		cm	deg
1	143.49	23.99	43.50	-19.51	41.10	-17.11	Peak		
2	173.56	21.62	43.50	-21.88	39.21	-17.59	Peak		
3	191.02	23.40	43.50	-20.10	42.51	-19.11	Peak		
4	202.66	26.07	43.50	-17.43	45.36	-19.29	Peak		
5	667.29	24.08	46.00	-21.92	32.84	-8.76	Peak		
6	738.10	26.98	46.00	-19.02	34.44	-7.46	Peak		

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

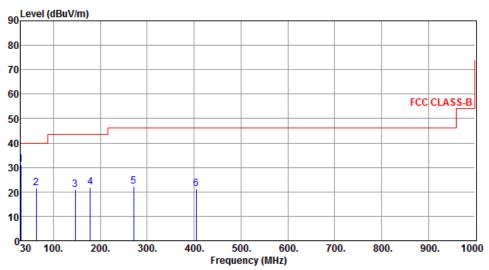
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	Test Freq. (MHz)	2462
Polarization	Vertical	Test Configuration	2



	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV		Remark	ANT High cm	Turn Table deg
1	30.00	31.29	40.00	-8.71	49.02	-17.73	Peak		
2	62.98	21.59	40.00	-18.41	39.47	-17.88	Peak		
3	146.40	21.00	43.50	-22.50	38.03	-17.03	Peak		
4	178.41	21.78	43.50	-21.72	39.94	-18.16	Peak		
5	271.53	22.14	46.00	-23.86	39.15	-17.01	Peak		
6	404.42	21.21	46.00	-24.79	34.76	-13.55	Peak		

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

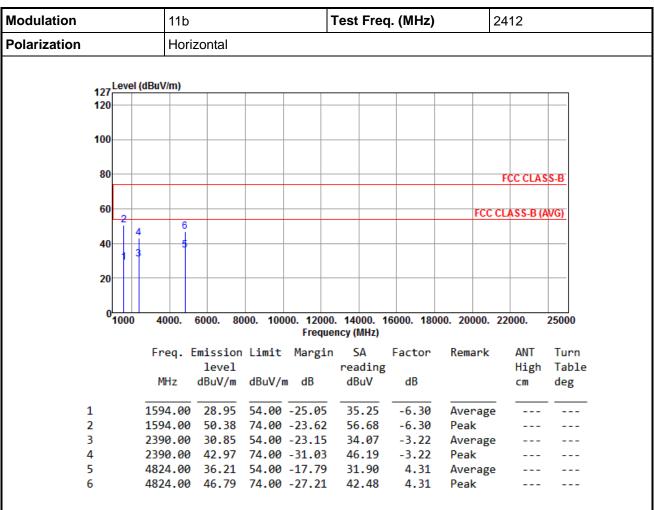
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3.5.5 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11b



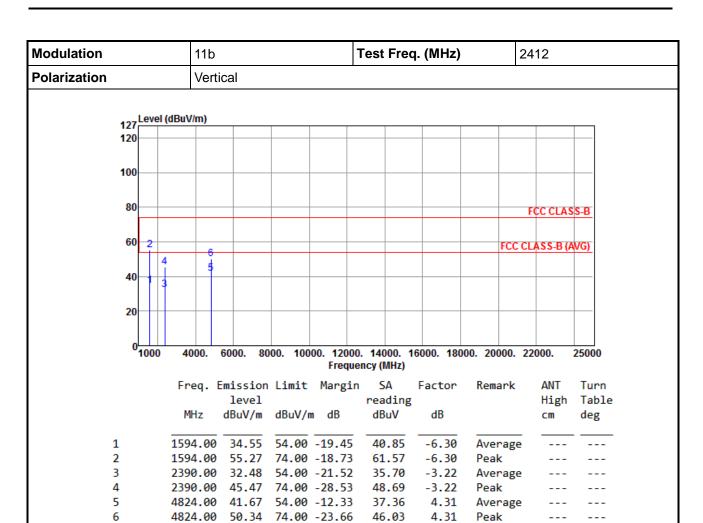
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation Polarization		11b			,	Test Freq. (MHz) 2			2437		
		Horizontal									
1	27 ^{Le}	evel (dBuV/m)								
	20	_									-
1	00										
	80										
	~ -									FCC CLAS	SS-B
	60										
	الما	2		8					FCC C	LASS-B (A	AVG)
		4	6								
	40	1 3									
	20										
	010	000	4000.	6000. 8	8000. 100	000. 12000). 14 000. 1	16000. 180	00. 20000. 2	22000.	25000
	-						ency (MHz)				
			Freq. E	missio	n Limit	Margir	s SA	Factor	Remark	ANT	Turn
			•	level			reading			High	Table
			MHz	dBuV/m	dBuV/	m dB	dBuV	dB		cm	deg
			4504.00								
1			1594.00			-24.66	35.64	-6.30	Average		
2			1594.00 2341.00			-22.32	57.98 34.96	-6.30 -3.41	Peak		
4			2341.00				46.38	-3.41	Average Peak		
5			4874.00			-17.15	32.46	4.39	Average		
6			4874.00			-27.25	42.36	4.39	Peak		
7			7311.00				28.52	8.92	Average		
_											

8.92

Peak

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

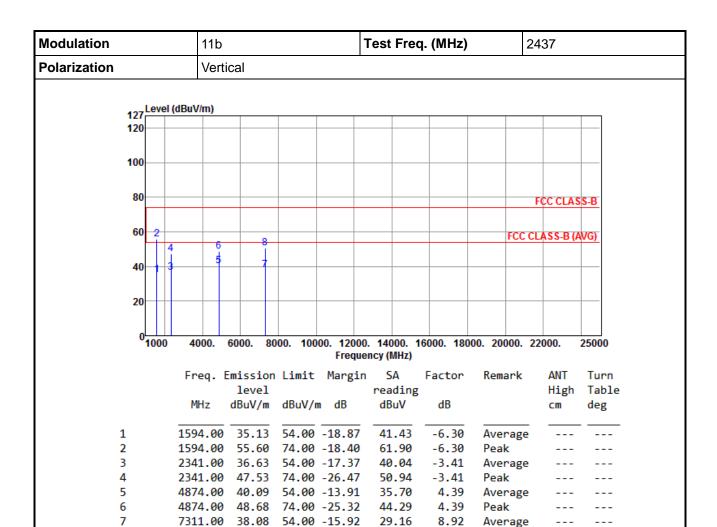
*Factor includes antenna factor, cable loss and amplifier gain

7311.00 49.68 74.00 -24.32 40.76

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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41.78

8.92

Peak

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

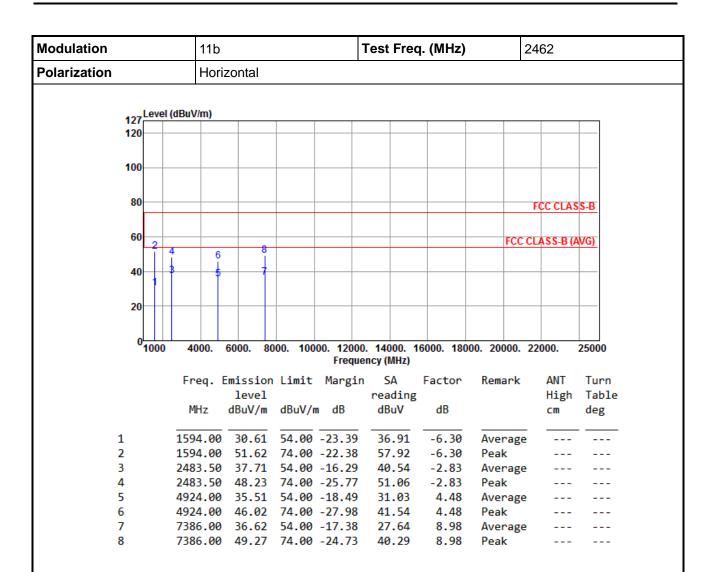
*Factor includes antenna factor , cable loss and amplifier gain

7311.00 50.70 74.00 -23.30

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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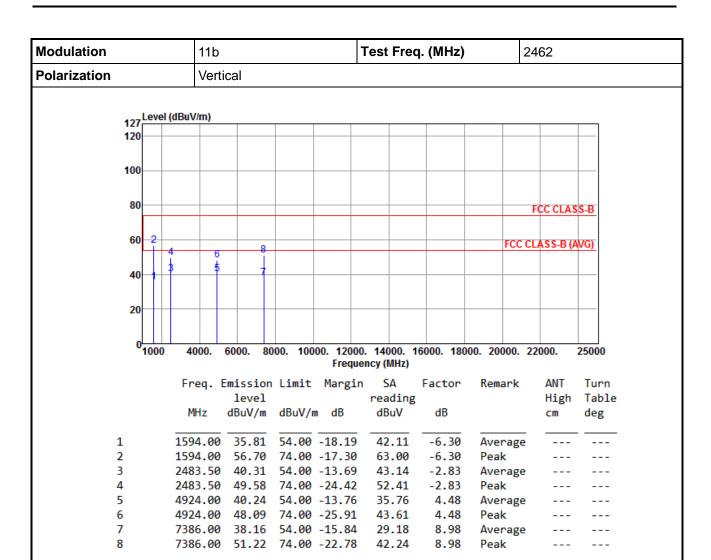
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

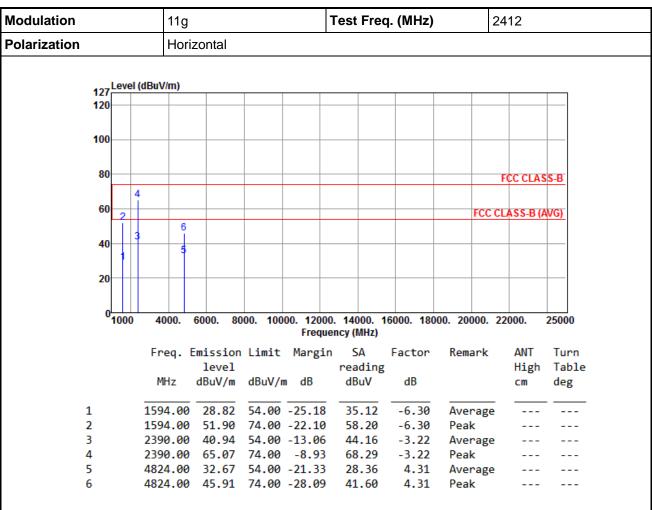
*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3.5.6 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11g



Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation	11g	11g			Test Freq. (MHz)				412		
Polarization	Vert	Vertical									
127 Level	(dBuV/m)										
120											
100											
80								FCC CLAS	S-B		
4	4										
60 2							FCC	CLASS-B (A	WG)		
	6										
40									-		
	1										
20											
0											
~1000	4000.	6000. 80	000. 100		. 14000. 1 ncy (MHz)	16000. 1800	00. 20000.	22000.	25000		
	Freq. I	Emission	Limit	Margin	SA	Factor	Remark	ANT	Turn		
		level			reading			High	Table		
	MHz	dBuV/m	dBuV/r	n dB	dBuV	dB		cm	deg		
1	1594.00	34.87	54.00	-19.13	41.17	-6.30	Average				
2	1594.00			-18.24	62.06	-6.30	Peak				
3	2390.00			-11.58	45.64	-3.22	Average				
4	2390.00	66.86	74.00	-7.14	70.08	-3.22	Peak				
5	4824.00	32.75	54.00	-21.25	28.44	4.31	Average				
6	4824.00	46.45	74.00	-27 55	42.14	4.31	Peak				

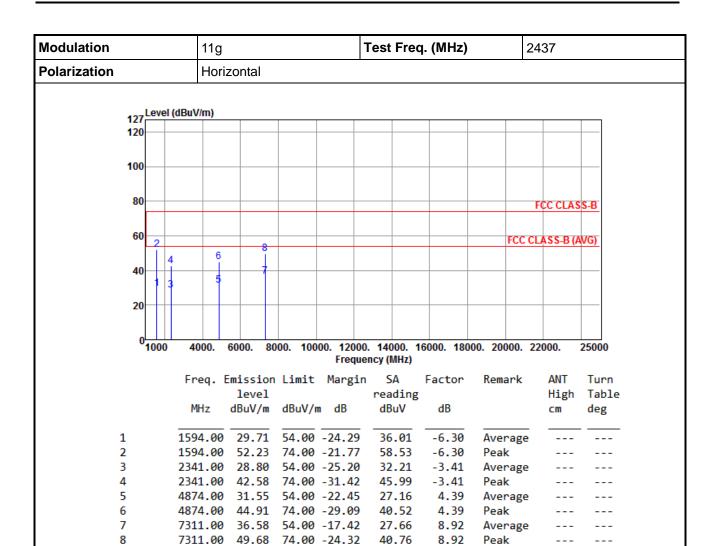
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) - Limit (dBuV/m).

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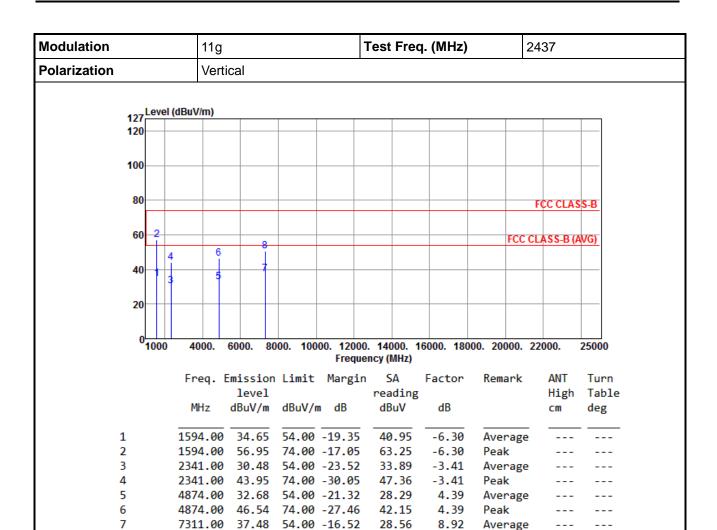


*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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8.92

Peak

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

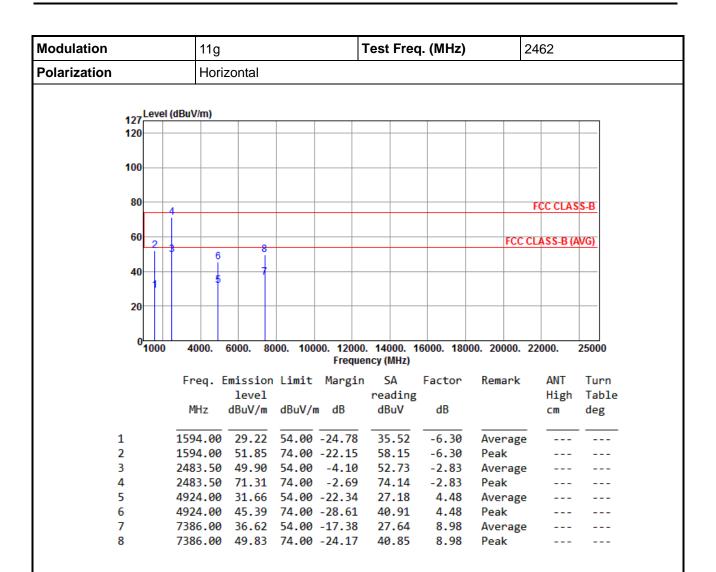
*Factor includes antenna factor , cable loss and amplifier gain

7311.00 50.57 74.00 -23.43 41.65

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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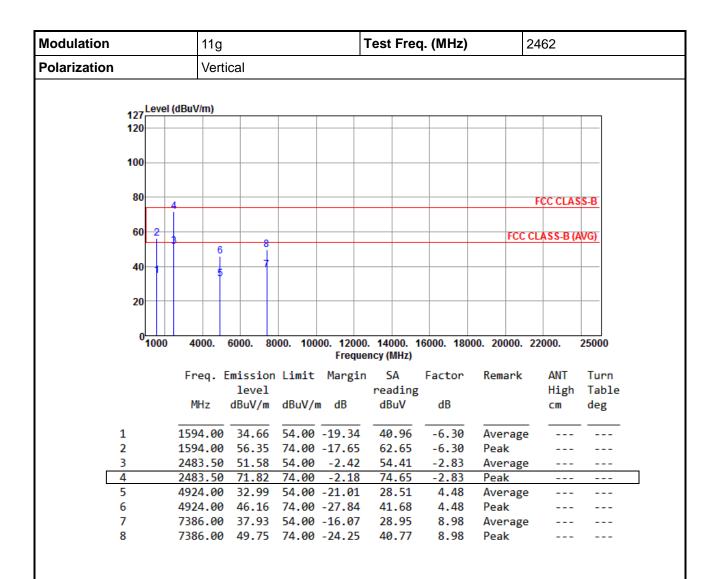


*Factor includes antenna factor , cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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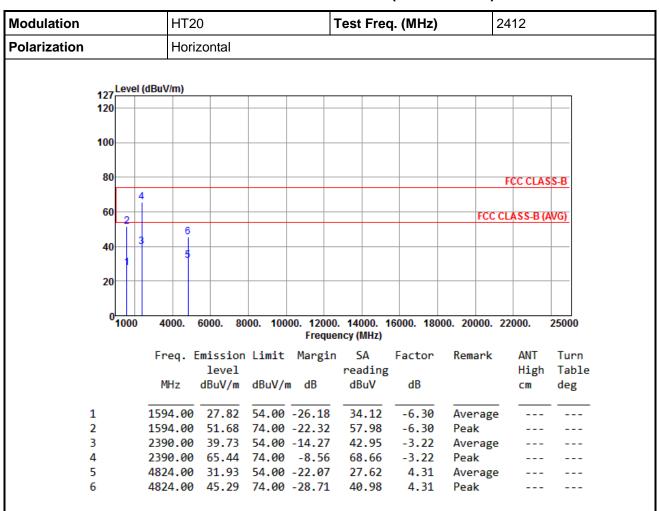
*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT20



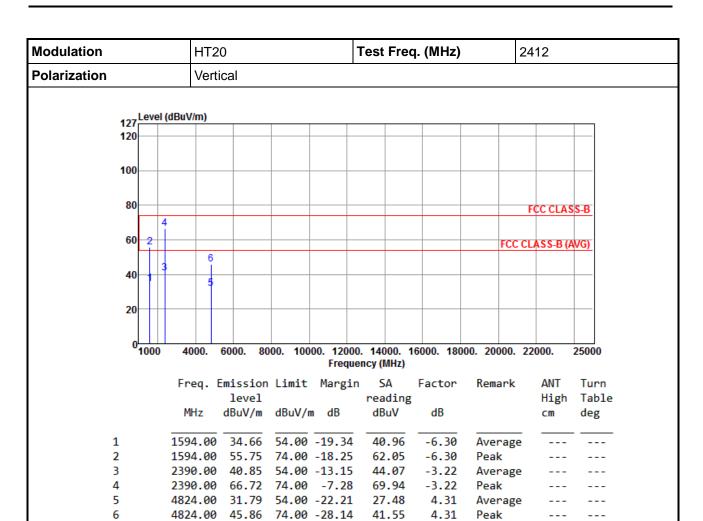
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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41.55

Peak

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Modulation		HT20				Test Fre	2437			
Polarization	Horizontal									
127 L	evel (dBı	ıV/m)								
120										
100										
80										
00									FCC CLAS	S-B
60	2							FCC (CLASS-B (A	WG)
	1 4	6	8	'						
40	₩		+ 7	,						
	1 3	1								
20										
0	Ш									
-10	000	4000.	6000.	8000. 10). 14000. ' ency (MHz)	16000. 180	00. 20000.	22000.	25000
	F	rea. E	missio	n Limi	t Margin	SA	Factor	Remark	ANT	Turn
		•	level			reading	ţ		High	Table
		MHz	dBuV/m	n dBuV	/m dB	dBuV	dB		cm	deg
1	15	94.00	29.96	54.0	0 -24.04	36.26	-6.30	Average		
2		94.00	51.48		0 -22.52	57.78	-6.30	Peak		
3		41.00			0 -25.35	32.06	-3.41	Average		
4					0 -32.34	45.07	-3.41	Peak		
5					0 -21.93	27.68	4.39	Average		
6	48	/4.00	45.16	74.0	0 -28.84	40.77	4.39	Peak		

8.92

8.92

Average

Peak

Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

7311.00 36.48 54.00 -17.52 27.56

7311.00 49.09 74.00 -24.91 40.17

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

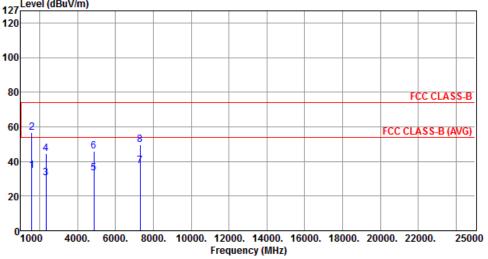
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Modulation	HT20			Test Freq. (MHz)				243	2437				
Polarization Vertical			I										
127	Level (dBu	V/m)											
120													
120													



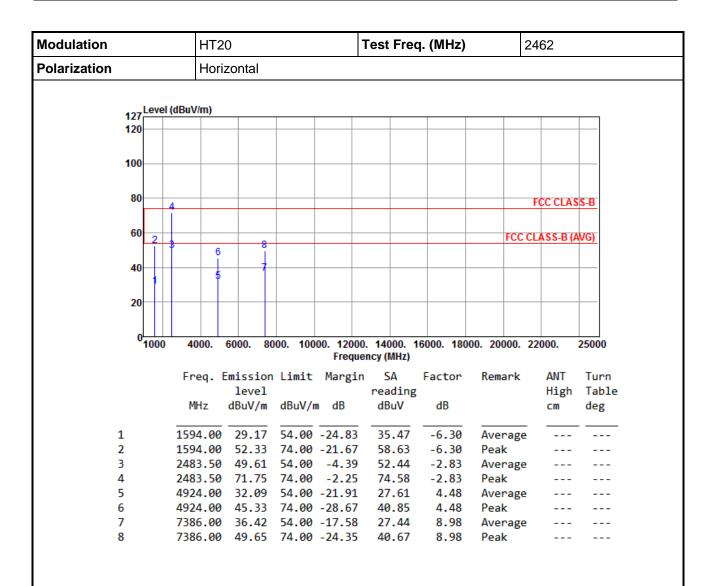
	Freq. MHz	Emission level dBuV/m	Limit dBuV/m	Ū	SA reading dBuV	Factor dB	Remark	ANT High cm	Turn Table deg
1	1594.00	34.51	54.00	-19.49	40.81	-6.30	Average		
2	1594.00	56.88	74.00	-17.12	63.18	-6.30	Peak		
3	2341.00	30.59	54.00	-23.41	34.00	-3.41	Average		
4	2341.00	44.51	74.00	-29.49	47.92	-3.41	Peak		
5	4874.00	33.05	54.00	-20.95	28.66	4.39	Average		
6	4874.00	46.06	74.00	-27.94	41.67	4.39	Peak		
7	7311.00	37.46	54.00	-16.54	28.54	8.92	Average		
8	7311.00	49.47	74.00	-24.53	40.55	8.92	Peak		

*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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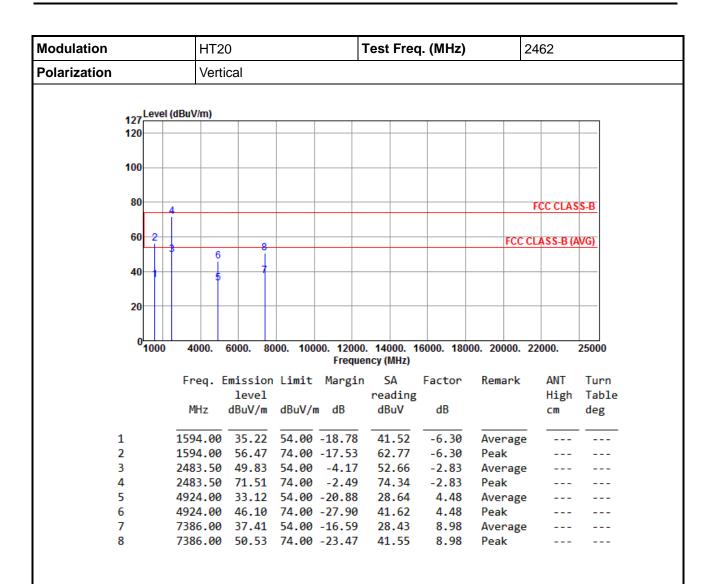


*Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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3.6 Unwanted Emissions into Non-Restricted Frequency Bands

3.6.1 Limit of Unwanted Emissions into Non-Restricted Frequency Bands

\boxtimes	The peak output power 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.
_	

The peak power in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum in-band peak PSD level in 100 kHz.

3.6.2 Test Procedures

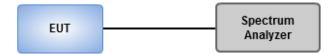
Reference Level Measurement

- 1. Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- 2. Set Sweep time = auto couple, Trace mode = max hold.
- 3. Allow trace to fully stabilize.
- 4. Use the peak marker function to determine the maximum amplitude level.

Unwanted Emissions Level Measurement

- 1. Set RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- 2. Trace Mode = max hold, Sweep = auto couple.
- 3. Allow the trace to stabilize.
- 4. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

3.6.3 Test Setup

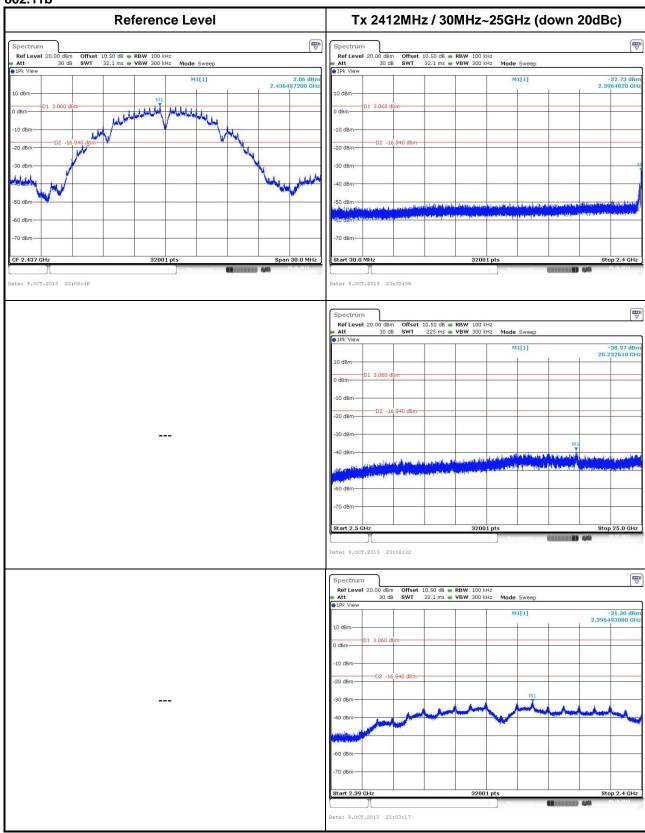


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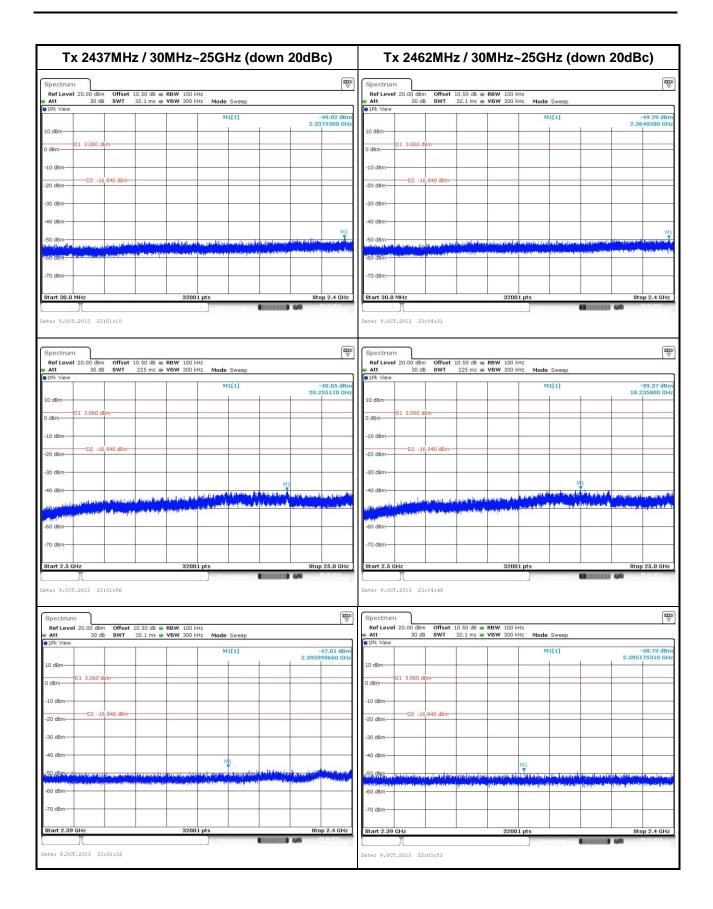
3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands

802.11b



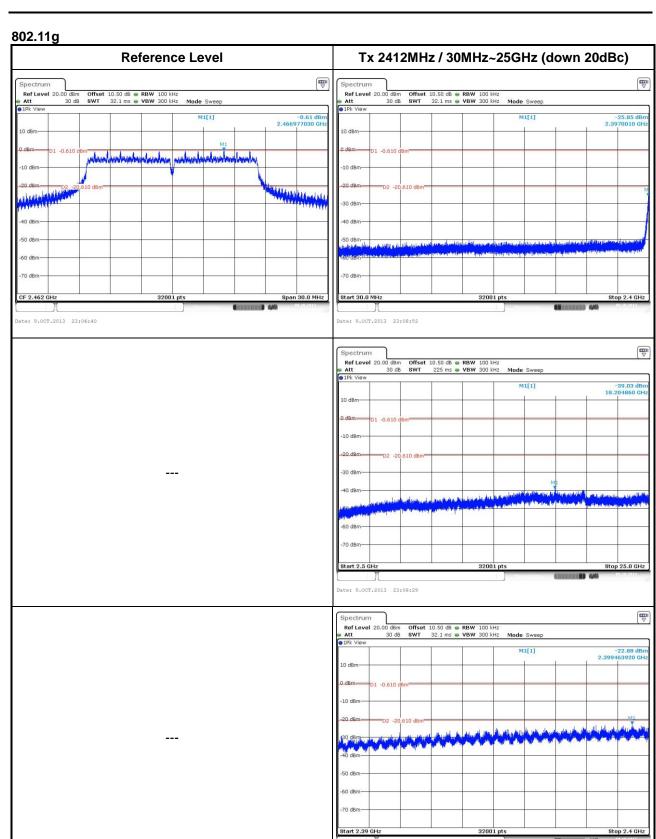
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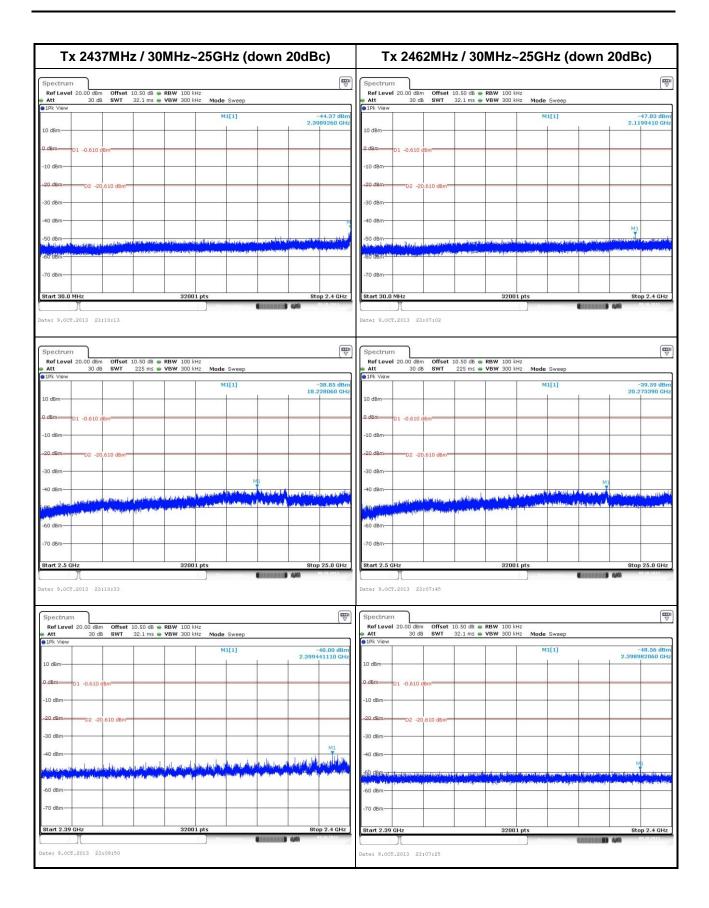




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Date: 9.0CT.2013 23:09:16

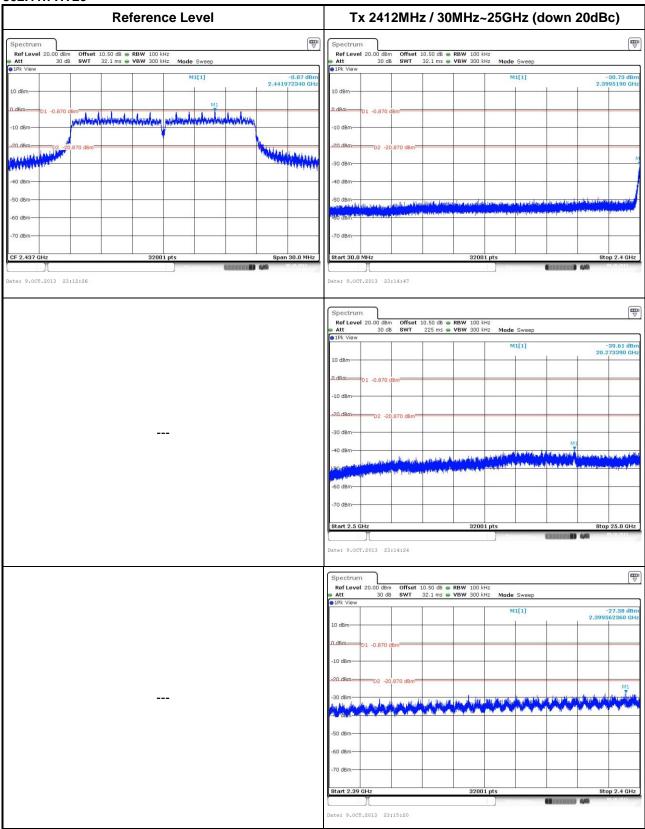




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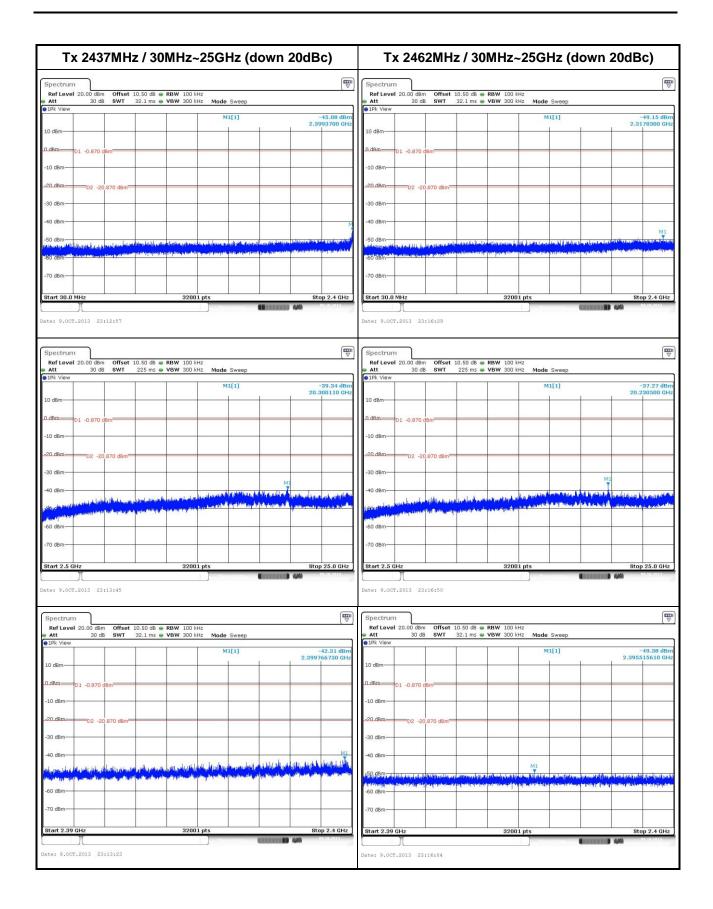


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4 Test laboratory information

Established in 2012, ICC provides foremost EMC & RF Testing and advisory consultation services by our skilled engineers and technicians. Our services employ a wide variety of advanced edge test equipment and one of the widest certification extents in the business.

International Certification Corp, it is our definitive objective is to institute long term, trust-based associations with our clients. The expectation we set up with our clients is based on outstanding service, practical expertise and devotion to a certified value structure. Our passion is to grant our clients with best EMC / RF services by oriented knowledgeable and accommodating staff.

Our Test sites are located at Linkou District and Kwei Shan Hsiang. Location map can be found on our website http://www.icertifi.com.tw.

Linkou Kwei Shan

Tel: 886-2-2601-1640

No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei

City, Taiwan, R.O.C.

Tel: 886-3-271-8666

No. 3-1, Lane 6, Wen San 3rd St., Kwei Shan Hsiang, Tao Yuan Hsien 333, Taiwan, R.O.C.

If you have any suggestion, please feel free to contact us as below information

Tel: 886-3-271-8666 Fax: 886-3-318-0155

Email: ICC_Service@icertifi.com.tw

==END==

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