

FCC Test Report

FCC ID : 2AAS9-1254XW

Equipment : INDOOR ACCESS POINT

Model No. : BW1254

Brand Name : Browan

Applicant : BROWAN COMMUNICATIONS Co., Ltd.

Address : No. 15-1, Zhonghua Rd., Hsinchu Industrial

Park, Hukou, Hsinchu, Taiwan, R. O. C. 303

Standard : 47 CFR FCC Part 15.247

Received Date : Aug. 02, 2013

Tested Date : Aug. 02 ~ Sep. 30, 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

ilac-MRA



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Release Record

Report No.	Version	Description	Issued Date
FR380701AI	Rev. 01	Initial issue	Feb. 14, 2014
FR380701AI	Rev. 02	Modified model name of antenna No.2 & 3 (page 5)	Feb. 21, 2014

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Summary of Test Results

FCC Rules	Test Items	Measured	Result
15.207	Conducted Emissions	[dBuV]: 2.878MHz 43.63 (Margin -2.37dB) - AV	Pass
15.247(d) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5440.00MHz 53.00 (Margin -1.00dB) - AV	Pass
15.247(b)(3)	Fundamental Emission Output Power	Power [dBm]: 11a: 29.76 HT20: 29.80 HT40: 29.81	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 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			
5725-5850	а	5745-5825	149-165 [5]	2	6-54 Mbps			
5725-5850	n (HT20)	5745-5825	149-165 [5]	2	MCS 0-15			
5725-5850	n (HT40)	5755-5795	151-159 [2]	2	MCS 0-15			

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

Note 2: 802.11a/n uses a combination of OFDM-BPSK, QPSK, 16QAM, 64QAM modulation.

1.1.2 Antenna Details

Ant.	Model	Туре	Connector	Operating Frequencies (MHz) / Antenna Gain (dBi)				
No.	Model	Туре	Connector	2400~2483.5	5150~5250	5250~5350	5470~5725	5725~5850
1	EDA-1713 2G4 R2-A7	Dipole (Omni-directi onal)	R-SMA	5	X	х	х	Х
2	EDA-1713 5G0 R2-A4	Dipole (Omni-directi onal)	R-SMA	Х	5	5	5	5
3	EDA-8709P- 25G R2-A11	Dipole (Omni-directi onal)	R-SMA	2	2	2	2	2
4	EDA-1713-2 5G R2-A4	Dipole (Omni-directi onal)	R-SMA	5	5	5	5	5
5	SAA05-2201 70	Dipole (Omni-directi onal)	R-SMA	3	5	5	5	5

Note: Ant. 1 was chosen for 2.4GHz test and Ant. 2 was for 5GHz test.

1.1.3 EUT Operational Condition

Supply Voltage		☐ DC	
Type of DC Source	☐ Internal DC supply	☐ External DC adapter	☐ Battery

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1.1.4 Accessories

	Accessories				
No.	Equipment	Description			
		Brand Name: LEI			
		Model Name: MU24-B480050-A1			
1	AC Adapter 1	Power Rating: I/P: 100-240Vac, 50-60Hz, 1.0A O/P: 48Vdc, 0.5A			
		Power Line: 1.5m non-shielded cable w/o core			
		Brand Name: POE			
		Model Name: MU24-B480050-A1			
2	2 POE	Power Rating: I/P: 100-240Vac, 50-60Hz, 1.0A O/P: 48Vdc, 0.5A			
		Power Line: 1.5m non-shielded cable w/o core			

1.1.5 Channel List

	band (MHz) a / HT20		~5850 n HT40
Channel	Channel Frequency(MHz)		Frequency(MHz)
149	5745	151	5755
153	5765	159	5795
157	5785		
161	5805		
165	5825		

1.1.6 Test Tool and Duty Cycle

Test tool	ART2-GUI V2.3
Duty Cycle Of Test Signal (%)	100.00% - IEEE 802.11a 100.00% - IEEE 802.11n (HT20) 100.00% - IEEE 802.11n (HT40)
	0 - IEEE 802.11a 0 - IEEE 802.11n (HT20) 0 - IEEE 802.11n (HT40)

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1.1.7 Power Setting

Modulation Mode	Test Frequency (MHz)	Power Set
11a	5745	17
11a	5785	17
11a	5825	17
HT20	5745	17
HT20	5785	17
HT20	5825	17
HT40	5755	17
HT40	5795	17

1.2 Local Support Equipment List

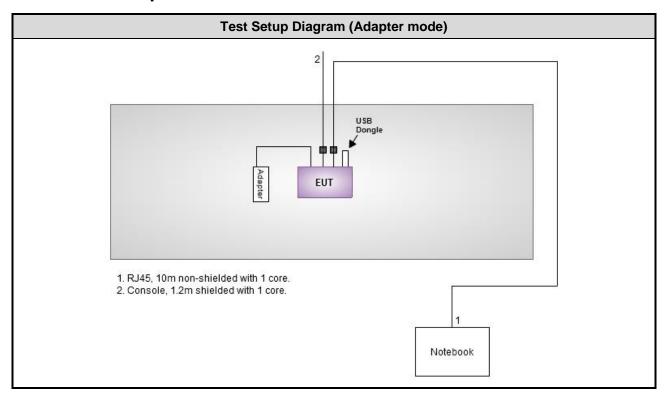
	Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)	
1	Notebook	DELL	E6430		DoC	RJ45, 10m non-shielded with 1 core.	
2	USB Dongle	PQI	U273V				

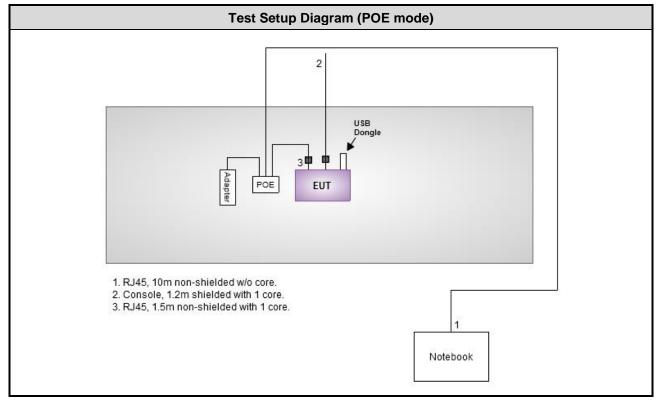
Note: Console cable was supplied by applicant.

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1.3 Test Setup Chart





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1.4 The Equipment List

Manufacturer R&S SCHWARZBECK ESS-ELEKTRONIK SCHWARZBECK ESS-ELEKTRONIK	Model No. ESCS 30 Schwarzbeck 8127	Serial No. 100169 8127-667	Calibration Date Oct. 02, 2012	Calibration Until Oct. 01, 2013
R&S SCHWARZBECK ESS-ELEKTRONIK SCHWARZBECK	ESCS 30	100169	Oct. 02, 2012	
SCHWARZBECK ESS-ELEKTRONIK SCHWARZBECK			,	Oct. 01, 2013
ESS-ELEKTRONIK SCHWARZBECK	Schwarzbeck 8127	8127-667	_	
			Dec. 04, 2012	Dec. 03, 2013
	Schwarzbeck 8127	8127-666	Dec. 04, 2012	Dec. 03, 2013
TESEQ	ISN T800	34406	Apr. 08, 2013	Apr. 07, 2014
TESEQ	ISN T200A	30494	Apr. 09, 2013	Apr. 08, 2014
TESEQ	ISN ST08	22589	Jan. 24, 2013	Jan. 23, 2014
FCC	F-33-4	121630	Dec. 04, 2012	Dec. 03, 2013
Woken	CFD200-NL	CFD200-NL-001	Dec. 25, 2012	Dec. 24, 2013
R&S	ESH3-Z6	100920	Nov. 21, 2012	Nov. 20, 2013
R&S	ESH3-Z6	100951	Jan. 30, 2013	Jan. 29, 2014
R&S	ENV216	101579	Jan. 07, 2013	Jan. 06, 2014
NA	50	01	Apr. 22, 2013	Apr. 21, 2014
NA	50	02	Apr. 22, 2013	Apr. 21, 2014
NA	50	03	Apr. 22, 2013	Apr. 21, 2014
NA	50	04	Apr. 22, 2013	Apr. 21, 2014
of	TESEQ TESEQ FCC Woken R&S R&S R&S NA NA NA NA	TESEQ ISN T200A TESEQ ISN ST08 FCC F-33-4 Woken CFD200-NL R&S ESH3-Z6 R&S ESH3-Z6 R&S ENV216 NA 50 NA 50 NA 50 NA 50	TESEQ ISN T200A 30494 TESEQ ISN ST08 22589 FCC F-33-4 121630 Woken CFD200-NL CFD200-NL-001 R&S ESH3-Z6 100920 R&S ESH3-Z6 100951 R&S ENV216 101579 NA 50 01 NA 50 02 NA 50 03 NA 50 04	TESEQ ISN T200A 30494 Apr. 09, 2013 TESEQ ISN ST08 22589 Jan. 24, 2013 FCC F-33-4 121630 Dec. 04, 2012 Woken CFD200-NL CFD200-NL-001 Dec. 25, 2012 R&S ESH3-Z6 100920 Nov. 21, 2012 R&S ESH3-Z6 100951 Jan. 30, 2013 R&S ENV216 101579 Jan. 07, 2013 NA 50 01 Apr. 22, 2013 NA 50 02 Apr. 22, 2013 NA 50 03 Apr. 22, 2013 NA 50 04 Apr. 22, 2013

Test Item	Radiated Emission above 1GHz								
Test Site	966 chamber1 / (03Cl	H01-WS)							
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until				
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	ROHDE&SCHWAR Z 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				

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Test Item	Radiated Emission ab	Radiated Emission above 1GHz								
Test Site	966 chamber1 / (03Cl	66 chamber1 / (03CH01-WS)								
Instrument	Manufacturer	Model No.	Model No. Serial No.		Calibration Until					
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-002	Dec. 25, 2012	Dec. 24, 2013					
control	EM Electronics	EM1000	60612	N/A	N/A					
Note: Calibration Interval of instruments listed above is one year.										

Loop Antenna	R&S	R&S HFH2-Z2		Nov. 15, 2012	Nov. 14, 2014				
Amplifier	MITEQ	AMF-6F-260400 9121372		Apr. 19, 2013	Apr. 18, 2015				
Note: Calibration Interval of instruments listed above is two year.									

Test Item	RF Conducted										
Test Site	(TH01-WS)	ΓH01-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	1241002	Oct. 15, 2012	Oct. 14, 2013						
Power Sensor	Anritsu	MA2411B	1027366	Oct. 24, 2012	Oct. 23, 2013						
Signal Generator	R&S	SMB100A	175727	Jan. 14, 2013	Jan. 13, 2014						
Radio Communication Analyzer	Anritsu	MT8820C	6201240341	Mar. 13, 2013	Mar. 12, 2014						
Wideband Radio Communication Tester	R&S	CMW500	106070	Jan. 29, 2013	Jan. 28, 2014						
Bluetooth Tester	R&S	CBT	100959	Jan. 09, 2013	Jan. 08, 2014						
MXG-B RF Vector Signal Generator	Agilent	N5182B	MY53050081	Apr. 19, 2013	Apr. 18, 2014						
Mobile WiMAX test set	Agilent	E6651A	MY47310158	Oct. 09 ,2012	Oct .09 , 2013						
Note: Calibration Interval of instruments listed above is one year.											

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 v03

FCC KDB 662911 D01 Multiple Transmitter Output v02

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

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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	
AC Conduction	CO01-WS	24°C / 72%	Peter Lin	
Radiated Emissions	03CH01-WS	25°C / 65%	Aska Huang	
RF Conducted	TH01-WS	23°C / 62%	Brad Wu	

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

2.2 The Worst Test Modes and Channel Details

Test item	Modulation Test Frequency (MHz) (Data rate (Mbps) / MCS	Test Configuration	
Conducted Emissions	HT40	5795	MCS 0	1, 2	
Radiated Emissions (below 1GHz)	HT40	5795	MCS 0	1, 2	
Radiated Emissions (above 1GHz)	11a 5745 / 5785 / 5825 HT20 5745 / 5785 / 5825 HT40 5755 / 5795		6 Mbps MCS 0 MCS 0	1	
Fundamental Emission Output Power	11a	5745 / 5785 / 5825	6 Mbps		
6dB bandwidth	HT20	5745 / 5785 / 5825	MCS 0	1	
Power spectral density	HT40	5755 / 5795	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 **Y-plane** results were found as the worst case and were shown in this report.

Test Configuration 1 : Adapter Mode Test Configuration 2 : POE Mode

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3 Transmitter Test Results

3.1 Conducted Emissions

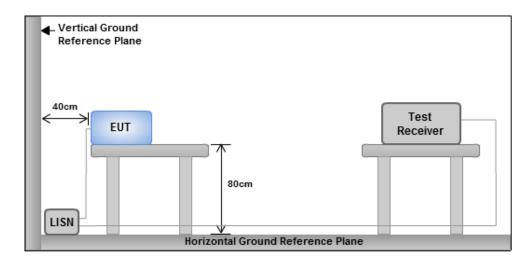
3.1.1 Limit of Conducted Emissions

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



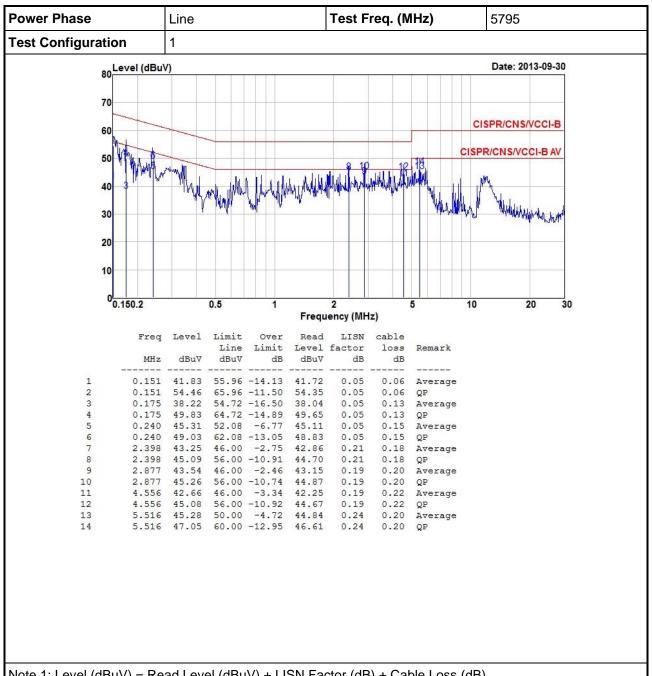
Note: 1. Support units were connected to second LISN.

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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Test Result of Conducted Emissions 3.1.4

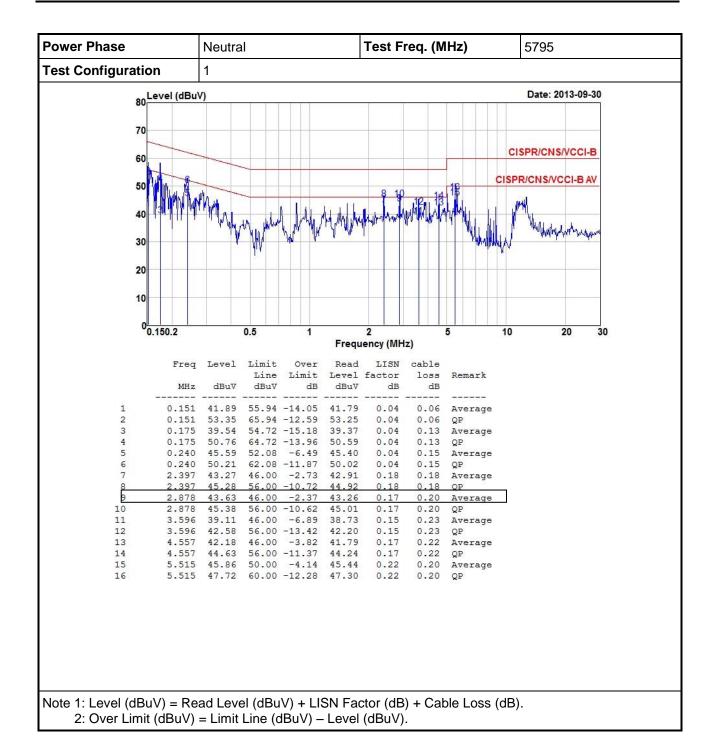


Note 1: Level (dBuV) = Read Level (dBuV) + LISN Factor (dB) + Cable Loss (dB).

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

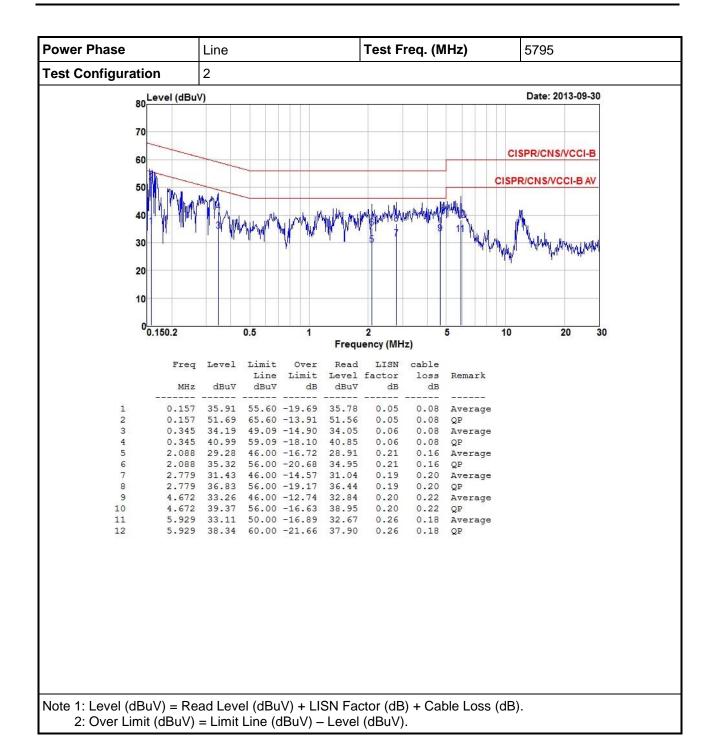
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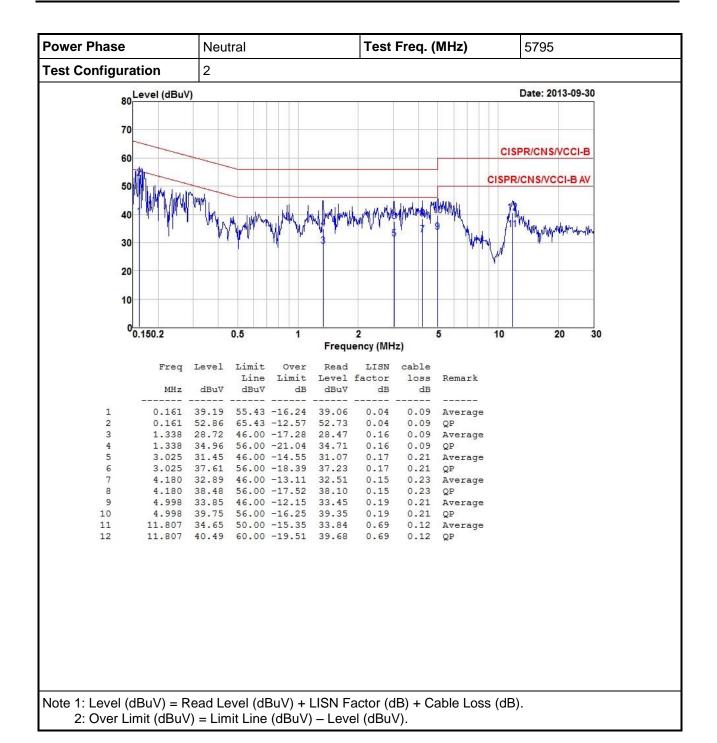
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3.2 6dB and Occupied Bandwidth

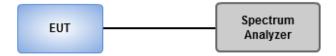
3.2.1 Limit of 6dB Bandwidth

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	N From (MH			Limit (Idua)			
Mode	N _{TX}	Freq. (MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Limit (kHz)
11a	2	5745	16.35	16.41			500
11a	2	5785	16.41	16.46			500
11a	2	5825	16.41	16.41			500
HT20	2	5745	17.57	17.62			500
HT20	2	5785	17.57	17.62			500
HT20	2	5825	17.57	17.62			500
HT40	2	5755	36.41	36.41			500
HT40	2	5795	36.41	36.41			500



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Modulation	N	Erog (MUz)		99% Occupied E	Bandwidth (MHz)	
Mode	N _{TX}	Freq. (MHz)	Chain 0 Chain 1		Chain 2	Chain 3
11a	2	5745	17.42	17.13		
11a	2	5785	17.42	17.13		
11a	2	5825	17.42	17.08		
HT20	2	5745	18.52	18.35		
HT20	2	5785	18.47	18.29		
HT20	2	5825	18.41	18.18		
HT40	2	5755	39.02	38.67		
HT40	2	5795	39.02	38.55		



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3.3 RF Output Power

3.3.1 Limit of RF Output Power

Cor	duct	ed po	ower shall not exceed 1Watt.					
\boxtimes	Ante	enna	gain <= 6dBi, no any corresponding reduction is in output power limit.					
	Ante	Antenna 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 tems operating in the 2400–2483.5 MHz band 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					
\boxtimes	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 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.					

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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	N _{TX}	Freq.	Peak		d output p Bm)	ower	Total Power			
Wode		(IVITIZ)	Chain 0	Chain 1	Chain 2	Chain 3	(mW)	(dBm)	(dBm)	
11a	2	5745	27.02	26.18			918.455	29.63	30.00	
11a	2	5785	27.13	26.34			946.943	29.76	30.00	
11a	2	5825	26.95	26.2			912.320	29.60	30.00	
HT20	2	5745	27.13	26.22			935.210	29.71	30.00	
HT20	2	5785	27.18	26.35			953.915	29.80	30.00	
HT20	2	5825	26.84	26.35			914.578	29.61	30.00	
HT40	2	5755	27.16	26.41			957.518	29.81	30.00	
HT40	2	5795	27.19	26.28			948.220	29.77	30.00	

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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.
 - Set the RBW = 30kHz, VBW = 100kHz.
 - 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.
 - 1. 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



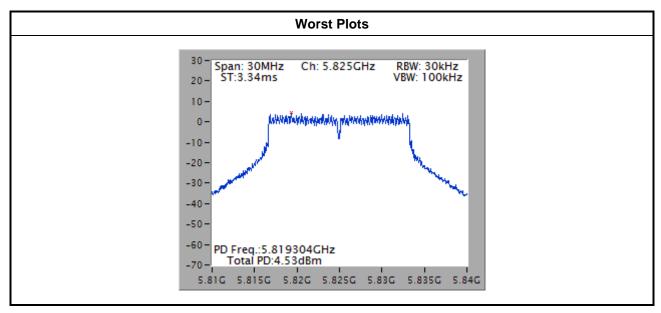
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3.4.4 Test Result of Power Spectral Density

Modulation Mode	N _{TX}	Freq. (MHz)	Total Power Spectral Density (dBm/30kHz)	Limit (dBm/3kHz)
11a	2	5745	4.23	5.99
11a	2	5785	4.15	5.99
11a	2	5825	4.53	5.99
HT20	2	5745	4.11	5.99
HT20	2	5785	3.65	5.99
HT20	2	5825	3.82	5.99
HT40	2	5755	0.79	5.99
HT40	2	5795	0.87	5.99

Note: Test result for HT20 / HT40 is bin-by-bin summing measured value of each TX port.



Note: Power density plot without duty factor

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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)	Field Strength (uV/m)	Field Strength (dBuV/m)	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

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

- 1. 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.

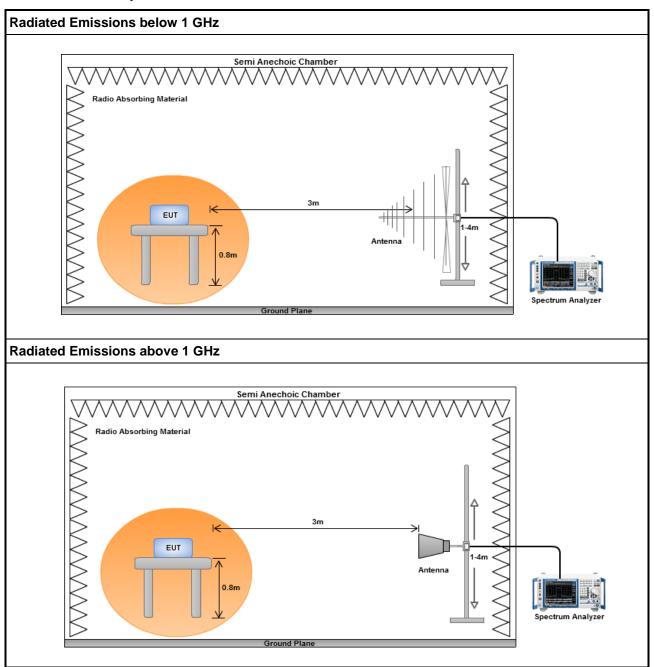
Note:

- 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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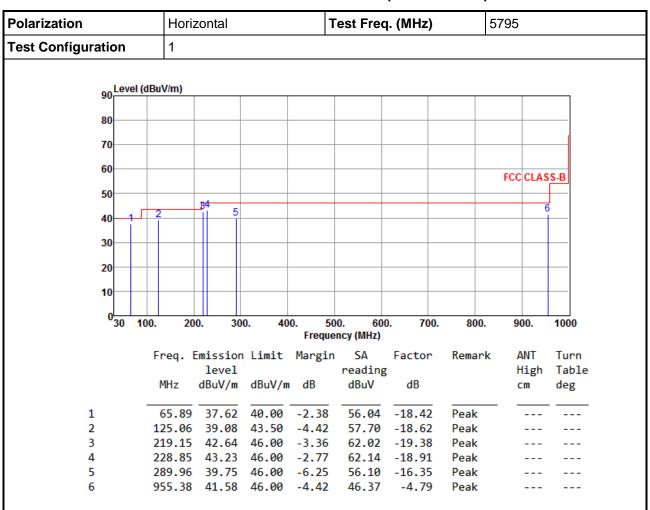
3.5.3 Test Setup



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3.5.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



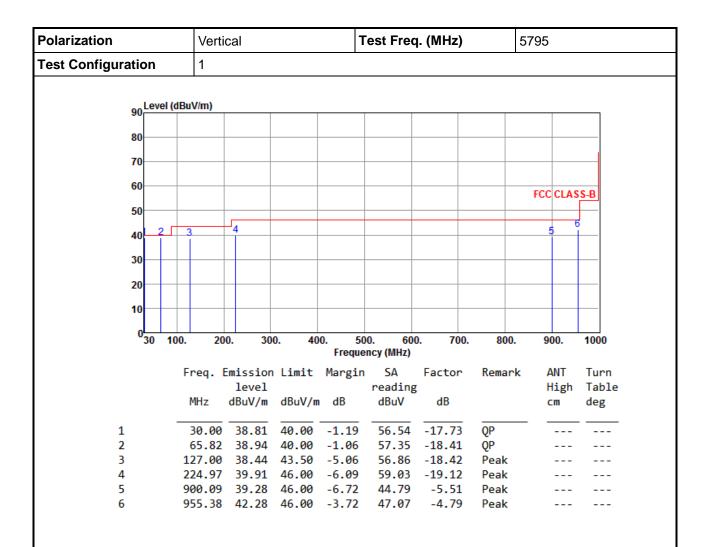
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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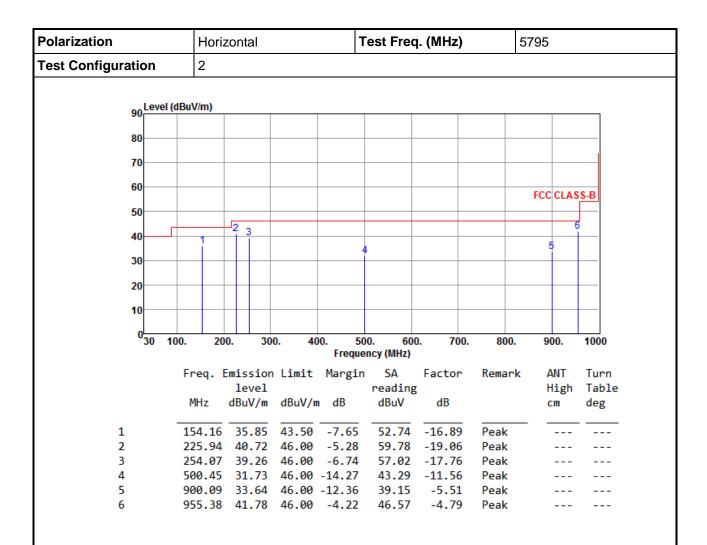




Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain Note 2: Margin (dB) = Emission level (dBuV/m) – Limit (dBuV/m).

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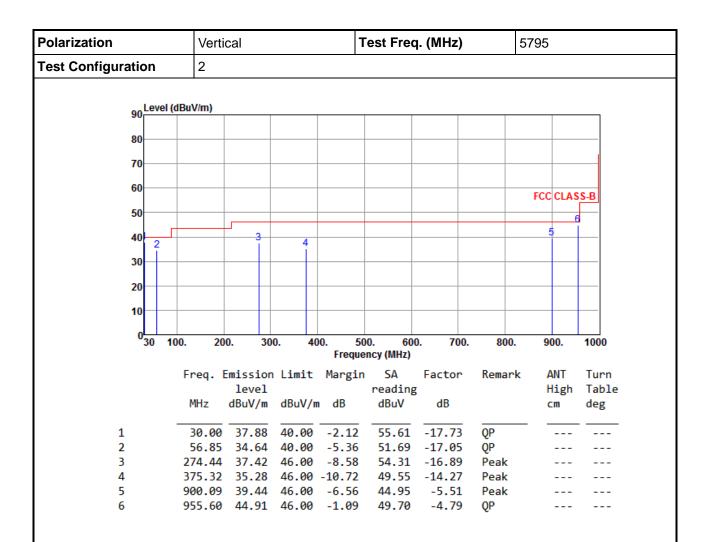
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

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

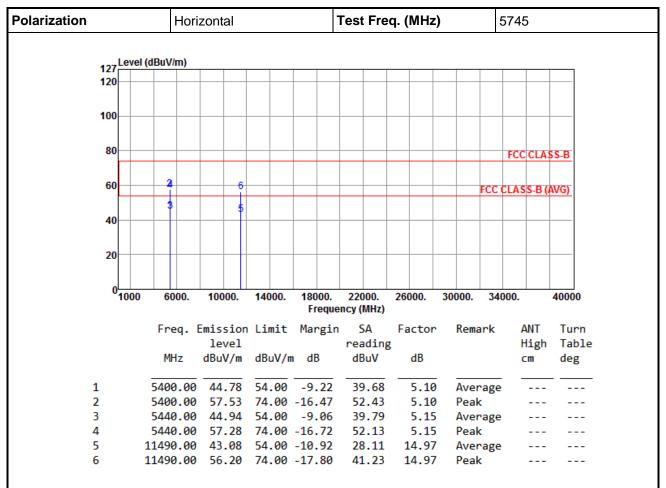
*Factor includes antenna factor, cable loss and amplifier gain

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 11a



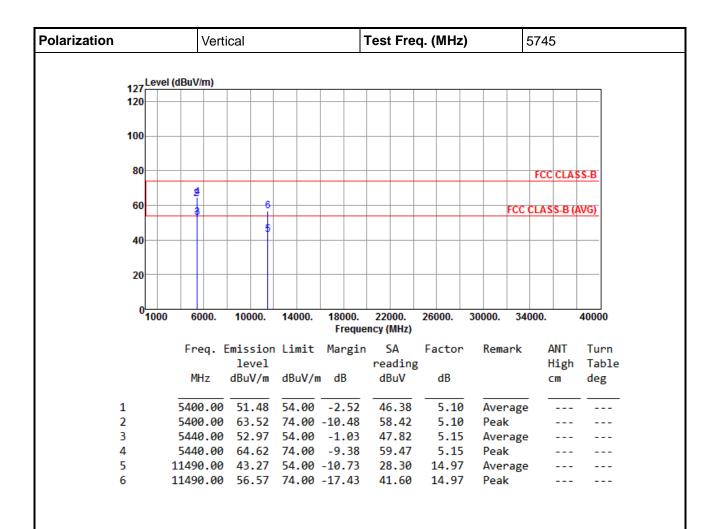
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



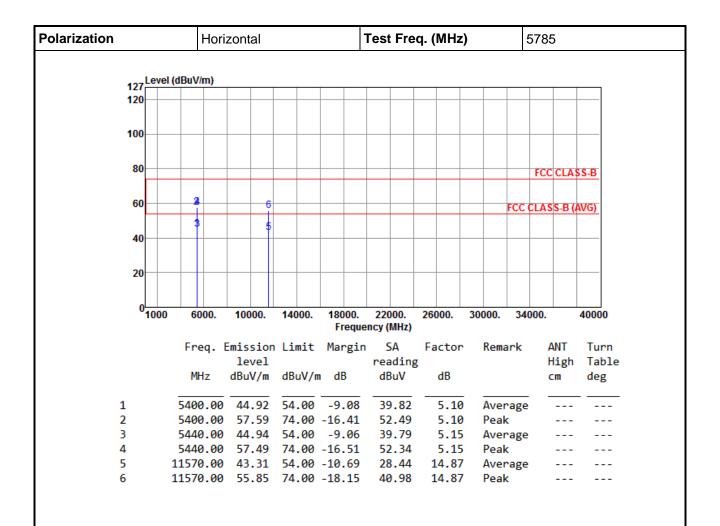


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



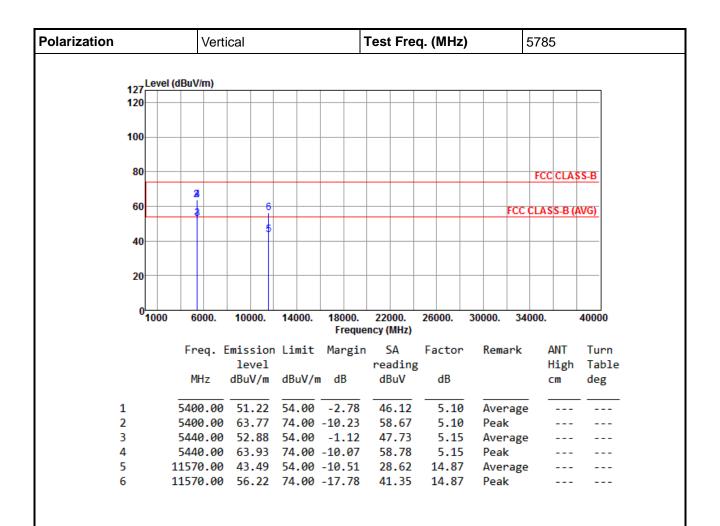


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



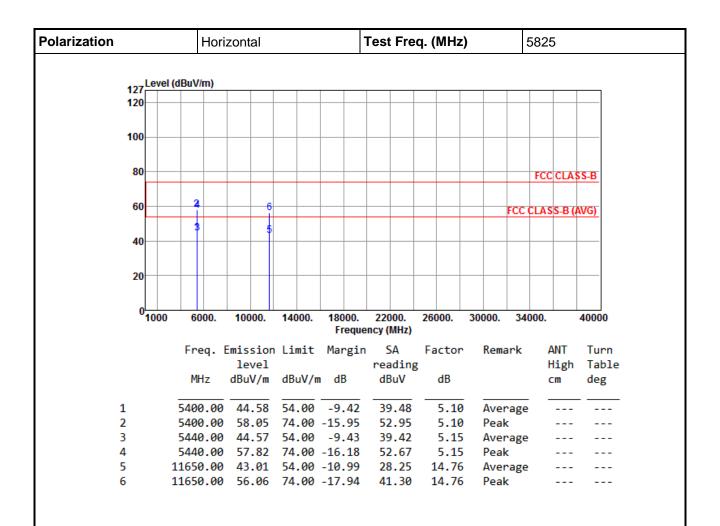


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



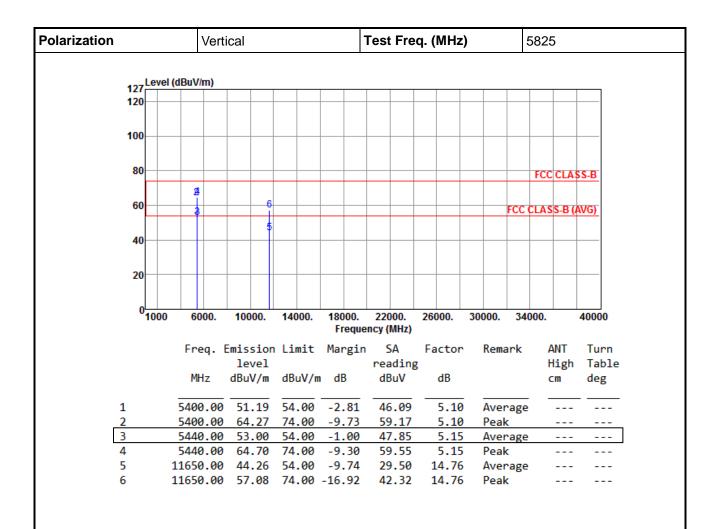


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.





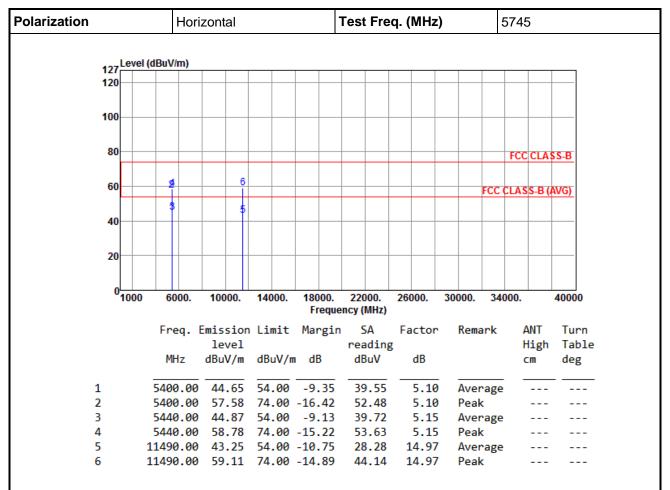
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



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



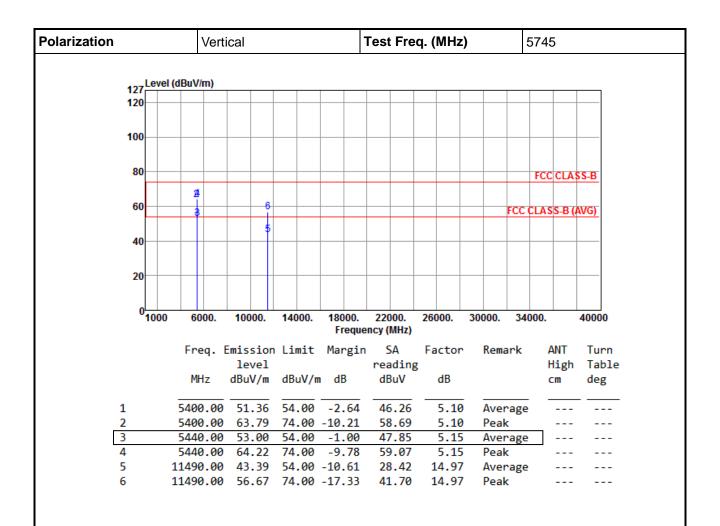
Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



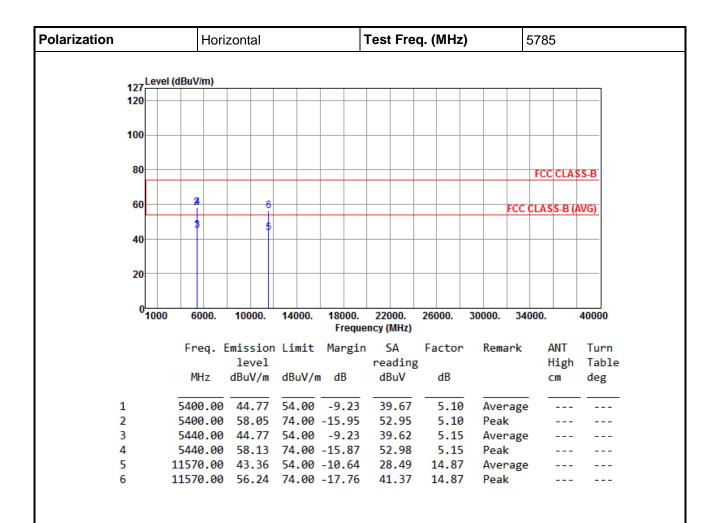


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



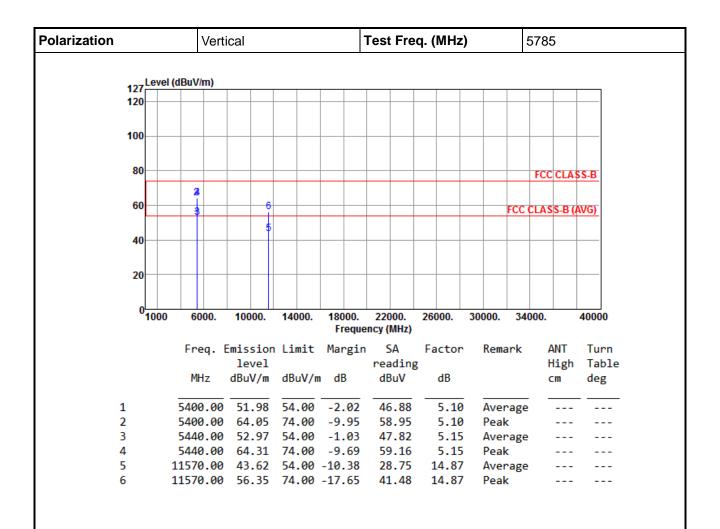


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



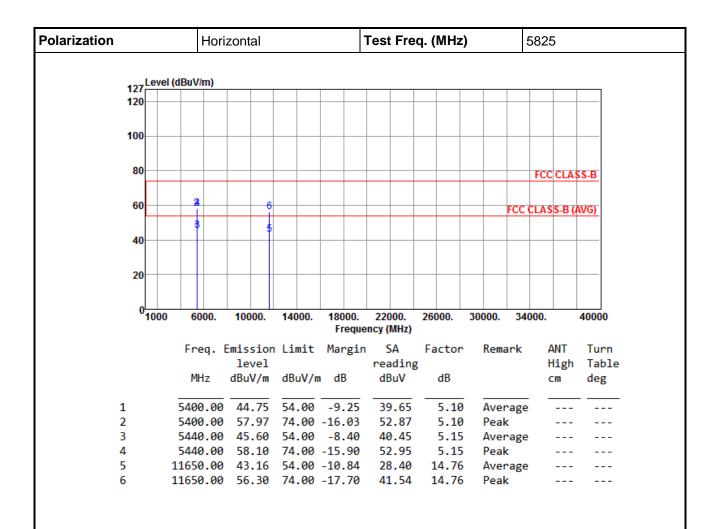


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



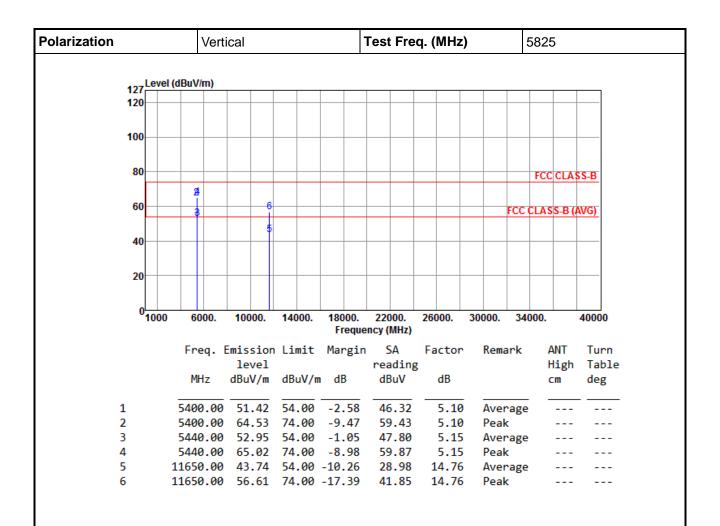


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.





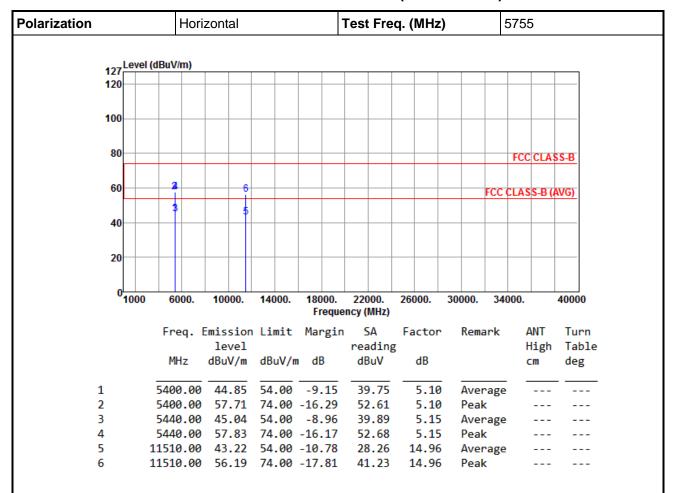
Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



3.5.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for HT40



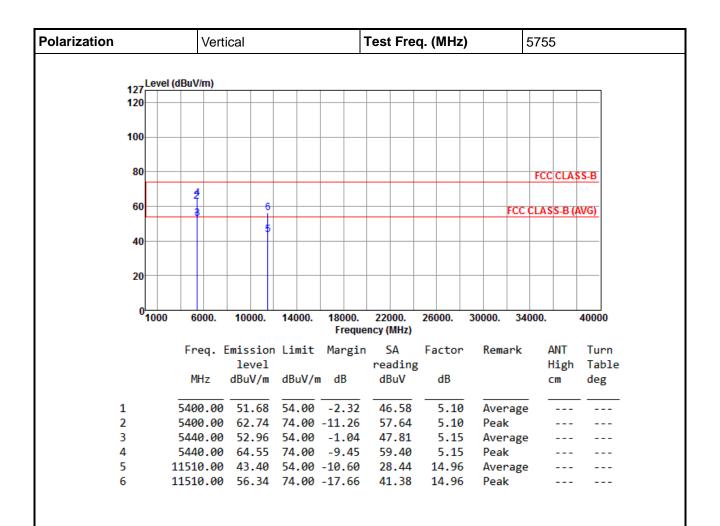
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Note 1: ">20dB" means spurious emission levels that exceed the level of 20 dB below the applicable limit.

Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.

Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.



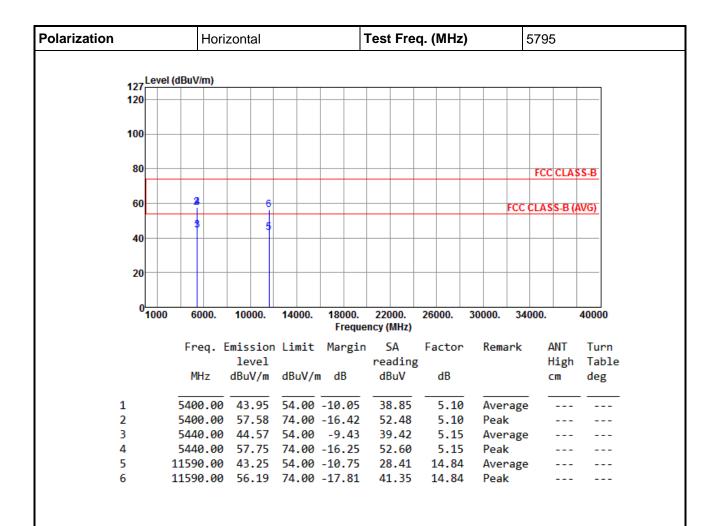


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



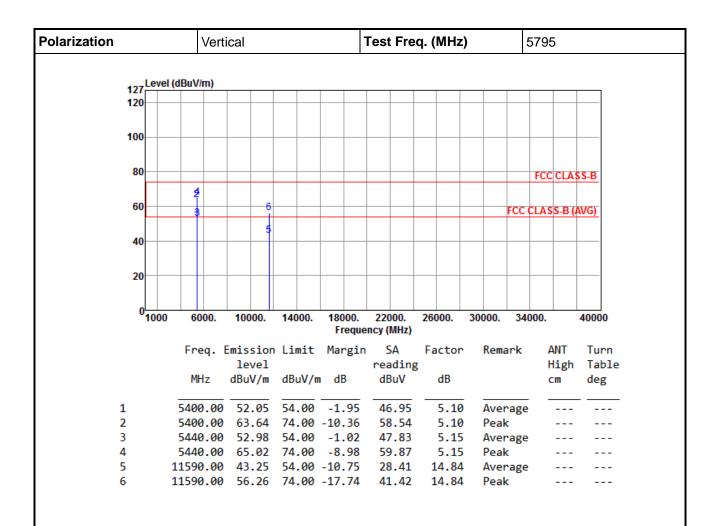


Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.





Note 3: For un-restricted bands, unwanted emissions shall be attenuated by at least 20 dB relative to the maximum measured in-band level.

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Note 2: For restricted bands, the peak measurement is fully sufficient, as the max field strength as measured with the Peak-Detector meets the AV-Limit so that the AV level does not need to be reported in addition.



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

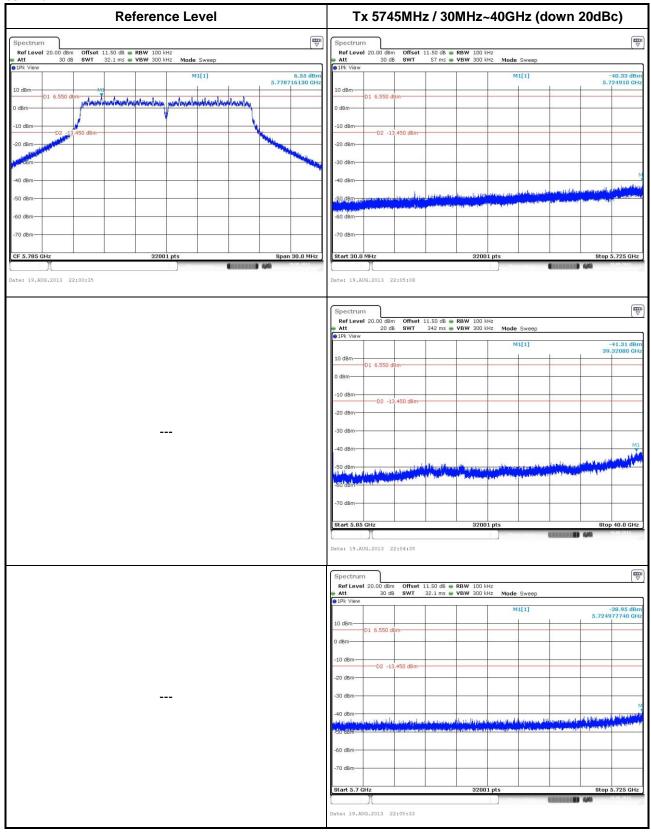


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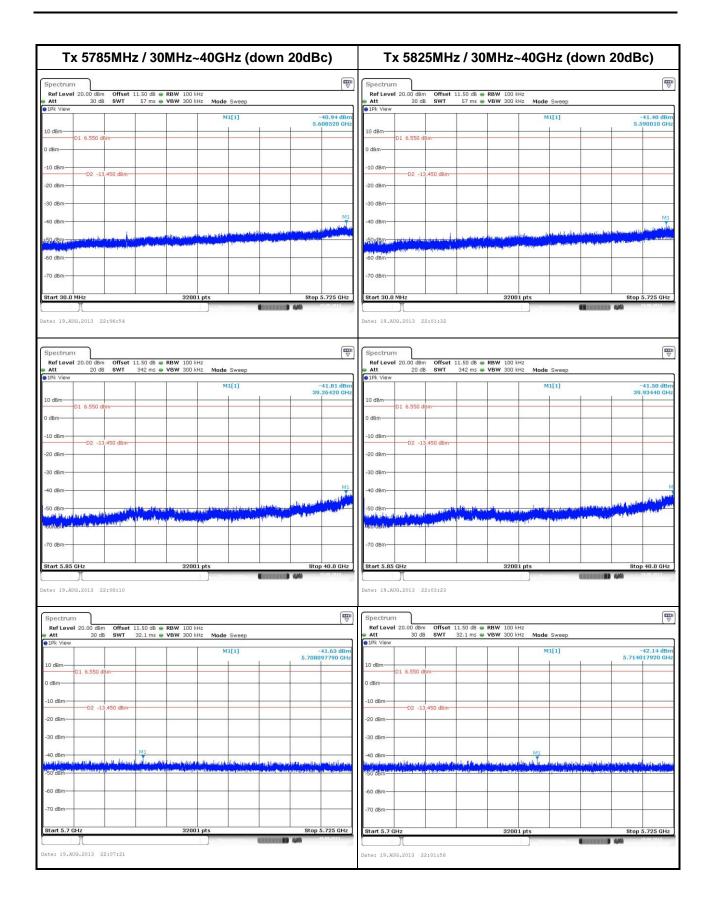
3.6.4 Unwanted Emissions into Non-Restricted Frequency Bands for 11a

802.11a



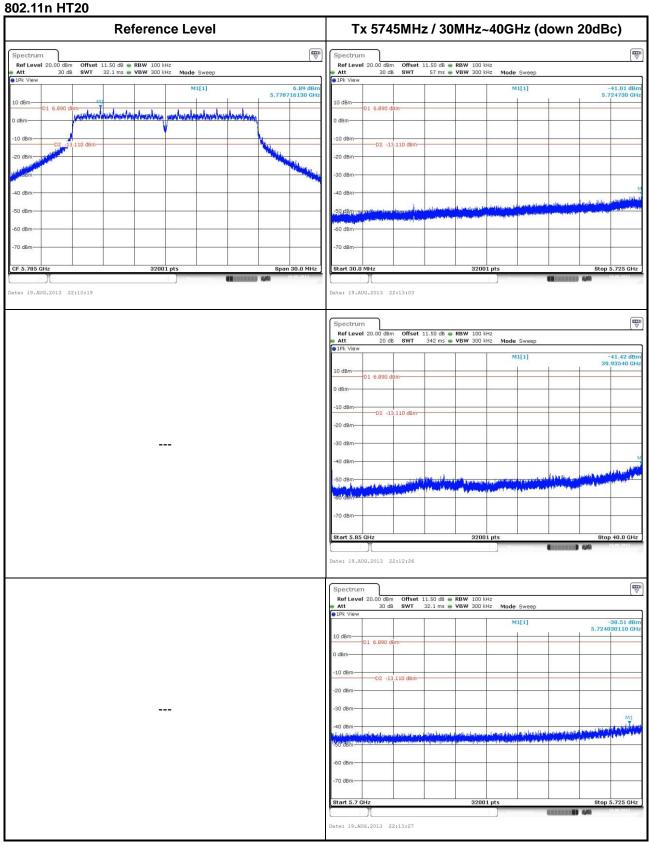
Report No.: FR380701AI Report Version: Rev. 02





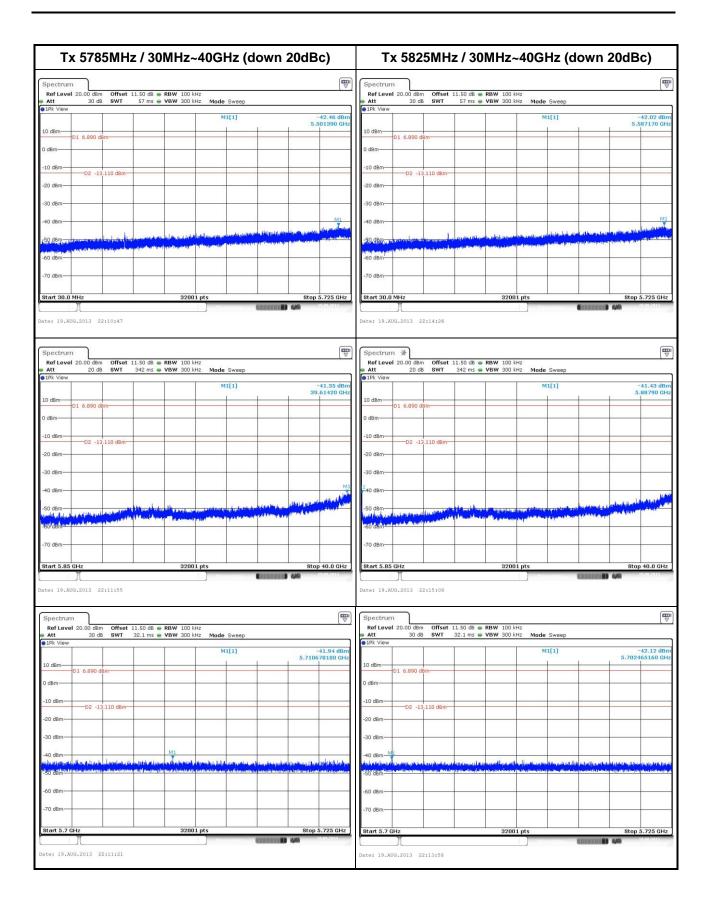
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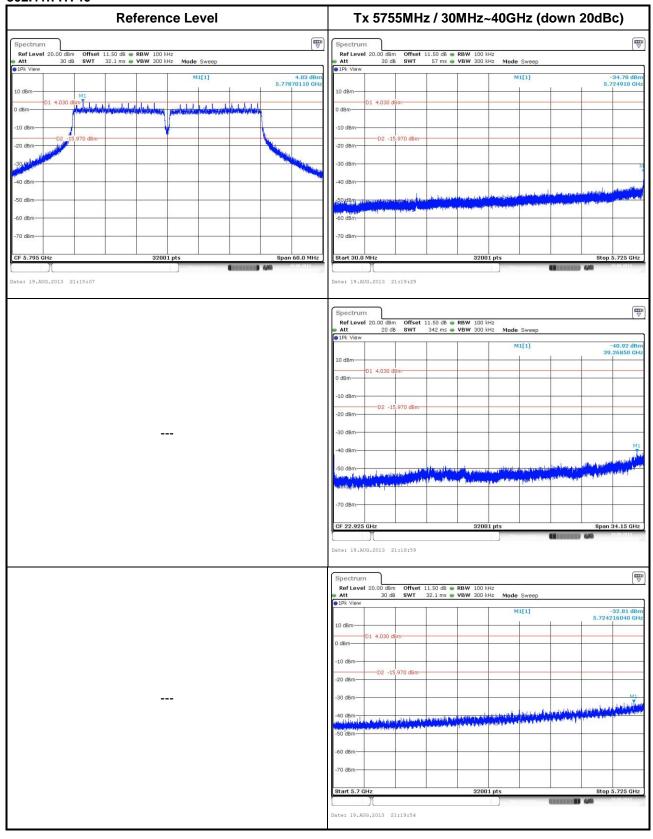




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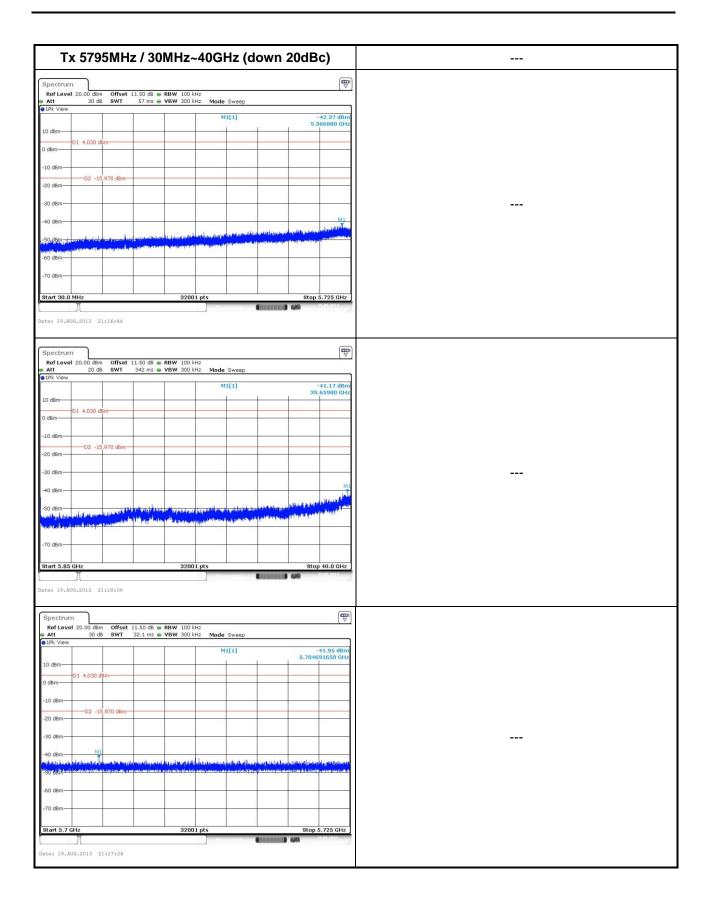


802.11n HT40



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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: 886-3-271-8666 Tel: 886-3-271-8666

No. 30-2, Ding Fwu Tsuen, Lin Kou District, New Taipei
City, Taiwan, R.O.C.

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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