

FCC Test Report

FCC ID : 2AAS9-2251XW

Equipment : Dual Radio 802.11a/n+b/g/n Outdoor Access

Point

Model No. : BW2251

Brand Name : BROWAN

Applicant : BROWAN COMMUNICATIONS Co., Ltd.

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

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

Manufacturer : Gemtek Technology Co., Ltd.

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

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

Standard : 47 CFR FCC Part 15.407

Received Date : Aug. 21, 2013

Tested Date : Aug. 21, 2013 ~ Jan. 02, 2014

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

lac-MRA



Report No.: FR390501AN Page: 1 of 83



Table of Contents

1	GENERAL DESCRIPTION	5
1.1	Information	5
1.2	Local Support Equipment List	
1.3	Test Setup Chart	
1.4	The Equipment List	
1.5	Testing Applied Standards	
1.6	Measurement Uncertainty	12
2	TEST CONFIGURATION	13
2.1	Testing Condition	13
2.2	The Worst Test Modes and Channel Details	13
3	TRANSMITTER TEST RESULTS	14
3.1	Conducted Emissions	14
3.2	Emission Bandwidth	17
3.3	RF Output Power	20
3.4	Peak Power Spectral Density	22
3.5	Peak Excursion	
3.6	Transmitter Radiated and Band Edge Emissions	28
3.7	Frequency Stability	81
4	TEST LABORATORY INFORMATION	83



Release Record

Report No.	Version	Description	Issued Date
FR390501AN	Rev. 01	Initial issue	Feb. 14, 2014

Report No.: FR390501AN Page: 3 of 83



Summary of Test Results

FCC Rules	FCC Rules Test Items Measured		Result
15.207	Conducted Emissions	[dBuV]: 1.223MHz 44.85 (Margin -1.15dB) - AV	Pass
15.407(b)(1)(2)(3) 15.209	Radiated Emissions	[dBuV/m at 3m]: 5725.00MHz 67.26 (Margin -1.04dB) - PK	Pass
15.407(a)(1)(2)(3)	Emission Bandwidth	Meet the requirement of limit	Pass
15.407(a)(1)(2)(3)	RF Output Power	Power [dBm]: 5150~5250 MHz:16.51 5250~5350 MHz:23.63 5470~5725 MHz:23.95	Pass
15.407(a)(1)(2)(3)	Peak Power Spectral Density	Meet the requirement of limit	Pass
15.407(a)(6)	Peak Excursion	Meet the requirement of limit	Pass
15.407(g)	Frequency Stability	Meet the requirement of limit	Pass
15.203	Antenna Requirement	Meet the requirement of limit	Pass

Report No.: FR390501AN Page: 4 of 83



1 General Description

1.1 Information

1.1.1 Specification of the Equipment under Test (EUT)

RF General Information							
IEEE Std. Frequency 802.11 Range (MHz)		Ch. Freq. (MHz)	Channel Number	Transmit Chains (N _{TX})	Data Rate / MCS		
a	5150-5250 5250-5350 5470-5725	5180-5240 5260-5320 5500-5700	36-48 [4] 52-64 [4] 100-140 [6]	2	6-54 Mbps		
n (HT20)	5150-5250 5250-5350 5470-5725	5180-5240 5260-5320 5500-5700	36-48 [4] 52-64 [4] 100-140 [6]	2	MCS 0-15		
n (HT40)	5150-5250 5250-5350 5470-5725	5190-5230 5270-5310 5510-5550	38-46 [2] 54-62 [2] 102-134 [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. No.	Model	Туре	Gain (dBi)	Connector
1	BA5071	Omni-directional	5	N type

1.1.3 EUT Operational Condition

I POWAL SIINNIV I VNA	48Vdc from AC adapter. 8~57Vdc from POE

Report No.: FR390501AN Page: 5 of 83



1.1.4 Accessories

	Accessories					
No.	Equipment	Description				
1	AC adapter	Brand Name: LEI Model Name: MU24-B480050-A1 Power Rating: I/P: 100-240Vac, 50-60Hz, 1.0A O/P: 48Vdc, 0.5A Power Line: AC 1.5m non-shielded cable w/o core				
2	POE	Brand Name: BROWAN Model Name: BE3013 Power Rating: I/P: 8 ~ 57Vdc O/P: 8 ~ 57Vdc				

1.1.5 Channel List

802.11 a	a / HT20	нт	⁻ 40
Channel	Frequency(MHz)	Channel	Frequency(MHz)
36	5180	38	5190
40	5200	46	5230
44	5220	54	5270
48	5240	62	5310
52	5260	102	5510
56	5280	110	5550
60	5300	-	-
64	5320	-	-
100	5500	-	-
104	5520	-	-
108	5540	-	-
112	5560	-	-
136	5680	-	-
140	5700	-	-

Report No.: FR390501AN Page: 6 of 83



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)
Duty Factor	0 - IEEE 802.11a 0 - IEEE 802.11n (HT20) 0 - IEEE 802.11n (HT40)

1.1.7 Power Setting

Channal			Modulation Mode	
Channel	Frequency(MHz)	11a	HT20	HT40
CH 36	5180	9.5	9.5	
CH 40	5200	9.5	10	
CH 48	5240	10.5	10.5	
CH 52	5260	18	18.5	
CH 60	5300	18	18.5	
CH 64	5320	18	18	
CH 100	5500	16	16.5	
CH 112	5560	16.5	17	
CH 140	5700	17.5	18	
CH 38	5190			12
CH 46	5230			12.5
CH 54	5270			20
CH 62	5310			16
CH 102	5510			13.5
CH 110	5550			20.5

Report No.: FR390501AN Page: 7 of 83

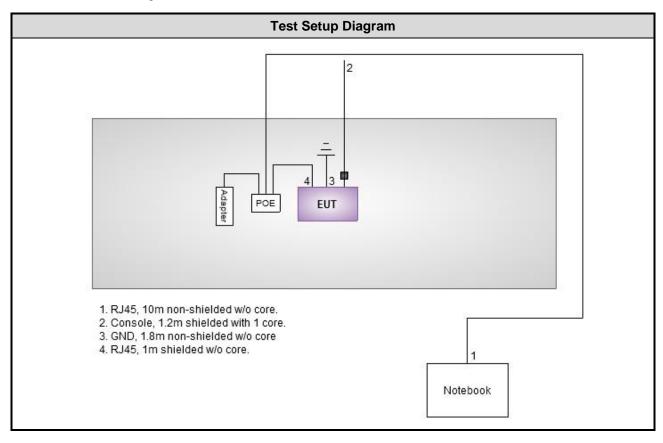


1.2 Local Support Equipment List

	Support Equipment List						
No.	Equipment	Brand	Model	S/N	FCC ID	Signal cable / Length (m)	
1	Notebook	DELL	E6430		DoC	RJ45 10m non-shielded w/o core.	

Note: Console cable was supplied by applicant.

1.3 Test Setup Chart



Report No.: FR390501AN Page: 8 of 83



1.4 The Equipment List

Test Item	Conducted Emission							
Test Site	Conduction room 1 / (CO01-WS)							
Test date	Oct. 23, 2013							
Instrument	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Until			
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			

Test Item	RF Conducted										
Test Site	(TH01-WS)										
Test date	Sep.13 ~ 15, 2013	p.13 ~ 15, 2013									
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	1241001	Oct. 08, 2013	Oct. 07, 2014						
Power Sensor	Anritsu	MA2411B	1207362	Oct. 08, 2013	Oct. 07, 2014						
Note: Calibration Interval of instruments listed above is one year.											

Report No.: FR390501AN Page: 9 of 83



Test Item	Radiated Emission	adiated Emission									
Test Site	966 chamber1 / (03Ch	66 chamber1 / (03CH01-WS)									
Test date	Aug.21 ~ Sep.12, 201	ug.21 ~ Sep.12, 2013									
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						
RF Cable-R10m	Woken	CFD400NL-LW	CFD400NL-002	Dec. 25, 2012	Dec. 24, 2013						
RF Cable-R10m Woken CFD400NL-LW CFD400NL-002 Dec. 25, 2012 Dec. 24, 2013 Note: Calibration Interval of instruments listed above is one year.											

Loop Antenna	R&S	HFH2-Z2	100330	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	F Conducted									
Test Site	(TH01-WS)	H01-WS)									
Test date	Jan.02, 2014										
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	Dec. 11, 2013	Dec. 10, 2014						
Power Meter	Anritsu	ML2495A	1241002	Oct. 24, 2013	Oct. 23, 2014						
Power Sensor	Anritsu	MA2411B	1027366	Oct. 24, 2013	Oct. 23, 2014						
Signal Generator	R&S	R&S SMB100A 175727 Jan. 14, 2013 Jan. 13, 2014									
Note: Calibration Inter	val of instruments listed	d above is one year.									

Report No.: FR390501AN Page: 10 of 83



MPRO S SS F SCHWAR	odel No. SAC-03 FSV40 ESR3 JLB9168	Serial No. 03CH01-WS 101498 101658 VULB9168-522	Calibration Date Jan. 04, 2013 Jan. 24, 2013 Jan. 28, 2013 Jan. 11, 2013	Calibration Until Jan. 03, 2014 Jan. 23, 2014 Jan. 27, 2014 Jan. 10, 2014
MPRO S SCHWAR Z	SAC-03 FSV40 ESR3	03CH01-WS 101498 101658	Jan. 04, 2013 Jan. 24, 2013 Jan. 28, 2013	Jan. 03, 2014 Jan. 23, 2014 Jan. 27, 2014
MPRO S SS F SCHWAR	SAC-03 FSV40 ESR3	03CH01-WS 101498 101658	Jan. 04, 2013 Jan. 24, 2013 Jan. 28, 2013	Jan. 03, 2014 Jan. 23, 2014 Jan. 27, 2014
SCHWAR	FSV40 ESR3	101498 101658	Jan. 24, 2013 Jan. 28, 2013	Jan. 23, 2014 Jan. 27, 2014
SCHWAR	ESR3	101658	Jan. 28, 2013	Jan. 27, 2014
7			,	,
RZBECK VL	JLB9168	VULB9168-522	Jan. 11, 2013	lan 10 2014
				Jan. 10, 2014
RZBECK BBH	HA 9120 D	BBHA 9120 D 1096	Feb. 18, 2013	Feb. 17, 2014
RZBECK BB	BHA 9170	BBHA 9170517	Jan. 14, 2013	Jan. 13, 2014
geon B	BPA-530	100219 Nov. 22, 2013		Nov. 21, 2014
lent 8	33017A	MY39501308	Dec. 16, 2013	Dec. 15, 2014
SUHNER SUC	OFLEX104	MY16014/4	Dec. 16, 2013	Dec. 15, 2014
SUHNER SUC	OFLEX104	MY16019/4	Dec. 16, 2013	Dec. 15, 2014
SUHNER SUC	OFLEX104	MY16139/4	Dec. 16, 2013	Dec. 15, 2014
ken CFD	400NL-LW	CFD400NL-001	Dec. 16, 2013	Dec. 15, 2014
ken CFD	400NL-LW	CFD400NL-002	Dec. 16, 2013	Dec. 15, 2014
	ent 8 SUHNER SUC SUHNER SUC SUHNER SUC Ken CFD Ken CFD	ent 83017A SUHNER SUCOFLEX104 SUHNER SUCOFLEX104 SUHNER SUCOFLEX104 Ken CFD400NL-LW	ent 83017A MY39501308 SUHNER SUCOFLEX104 MY16014/4 SUHNER SUCOFLEX104 MY16019/4 SUHNER SUCOFLEX104 MY16139/4 Ken CFD400NL-LW CFD400NL-001 Ken CFD400NL-LW CFD400NL-002	ent 83017A MY39501308 Dec. 16, 2013 SUHNER SUCOFLEX104 MY16014/4 Dec. 16, 2013 SUHNER SUCOFLEX104 MY16019/4 Dec. 16, 2013 SUHNER SUCOFLEX104 MY16139/4 Dec. 16, 2013 Ken CFD400NL-LW CFD400NL-001 Dec. 16, 2013 Ken CFD400NL-LW CFD400NL-002 Dec. 16, 2013

1.5 Testing Applied Standards

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

47 CFR FCC Part 15.407

ANSI C63.10-2009

FCC KDB 412172

FCC KDB 789033 D01 General UNII Test procedures v01r03

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

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

Report No.: FR390501AN Page: 11 of 83



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	±74.147 Hz						
Conducted power	±0.717 dB						
Power density	±2.687 dB						
Frequency error	±74.147 Hz						
Temperature	±0.3 °C						
AC conducted emission	±2.43 dB						
Radiated emission	±2.49 dB						

Report No.: FR390501AN Page: 12 of 83



2 Test Configuration

2.1 Testing Condition

Test Item	Test Site	Ambient Condition	Tested By
AC Conduction	CO01-WS	25°C / 62%	Skys Huang
Radiated Emissions	03CH01-WS	24°C / 62%	Aska Huang
RF Conducted	TH01-WS	23°C / 62%	Felix Sung

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	HT40	5550	MCS 0	-
Radiated Emissions <1GHz	HT40	5550	MCS 0	-
Radiated Emissions >1GHz	11a 5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5560 / 5700		6	-
RF Output Power Emission Bandwidth	HT20	5180 / 5200 / 5240 / 5260 / 5300 5320 / 5500 / 5560 / 5700	MCS 0	-
Peak Power Spectral Density	HT40	5190 / 5230/ 5270 / 5310 / 5510 5550	MCS 0	-
	11a	5240 / 5260 / 5700	6	-
Peak Excursion	HT20	5240 / 5300 / 5700	MCS 0	
	HT40	5230 / 5270 / 5550	MCS 0	
Frequency Stability	Un-modulation	5200 / 5320		-

Report No.: FR390501AN Page: 13 of 83



3 Transmitter Test Results

3.1 Conducted Emissions

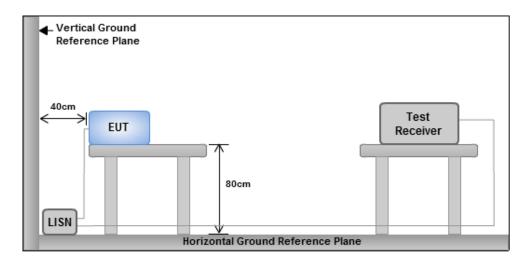
3.1.1 Limit of Conducted Emissions

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 logarith	m 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



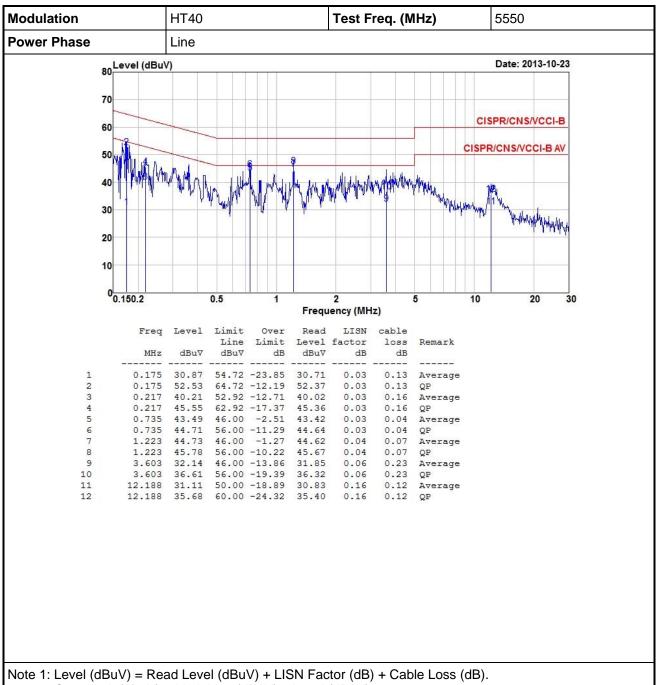
Note: 1. Support units were connected to second LISN.

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

Report No.: FR390501AN Page: 14 of 83



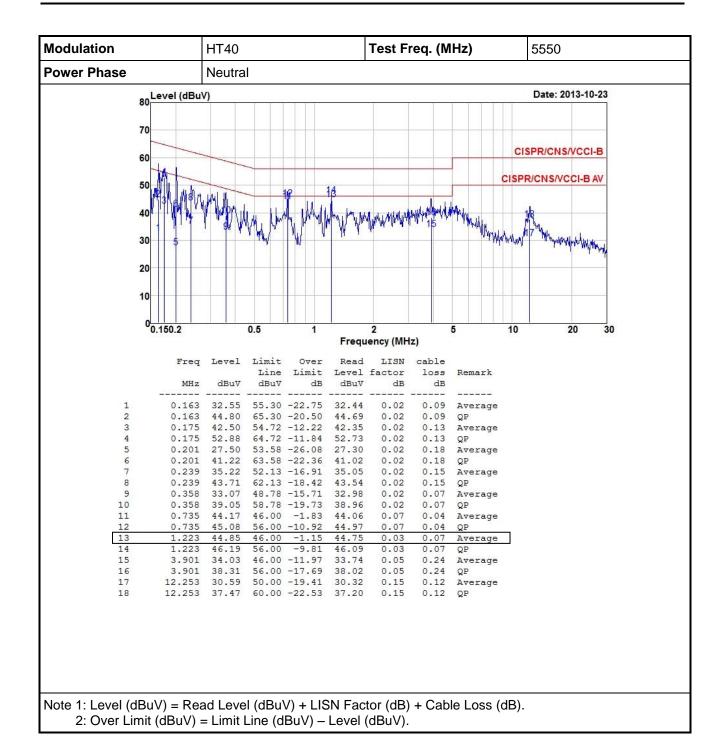
3.1.4 Test Result of Conducted Emissions



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

Report No.: FR390501AN Page: 15 of 83





Page: 16 of 83

Report No.: FR390501AN Report Version: Rev. 01

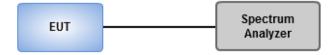


3.2 Emission Bandwidth

3.2.1 Test Procedures

- 1. Set RBW = approximately 1% of the emission bandwidth.
- 2. Set the VBW > RBW, Detector = Peak.
- 3. Trace mode = max hold.
- 4. Measure the maximum width of the emission that is 26 dB down from the peak of the emission.

3.2.2 Test Setup



Report No.: FR390501AN Page: 17 of 83

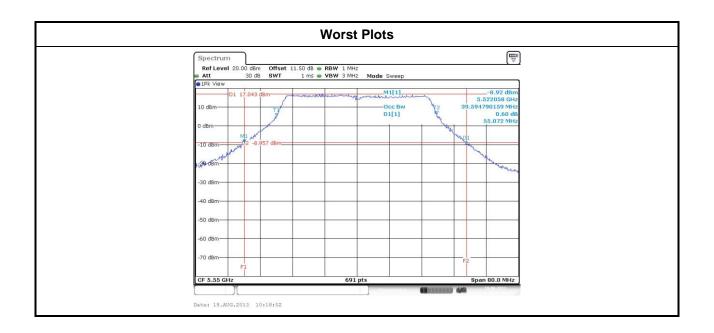


3.2.3 Test Result of Emission Bandwidth

Modulation		Freq.	26dB Bandwidth (MHz)			99% Bandwidth (MHz)				Limit (dBm)		
Mode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Chain 0	Chain 1	Chain 2	Chain 3	2 6 d B B W	9 9 % B W
11a	2	5180	25.10	23.13			17.37	16.96			17.00	16.29
11a	2	5200	24.52	23.54			17.42	17.08			17.00	16.32
11a	2	5240	24.41	23.94			17.42	17.08			17.00	16.32
11a	2	5260	24.64	23.42			17.31	16.90			24.00	23.28
11a	2	5300	24.87	23.54			17.37	16.96			24.00	23.29
11a	2	5320	24.87	23.13			17.37	16.96			24.00	23.29
11a	2	5500	24.81	24.00			17.42	16.90			24.00	23.28
11a	2	5560	24.12	23.42			17.08	16.96			24.00	23.29
11a	2	5700	24.52	24.06			17.48	17.08			24.00	23.32
HT20	2	5180	25.33	24.35			18.47	18.18			17.00	16.60
HT20	2	5200	25.62	24.75			18.47	18.23			17.00	16.61
HT20	2	5240	25.45	24.81			18.35	18.23			17.00	16.61
HT20	2	5260	25.74	25.16			18.64	18.41			24.00	23.65
HT20	2	5300	25.62	25.16			18.52	18.58			24.00	23.68
HT20	2	5320	25.33	24.58			18.35	18.12			24.00	23.58
HT20	2	5500	25.62	25.39			18.52	18.47			24.00	23.66
HT20	2	5560	25.86	24.46			18.41	18.47			24.00	23.65
HT20	2	5700	25.62	25.39			18.47	18.23			24.00	23.61
HT40	2	5190	54.96	50.90			38.90	38.21			17.00	17.00
HT40	2	5230	54.38	52.52			38.90	38.32			17.00	17.00
HT40	2	5270	54.38	51.71			38.78	38.90			24.00	24.00
HT40	2	5310	53.80	52.75			39.02	38.78			24.00	24.00
HT40	2	5510	54.61	53.33			39.25	38.78			24.00	24.00
HT40	2	5550	55.07	52.87			39.59	38.67			24.00	24.00

Report No.: FR390501AN Page: 18 of 83





Report No.: FR390501AN Page: 19 of 83



3.3 RF Output Power

3.3.1 Limit of RF Output Power

	Frequency Band (GHz)	Limit					
\boxtimes	5.15~5.25	50mW or 4dBm+10 log B					
\boxtimes	5.25~5.35	250mW or 11dBm+10 log B					
\boxtimes	5.47~5.725	250mW or 11dBm+10 log B					
Note	Note: "B" is the 26dB emission bandwidth in MHz.						

3.3.2 Test Procedures

Now Power meter

Measurements is performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required

3.3.3 Test Setup



Report No.: FR390501AN Page: 20 of 83



3.3.4 Test Result of Maximum Conducted Output Power

Modulation	Modulation N Freq.		A	verage Po	ower (dBm	Total	Total	Limit	
Mode	N _{TX}	(MHz)	Chain 0	Chain 1	Chain 2	Chain 3	Power (mW)	Power (dBm)	(dBm)
11a	2	5180	10.93	10.08			22.574	13.54	17.00
11a	2	5200	10.83	9.93			21.946	13.41	17.00
11a	2	5240	11.01	10.32			23.383	13.69	17.00
11a	2	5260	17.82	17.87			121.769	20.86	24.00
11a	2	5300	17.33	17.78			114.055	20.57	24.00
11a	2	5320	17.29	17.71			112.600	20.52	24.00
11a	2	5500	17.89	17.67			119.997	20.79	24.00
11a	2	5560	18.71	16.79			122.055	20.87	24.00
11a	2	5700	18.92	16.91			127.074	21.04	24.00
HT20	2	5180	11.04	10.16			23.081	13.63	17.00
HT20	2	5200	11.03	10.23			23.220	13.66	17.00
HT20	2	5240	11.07	10.24			23.362	13.69	17.00
HT20	2	5260	18.14	18.09			129.580	21.13	24.00
HT20	2	5300	17.68	18.62			131.392	21.19	24.00
HT20	2	5320	17.62	18.31			125.574	20.99	24.00
HT20	2	5500	18.43	17.78			129.642	21.13	24.00
HT20	2	5560	18.87	17.22			129.813	21.13	24.00
HT20	2	5700	19.02	17.08			130.850	21.17	24.00
HT40	2	5190	13.71	13.15			44.150	16.45	17.00
HT40	2	5230	13.78	13.21			44.819	16.51	17.00
HT40	2	5270	20.42	20.81			230.658	23.63	24.00
HT40	2	5310	17.13	17.24			104.608	20.20	24.00
HT40	2	5510	15.55	14.36			63.182	18.01	24.00
HT40	2	5550	21.48	20.33			248.499	23.95	24.00

Report No.: FR390501AN Page: 21 of 83



3.4 Peak Power Spectral Density

3.4.1 Limit of Peak Power Spectral Density

	Frequency Band (GHz)	Limit (dBm)
\boxtimes	5.15~5.25	4
\boxtimes	5.25~5.35	11
	5.47~5.725	11

3.4.2 Test Procedures

- Method SA-1
 - 1. Set RBW = 1 MHz, VBW = 3 MHz, Sweep time = auto, Detector = RMS.
 - 2. Trace average 100 traces.
 - 3. Use the peak marker function to determine the maximum amplitude level.
- ☐ Method SA-2
 - 1. Set RBW = 1 MHz, VBW = 3 MHz, Detector = RMS.
 - 2. Set sweep time ≥ 10 * (number of points in sweep) * (symbol period of the transmitted signal).
 - 3. Perform a single sweep.
 - 4. Use the peak marker function to determine the maximum amplitude level.
- ☐ Method SA-2 Alternative
 - 1. Set RBW = 1 MHz, VBW = 3 MHz, Detector = RMS.
 - 2. Set sweep time \geq 10 * (number of points in sweep) * (total on/off period of the transmitted signal).
 - 3. Perform a single sweep.
 - 4. Use the peak marker function to determine the maximum amplitude level.
 - 5. Add $10 \log(1/x)$, where x is the duty cycle.

3.4.3 Test Setup



Report No.: FR390501AN Page: 22 of 83



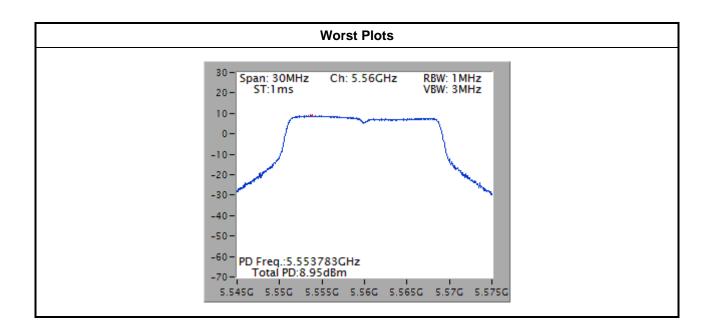
3.4.4 Test Result of Peak Power Spectral Density

			_			
Modulation Mode	N _{TX}	Freq. (MHz)	PSD (dBm)	Duty Factor (dB)	Total PSD (dBm)	Limit (dBm)
11a	2	5180	1.50	0.00	1.50	1.99
11a	2	5200	1.54	0.00	1.54	1.99
11a	2	5240	1.66	0.00	1.66	1.99
11a	2	5260	8.73	0.00	8.73	8.99
11a	2	5300	8.75	0.00	8.75	8.99
11a	2	5320	8.70	0.00	8.70	8.99
11a	2	5500	8.61	0.00	8.61	8.99
11a	2	5560	8.48	0.00	8.48	8.99
11a	2	5700	8.59	0.00	8.59	8.99
HT20	2	5180	1.31	0.00	1.31	1.99
HT20	2	5200	1.38	0.00	1.38	1.99
HT20	2	5240	1.52	0.00	1.52	1.99
HT20	2	5260	8.51	0.00	8.51	8.99
HT20	2	5300	8.94	0.00	8.94	8.99
HT20	2	5320	8.84	0.00	8.84	8.99
HT20	2	5500	8.79	0.00	8.79	8.99
HT20	2	5560	8.95	0.00	8.95	8.99
HT20	2	5700	8.88	0.00	8.88	8.99
HT40	2	5190	1.17	0.00	1.17	1.99
HT40	2	5230	0.89	0.00	0.89	1.99
HT40	2	5270	8.62	0.00	8.62	8.99
HT40	2	5310	4.74	0.00	4.74	8.99
HT40	2	5510	2.50	0.00	2.50	8.99
HT40	2	5550	7.75	0.00	7.75	8.99

 Test result is bin-by-bin summing measured value of each TX port.
 Directional gain = 5 + 10*log(2/1) = 8.01 dBi > 6 dBi For 5150~5250 MHz band, Limit shall be reduced to 4 dBm - (8.01 dBi - 6 dBi) = 1.99 dBmFor 5250~5350 and 5470~5725 MHz band, Limit shall be reduced to 11 dBm - (8.01 dBi - 6 dBi) = 8.99 dBm

Report No.: FR390501AN Page: 23 of 83





Report No.: FR390501AN Page: 24 of 83



3.5 Peak Excursion

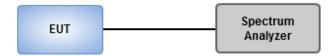
3.5.1 Peak Excursion Limit

Peak excursion of the modulation envelope shall not exceed 13 dB across any 1 MHz bandwidth.

3.5.2 Test Procedures

- 1. Set RBW = 1 MHz, VBW = 3 MHz, Detector = peak.
- 2. Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
- 3. Use the peak search function to find the peak of the spectrum.
- 4. Use the procedure of section 3.4.2 to measure the PPSD.
- 5. Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD

3.5.3 Test Setup



Report No.: FR390501AN Page: 25 of 83



3.5.4 Test Result of Peak Excursion

Mode	Modulation Mode	N _{TX}	Freq. (MHz)	Measured value(dB)	Duty factor (dB)	Peak Excursion (dB)	Limit
11a	BPSK	2	5240	7.96	0.00	7.96	13
11a	QPSK	2	5240	8.72	0.00	8.72	13
11a	16QAM	2	5240	8.34	0.00	8.34	13
11a	64QAM	2	5240	8.15	0.00	8.15	13
HT20	BPSK	2	5240	8.45	0.00	8.45	13
HT20	QPSK	2	5240	8.44	0.00	8.44	13
HT20	16QAM	2	5240	8.6	0.00	8.60	13
HT20	64QAM	2	5240	9.28	0.00	9.28	13
HT40	BPSK	2	5230	8.72	0.00	8.72	13
HT40	QPSK	2	5230	9.37	0.00	9.37	13
HT40	16QAM	2	5230	8.55	0.00	8.55	13
HT40	64QAM	2	5230	8.06	0.00	8.06	13

Mode	Modulation Mode	N _{TX}	Freq. (MHz)	Measured value(dB)	Duty factor (dB)	Peak Excursion (dB)	Limit
11a	BPSK	2	5260	8.54	0.00	8.54	13
11a	QPSK	2	5260	8.53	0.00	8.53	13
11a	16QAM	2	5260	8.96	0.00	8.96	13
11a	64QAM	2	5260	8.39	0.00	8.39	13
HT20	BPSK	2	5300	8.07	0.00	8.07	13
HT20	QPSK	2	5300	8.35	0.00	8.35	13
HT20	16QAM	2	5300	8.99	0.00	8.99	13
HT20	64QAM	2	5300	8.45	0.00	8.45	13
HT40	BPSK	2	5270	7.42	0.00	7.42	13
HT40	QPSK	2	5270	8.25	0.00	8.25	13
HT40	16QAM	2	5270	8.59	0.00	8.59	13
HT40	64QAM	2	5270	8.08	0.00	8.08	13

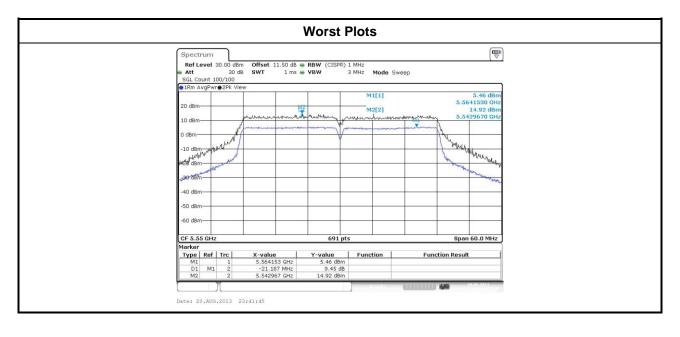
Note: Measured value = Peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission. Since the duty cycle is < 98 %, duty factor is required to average spectrum Peak exclusion = Measured value – duty factor

Report No.: FR390501AN Page: 26 of 83



Mode	Modulation Mode	N _{TX}	Freq. (MHz)	Measured value(dB)	Duty factor (dB)	Peak Excursion (dB)	Limit
11a	BPSK	2	5700	7.88	0.00	7.88	13
11a	QPSK	2	5700	8.32	0.00	8.32	13
11a	16QAM	2	5700	9.3	0.00	9.30	13
11a	64QAM	2	5700	8.3	0.00	8.30	13
HT20	BPSK	2	5700	8.09	0.00	8.09	13
HT20	QPSK	2	5700	8.95	0.00	8.95	13
HT20	16QAM	2	5700	8.52	0.00	8.52	13
HT20	64QAM	2	5700	9.05	0.00	9.05	13
HT40	BPSK	2	5550	8.53	0.00	8.53	13
HT40	QPSK	2	5550	7.97	0.00	7.97	13
HT40	16QAM	2	5550	9.45	0.00	9.45	13
HT40	64QAM	2	5550	9.25	0.00	9.25	13

Note: Measured value = Peak-max-hold spectrum to the maximum of the average spectrum for continuous transmission.



Report No.: FR390501AN Page: 27 of 83



3.6 Transmitter Radiated and Band Edge Emissions

3.6.1 Limit of Transmitter Radiated and Band Edge Emissions

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.

Un-restricted band emissions above 1GHz Limit					
Operating Band	Limit				
5.15 - 5.25 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
5.25 - 5.35 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
5.47 - 5.725 GHz	e.i.r.p27 dBm [68.2 dBuV/m@3m]				
5.725 - 5.825 GHz	5.715 5.725 GHz: e.i.r.p17 dBm [78.2 dBuV/m@3m] 5.825 5.835 GHz: e.i.r.p17 dBm [78.2 dBuV/m@3m] Other un-restricted band: e.i.r.p27 dBm [68.2 dBuV/m@3m]				

Note 1: Measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Report No.: FR390501AN Page: 28 of 83



3.6.2 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.
- 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.

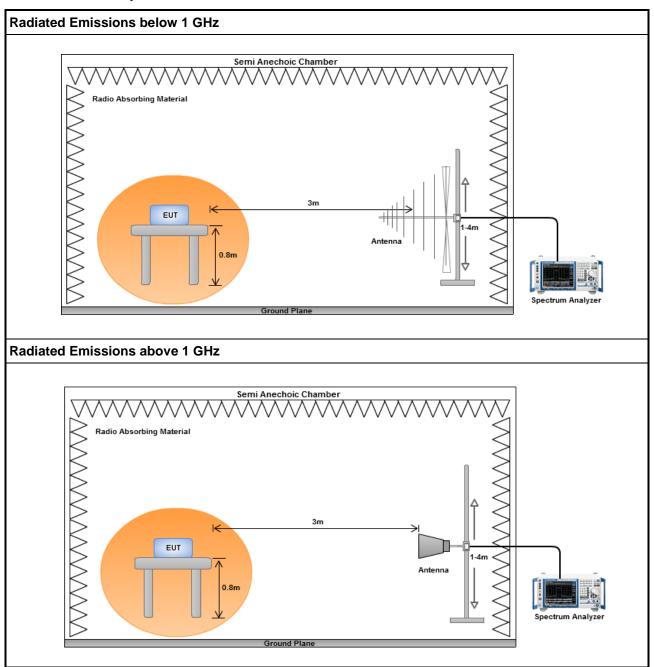
Note:

- 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.

Report No.: FR390501AN Page: 29 of 83



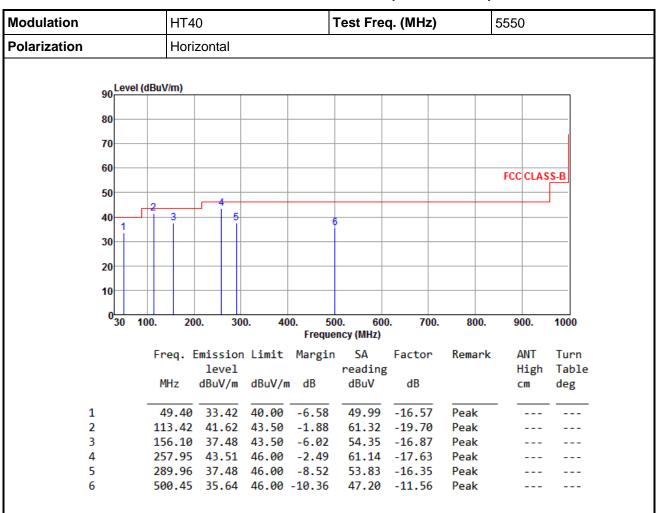
3.6.3 Test Setup



Report No.: FR390501AN Page: 30 of 83



3.6.4 Transmitter Radiated Unwanted Emissions (Below 1GHz)



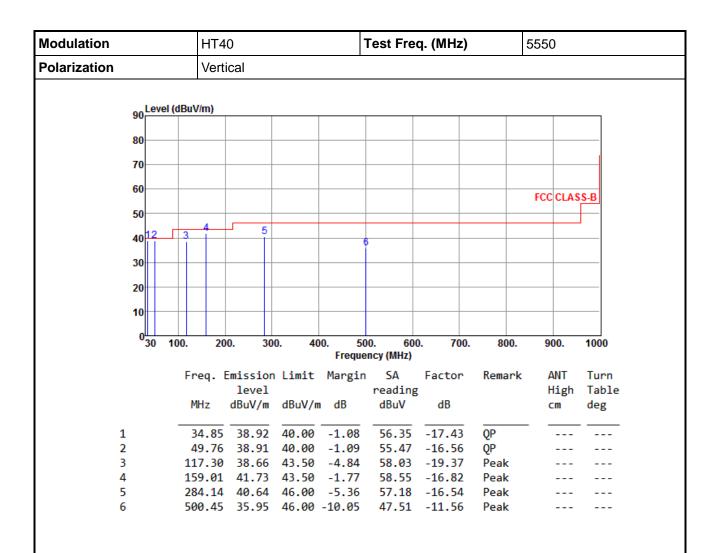
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 31 of 83





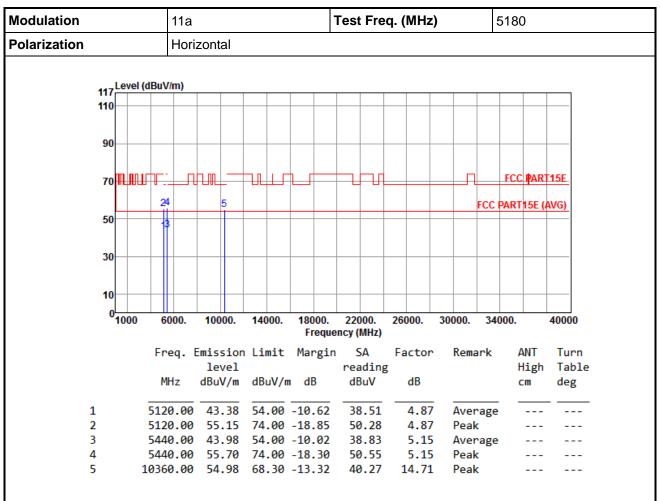
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain

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

Report No.: FR390501AN Page: 32 of 83



3.6.1 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 11a



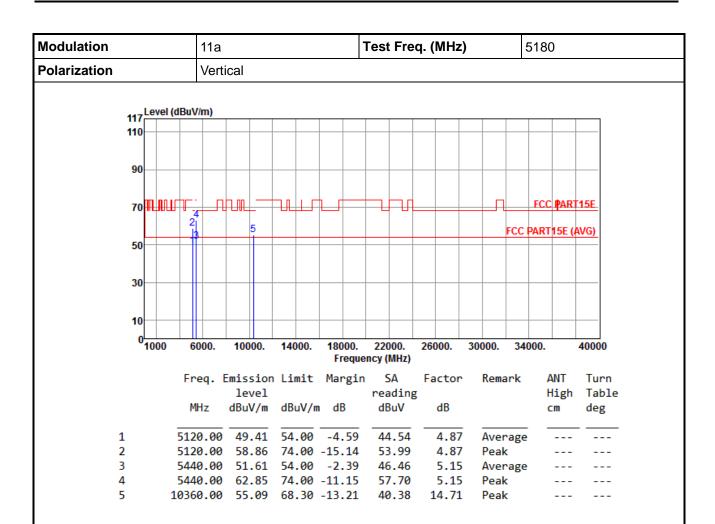
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 33 of 83



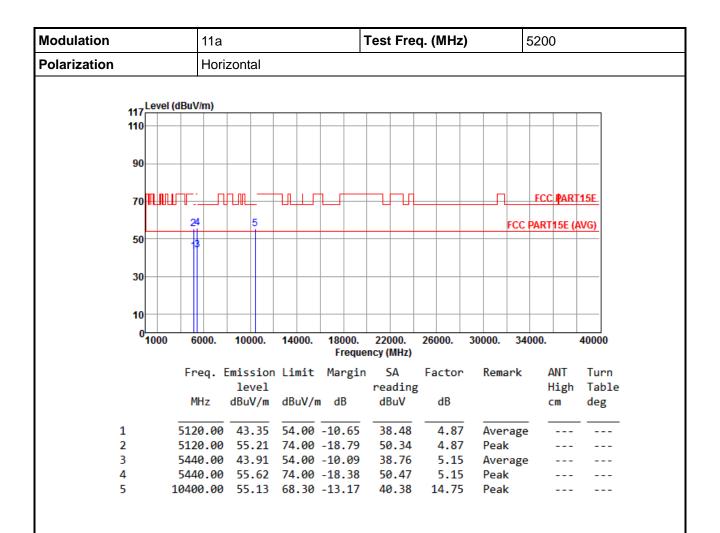


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 34 of 83





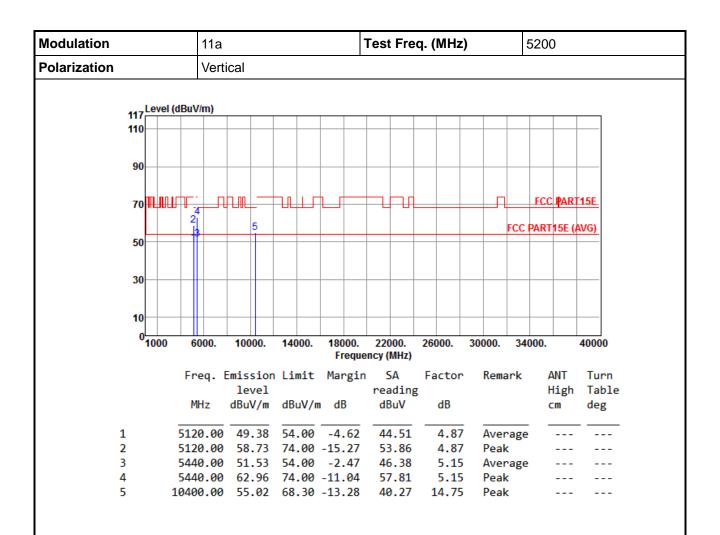
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 35 of 83





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).

Report No.: FR390501AN Page: 36 of 83



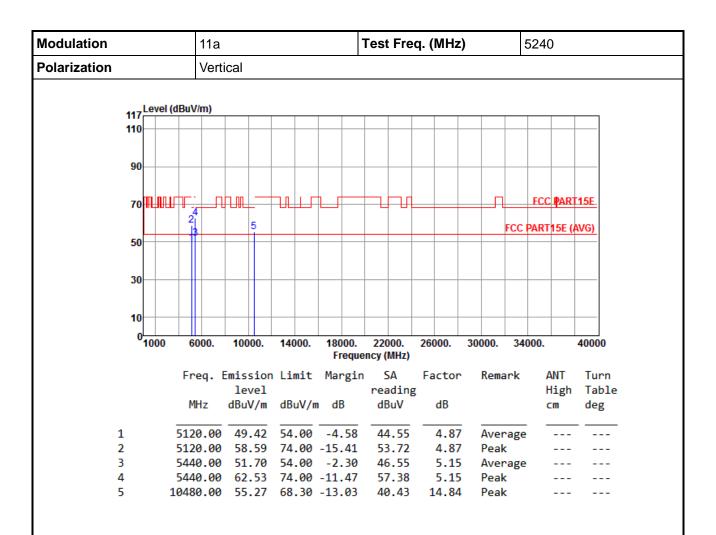


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 37 of 83



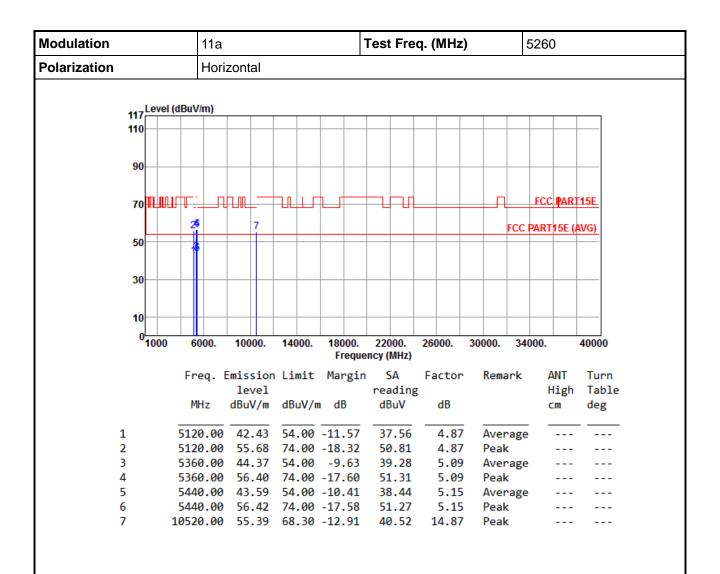


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 38 of 83



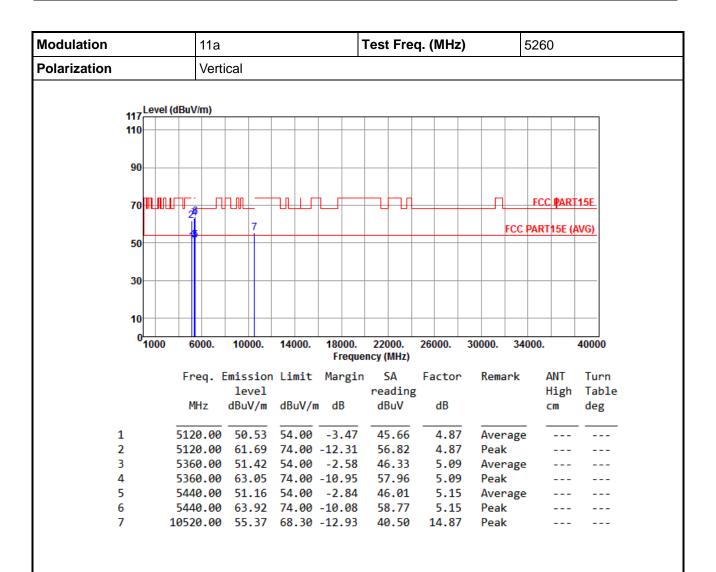


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 39 of 83



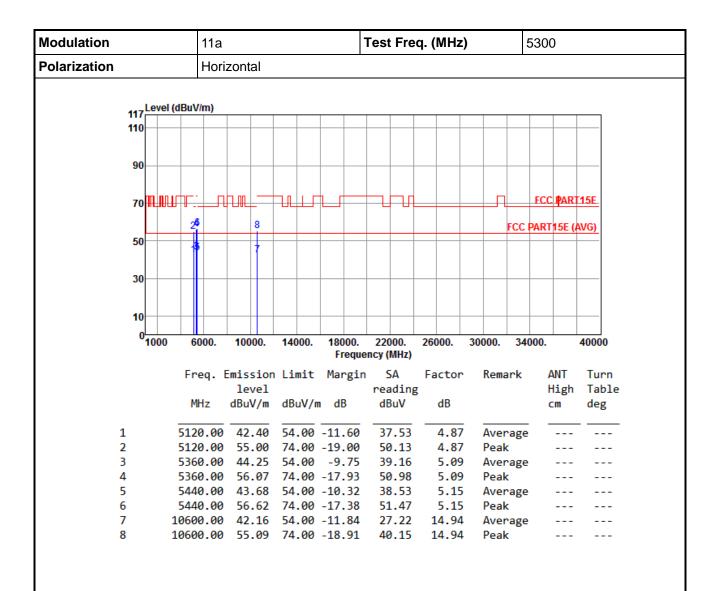


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 40 of 83



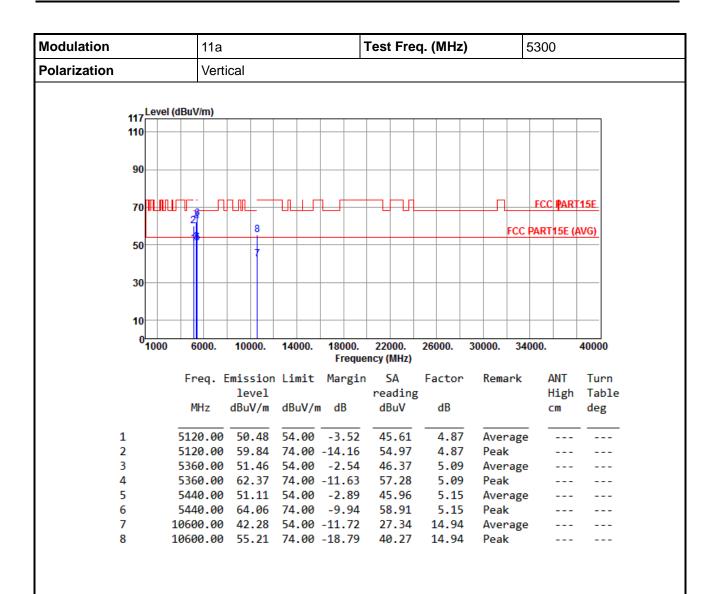


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 41 of 83



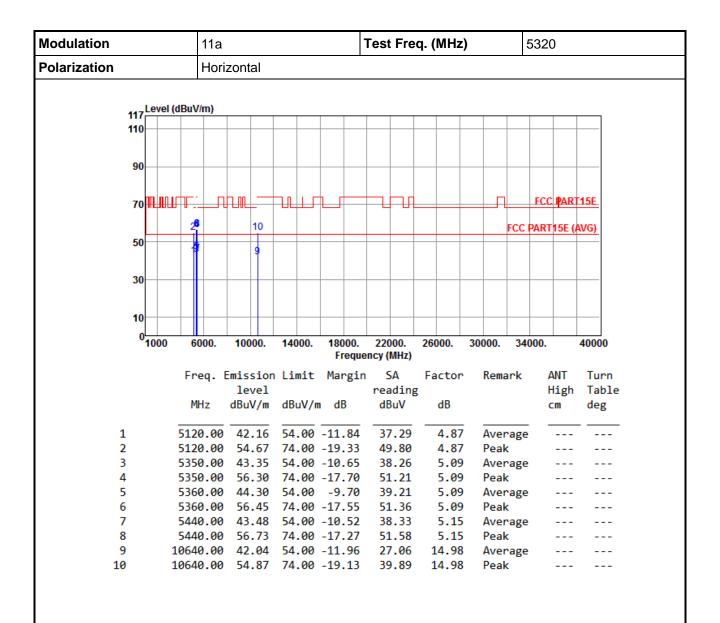


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 42 of 83



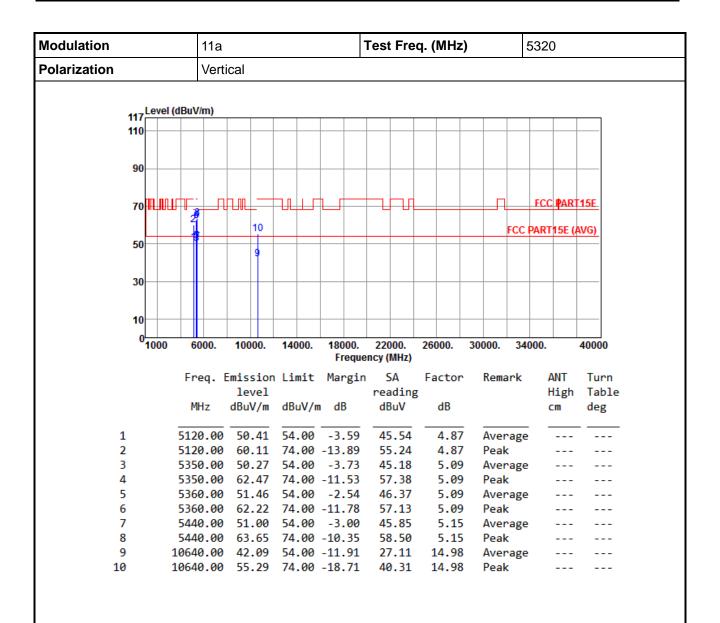


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 43 of 83





*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 44 of 83

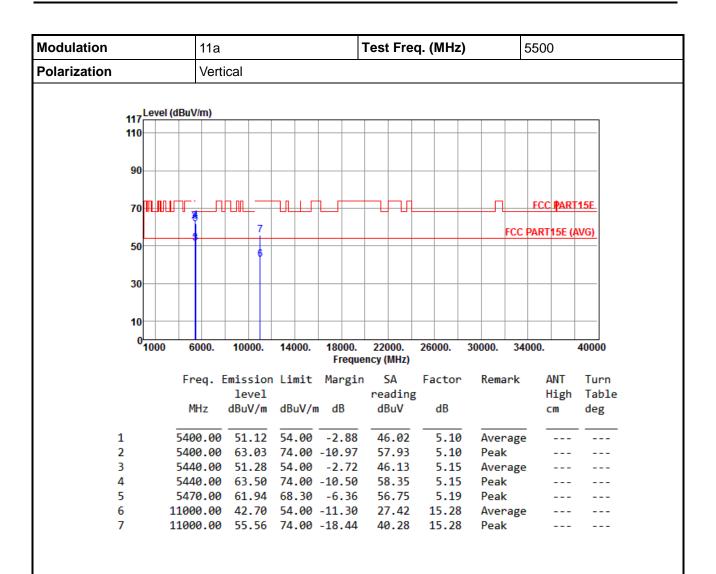


Modulation			11a Test Freq. (MHz) 5500																	
Polarization				Hor	izont	al														
	117	Leve	l (dBu\	//m)																
	110																			
	90																			
	70	m n				_		Т				⊐п				П		FCC	. PART	[15E
	,,,			4		7											FCC I		15E (/	
	50					6														
	30																			
	10																			
	0	Ш																		
		1000) 6	000.	100	000.	140	000.	180		220 ency (l		260	000.	300	00.	340	000.		40000
			г.,		F				Mar			Α	г.	actor		Rema		,	ANT	Tur
			FI	eq.		vel	II LII	штс	riar	.RTII		ding		ic cor		(eilla	II'K		digh	
			M	1Hz			dB	uV/r	n dB	3		BuV		dB					ingii	deg
	1		540	0.00	43	.26	54	.00	-10.	74	38	.16	_	5.10) A	lver	age	-		
	2		540	0.00	57	.41	74	.00	-16.	59	52	.31		5.10		eak				
	3		544	10.00	43	.58	54	.00	-10.	42		.43		5.15			age			
	4		544	10.00	56	.94	74	.00	-17.	06	51	.79		5.15	5 P	eak				
	5		547	70.00	55	.12	68	.30	-13.	18	49	.93		5.19) P	eak				
	6			0.00		.30			-11.			.02		5.28			age			
	7		1100	0.00	55	.49	74	.00	-18.	51	40	.21	1	15.28	3 P	^o eak				

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

Report No.: FR390501AN Page: 45 of 83



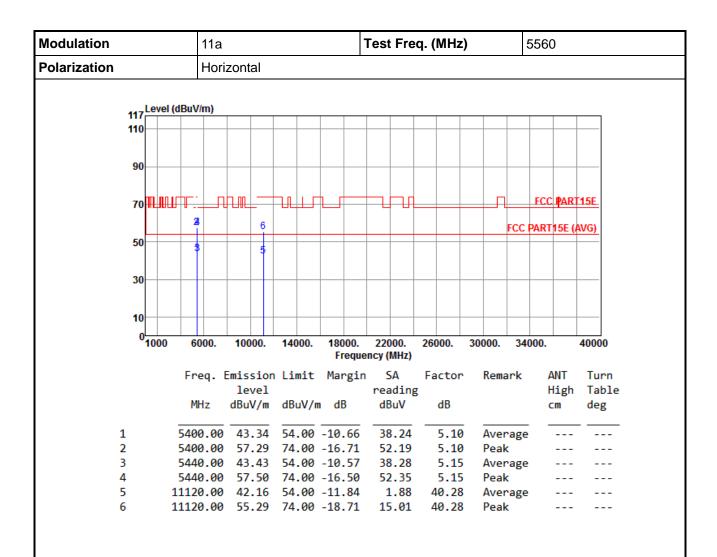


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 46 of 83



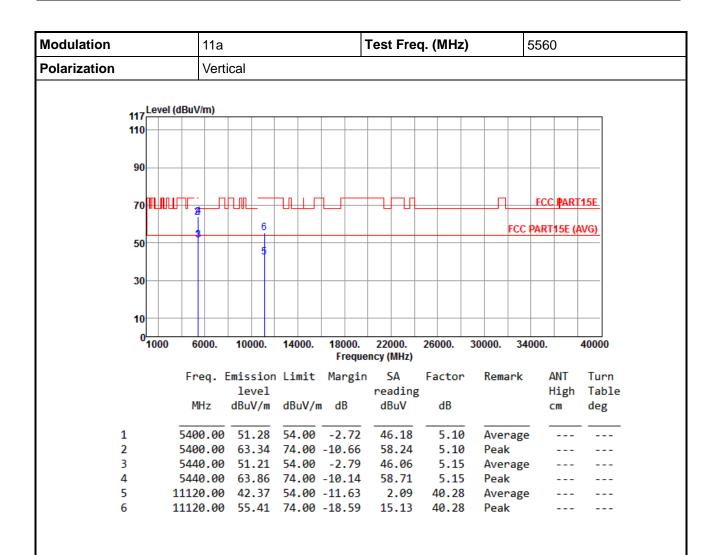


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 47 of 83



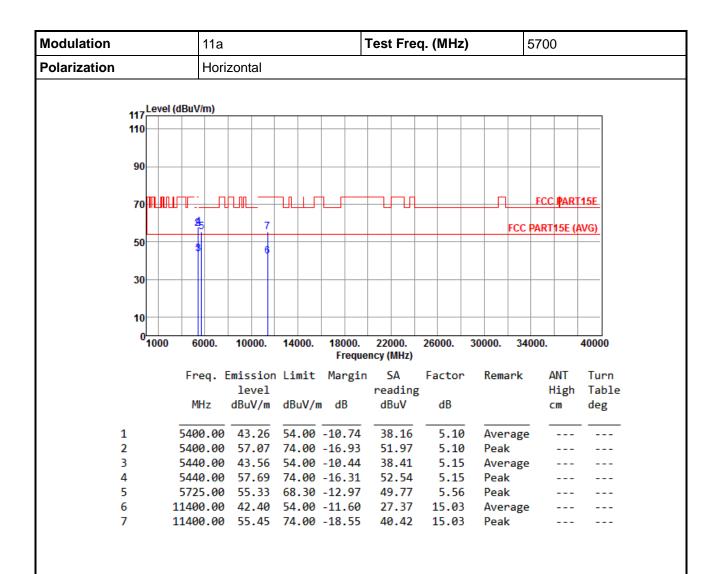


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 48 of 83



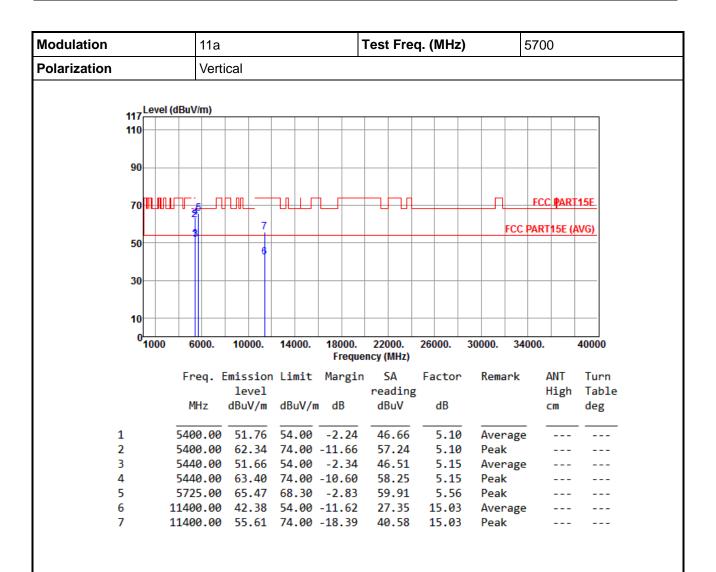


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 49 of 83





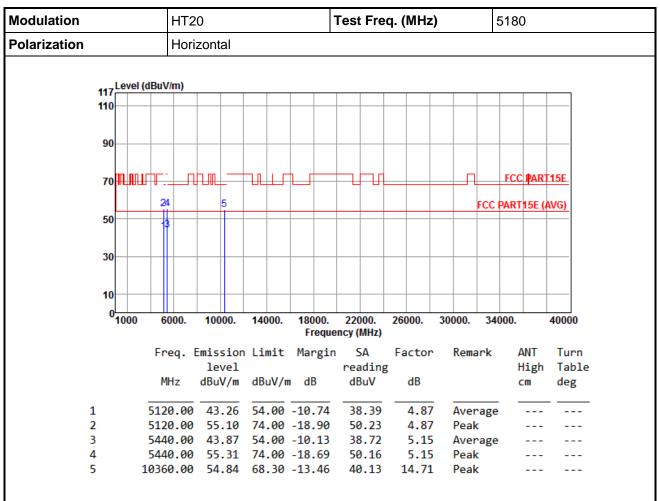
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain

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

Report No.: FR390501AN Page: 50 of 83



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



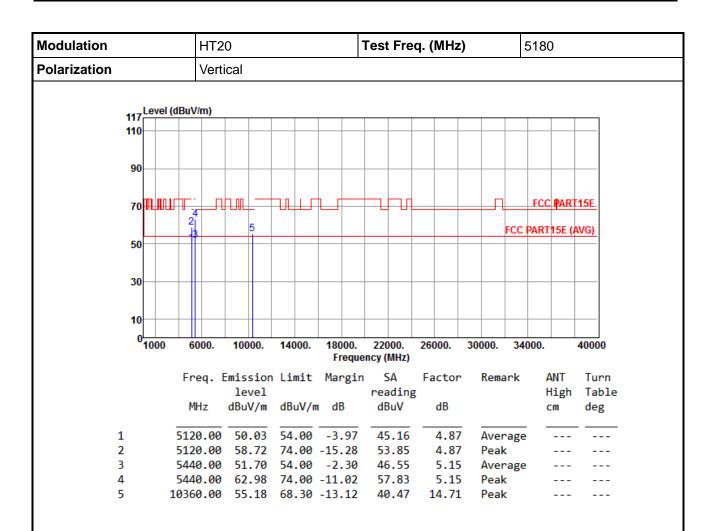
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 51 of 83



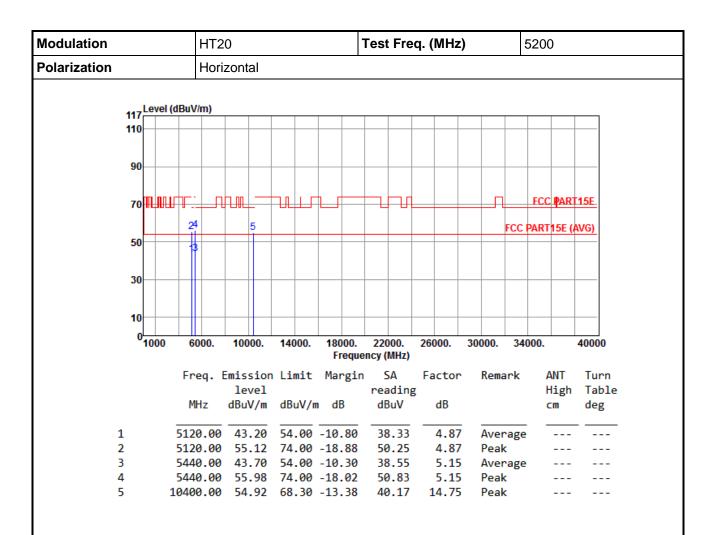


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain

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

Report No.: FR390501AN Page: 52 of 83



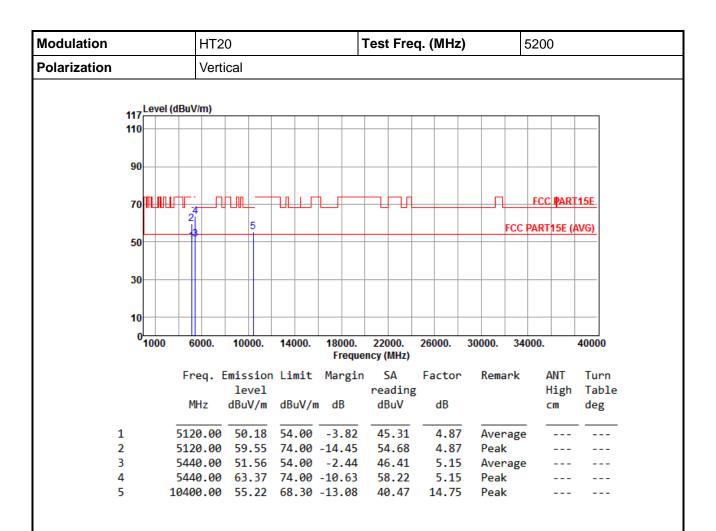


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 53 of 83



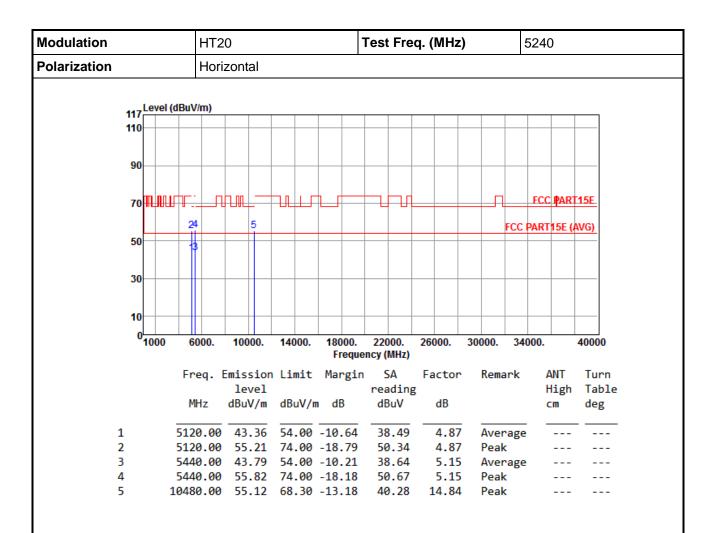


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 54 of 83



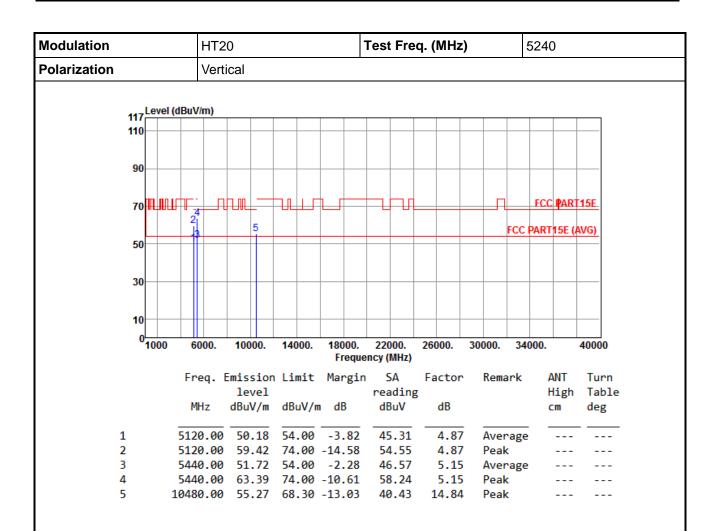


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 55 of 83



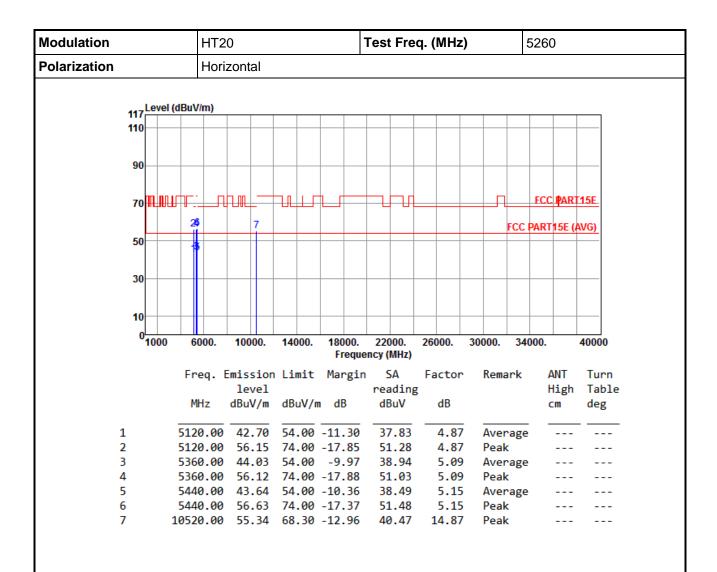


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 56 of 83



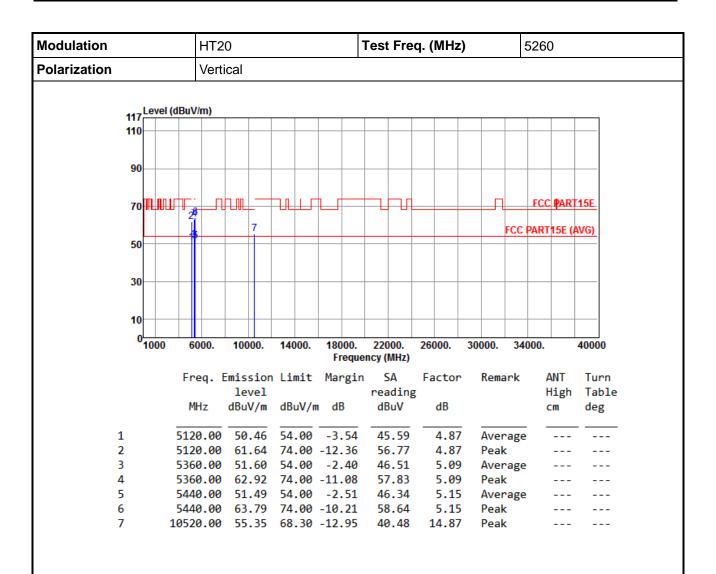


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 57 of 83



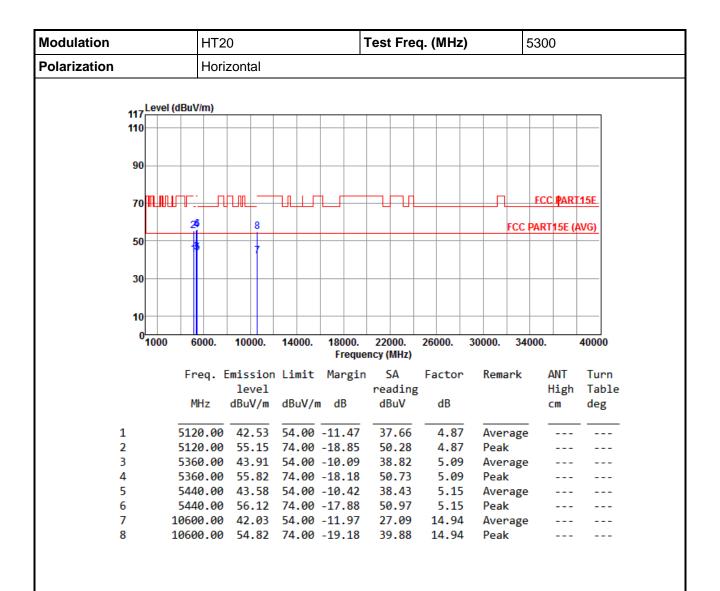


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 58 of 83



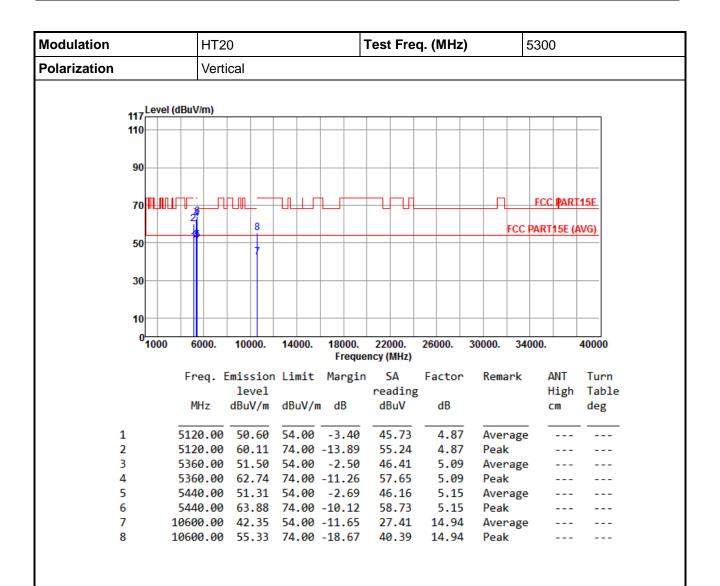


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 59 of 83



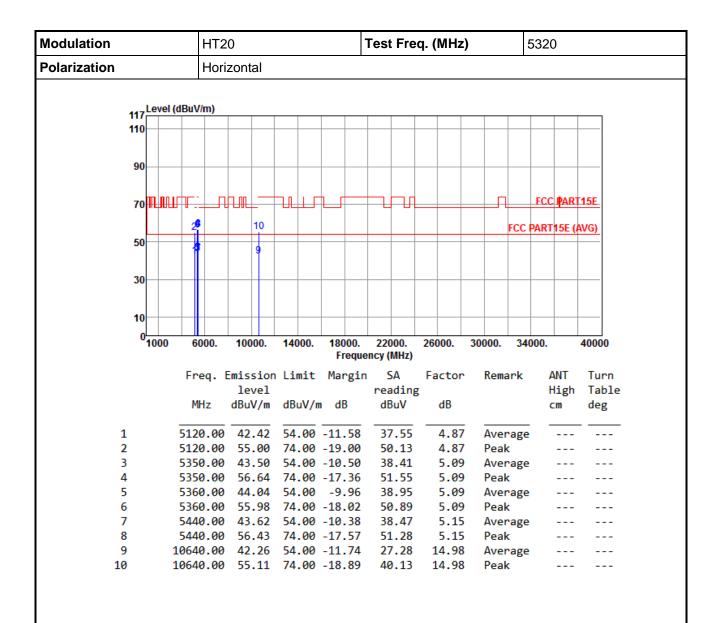


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 60 of 83



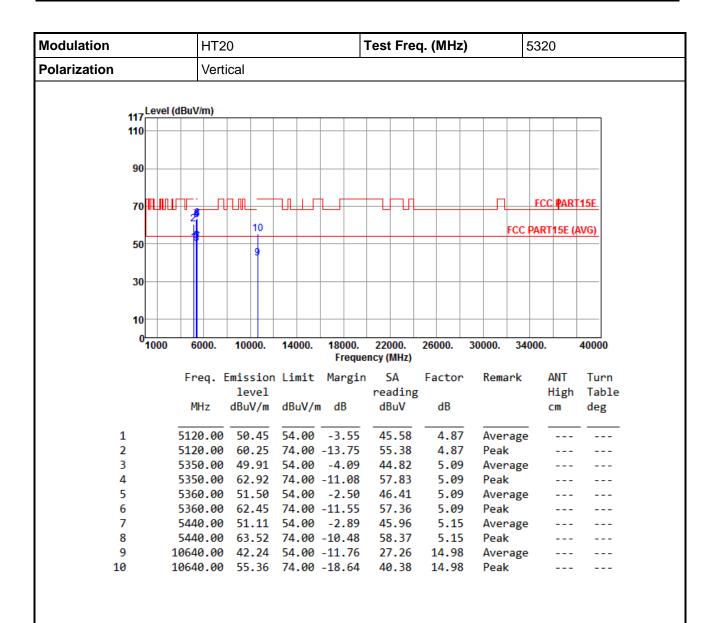


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 61 of 83





*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 62 of 83



Modulation			HT2	0					٦	Гest	Fre	q. (MHz	:)		5	5500	0		
Polarization			Hori	zont	al				•											
44.7	Level	(dBuV	//m)																	
110																				
90																				
70			₽Л		_	1	_	ш		_	<u> </u>				Л		FCC	P AR	[15E	
50			}		7											FCC I	PART	15E (AVG)	
					6															
30																				
10																				
Ů,	1000	6	000.	100	00.	1400	0.	180 Fr		220 ncy (I		260	000.	3000	00.	340	000.		4000	10
		Fr	eq. I		sion vel	Limi	it	Mar	gin		A ding		ctor	R	ema	ırk		ANT High	Tu Ta	rn ble
		М	Hz			dBu\	//m	dB	3	dB			dB					cm	de	g
1			0.00			54.6 74.6			_		.36		5.10 5.10		ver	age	-		-	
2 3						54.6					.51		5.15			age			_	

5.15

5.19

Peak

Peak

Peak

Average

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

*Factor includes antenna factor, cable loss and amplifier gain

5440.00 56.97 74.00 -17.03 51.82

5470.00 55.32 68.30 -12.98 50.13

11000.00 42.59 54.00 -11.41 27.31 15.28

11000.00 55.70 74.00 -18.30 40.42 15.28

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

Report No.: FR390501AN Page: 63 of 83

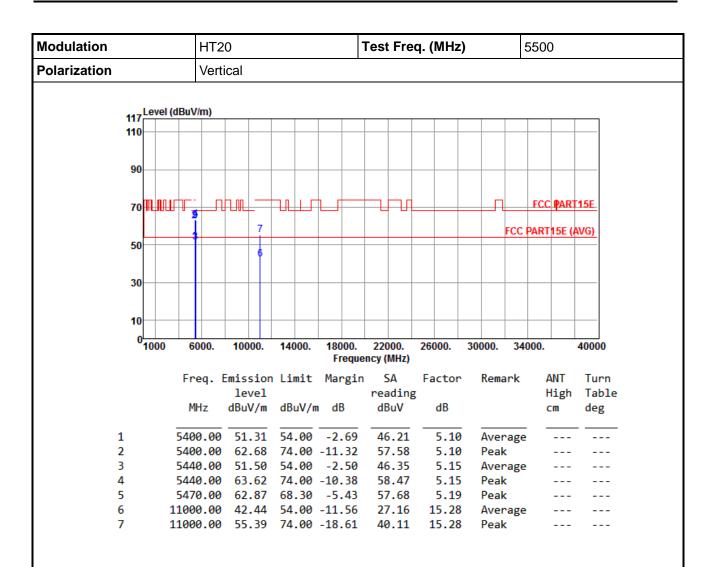
Report Version: Rev. 01

5

6

7



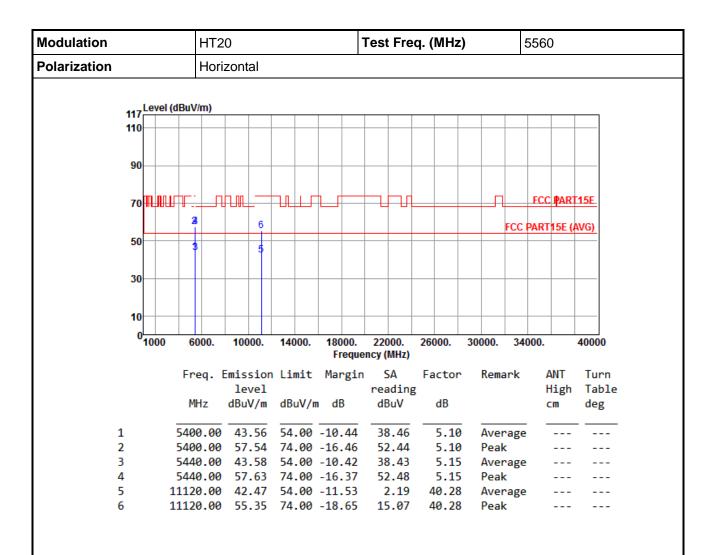


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor , cable loss and amplifier gain

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

Report No.: FR390501AN Page: 64 of 83



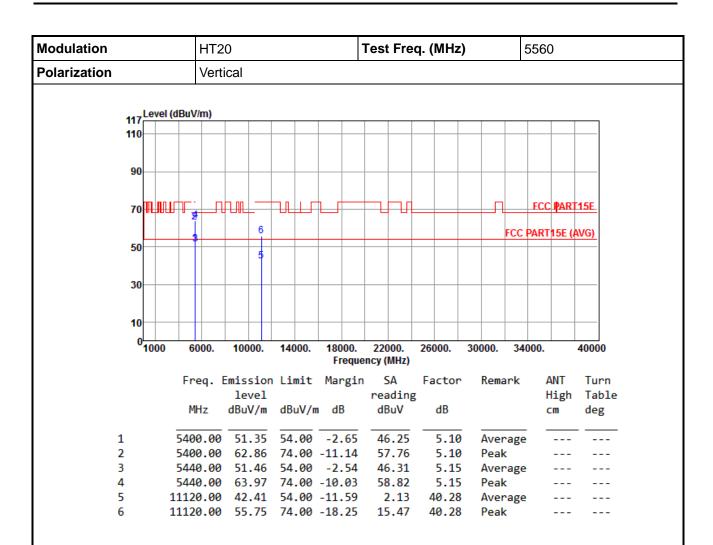


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 65 of 83



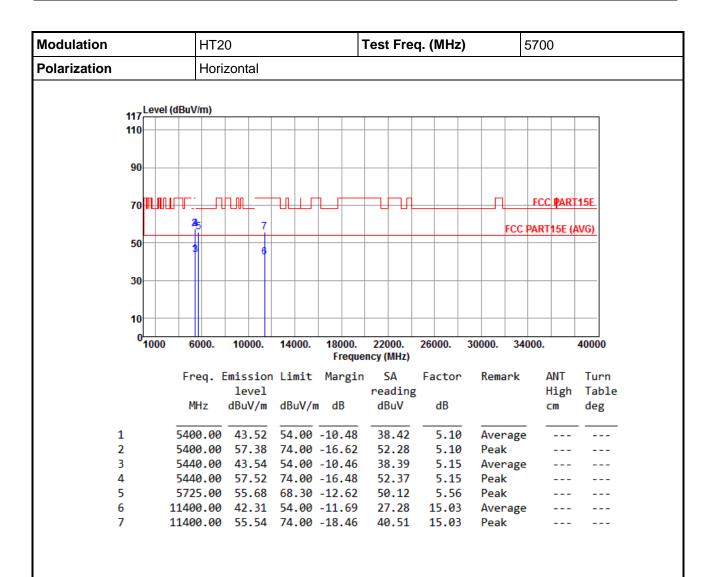


Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB) *Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 66 of 83



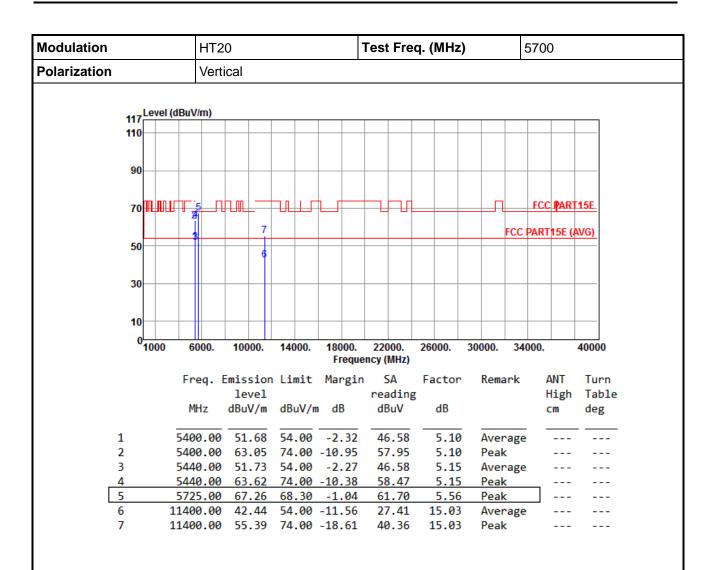


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 67 of 83





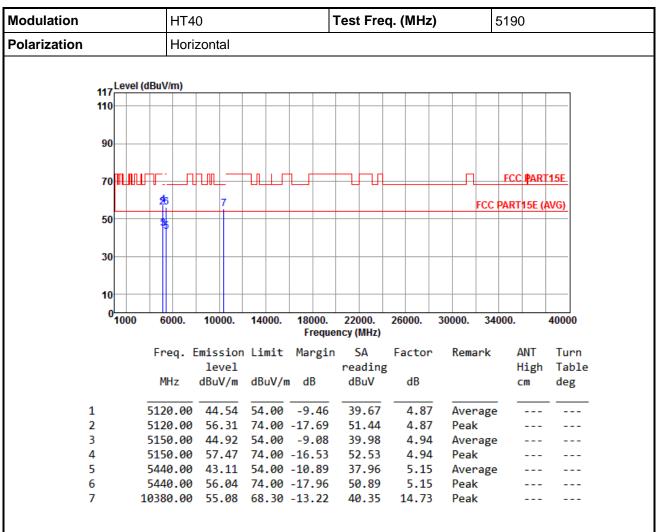
*Factor includes antenna factor , cable loss and amplifier gain

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

Report No.: FR390501AN Page: 68 of 83 Report Version: Rev. 01



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



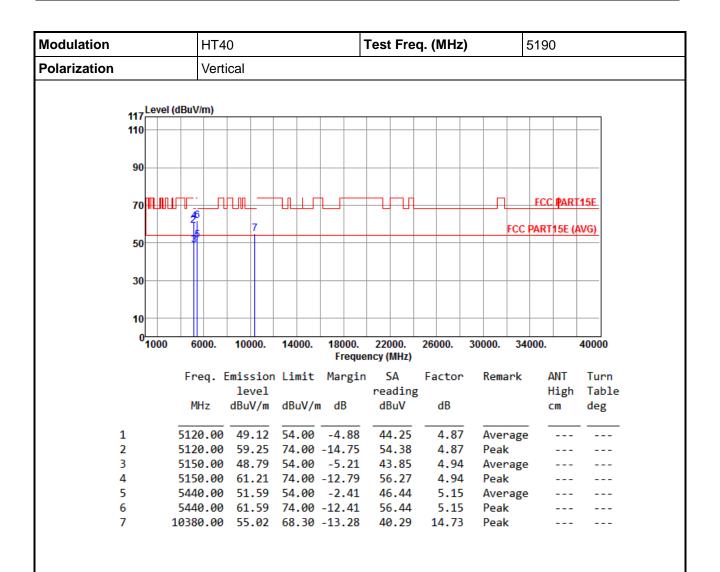
Note 1: Emission Level (dBuV/m) = SA Reading (dBuV/m) + Factor* (dB)

*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 69 of 83



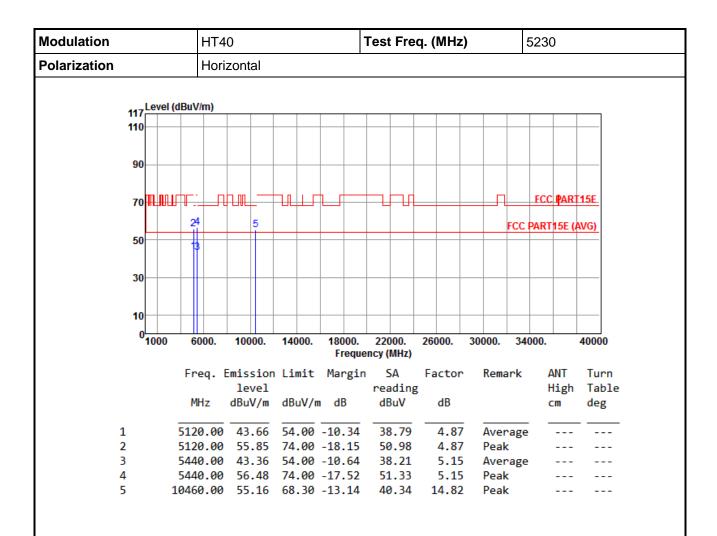


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 70 of 83



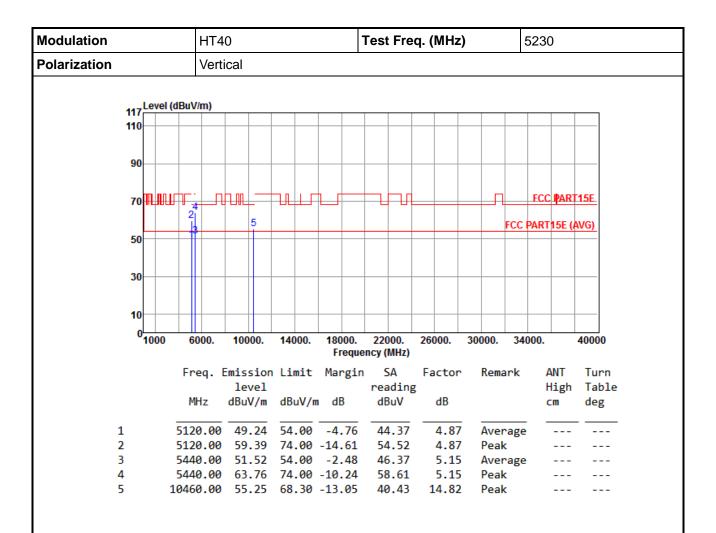


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 71 of 83



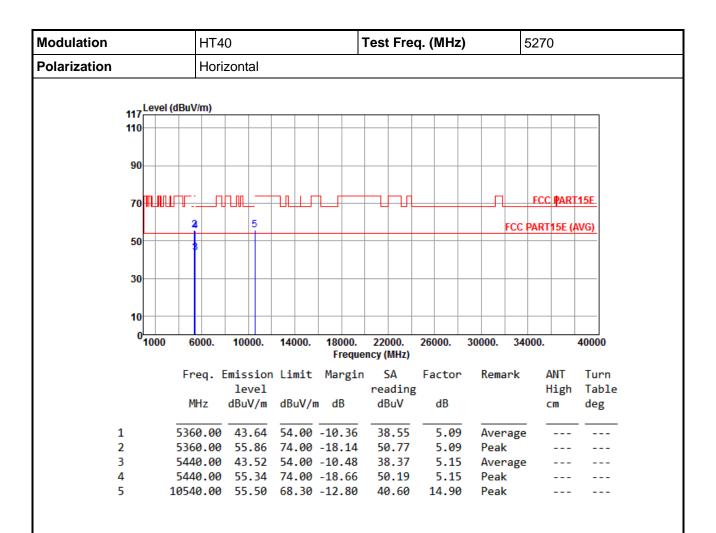


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 72 of 83



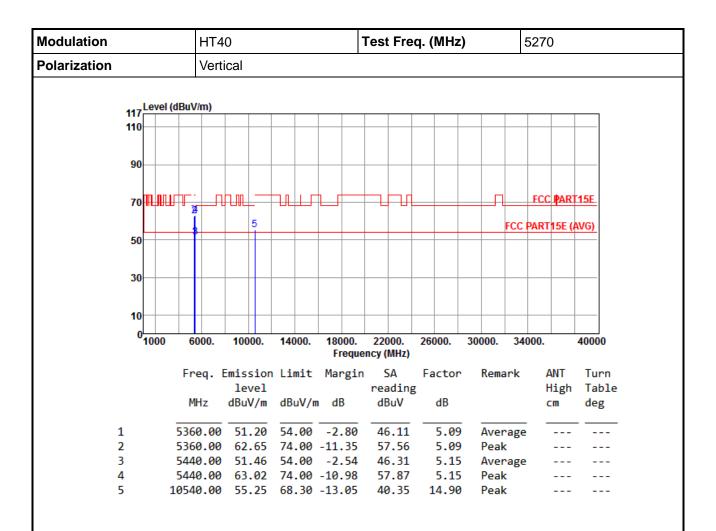


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 73 of 83



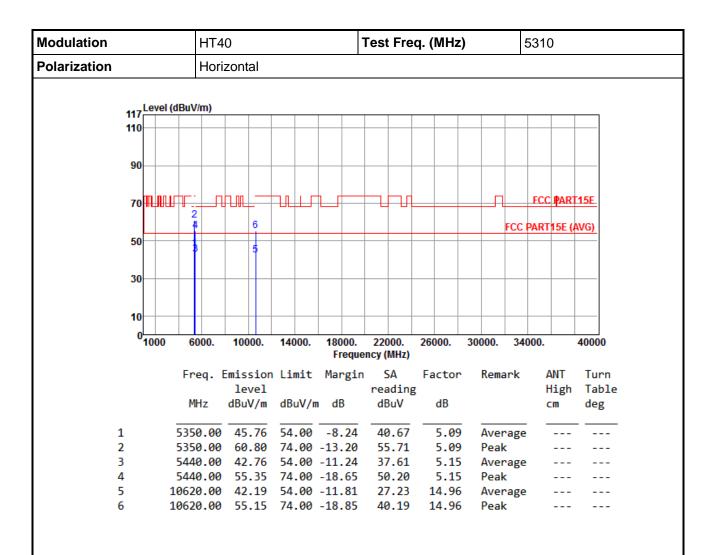


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 74 of 83



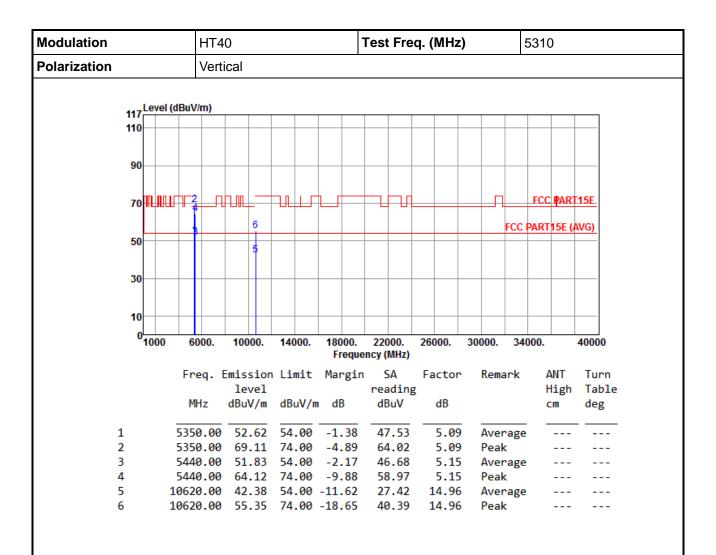


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 75 of 83



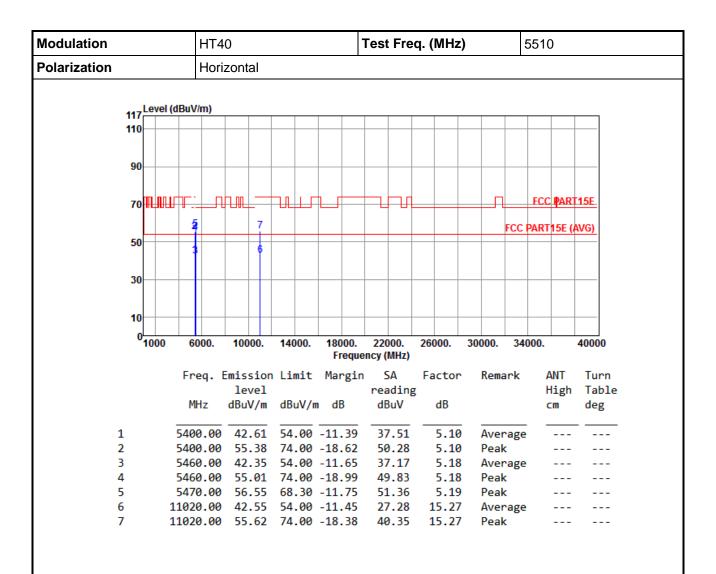


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 76 of 83



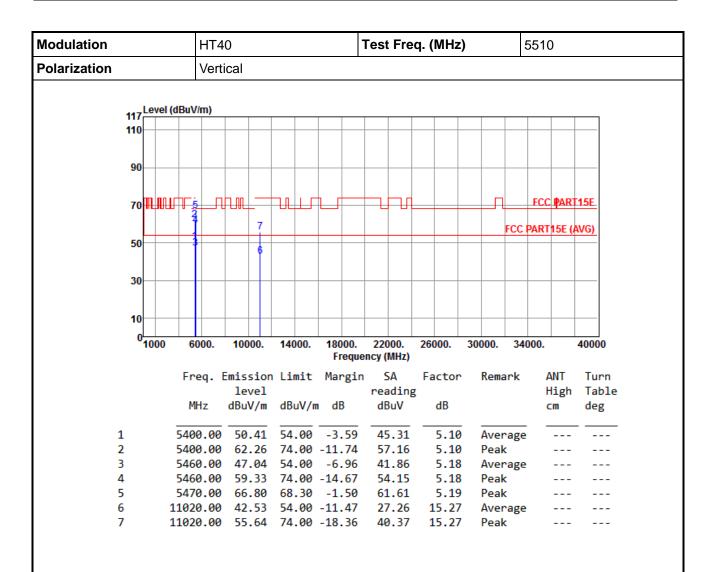


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 77 of 83



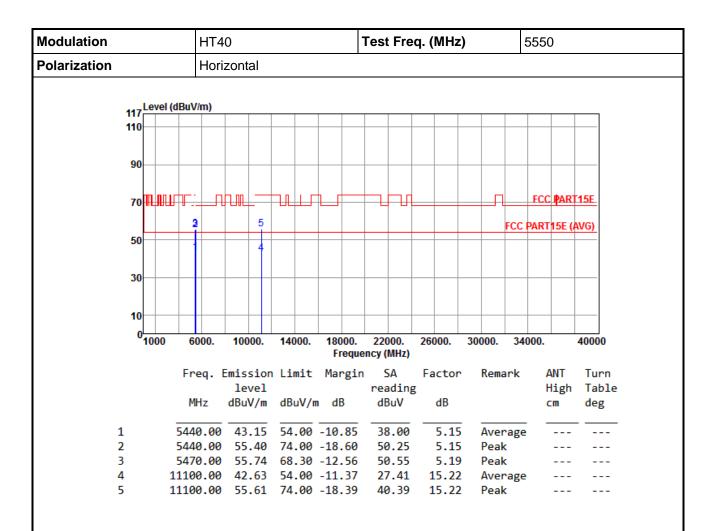


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 78 of 83



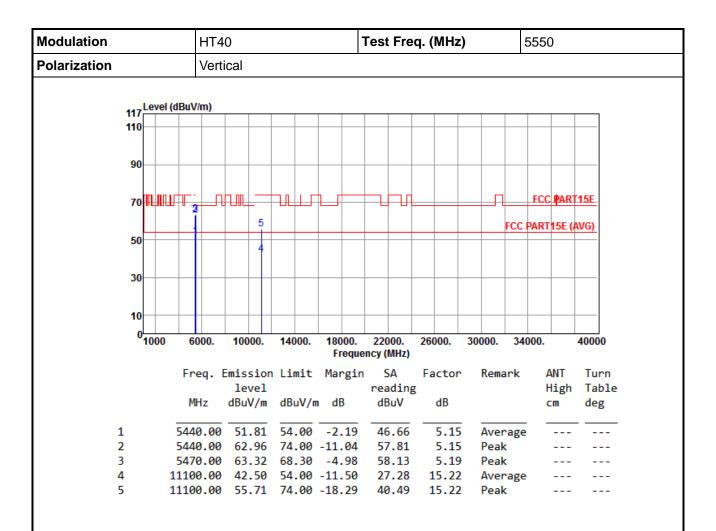


*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 79 of 83





*Factor includes antenna factor, cable loss and amplifier gain

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

Report No.: FR390501AN Page: 80 of 83



3.7 Frequency Stability

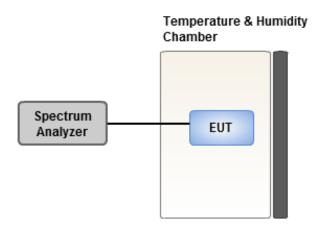
3.7.1 Limit of Frequency Stability

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

3.7.2 Test Procedures

- 1. The EUT is installed in an environment test chamber with external power source.
- Set the chamber to operate at 50 centigrade and external power source to output at nominal voltage of EUT.
- 3. A sufficient stabilization period at each temperature is used prior to each frequency measurement.
- 4. When temperature is stabled, measure the frequency stability.
- 5. The test shall be performed under -30 to 50 centigrade and 85 to 115 percent of the nominal voltage. Change setting of chamber and external power source to complete all conditions.

3.7.3 Test Setup



Report No.: FR390501AN Page: 81 of 83



3.7.4 Test Result of Frequency Stability

Frequency: 5200 MHz	Frequency Drift (ppm)											
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes								
T20°CVmax	-0.04	0.22	-0.11	0.06								
T20°CVmin	3.94	3.88	3.97	3.75								
T55°CVnom	3.93	3.79	4.53	4.40								
T50°CVnom	4.83	4.51	5.17	4.61								
T40°CVnom	-2.65	-2.91	-2.70	-2.95								
T30°CVnom	0.77	0.91	0.98	0.51								
T20°CVnom	0.64	1.36	0.80	0.34								
T10°CVnom	-0.34	-0.47	-0.07	0.08								
T0°CVnom	-0.19	-0.23	-0.10	-0.65								
T-10°CVnom	-0.20	-0.18	0.31	-0.65								
T-20°CVnom	-0.67	-0.37	-0.59	-0.93								
T-30°CVnom	-0.24	-0.48	0.14	0.10								
Vnom [Vdc]: 110		Vmax [Vdc]: 126.5	Vmin [Vdc]: 93.5									
Tnom [°C]: 20		Tmax [°C]: 55	Tmin [°C]: -30									

Frequency: 5320 MHz	Frequency Drift (ppm)											
Temperature (°C)	0 minute	2 minutes	5 minutes	10 minutes								
T20°CVmax	-0.01	0.04	0.42	0.33								
T20°CVmin	4.23	4.18	4.30	3.87								
T55°CVnom	4.50	4.73	4.94	5.04								
T50°CVnom	4.45	4.17	4.62	5.01								
T40°CVnom	-2.55	-1.88	-2.04	-2.04								
T30°CVnom	0.78	0.83	0.60	0.77								
T20°CVnom	0.74	0.94	0.94	1.58								
T10°CVnom	-0.45	0.08	-0.51	-0.64								
T0°CVnom	0.46	1.23	0.82	0.33								
T-10°CVnom	0.12	-0.12	0.57	0.34								
T-20°CVnom	-0.42	-0.71	-0.22	-0.60								
T-30°CVnom	0.51	1.23	0.60	1.04								
Vnom [Vdc]: 110		Vmax [Vdc]: 126.5	Vmin [Vdc]: 93.5									
Tnom [°C]: 20		Tmax [°C]: 55	Tmin [°C]: -30									

Report No.: FR390501AN Page: 82 of 83



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.

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

Tel: 886-3-271-8666

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==

Report No.: FR390501AN Page: 83 of 83