

# **FCC Test Report**

Equipment	:	2x2 802.11a/b/g/n +BT Module(SiP)
Brand Name	:	Qualcomm Atheros
Model No.	:	QCA6234
FCC ID	:	PPD-QCA6234
Standard	:	47 CFR FCC Part 15.407
Operating Band	:	5150 MHz – 5250 MHz 5250 MHz – 5350 MHz 5470 MHz – 5725 MHz
FCC Classification	:	NII
Applicant Manufacturer	:	Dell Inc. One Dell Way, Round Rock, Texas 78682, USA

The product sample received on Sep. 17, 2013 and completely tested on Sep. 25, 2013. We, SPORTON, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2009 and shown compliance with the applicable technical standards.

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

**Reviewed by:** 

Assistant Manager





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#### APPENDIX B. PHOTOGRAPHS OF EUT



# Summary of Test Result

	Conformance Test Specifications								
Report Clause	Ref. Std. Clause	Description	Measured	Limit	Result				
1.1.1	15.203	Antenna Requirement	Antenna connector mechanism complied	FCC 15.203	Complied				
3.1	15.407(a)	RF Output Power (Maximum Conducted (Average) Output Power)	Power [dBm] 5150-5250MHz:12.93 5250-5350MHz:12.99 5470-5725MHz:12.96	Power [dBm] 5150-5250MHz:17 5250-5350MHz:24 5470-5725MHz:24	Complied				
3.2	15.407(b)	Transmitter Bandedge Emissions	Restricted Bands [dBuV/m at 1m]: 5728.100MHz 65.77 (Margin 17.77dB) - PK 51.30 (Margin 12.24dB) - AV	Non-Restricted Bands: ≤ -27dBm (77.84dBuV/m@1m) Restricted Bands: FCC 15.209	Complied				
3.3	15.407(b)	Transmitter Radiated Unwanted Emissions	Restricted Bands [dBuV/m at 1m]: 62.980MHz 35.16 (Margin4.84dB) – PK	Non-Restricted Bands: ≤ -27dBm (68.3dBuV/m@3m) Restricted Bands: FCC 15.209	Complied				



# **Revision History**

Report No.	Version	Description	Issued Date
FR391338AN	Rev. 01	Initial issue of report	Sep. 25, 2013



# 1 General Description

# 1.1 Information

#### 1.1.1 RF General Information

RF General Information							
Frequency Range (MHz)	IEEE Std. 802.11	Ch. Freq. (MHz)	Channel Number	Transmit Chains (N <sub>⊤x</sub> )	RF Output Power (dBm)		
5150-5250	а	5180-5240	36-48 [4]	2	12.93		
5250-5350		5260-5320	52-64 [4]	2	12.99		
5470-5725		5500-5700	100-140 [8]	2	12.96		
5150-5250	n (HT20)	5180-5240	36-48 [4]	2	12.92		
5250-5350		5260-5320	52-64 [4]	2	12.89		
5470-5725		5500-5700	100-140 [8]	2	12.92		
5150-5250	n (HT40)	5190-5230	38-46 [2]	2	11.44		
5250-5350		5270-5310	54-62 [2]	2	12.63		
5470-5725		5510-5670	102-134 [3]	2	12.95		
Note 1: RF output	t power specifies t	hat Maximum Con	ducted (Average)	Output Power.			

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

#### 1.1.2 Antenna Information

	Antenna Category						
$\square$	Integral antenna (antenna permanently attached)						
	Temporary RF connector provided						
	No temporary RF connector provided Transmit chains bypass antenna and soldered temporary RF connector provided for connected measurement. In case of conducted measurements the transmitter shall be connected to the measuring equipment via a suitable attenuator and correct for all losses in the RF path.						

	Antenna General Information						
No.	No. Ant. Cat. Ant. Type Gain (dBi)						
1	Integral	Chip	2.20				

#### 1.1.3 EUT Operational Condition

Supply Voltage	AC mains	DC	
Type of DC Source	Internal DC supply	External DC adapter	Li-on Battery





# **1.2 Support Equipment**

	Support Equipment- Radiated Emission Test							
No. Equipment Brand Name Model Name								
1	AC Adaptor (For Tablet PC use)	DELL	HA10USNM130					
2	Tablet PC           (Built in Qualcomm Atheros module)	DELL	T01D/T01D001 ("." Can be 0-9, A-Z or blank)					

# **1.3 Testing Applied Standards**

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

- 47 CFR FCC Part 15
- ANSI C63.10-2009
- FCC KDB 789033 v01r03
- FCC KDB 662911 v02

# **1.4 Testing Location Information**

	Testing Location							
$\bowtie$	HWA YA	ADD	:	No. 52, Hwa Ya 1 <sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.				
		TEL	:	886-3-327-3456 FAX	886-3-327-3456 FAX : 886-3-327-0973			
	Test Condition			Test Site No.	Test Engineer	Test Environment		
	Radiated Emission			03CH03-HY	Eddie	22.6°C / 53.2%		

# 1.5 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						
Test Item Uncertainty Limit						
All emissions, radiated	30 – 1000 MHz	±2.56 dB	N/A			
	1 – 18 GHz	±3.59 dB	N/A			
	18 – 40 GHz	±3.82 dB	N/A			
	40 – 200 GHz	N/A	N/A			
Duty Cycle		±1.42 %	N/A			



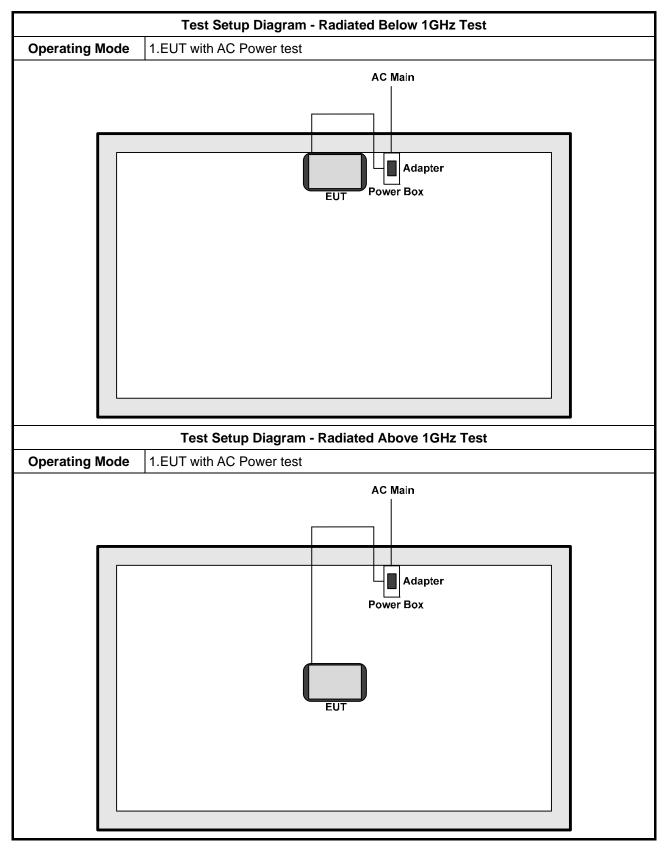
# 2 Test Configuration of EUT

# 2.1 The Worst Case Measurement Configuration

Th	The Worst Case Mode for Following Conformance Tests				
Tests Item	Transmitter Radiated Unwa Transmitter Radiated Banc				
Test Condition	Radiated measurement				
	EUT will be placed in	fixed position.			
User Position	EUT will be placed in mobile position and operating multiple positions. EUT shall be performed three orthogonal planes. The worst planes is X.				
	EUT will be a hand-held or body-worn battery-powered devices and operating multiple positions. EUT shall be performed two or three orthogonal planes.				
Operating Mode	1. EUT with AC Pow	er test			
Modulation Mode	11a, HT20, HT40				
	X Plane	Y Plane	Z Plane		
Orthogonal Planes of EUT					



# 2.2 Test Setup Diagram





# 3 Transmitter Test Result

# 3.1 **RF Output Power**

#### 3.1.1 **RF Output Power Limit**

	Maximum Conducted Output Power Limit
UN	I Devices
	For the 5.15-5.25 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 17 - (G_{TX} - 6)$ .
	For the 5.25-5.35 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .
	For the 5.47-5.725 GHz band, the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX}$ > 6 dBi, then $P_{Out} = 24 - (G_{TX} - 6)$ .
	For the 5.725-5.825 GHz band:
	Point-to-multipoint systems (P2M): the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 6$ dBi, then $P_{Out} = 30 - (G_{TX} - 6)$ .
	Point-to-point systems (P2P): the maximum conducted output power ( $P_{Out}$ ) shall not exceed the lesser of 1 W or 17 dBm + 10 log B, where B is the 26 dB emission bandwidth in MHz. If $G_{TX} > 23$ dBi, then $P_{Out} = 30 - (G_{TX} - 23)$ .
LE-	LAN Devices
$\square$	For the 5.15-5.25 GHz band, the maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
$\square$	For the 5.25-5.35 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.47-5.6 GHz band and 5.65-5.725 GHz band, the maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz
	For the 5.725-5.825 GHz band, the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	Point-to-multipoint systems (P2M): the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz.
	$\label{eq:point-to-point systems (P2P): the maximum e.i.r.p. shall not exceed 4.0 W or 23 + 10 log B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. If e.i.r.p. > 36 dBm, G_{TX} \leq P_{Out}$
Ρ <sub>ου</sub> G <sub>τx</sub>	t = maximum conducted output power in dBm, = the maximum transmitting antenna directional gain in dBi.

## 3.1.2 Measuring Instruments

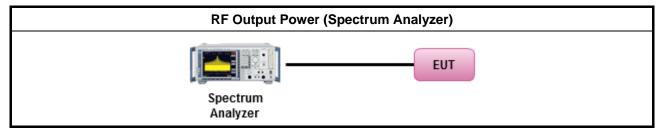
Refer a test equipment and calibration data table in this test report.



## 3.1.3 Test Procedures

		Test Method
$\boxtimes$	Max	imum Conducted Output Power
	[dut	y cycle ≥ 98% or external video / power trigger]
	$\boxtimes$	Refer as FCC KDB 789033, clause E Method SA-1 (spectral trace averaging).
		Refer as FCC KDB 789033, clause E Method SA-1 Alt. (RMS detection with slow sweep speed)
	duty	cycle < 98% and average over on/off periods with duty factor
		Refer as FCC KDB 789033, clause E Method SA-2 (spectral trace averaging).
		Refer as FCC KDB 789033, clause E Method SA-2 Alt. (RMS detection with slow sweep speed)
	Wid	eband RF power meter and average over on/off periods with duty factor
		Refer as FCC KDB 789033, clause E Method PM (using an RF average power meter).
$\square$	For	conducted measurement.
	$\boxtimes$	The EUT supports single transmit chain and measurements performed on this transmit chain.
		The EUT supports diversity transmitting and the results on transmit chain port 1 is the worst case.
		The EUT supports multiple transmit chains using options given below: Refer as FCC KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
		If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) EIRP <sub>total</sub> = P <sub>total</sub> + DG

# 3.1.4 Test Setup





	Directional G	ain (DG) Result			
Transmit Chains No.	1	2	-	-	
Maximum G <sub>ANT</sub> (dBi)	2.20	2.20	-	-	
Modulation Mode	N <sub>TX</sub>	N <sub>SS</sub> (Min.)	Array Gain (dB)	Power DG (dBi) Note <sup>3</sup>	
11a,6-54Mbps	2	2	-	2.20	
HT20,M8-M15	2	2	0	2.20	
HT40, M8-M15 2 2 0 2.20					
Note 1: For all transmitter outputs of Any transmit signals are con All transmit signals are con Note 2: For all transmitter outputs of Any transmit signals are con All transmit signals are con Note 3: For Spatial Multiplexing, Di where Nss = the number of Note 4: For CDD transmissions, di Directional Gain (DG) = GA Array Gain = 0 dB (i.e., no Array Gain = 0 dB (i.e., no	prelated, Direction oppletely uncorrelativith unequal anter prelated, Direction oppletely uncorrelativity rectional Gain (Do f independent spate rectional gain is car NT + Array Gain, w array gain) for NTX	al Gain = $G_{ANT}$ + 1 ed, Directional Gai na gains, direction al Gain =10 log[(10 ed, Directional Gai G) = $G_{ANT}$ + 10 log(( tial streams data. alculated as power where Array Gain is $C \leq 4$ ;	$  \begin{array}{l} 0 \ \log(N_{Tx}) \\ \text{in} &= G_{ANT} \\ \text{aal gain is to be cord } \\ 0^{G^{1/20}} &+ \ldots &+ 10^{G^{N/20}} \\ \text{n} &= 10 \ \log[(10^{G^{1/10}} \\ N_{Tx}/N_{SS}), \\ \\ \text{measurements:} \\ \text{as follows:} \end{array} $		

## 3.1.5 Directional Gain for Power Measurement

#### 3.1.6 Test Result of Maximum Conducted Output Power

Condit	ion			RF Output Power (dBm)								
Modulation Mode	Ντχ	Freq. (MHz)	Chain Port 1	Chain Port 2	Sum Chain	Power Limit	DG (dBi)	EIRP Power				
11a	2	5180	10.75	8.88	12.93	17.00	2.20	15.13				
11a	2	5200	9.99	9.31	12.67	17.00	2.20	14.87				
11a	2	5240	9.97	9.84	12.92	17.00	2.20	15.12				
HT20	2	5180	10.45	9.30	12.92	17.00	2.20	15.12				
HT20	2	5200	10.59	8.42	12.65	17.00	2.20	14.85				
HT20	2	5240	10.11	9.71	12.92	17.00	2.20	15.12				
HT40	2	5190	5.62	3.91	7.86	17.00	2.20	10.06				
HT40	2	5230	8.91	7.90	11.44	17.00	2.20	13.64				
Resu	ilt			•	Com	plied		÷				





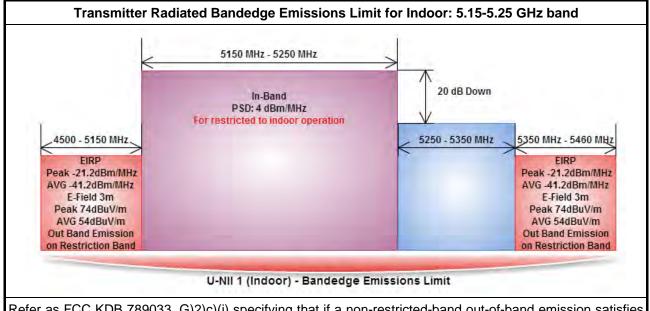
			Maximum Co	nducted Outp	out Power Resu	lt					
Condit	tion		RF Output Power (dBm)								
Modulation Mode	Ντχ	Freq. (MHz)	Chain Port 1	Chain Port 2	Sum Chain	Power Limit	DG (dBi)	EIRP Power			
11a	2	5260	9.98	9.63	12.82	24.00	2.20	15.02			
11a	2	5300	10.89	8.59	12.90	24.00	2.20	15.10			
11a	2	5320	10.79	8.98	12.99	24.00	2.20	15.19			
HT20	2	5260	10.25	9.47	12.89	24.00	2.20	15.09			
HT20	2	5300	10.54	8.52	12.66	24.00	2.20	14.86			
HT20	2	5320	10.73	8.48	12.76	24.00	2.20	14.96			
HT40	2	5270	9.72	9.51	12.63	24.00	2.20	14.83			
HT40	2	5310	3.57	3.11	6.36	24.00	2.20	8.56			
Resu	ılt				Corr	plied					

			Maximum Co	nducted Outp	ut Power Resu	lt				
Condit	ion		RF Output Power (dBm)							
Modulation Mode	Ντχ	Freq. (MHz)	Chain Port 1	Chain Port 2	Sum Chain	Power Limit	DG (dBi)	EIRP Power		
11a	2	5500	10.32	8.91	12.68	24.00	2.20	14.88		
11a	2	5580	10.15	9.19	12.71	24.00	2.20	14.91		
11a	2	5700	10.00	9.90	12.96	24.00	2.20	15.16		
HT20	2	5500	10.37	9.27	12.87	24.00	2.20	15.07		
HT20	2	5580	9.85	9.35	12.62	24.00	2.20	14.82		
HT20	2	5700	10.13	9.67	12.92	24.00	2.20	15.12		
HT40	2	5510	7.51	6.24	9.93	24.00	2.20	12.13		
HT40	2	5550	10.19	9.67	12.95	24.00	2.20	15.15		
HT40	2	5670	10.17	9.58	12.90	24.00	2.20	15.10		
Resu	ılt				Com	plied				

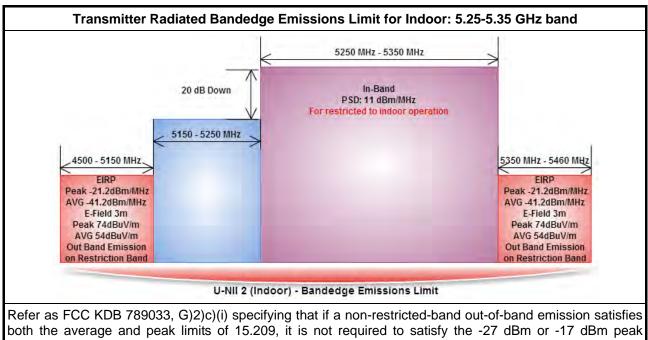


# 3.2 Transmitter Radiated Bandedge Emissions

#### 3.2.1 Transmitter Radiated Bandedge Emissions Limit

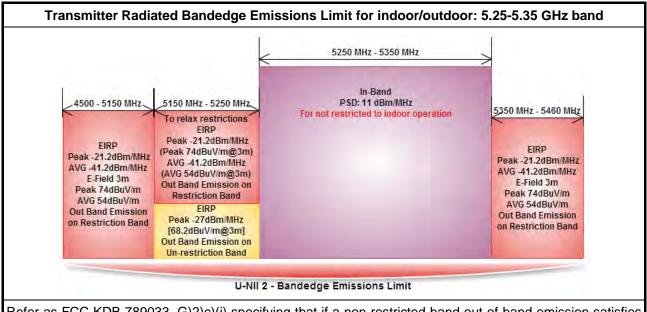


Refer as FCC KDB 789033, G)2)c)(i) specifying that if a non-restricted-band out-of-band emission satisfies both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.

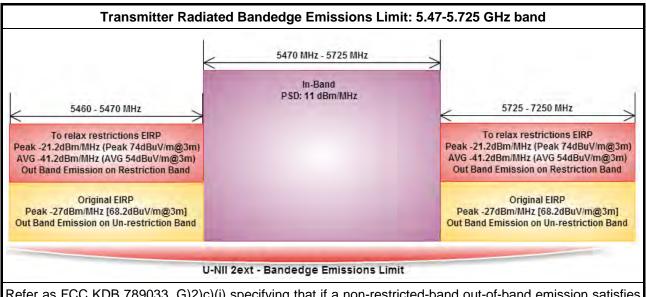


both the average and peak limits of 15.209, it is not required to satisfy the -27 dBm or -17 dBm peak emission limit. Reason for change: to ensure that emission requirements in the non-restricted bands are not more stringent than those in the restricted bands.





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## 3.2.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

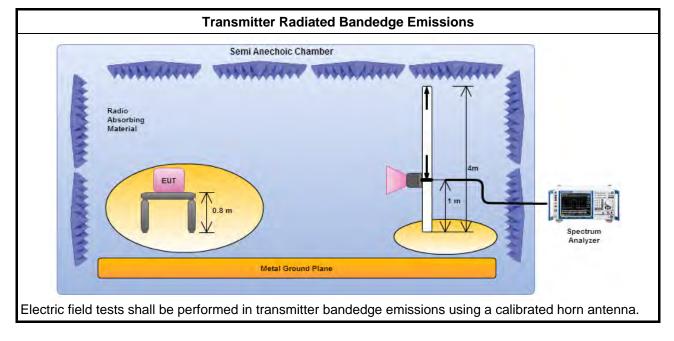


## 3.2.3 Test Procedures

	Test Method
	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). Measurements in the bandedge are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
$\square$	The average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
	Refer as ANSI C63.10, clause 6.9.2.2 bandedge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
	If EUT operate in adjacent contiguous bands, bandedge testing performed at the lowest frequency channel at lower-band and highest frequency channel at higher-band. Transmitter in-band emissions will consist of adjacent contiguous bands (e.g., IEEE 802.11ac VHT160 The lowest frequency channel at lower-band and highest frequency channel at higher-band in-band emissions will consist of two adjacent contiguous bands.)
	Operating in 5.15-5.25 GHz band (lower-band) and 5.25-5.35 GHz band (higher-band).
	Operating in 5.47-5.725 GHz band (lower-band) and 5.725-5.825 GHz band (higher-band).
	If EUT operate in individual non-contiguous bands, bandedge testing performed at the lowest frequency channel and highest frequency channel within lower-band and higher-band. (e.g., (e.g., IEEE 802.11ac VHT160)
	Operating in 5.25-5.35 GHz band (lower-band) and 5.47-5.725 GHz band (higher-band).
	Operating in 5.15-5.25 GHz band (lower-band) and 5.725-5.825 GHz band (higher-band).
$\bowtie$	For the transmitter unwanted emissions shall be measured using following options below:
	Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands.
	Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.
	Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
	Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
	⊠ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW ≥ $1/T$ , where T is pulse time.
	Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
	Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
	Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
$\square$	For the transmitter bandedge emissions shall be measured using following options below:
	<ul> <li>Refer as FCC KDB 789033, clause H)3)d) for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).</li> </ul>
	Refer as ANSI C63.10, clause 6.9.2 for band-edge testing.
	Refer as ANSI C63.10, clause 6.9.3 for marker-delta method for band-edge measurements.
$\boxtimes$	For radiated measurement, refer as ANSI C63.10, clause 6.5 for radiated emissions from above 1 GHz.



#### 3.2.4 Test Setup



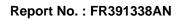


# 3.2.5 Transmitter Radiated Bandedge Emissions (with Antenna)

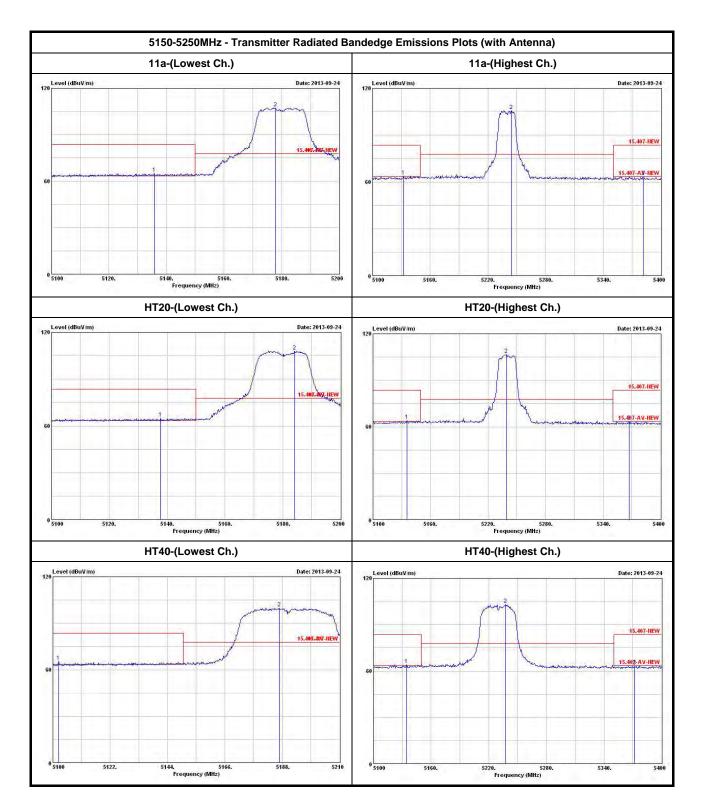
Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11a	2	5180	1	5135.800	65.06	83.54	5147.800	50.97	63.54	Н
11a	2	5240	1	5132.100	63.74	83.54	5147.400	51.03	63.54	Н
HT20, M8-15	2	5180	1	5137.800	64.92	83.54	5147.800	50.86	63.54	Н
HT20, M8-15	2	5240	1	5135.700	63.94	83.54	5149.800	51.01	63.54	Н
HT40, M8-15	2	5190	1	5102.090	65.34	83.54	5149.500	50.82	63.54	Н
HT40, M8-15	2	5230	1	5134.200	64.10	83.54	5148.600	50.98	63.54	Н

Modulation Mode	N <sub>TX</sub>	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11a	2	5260	1	5397.000	63.36	83.54	5385.000	50.55	63.54	Н
11a	2	5320	1	5398.300	64.68	83.54	5350.300	50.62	63.54	Н
HT20, M8-15	2	5260	1	5355.000	63.20	83.54	5356.200	50.71	63.54	Н
HT20, M8-15	2	5320	1	5365.900	64.27	83.54	5381.900	50.52	63.54	Н
HT40, M8-15	2	5270	1	5374.500	63.71	83.54	5382.600	50.36	63.54	Н
HT40, M8-15	2	5310	1	5360.380	63.86	83.54	5355.790	50.34	63.54	Н

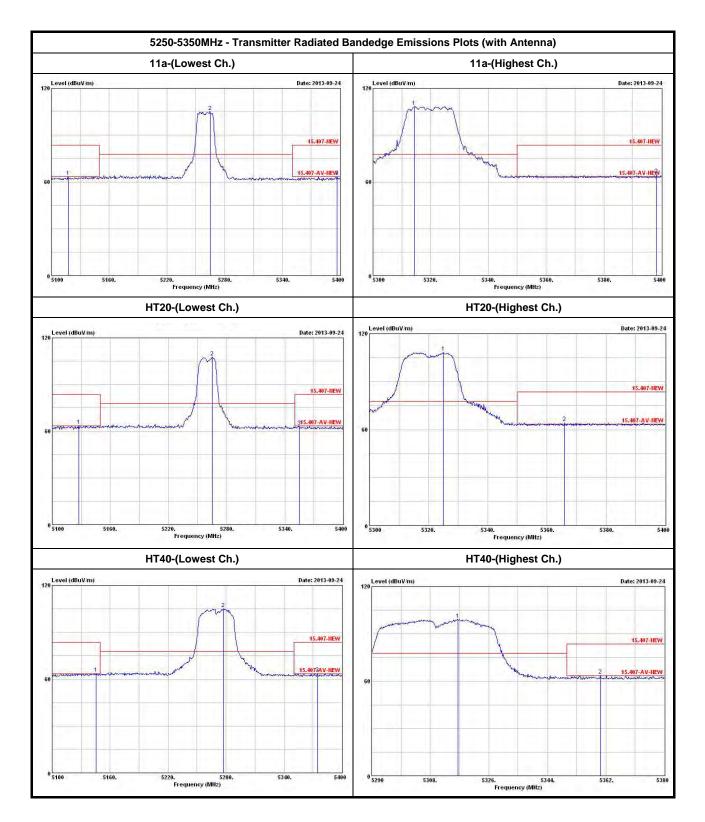
Modulation Mode	Ντχ	Freq. (MHz)	Measure Distance (m)	Freq. (MHz) PK	Level (dBuV/m) PK	Limit (dBuV/m) PK	Freq. (MHz) AV	Level (dBuV/m) AV	Limit (dBuV/m) AV	Pol.
11a	2	5500	1	5436.000	64.07	83.54	5469.200	50.22	63.54	Н
11a	2	5700	1	5738.120	65.77	83.54	5728.100	51.30	63.54	Н
HT20, M8-15	2	5500	1	5462.240	64.23	83.54	5434.000	50.22	63.54	Н
HT20, M8-15	2	5700	1	5745.620	65.60	77.84	-	-	-	Н
HT40, M8-15	2	5510	1	5469.900	63.66	83.54	5470.000	50.73	63.54	Н
HT40, M8-15	2	5670	1	5733.000	64.13	77.84	-	-	-	Н



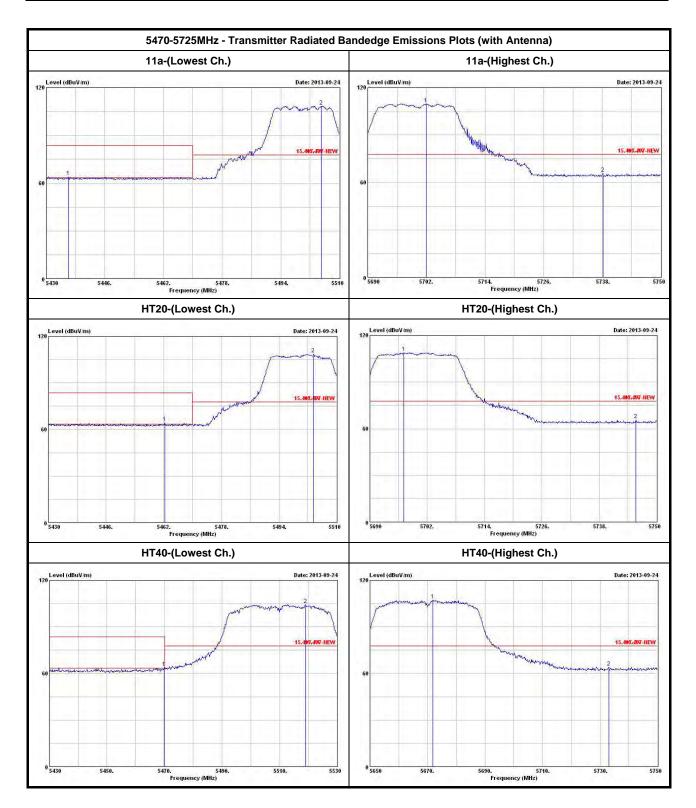














# 3.3 Transmitter Radiated Unwanted Emissions

#### 3.3.1 Transmitter Radiated Unwanted Emissions Limit

Unwanted emissions below 1 GHz and restricted band emissions above 1GHz limit									
Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)							
2400/F(kHz)	48.5 - 13.8	300							
24000/F(kHz)	33.8 - 23	30							
30	29	30							
100	40	3							
150	43.5	3							
200	46	3							
500	54	3							
	Field Strength (uV/m)           2400/F(kHz)           24000/F(kHz)           30           100           150           200	Field Strength (uV/m)         Field Strength (dBuV/m)           2400/F(kHz)         48.5 - 13.8           24000/F(kHz)         33.8 - 23           30         29           100         40           150         43.5           200         46							

Note 1: Test distance for frequencies at or above 30 MHz, 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).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

	Un-restricted band emissions above 1GHz Limit
<b>Operating Band</b>	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]
performed in the r equipment. When be extrapolated to	ay be performed at a distance other than the limit distance provided they are not near field and the emissions to be measured can be detected by the measuremen performing measurements at a distance other than that specified, the results sha the specified distance using an extrapolation factor of 20 dB/decade (inverse of field-strength measurements, inverse of linear distance-squared for power-densite

#### 3.3.2 Measuring Instruments

measurements).

Refer a test equipment and calibration data table in this test report.

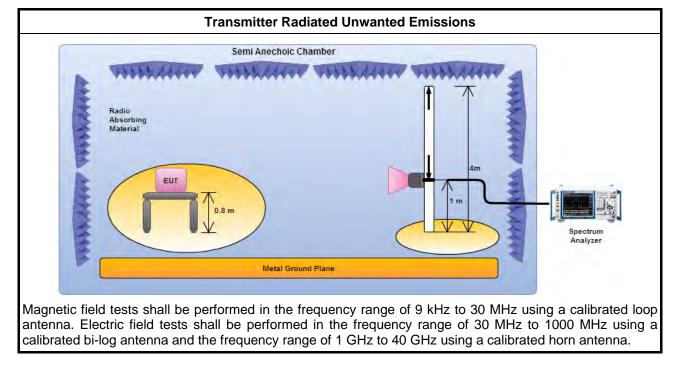


### 3.3.3 Test Procedures

		Test Method
	perfe equi abov are i be e dista	surements may be performed at a distance other than the limit distance provided they are not ormed in the near field and the emissions to be measured can be detected by the measurement pment. Measurements shall not be performed at a distance greater than 30 m for frequencies /e 30 MHz, unless it can be further demonstrated that measurements at a distance of 30 m or less mpractical. When performing measurements at a distance other than that specified, the results shall xtrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear ance for field-strength measurements, inverse of linear distance-squared for power-density surements).
	$\boxtimes$	Measurements in the frequency range 5 GHz - 10GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
		Measurements in the frequency range 10 GHz - 18GHz are typically made at a closer distance 1m, because the instrumentation noise floor is typically close to the radiated emission limit.
		Measurements in the frequency range above 18 GHz - 40GHz are typically made at a closer distance 0.5m, because the instrumentation noise floor is typically close to the radiated emission limit.
$\boxtimes$	The	average emission levels shall be measured in [duty cycle $\geq$ 98 or duty factor].
$\boxtimes$	For	the transmitter unwanted emissions shall be measured using following options below:
	$\boxtimes$	Refer as FCC KDB 789033, clause H)2) for unwanted emissions into non-restricted bands.
	$\square$	Refer as FCC KDB 789033, clause H)1) for unwanted emissions into restricted bands.
		Refer as FCC KDB 789033, H)6) Method AD (Trace Averaging).
		Refer as FCC KDB 789033, H)6) Method VB (Reduced VBW).
		□ Refer as ANSI C63.10, clause 4.2.3.2.3 (Reduced VBW). VBW $\ge$ 1/T, where T is pulse time.
		Refer as ANSI C63.10, clause 4.2.3.2.4 average value of pulsed emissions.
		Refer as FCC KDB 789033, clause H)5) measurement procedure peak limit.
		Refer as ANSI C63.10, clause 4.2.3.2.2 measurement procedure peak limit.
$\boxtimes$	For	radiated measurement.
	$\square$	Refer as ANSI C63.10, clause 6.4 for radiated emissions from below 30 MHz.
	$\square$	Refer as ANSI C63.10, clause 6.5 for radiated emissions from 30 MHz to 1000 MHz.
	$\boxtimes$	Refer as ANSI C63.10, clause 6.6 for radiated emissions from above 1 GHz.



#### 3.3.4 Test Setup



## 3.3.5 Transmitter Radiated Unwanted Emissions (Below 30MHz)

All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.

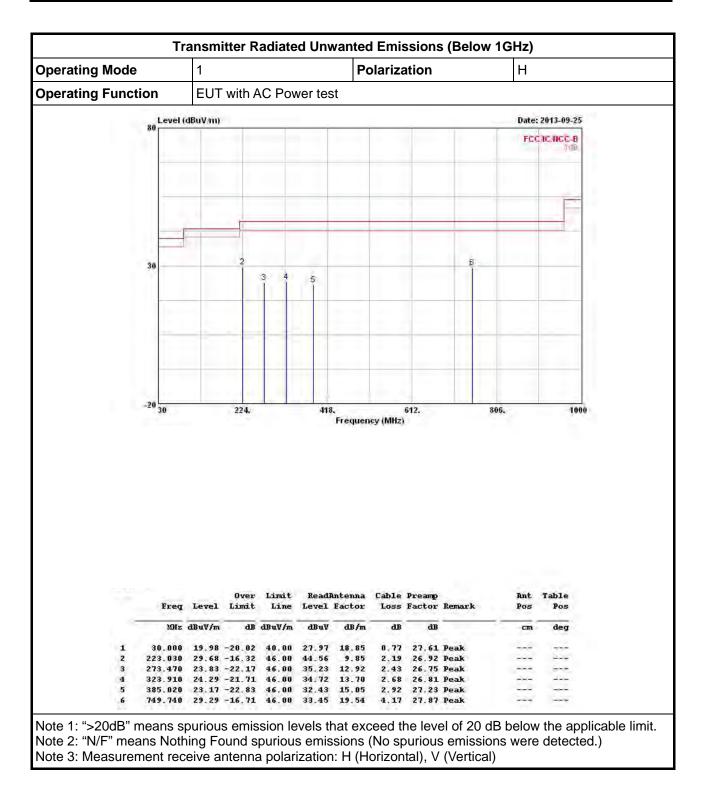


perating Mode	9	1				P	olariza	ation		V	
perating Func	tion	EUT	with <i>i</i>	AC Po	wer tes	st					
	Level	dBuV/m)								Date	: 2013-09
	80									FC	ACHICC
									1.0		01
				_							
		_							-		F
						_	_				
							-	-	-		
	-2										
	30 1 3	-	5		_			_	6	_	
	III	4	1						1		
	6									1.1	
	-20 30		224.		418			612.		806.	
	-20 30		224.		418	, Frequen		612.		806.	
	30		Over		ReadR	Frequen	cy(MHz) Cable	Preamp		Ant	Table
	SU	Level	Over Limit	Line	ReadR	Frequen ntenna Factor	Cable Loss	Preamp	Remark	Ant Pos	Table Pos
	30 Freq MHz	dBuV/m	Over Limit dB	Line dBuV/m	ReadR Level dBuV	ntenna Factor dB/m	Cable Loss dB	Preamp Factor dB		Ant Pos cm	Table Pos deg
1 2	30 Ereq 1042 48.430	dBuV/m 27.41	Over Limit dB -12.59	Line dBuV/m 40.00	ReadR Level dBuV 44.96	ntenna Factor dB/m 9.05	Cable Loss dB 0.98	Preamp Factor dB 27.58	Peak	Ant Pos	Table Pos deg
2	30 Freq Miz 48.430 62.980 78.500	dBuV/m 27.41 35.16 26.49	Over Limit dB -12.59 -4.84 -13.51	Line dBuV/m 40.00 40.00 40.00	ReadR Level dBuW 44.96 45.59	ntenna Factor dB/m 9.05 6.70 7.09	Cable Loss dB 1.13 1.28	Preamp Factor dB 27.58 27.53 27.47	Peak Peak Peak	Ant Pos 	Table Pos deg
2	30 Freq MHz 48,430 62,980	dBuV/m 27.41 35.16 26.49 24.16	Over Limit dB -12.59 -4.84 -13.51 -13.91	Line dBuV/m 40.00 40.00 40.00 43.50	ReadR Level dBuV 44.96 554.86 45.59 39.51	ntenna Factor dB/m 9.05 6.70	Cable Loss dB 0.98 1.13	Preamp Factor dB 27.58 27.53 27.47 27.47	Peak Peak Peak Peak	Ant Pos 	Table Pos deg

# 3.3.6 Transmitter Radiated Unwanted Emissions (Below 1GHz)

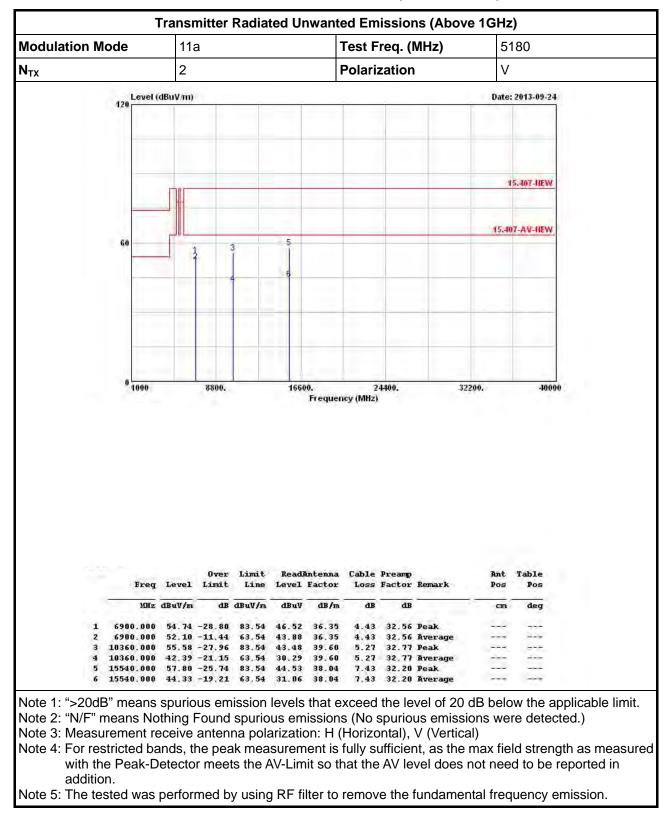




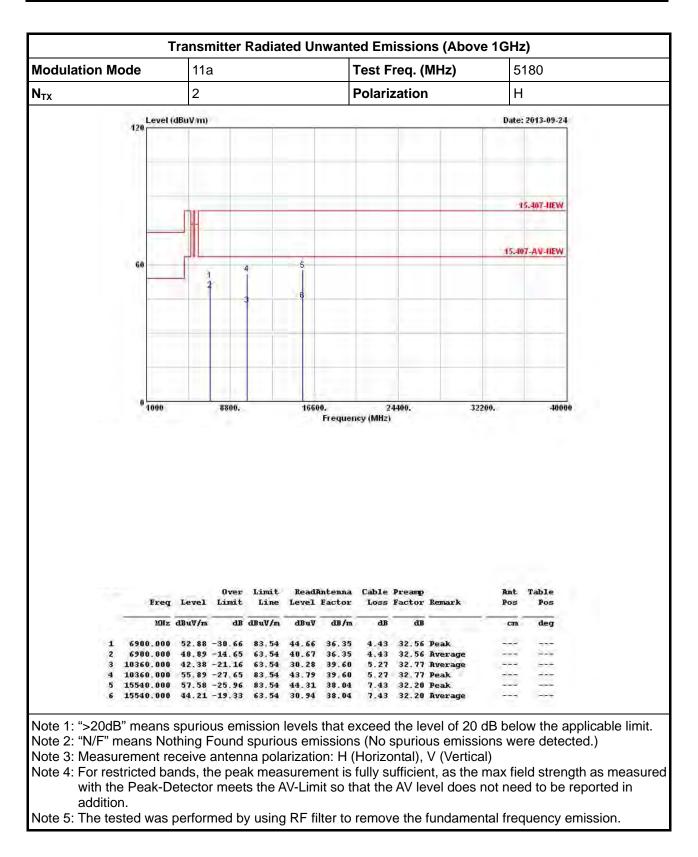




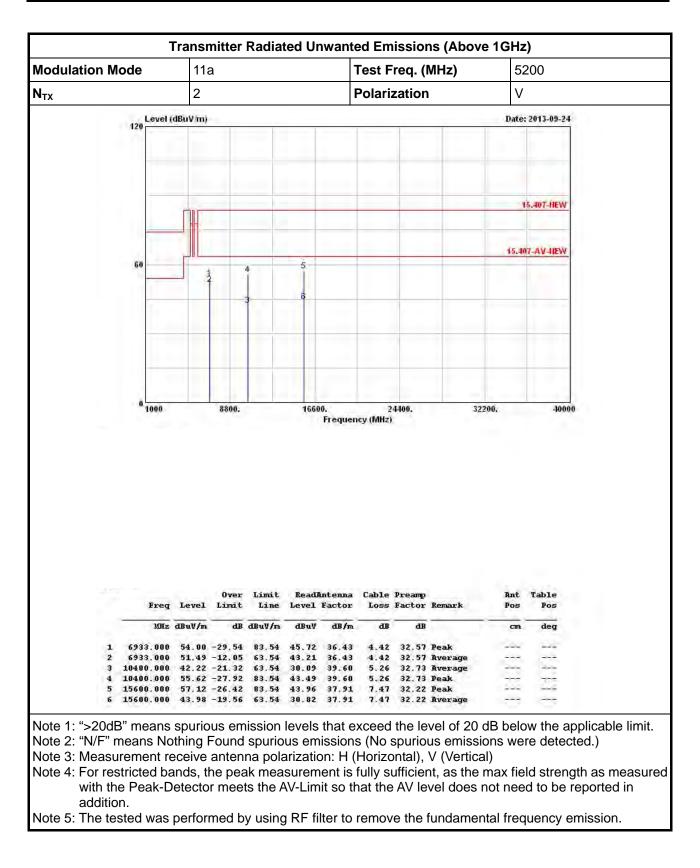
#### 3.3.7 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5150-5250MHz



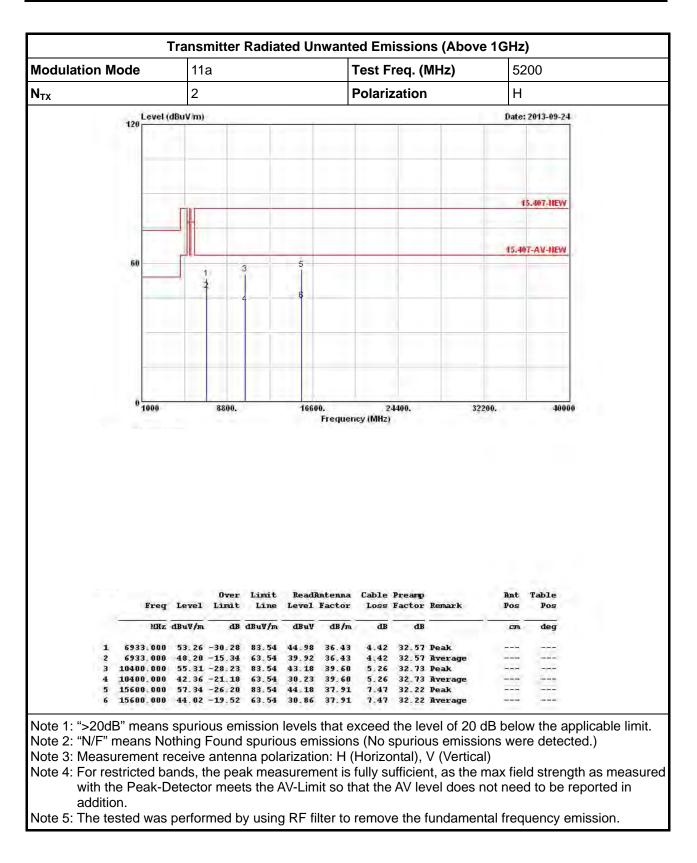




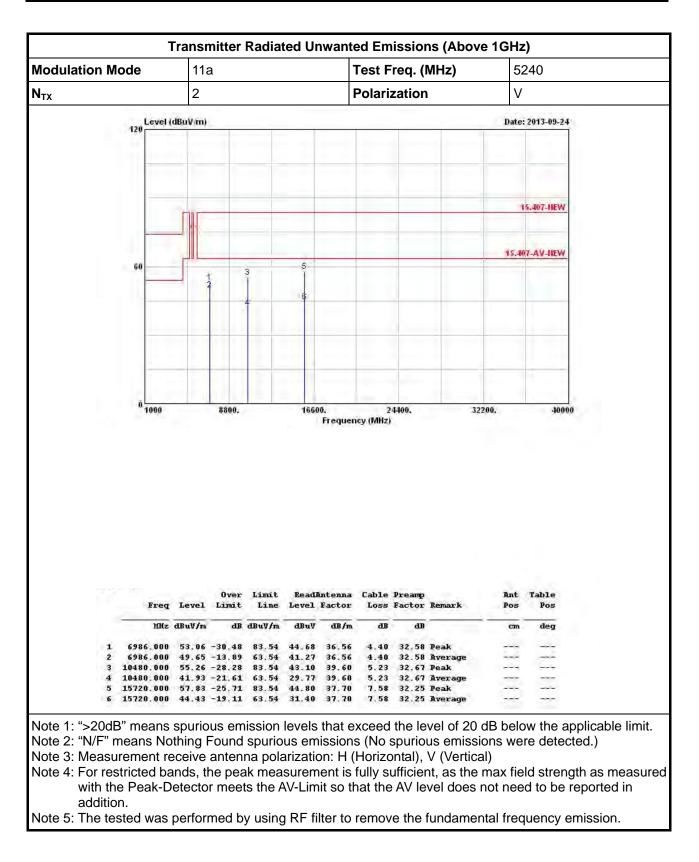




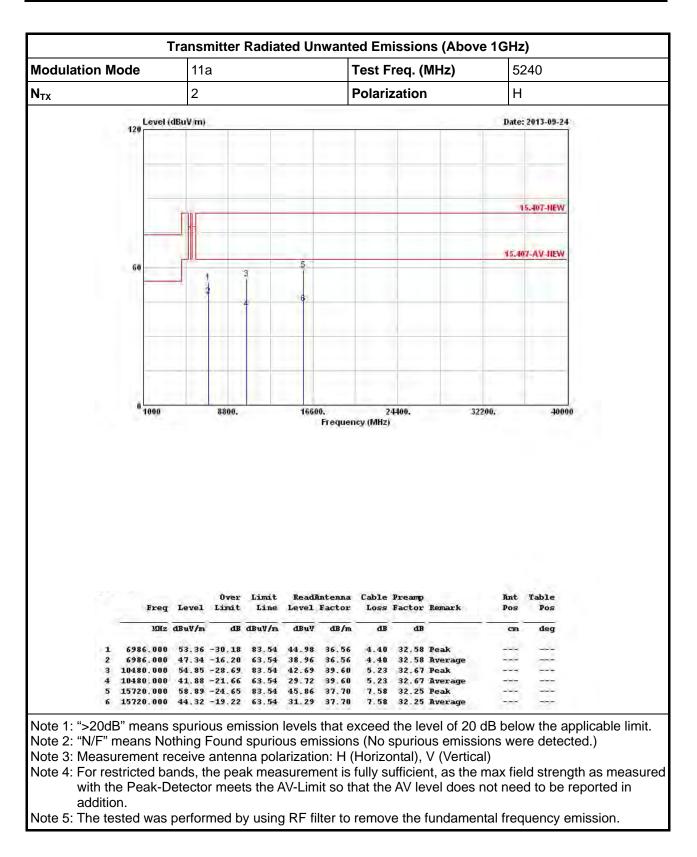




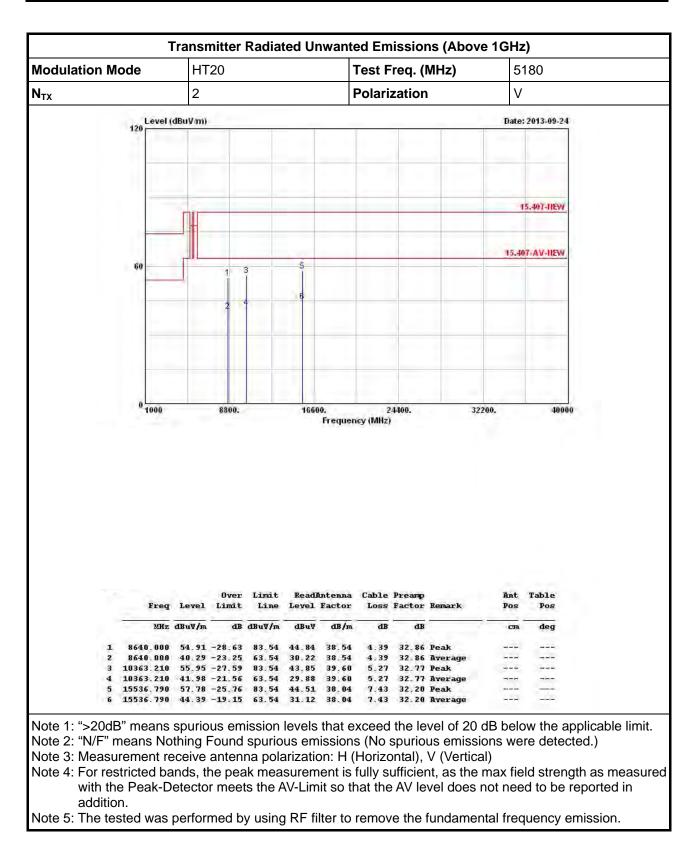




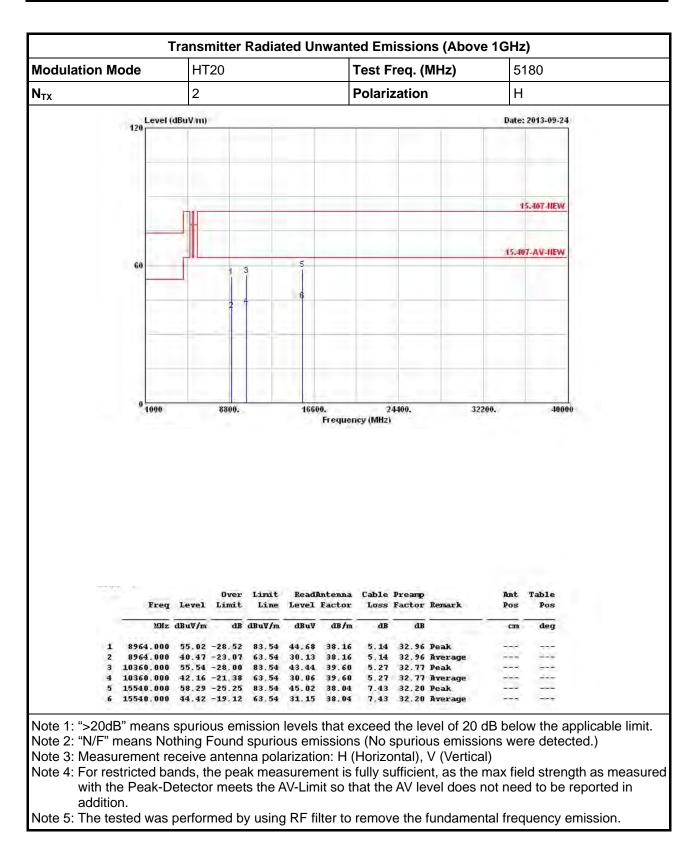




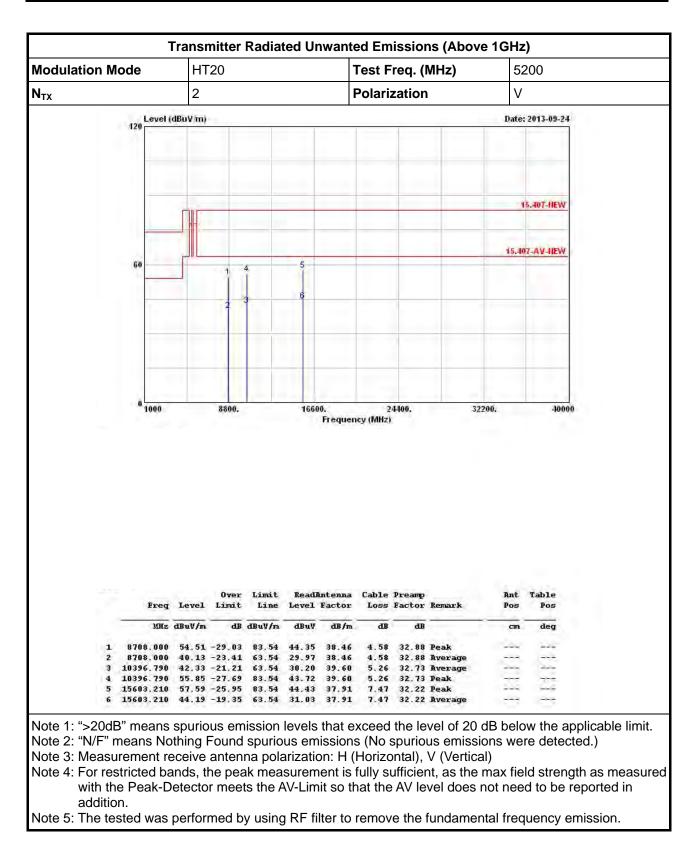




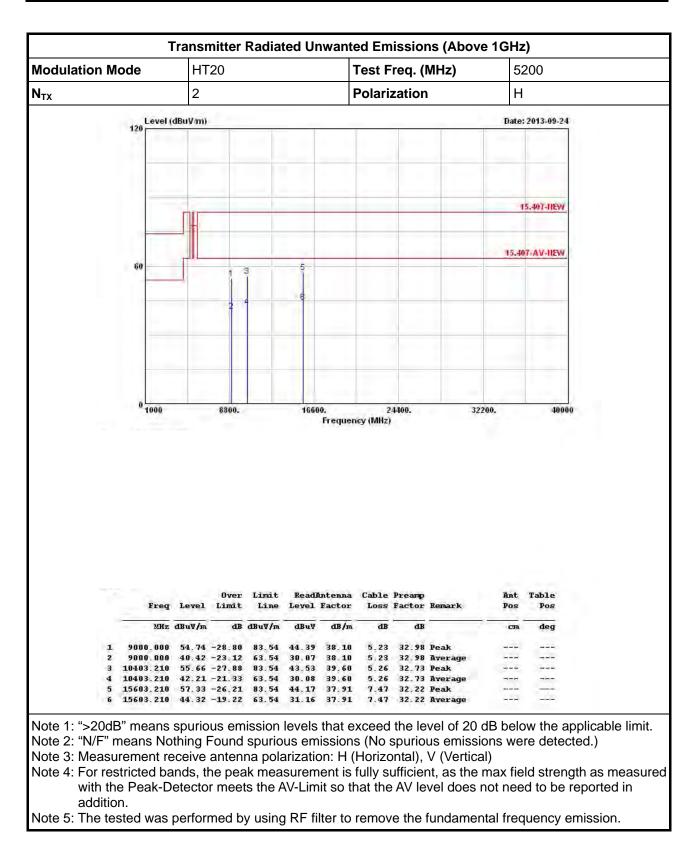




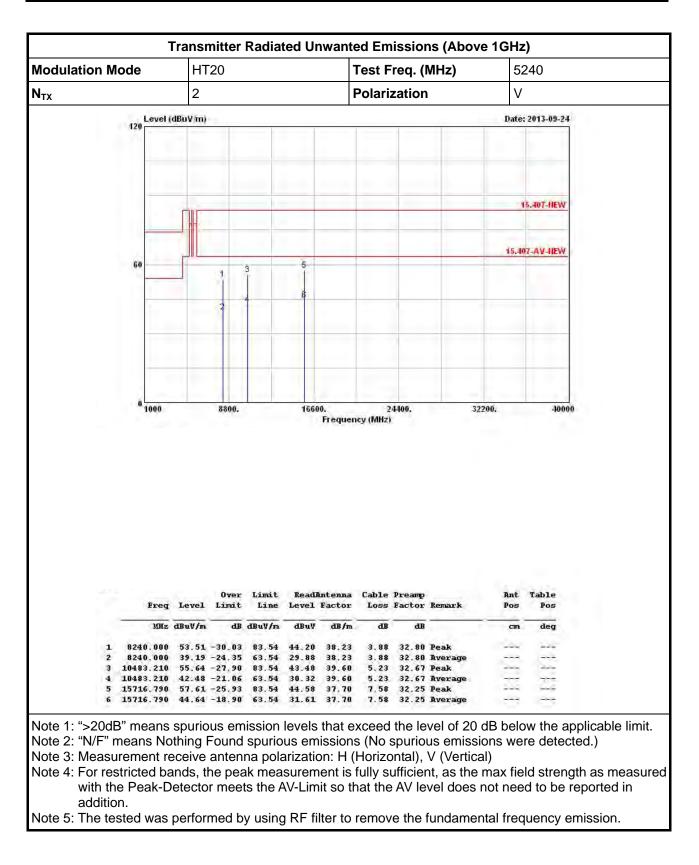




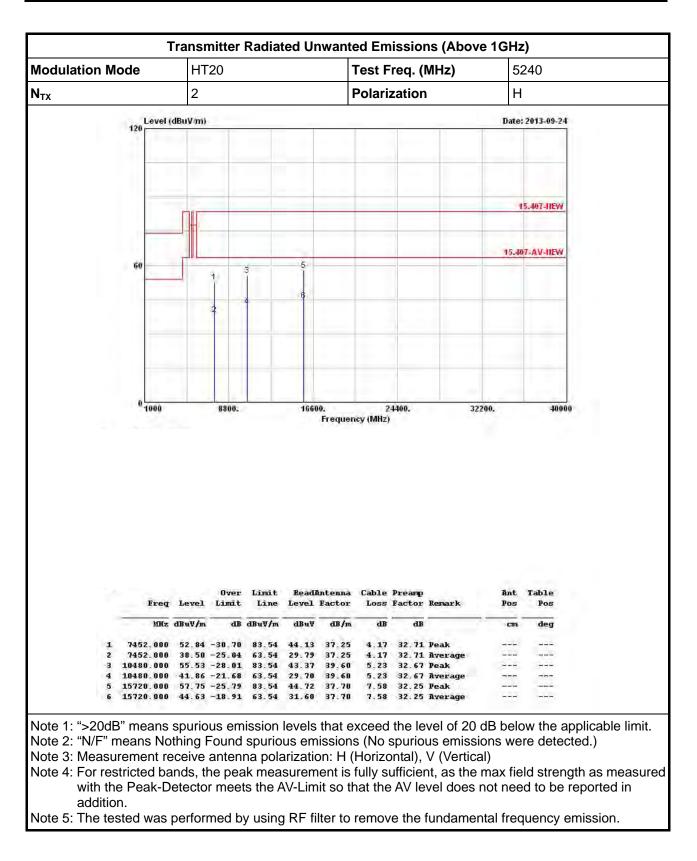


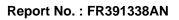




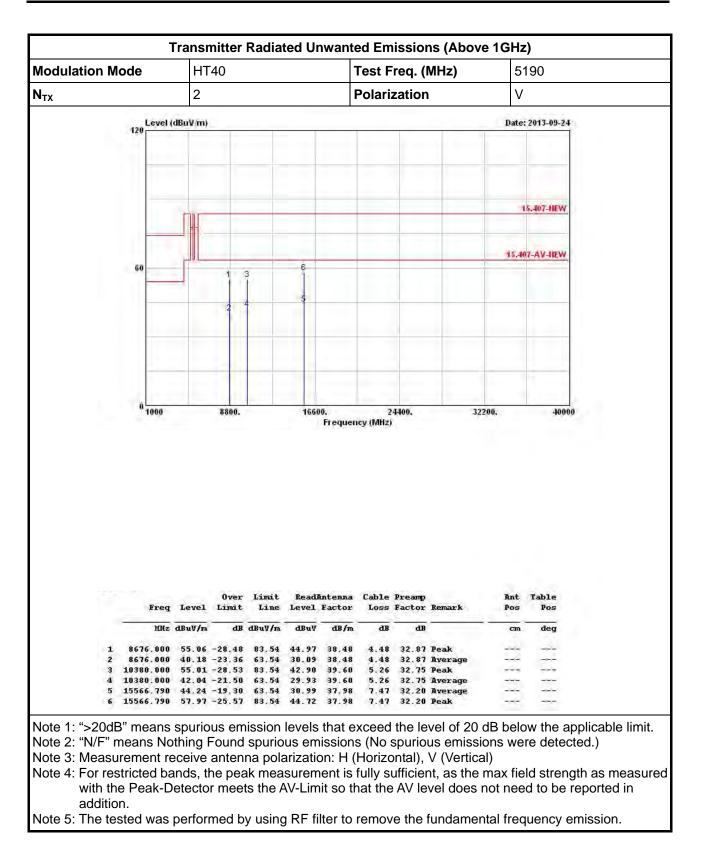


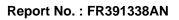




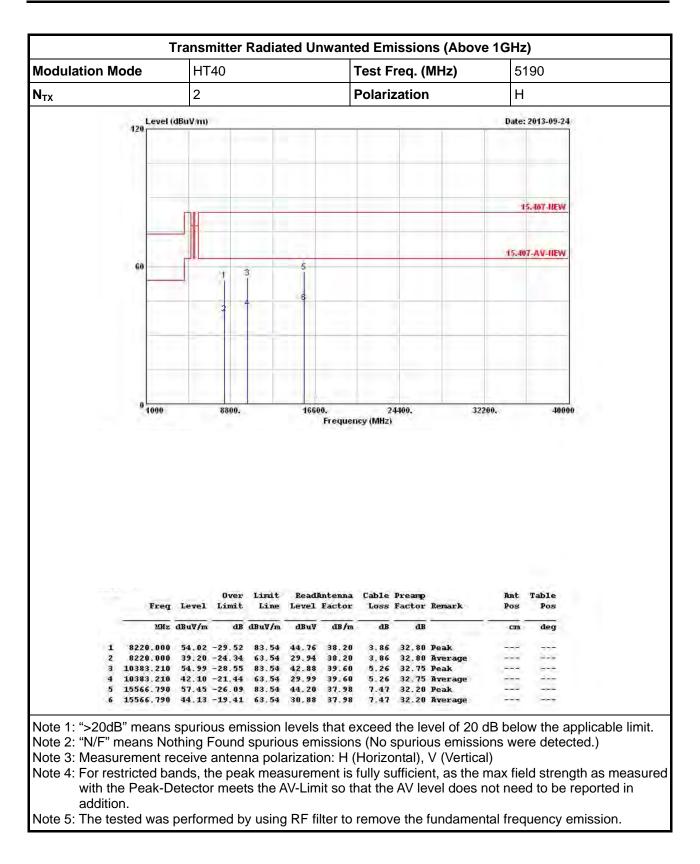


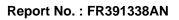




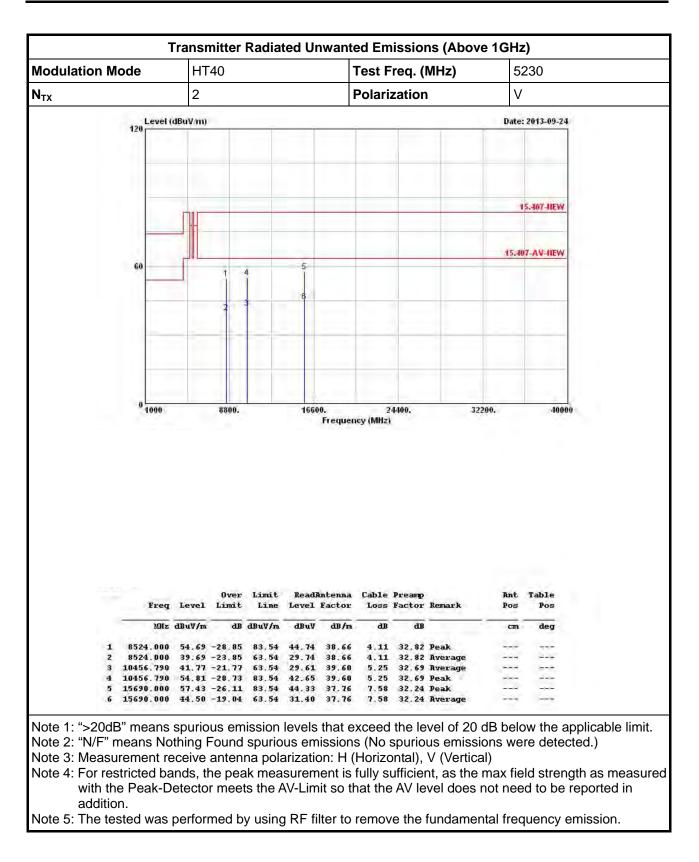




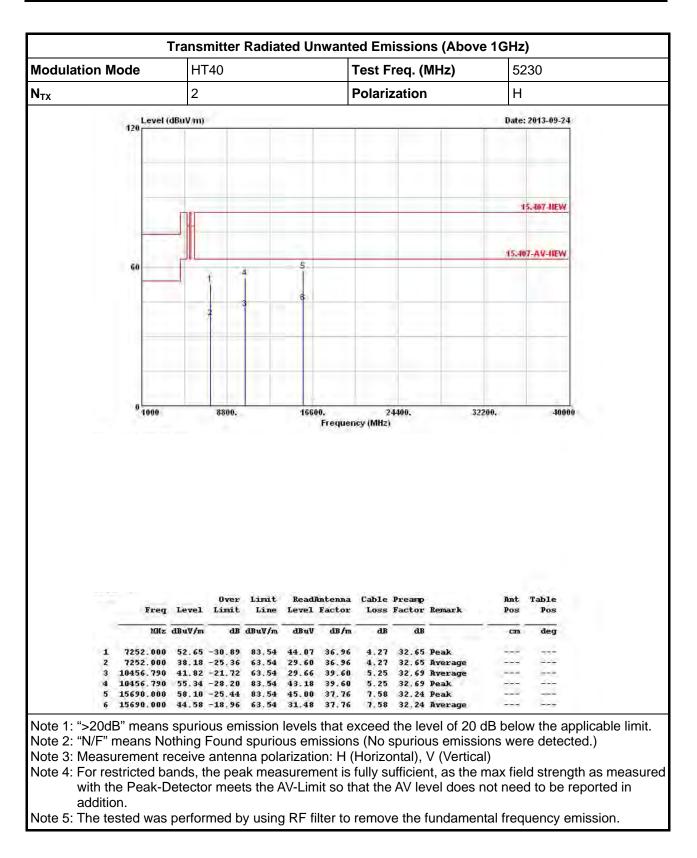






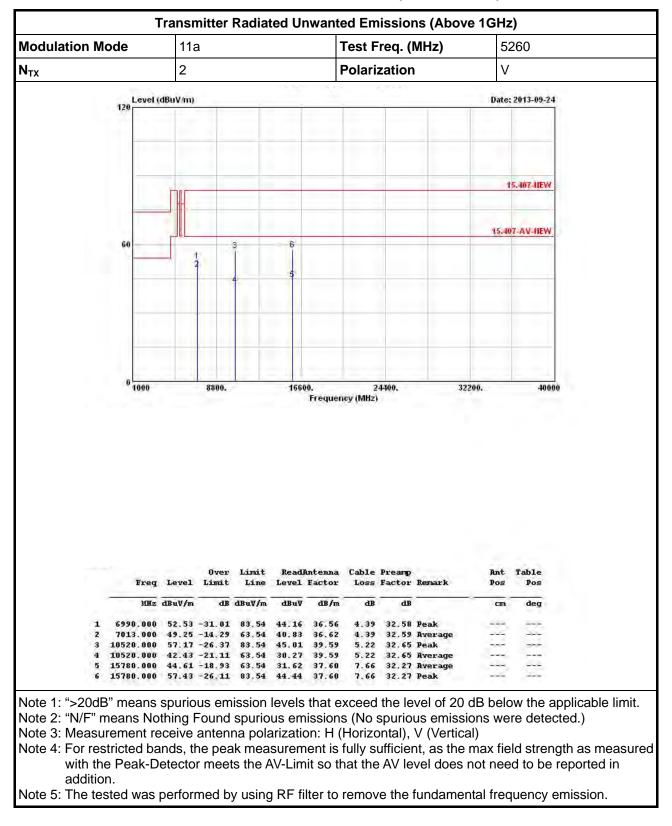




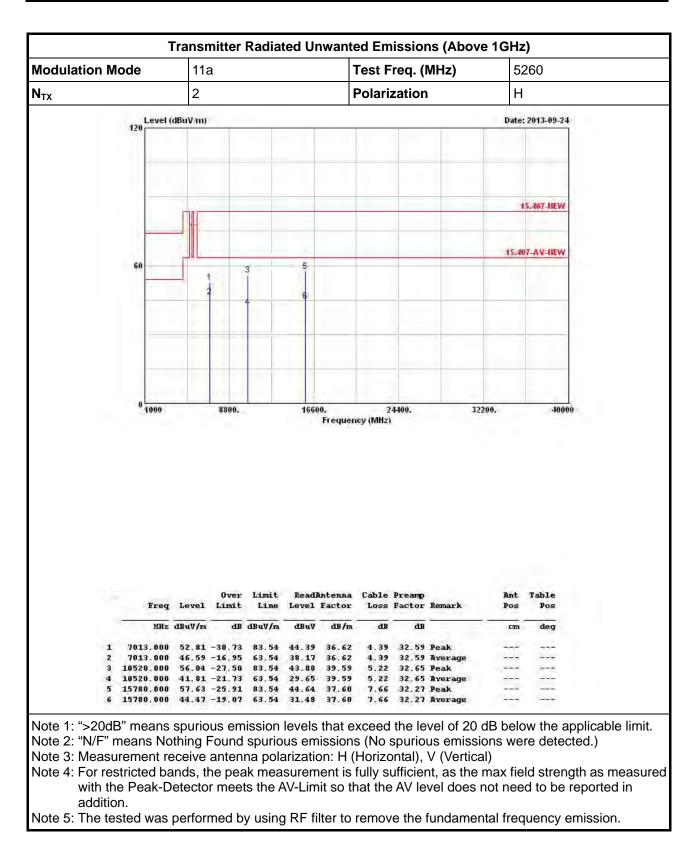




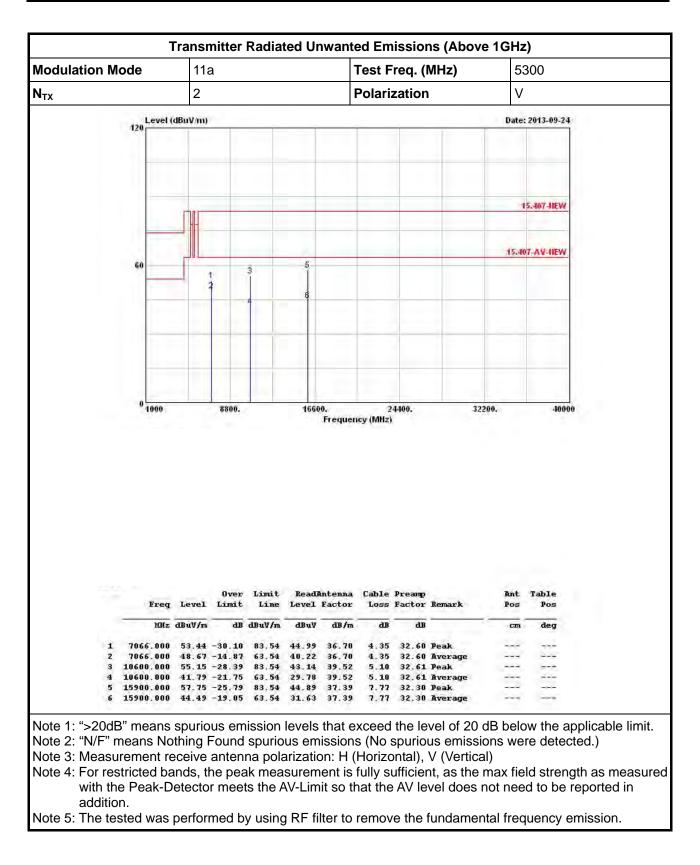
## 3.3.8 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5250-5350MHz



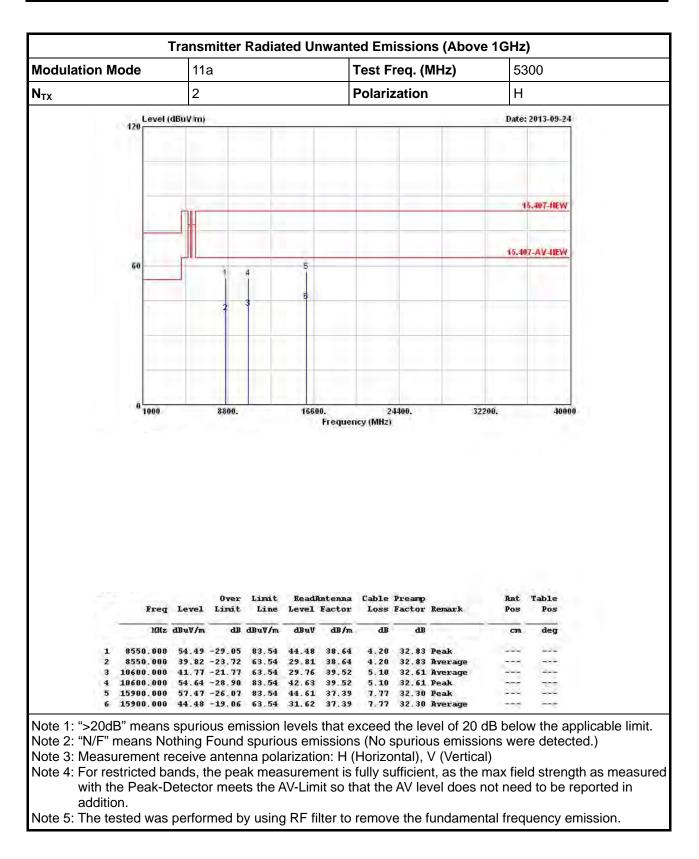




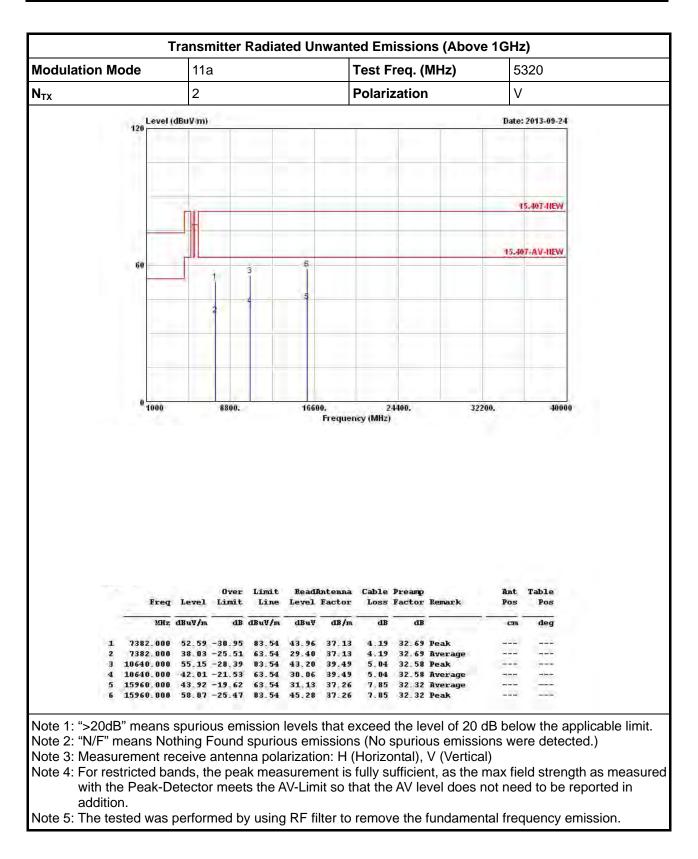




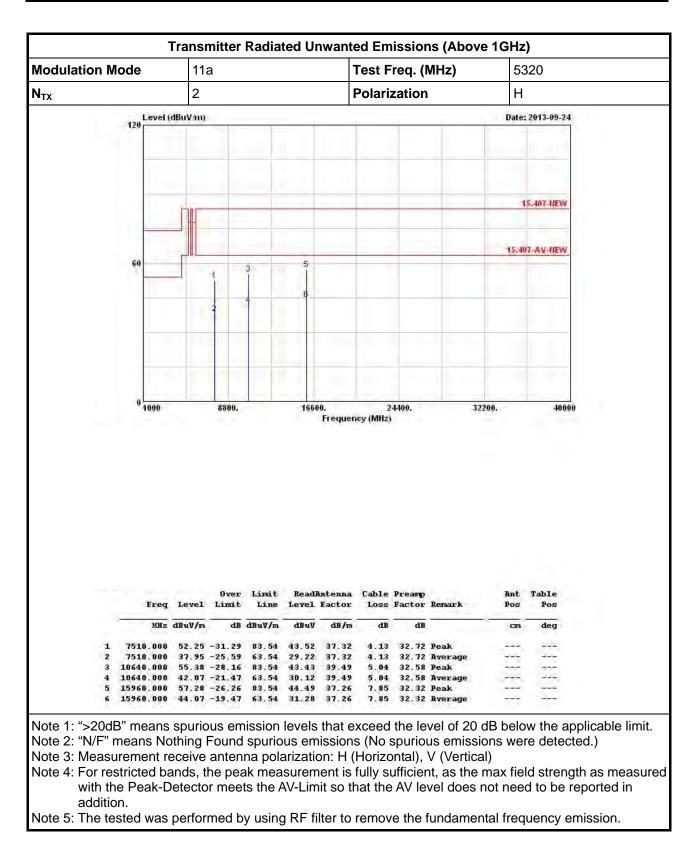




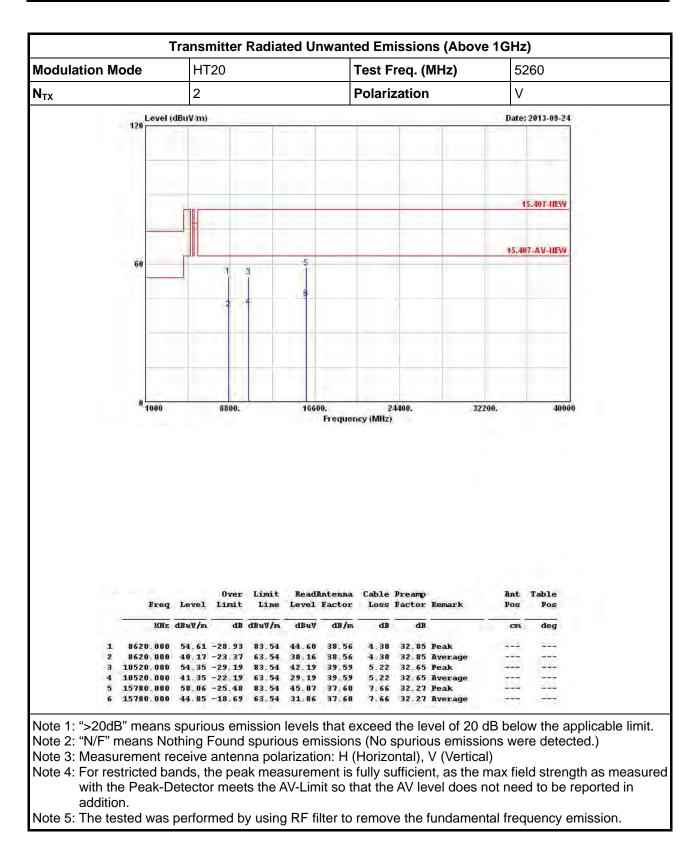




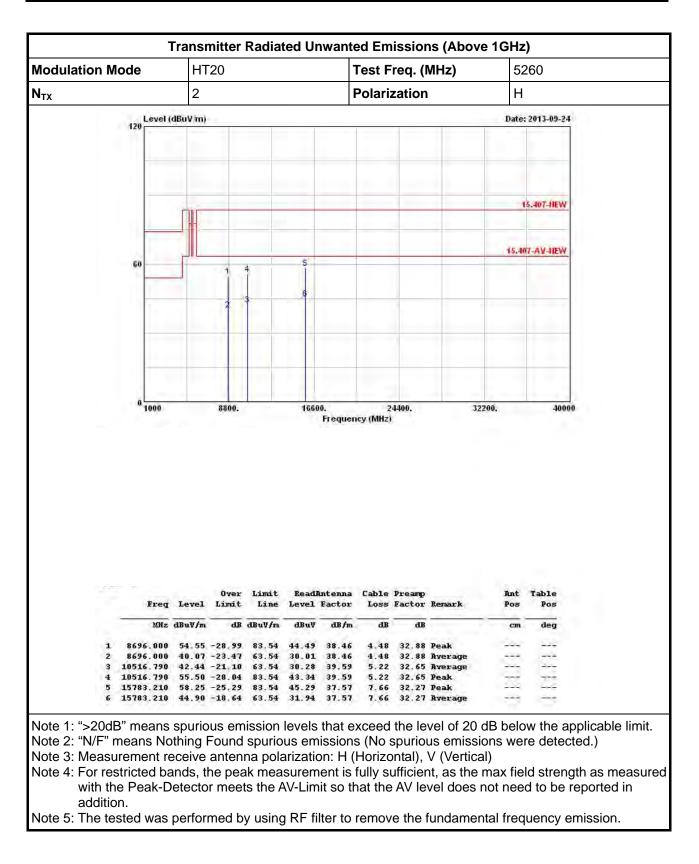


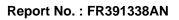




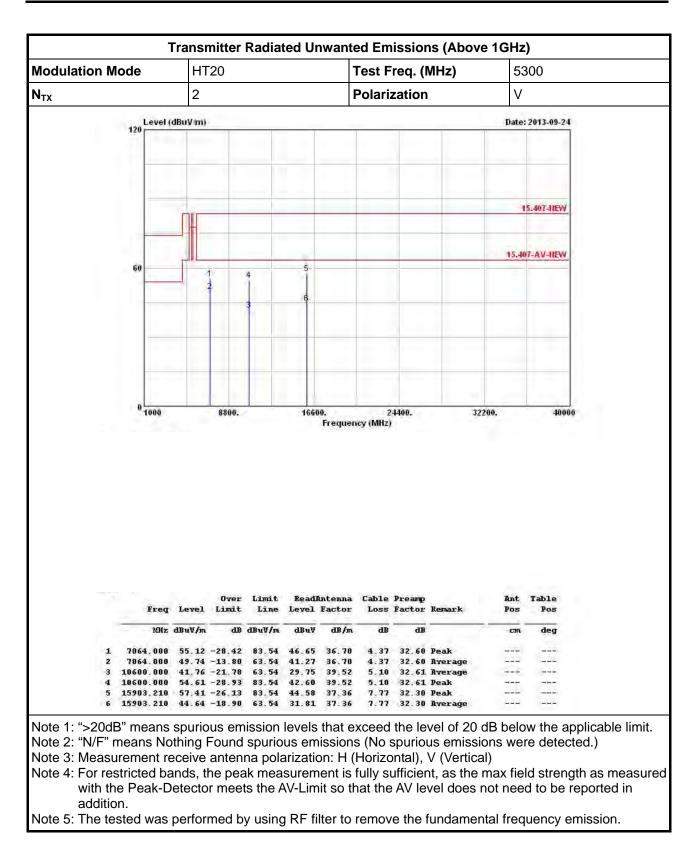




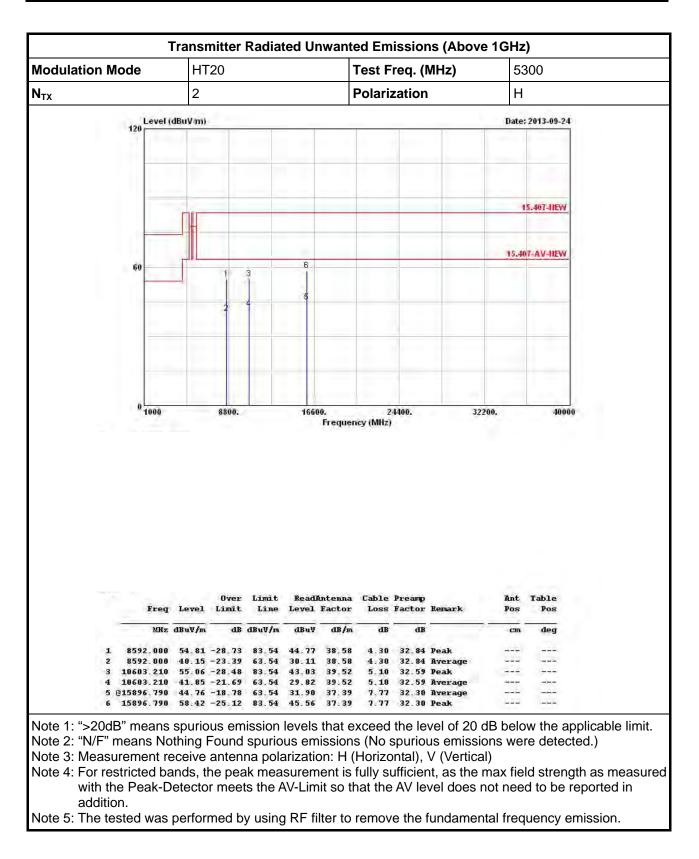




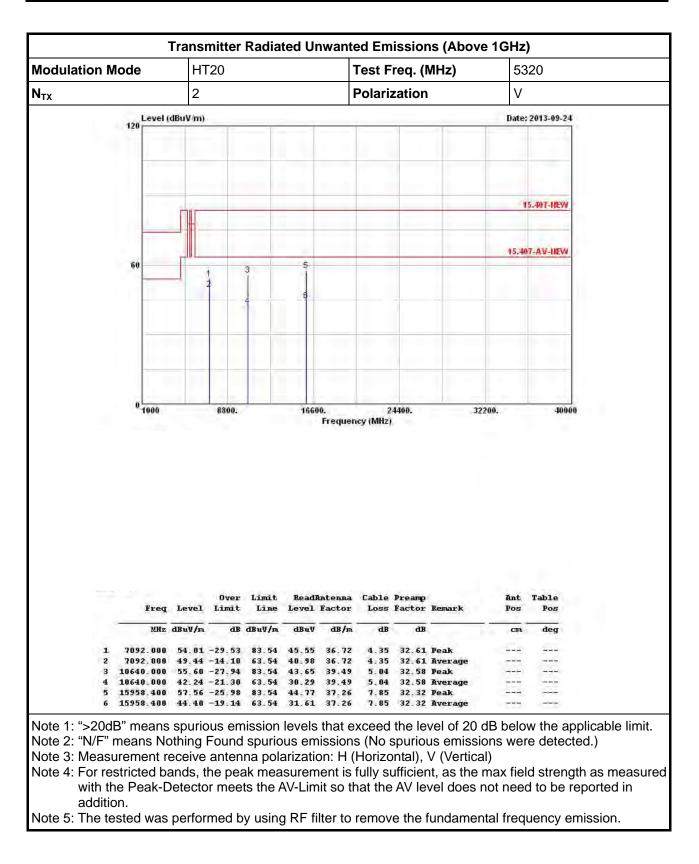


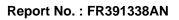




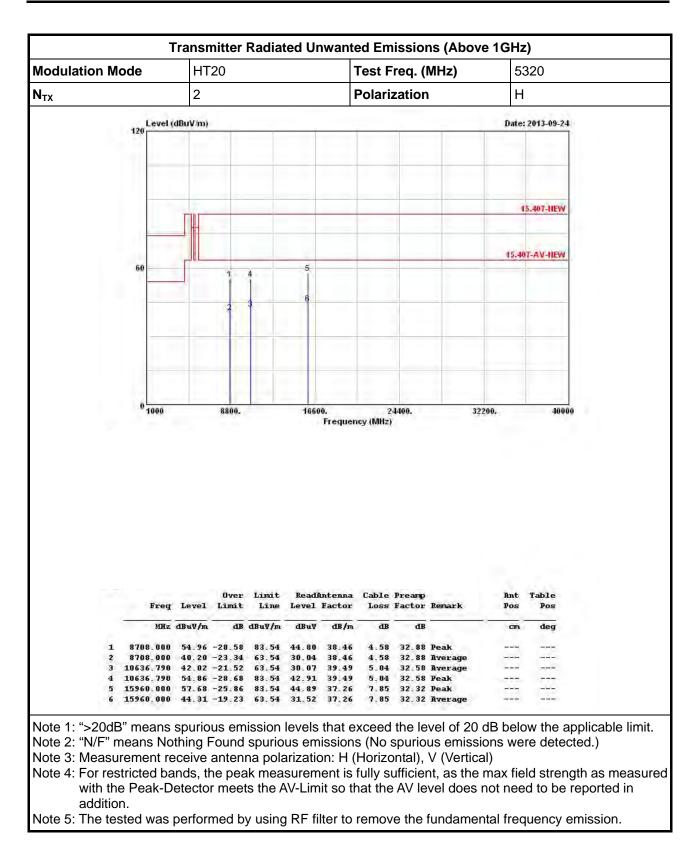




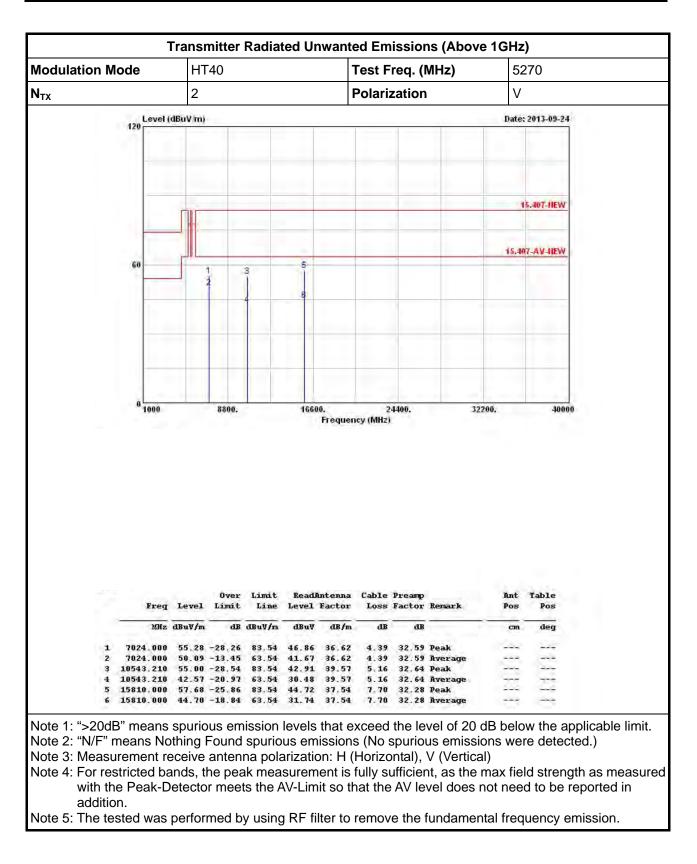




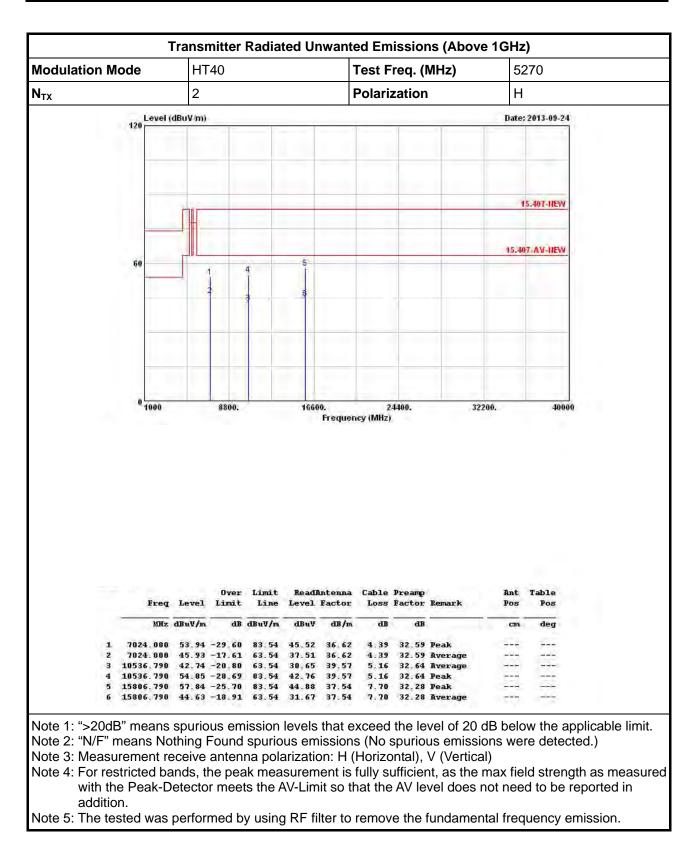




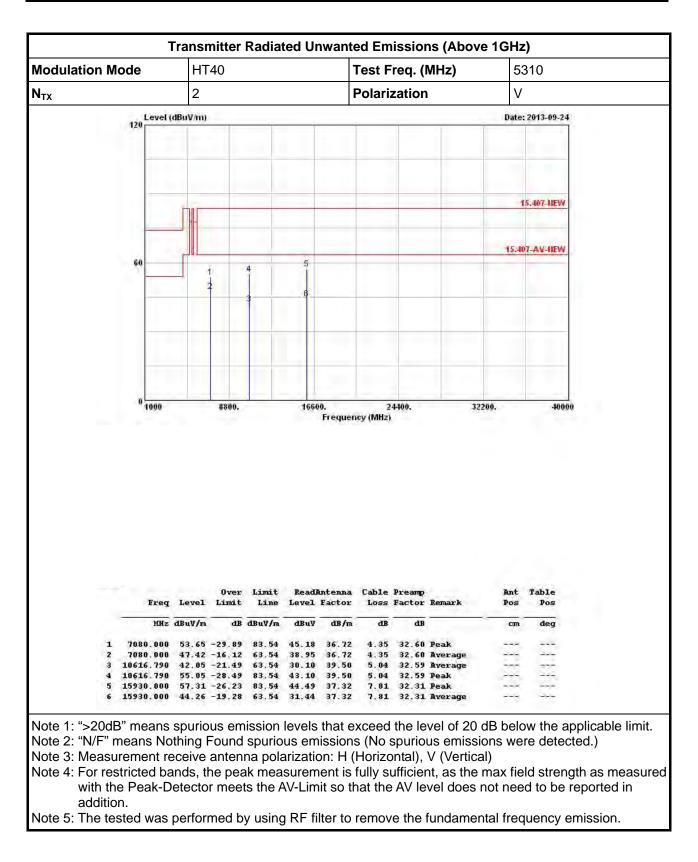




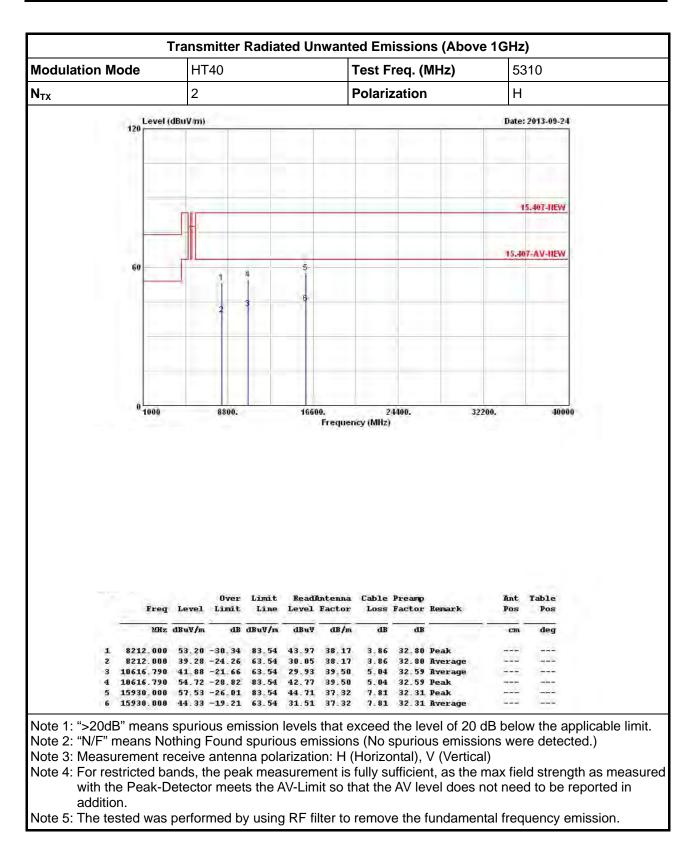






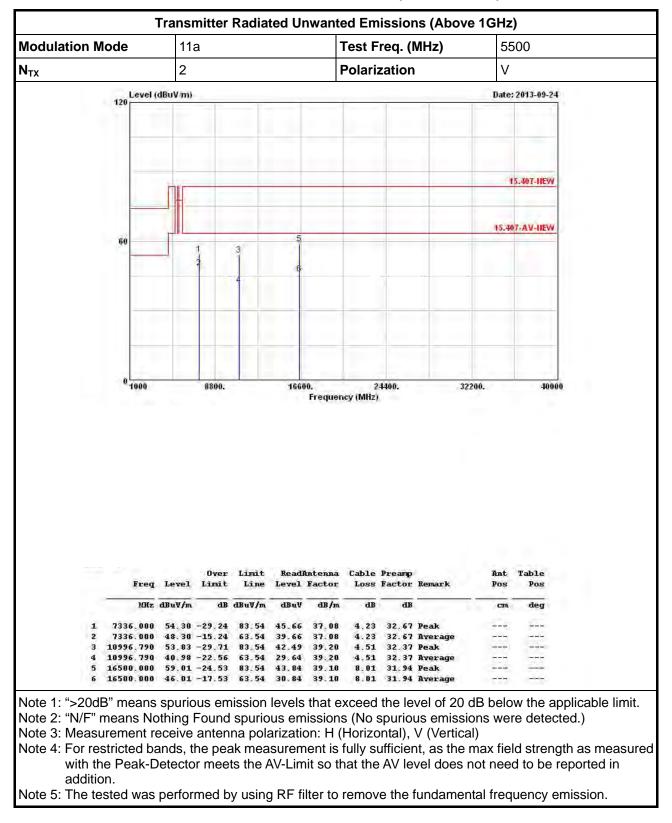




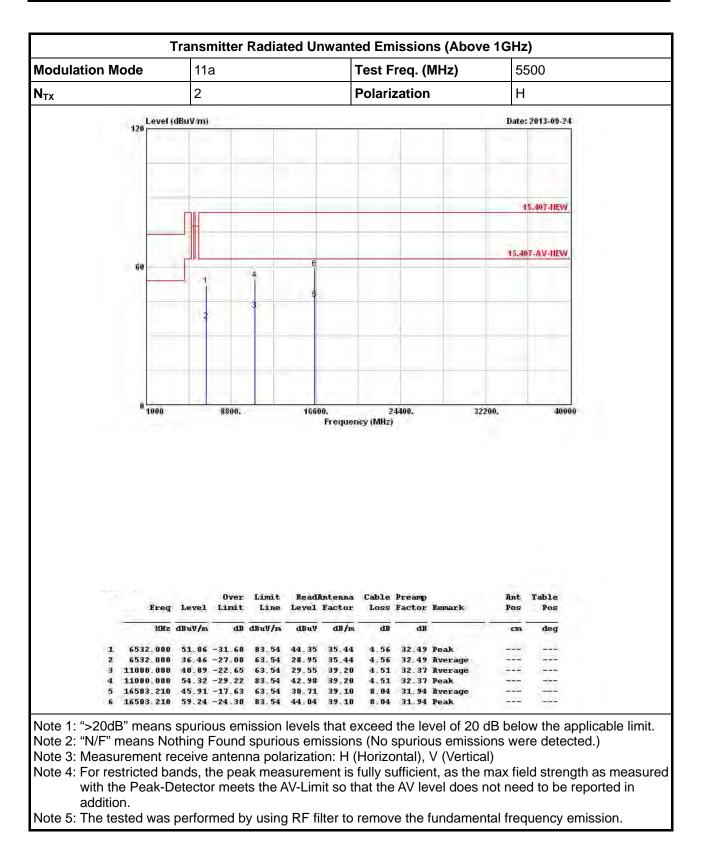




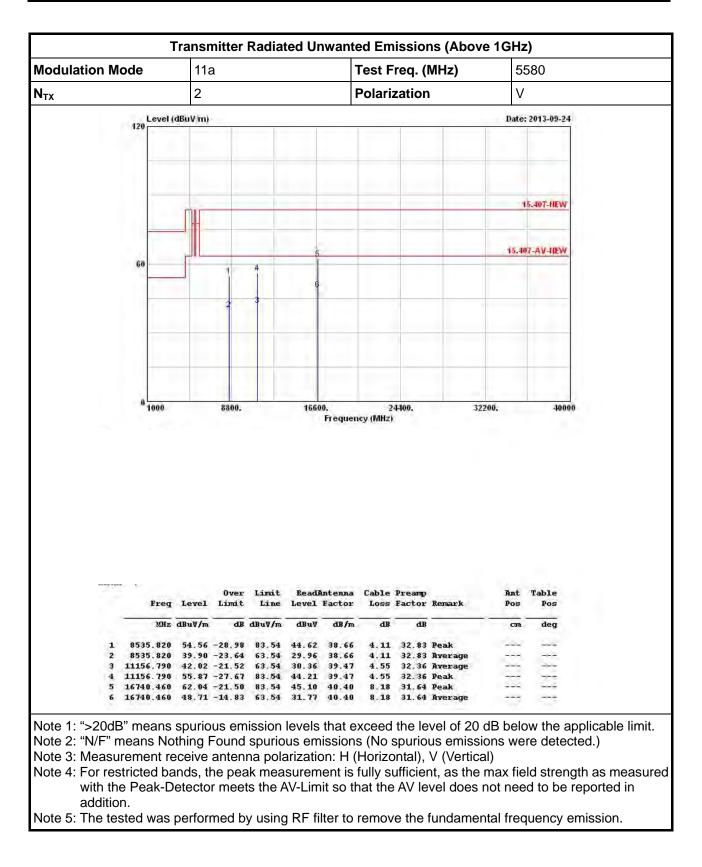
## 3.3.9 Transmitter Radiated Unwanted Emissions (Above 1GHz) for 5470-5725MHz



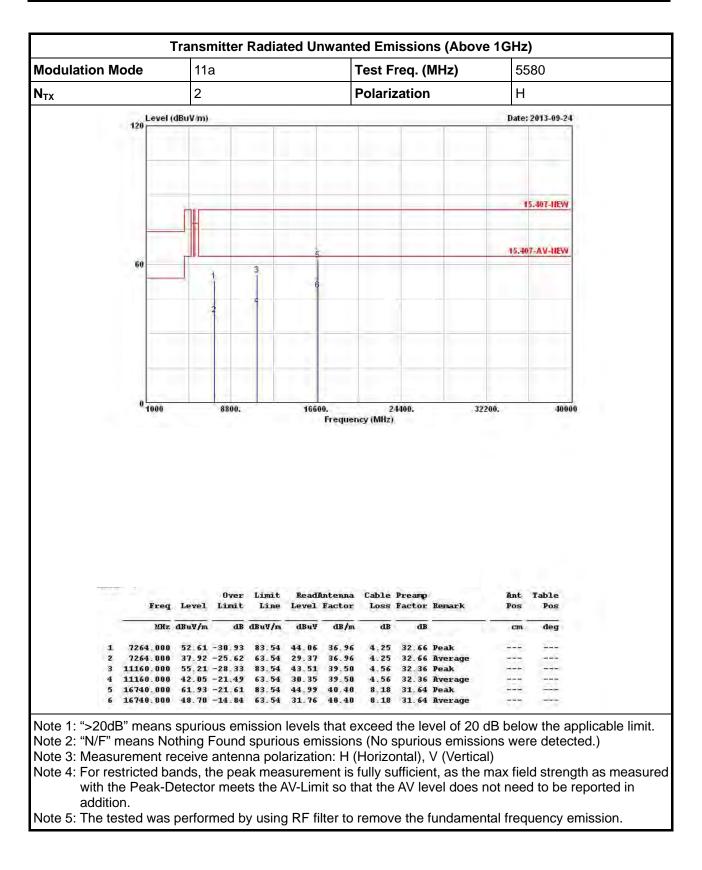




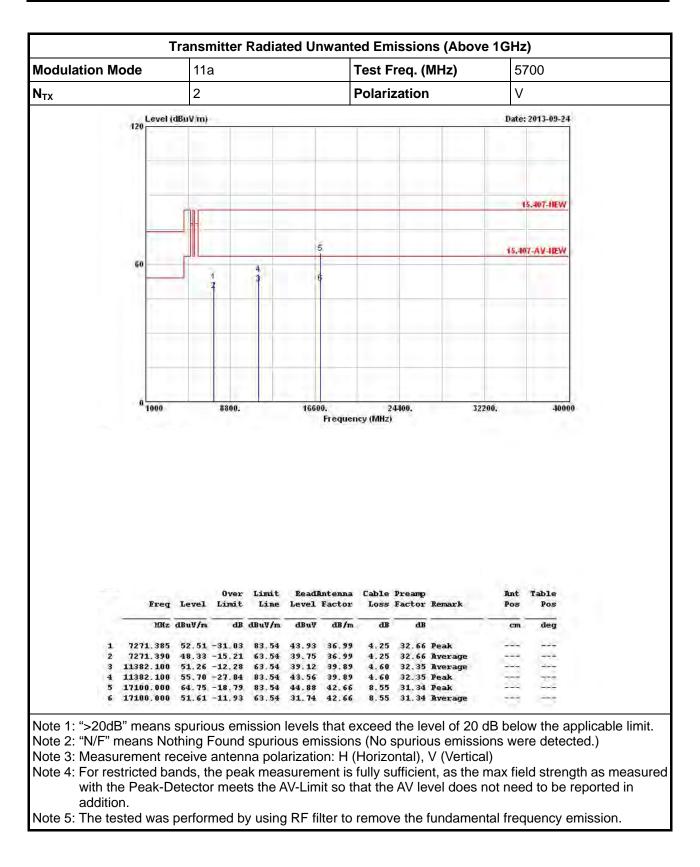




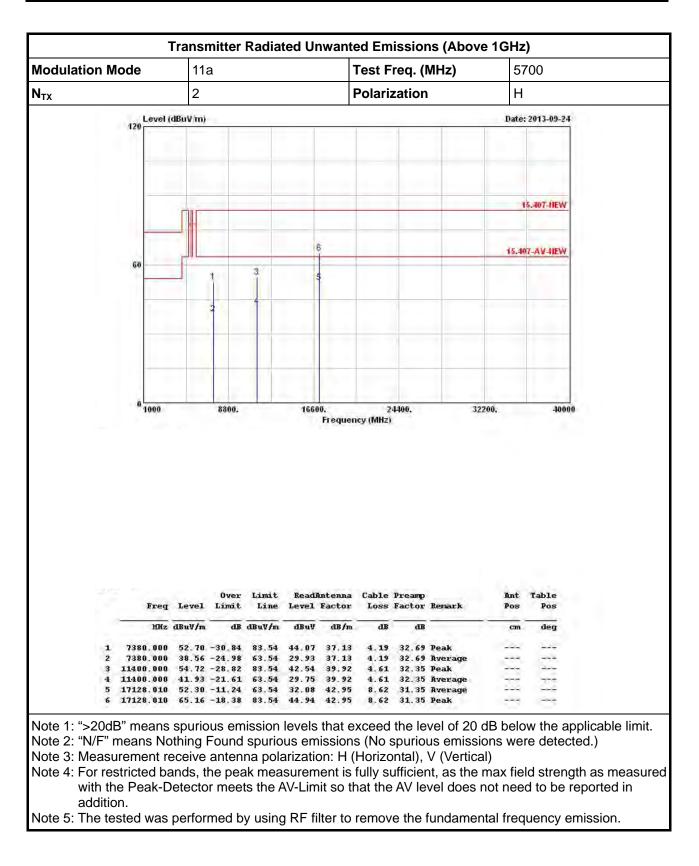




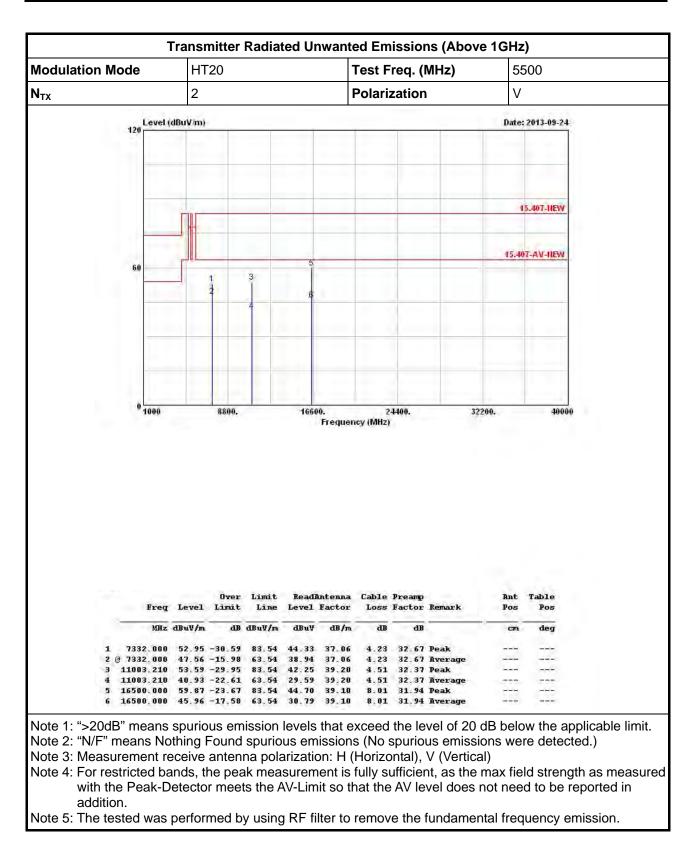




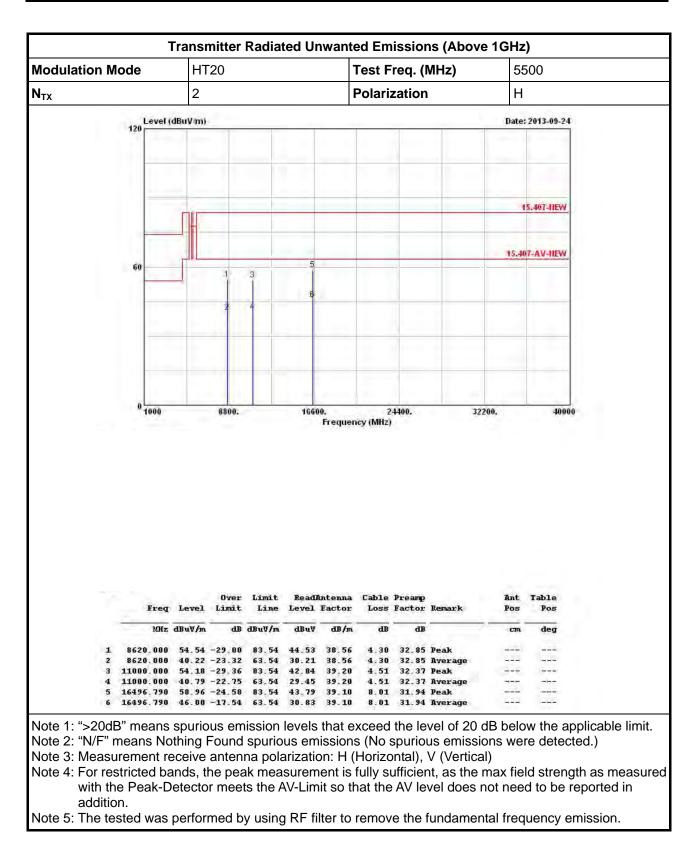




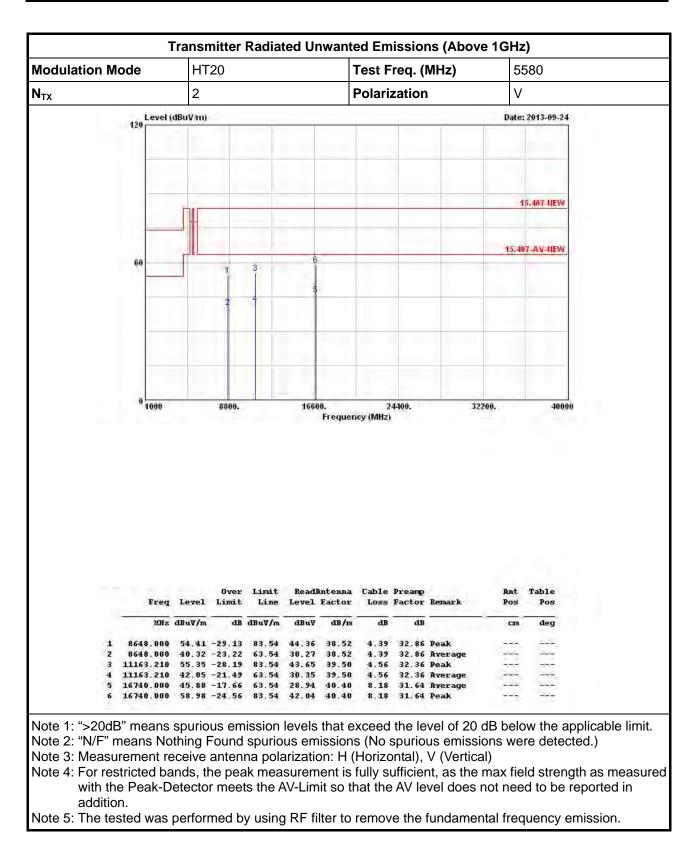




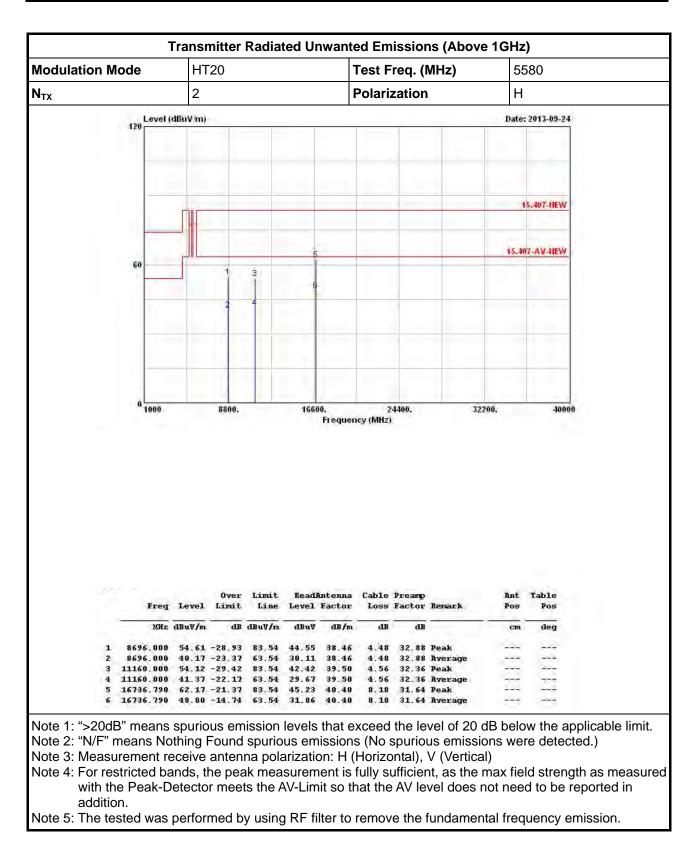




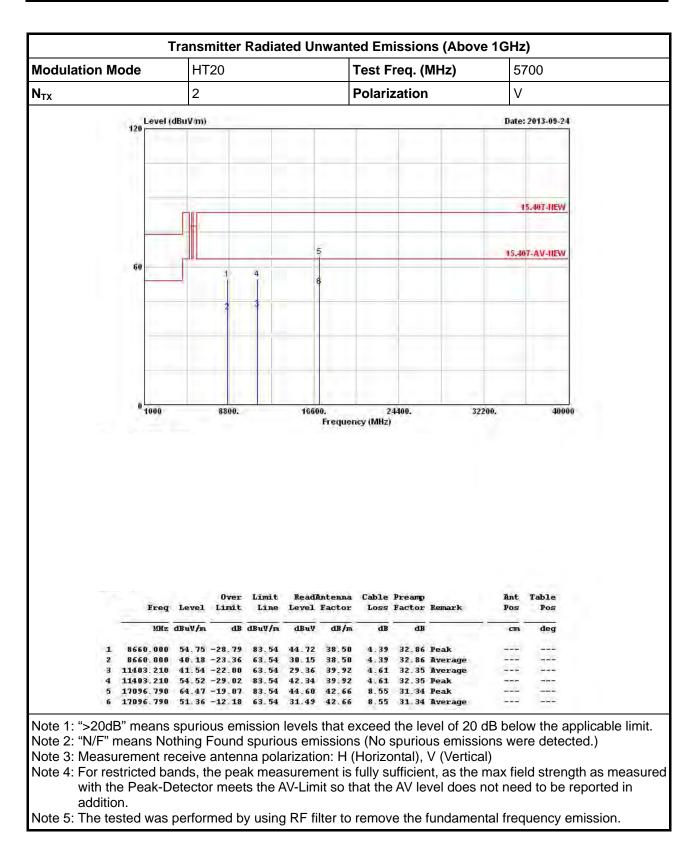




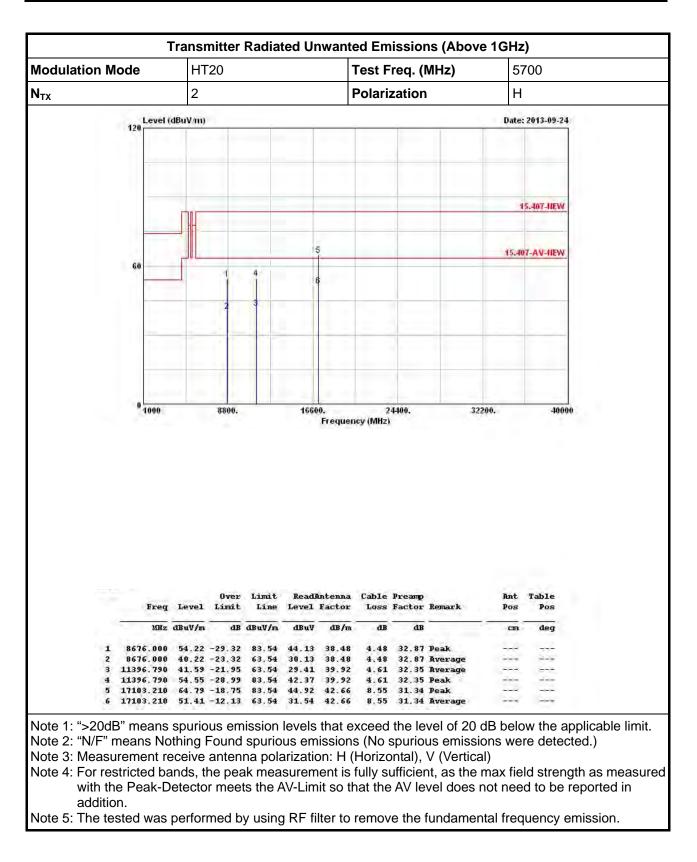




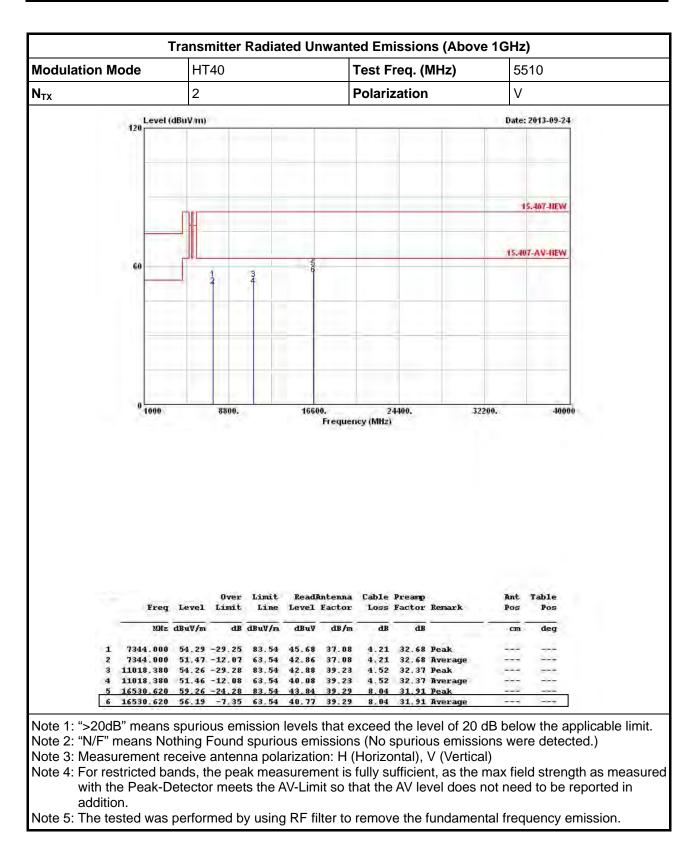




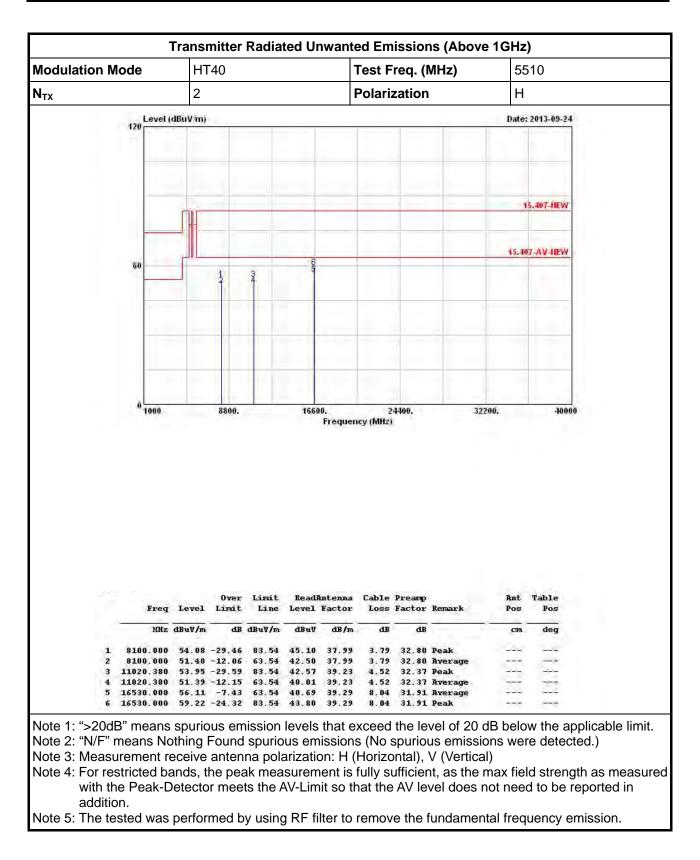


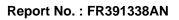




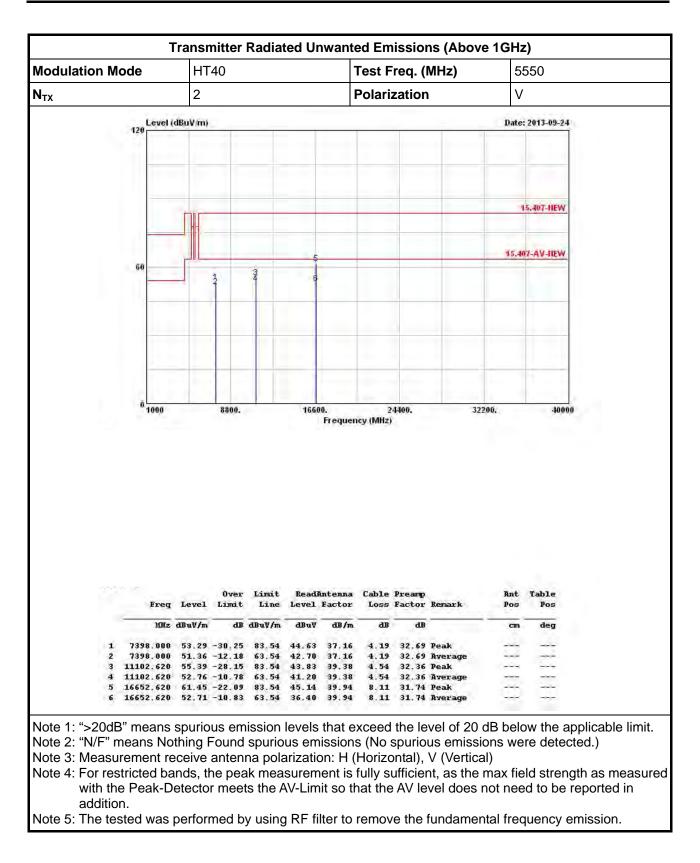




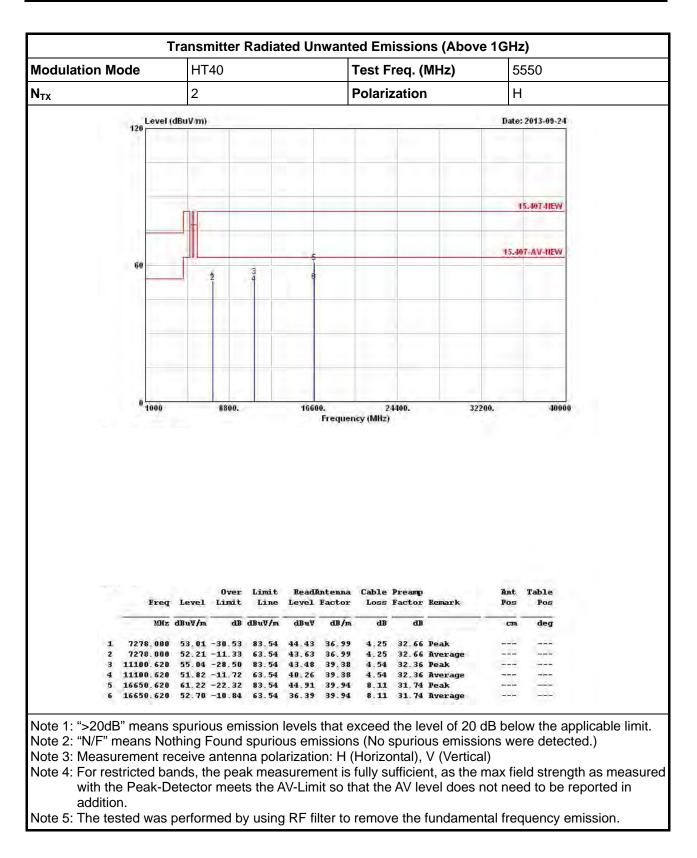




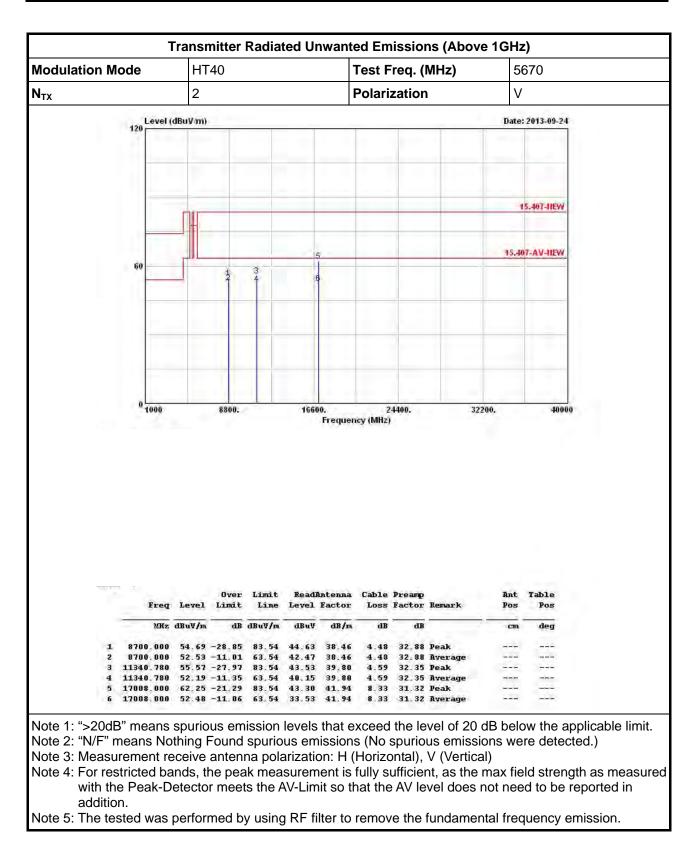




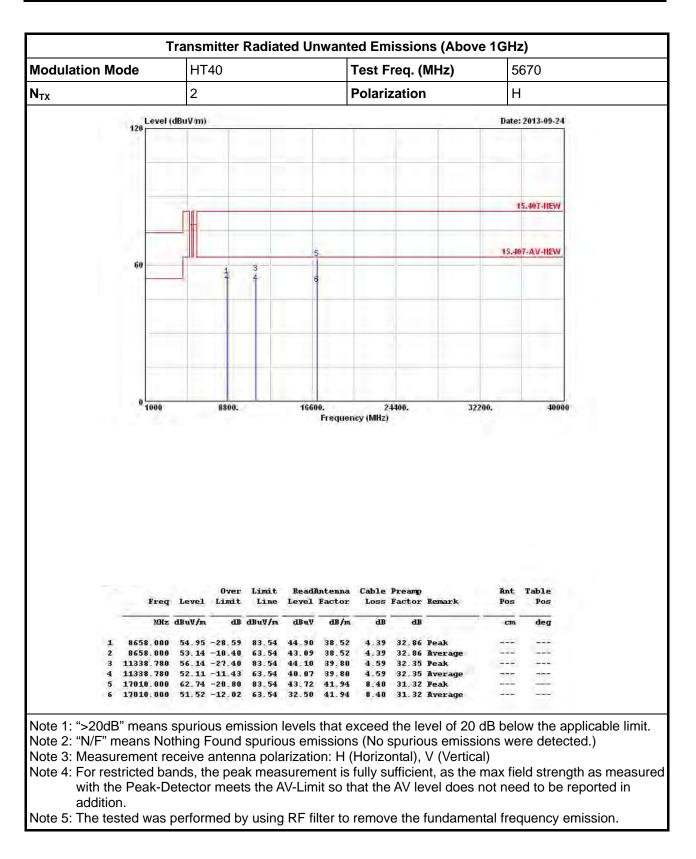














## 4 Test Equipment and Calibration Data

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	Dec. 01, 2012	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	May. 03, 2013	Radiation (03CH03-HY)
Amplifier	Agilent	8449B	3008A02364	1GHz ~ 26.5GHz	May. 06, 2013	Radiation (03CH03-HY)
Receiver	R&S	ESU26	1302.6005.26	20Hz ~ 26.5GHz	Apr. 02, 2013	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL 6112D	22237	30MHz ~ 1GHz	Sep. 21, 2013	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6741	1GHz ~ 18GHz	May 31, 2013	Radiation (03CH03-HY)
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	15GHz ~ 40GHz	Jan. 08, 2013	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	9MHz ~ 1GHz	Jan. 17, 2013	Radiation (03CH03-HY)
RF Cable-high	SUHNER	SUCOFLEX 106	03CH03-HY	1GHz ~ 40GHz	Jan. 17, 2013	Radiation (03CH03-HY)
Turn Table	EM Electronics	EM Electronics	060615	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	MF	MF-7802	MF780208179	1 ~ 4 m	N/A	Radiation (03CH03-HY)

Note: Calibration Interval of instruments listed above is one year.

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Amplifier	EM	EM18G40G	060572	18GHz ~ 40GHz	Jan. 20, 2013	Radiation (03CH03-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz - 30 MHz	Dec. 02, 2012	Radiation (03CH03-HY)

Note: Calibration Interval of instruments listed above is two year.