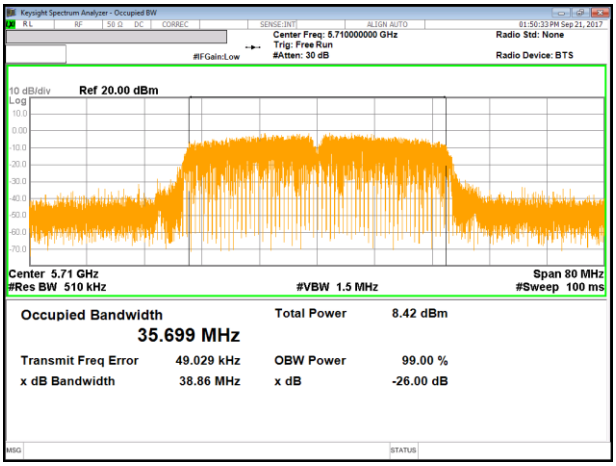
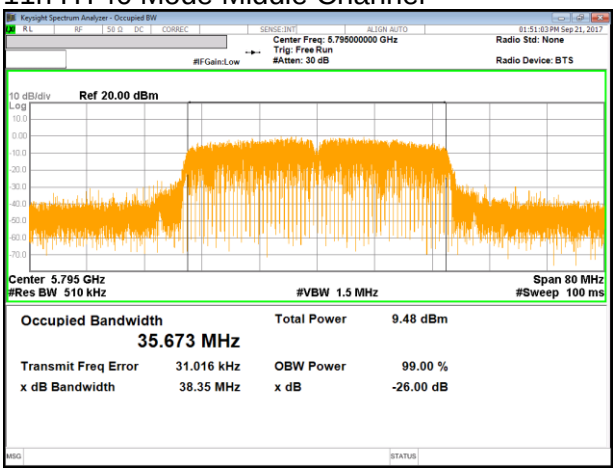
UNII 5.8 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Straddle Channel



11n HT40 Mode Low Channel

11n HT40 Mode Middle Channel



9. ANTENNA PORT TEST RESULTS

9.1. 6 dB BANDWIDTH

LIMITS

FCC §15.407 (e)

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

TEST PROCEDURE

Reference to 789033 D02 General UNII Test Procedures New Rules v01r04: The transmitter output is connected to a spectrum analyzer with the RBW set to100KHz, the VBW >= 3 x RBW, peak detector and max hold.

NOTE

- Calculation for 6dB Bandwidth of UNII-3 Straddle Channel

ex) Fundamental frequency : 5720MHz
  - 6dB BW : 16.350MHz
  - Starting Frequency of UNII-3 band : 5725MHz
  - 6dB Bandwidth of UNII-3 band Portion
    = (5720 + (16.350 / 2) -5725) = 3.175 MHz

RESULTS

9.1.1. 802.11a MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5720	1.460	0.5
Low	5745	13.770	0.5
Mid	5785	13.160	0.5
High	5825	13.770	0.5
Worst		1.460	

9.1.2. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5720	2.525	0.5
Low	5745	15.030	0.5
Mid	5785	14.450	0.5
High	5825	13.840	0.5
Worst		2.525	

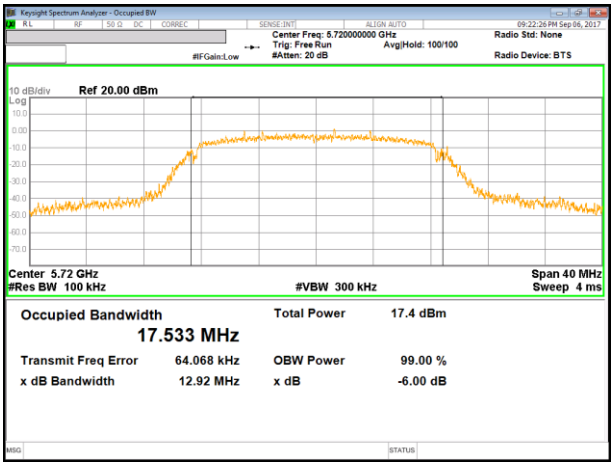
9.1.3. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Channel	Frequency [MHz]	6 dB Bandwidth [MHz]	Minimum Limit [MHz]
Straddle	5710	1.925	0.5
Low	5755	35.020	0.5
High	5795	33.840	0.5
Worst		1.925	

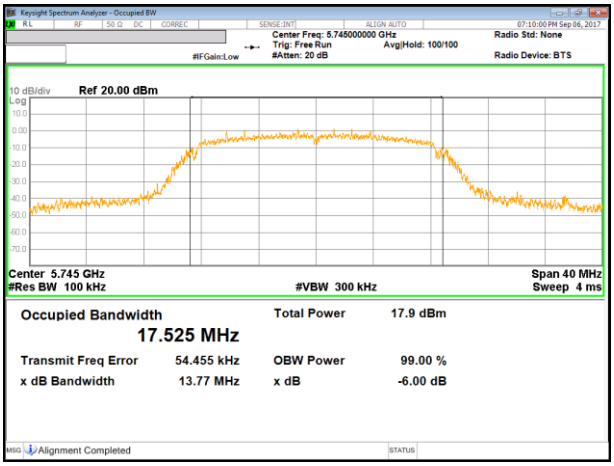
9.1.4. 6 dB BANDWIDTH PLOTS

UNII 5.8 GHz IEEE 802.11a mode

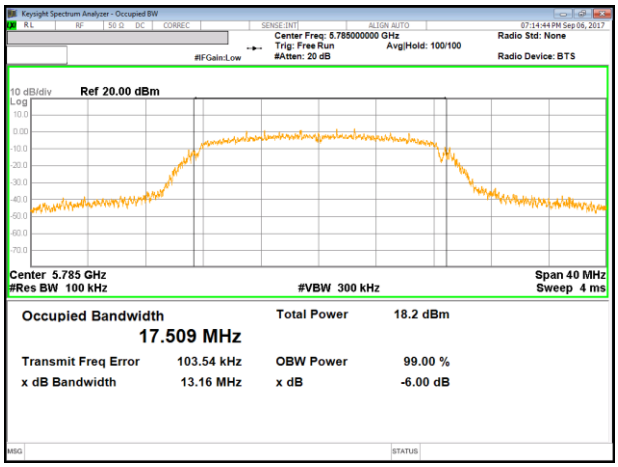
11a Mode Straddle Channel



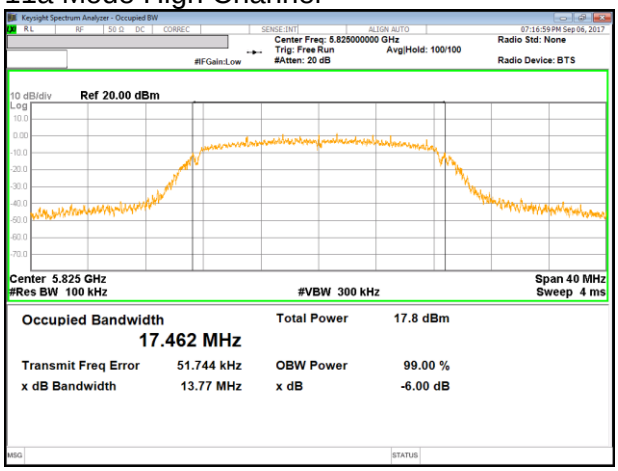
11a Mode Low Channel



11a Mode Middle Channel

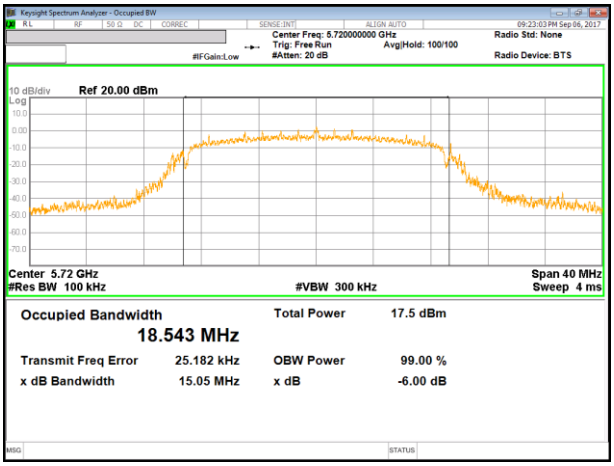


11a Mode High Channel

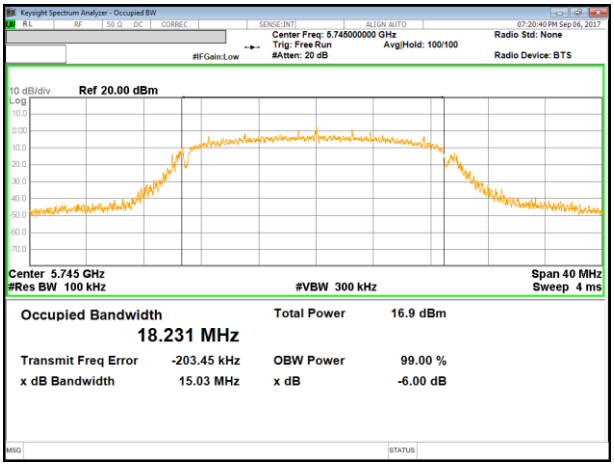


UNII 5.8 GHz IEEE 802.11n HT20 mode

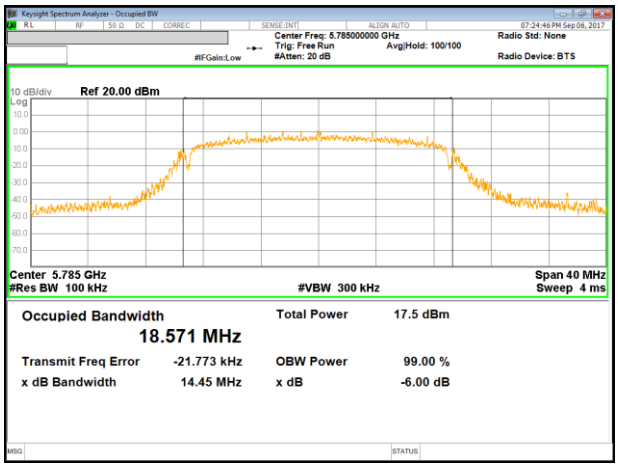
11n HT20 Mode Straddle Channel



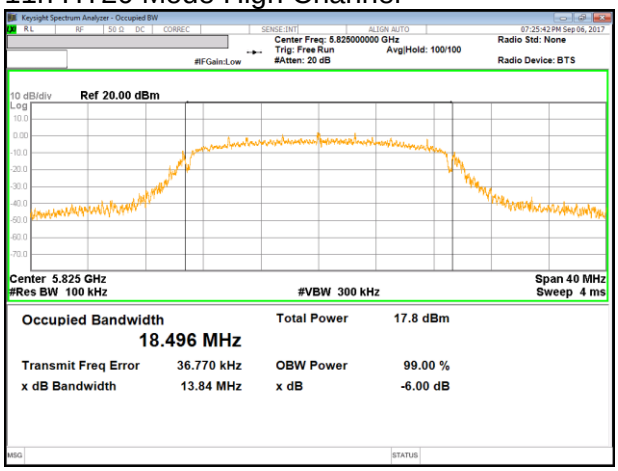
11n HT20 Mode Low Channel



11n HT20 Mode Middle Channel

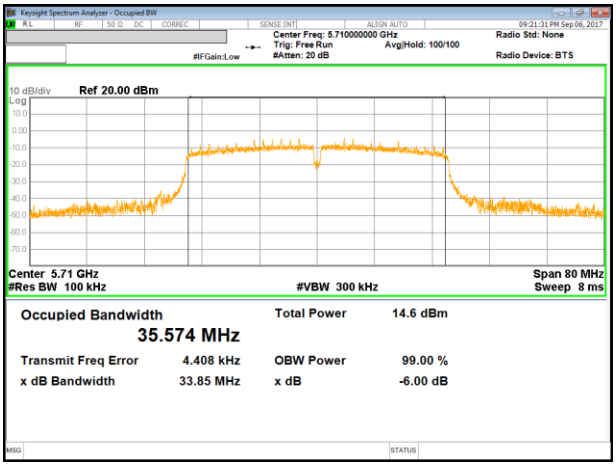


11n HT20 Mode High Channel

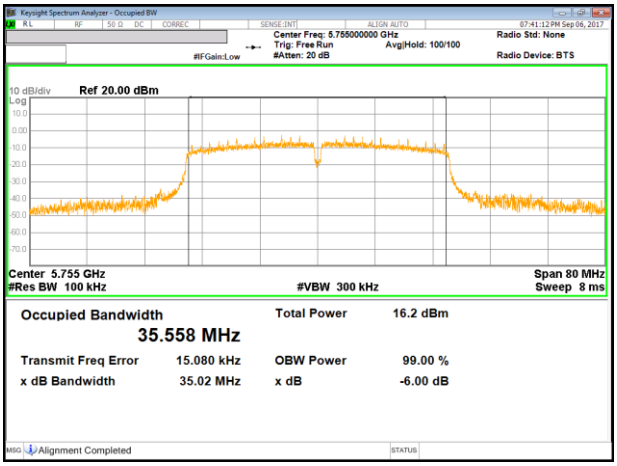


UNII 5.8 GHz IEEE 802.11n HT40 mode

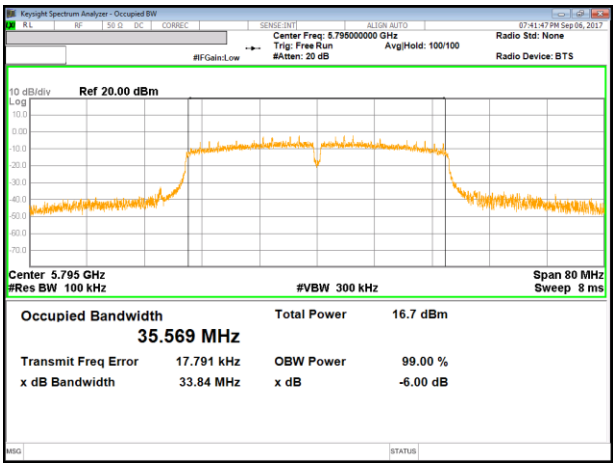
11n HT40 Mode Straddle Channel



11n HT40 Mode Low Channel



11n HT40 Mode Middle Channel



9.2. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1) (2) (3)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

TEST PROCEDURE

The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-2 is used for power(RBW set to1MHz and VBW set to ≥ 3MHz). For PSD, RBW set to1MHz and VBW >= 3 x RBW for the band 5.15-5.25GHz, 5.25-5.35GHz and 5.47-5.725GHz (for the band 5.725-5.85 GHz, RBW set to 500KHz and the VBW >= 3 x RBW) RMS detector and trace averaging.
Band power function used for power and peak marker value of the spectrum is used for PSD.
Add duty cycle correction factor.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

5 GHz

Frequency Band [MHz]	Antenna Gain [dBi]
5150 - 5250	-0.20
5250 - 5350	-0.29
5470 - 5725	0.62
5725 - 5850	0.77

RESULTS

9.2.1. 802.11a MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5180	20.95	-0.20	-0.20
Mid	5200	20.84	-0.20	-0.20
High	5240	20.74	-0.20	-0.20

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5180	24.00	24.00	11.00
Mid	5200	24.00	24.00	11.00
High	5240	24.00	24.00	11.00

Duty Cycle CF [dB]	0.18	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5180	12.05	12.23	24.00	-11.77
Mid	5200	12.25	12.43	24.00	-11.57
High	5240	12.07	12.24	24.00	-11.76

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5180	2.14	2.32	11.00	-8.68
Mid	5200	2.83	3.00	11.00	-8.00
High	5240	2.48	2.65	11.00	-8.35

9.2.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5180	21.16	-0.20	-0.20
Mid	5200	21.67	-0.20	-0.20
High	5240	21.36	-0.20	-0.20

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5180	24.00	24.00	11.00
Mid	5200	24.00	24.00	11.00
High	5240	24.00	24.00	11.00

Duty Cycle CF [dB]	0.16	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5180	11.56	11.72	24.00	-12.28
Mid	5200	11.70	11.86	24.00	-12.14
High	5240	11.57	11.73	24.00	-12.27

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5180	1.57	1.73	11.00	-9.27
Mid	5200	1.85	2.01	11.00	-8.99
High	5240	1.80	1.96	11.00	-9.04

9.2.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5190	41.82	-0.20	-0.20
High	5230	39.35	-0.20	-0.20

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5190	24.00	24.00	11.00
High	5230	24.00	24.00	11.00

Duty Cycle CF [dB]	0.38	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5190	10.91	11.28	24.00	-12.72
High	5230	10.43	10.81	24.00	-13.19

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5190	-2.28	-1.90	11.00	-12.90
High	5230	-2.49	-2.11	11.00	-13.11

9.2.4. 802.11a MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5260	20.55	-0.29	-0.29
Mid	5300	20.94	-0.29	-0.29
High	5320	20.86	-0.29	-0.29

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5260	24.00	24.00	11.00
Mid	5300	24.00	24.00	11.00
High	5320	24.00	24.00	11.00

Duty Cycle CF [dB]	0.18	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5260	12.01	12.19	24.00	-11.81
Mid	5300	12.11	12.29	24.00	-11.71
High	5320	12.23	12.41	24.00	-11.59

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5260	2.53	2.71	11.00	-8.29
Mid	5300	2.34	2.52	11.00	-8.48
High	5320	2.42	2.60	11.00	-8.40

9.2.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5260	21.22	-0.29	-0.29
Mid	5300	21.46	-0.29	-0.29
High	5320	21.73	-0.29	-0.29

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5260	24.00	24.00	11.00
Mid	5300	24.00	24.00	11.00
High	5320	24.00	24.00	11.00

Duty Cycle CF [dB]	0.16	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5260	11.69	11.85	24.00	-12.15
Mid	5300	11.69	11.86	24.00	-12.14
High	5320	11.70	11.86	24.00	-12.14

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5260	2.34	2.50	11.00	-8.50
Mid	5300	1.94	2.10	11.00	-8.90
High	5320	1.61	1.77	11.00	-9.23

9.2.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5270	39.66	-0.29	-0.29
High	5310	42.06	-0.29	-0.29

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5270	24.00	24.00	11.00
High	5310	24.00	24.00	11.00

Duty Cycle CF [dB]	0.38	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5270	10.38	10.75	24.00	-13.25
High	5310	10.30	10.68	24.00	-13.32

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5270	-1.94	-1.56	11.00	-12.56
High	5310	-2.44	-2.07	11.00	-13.07

9.2.7. 802.11a MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5500	20.74	0.62	0.62
Mid	5580	20.78	0.62	0.62
High	5700	20.66	0.62	0.62

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5500	24.00	24.00	11.00
Mid	5580	24.00	24.00	11.00
High	5700	24.00	24.00	11.00

Duty Cycle CF [dB]	0.18	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5500	12.14	12.32	24.00	-11.68
Mid	5580	12.25	12.42	24.00	-11.58
High	5700	12.20	12.38	24.00	-11.62

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5500	2.38	2.56	11.00	-8.44
Mid	5580	2.49	2.67	11.00	-8.33
High	5700	2.36	2.54	11.00	-8.46

9.2.8. 802.11n HT20 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5500	20.73	0.62	0.62
Mid	5580	20.86	0.62	0.62
High	5700	21.04	0.62	0.62

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5500	24.00	24.00	11.00
Mid	5580	24.00	24.00	11.00
High	5700	24.00	24.00	11.00

Duty Cycle CF [dB]	0.16	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5500	11.59	11.75	24.00	-12.25
Mid	5580	11.58	11.74	24.00	-12.26
High	5700	11.61	11.78	24.00	-12.22

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5500	1.61	1.78	11.00	-9.22
Mid	5580	1.97	2.14	11.00	-8.86
High	5700	1.70	1.86	11.00	-9.14

9.2.9. 802.11n HT40 MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5510	39.18	0.62	0.62
Mid	5590	41.64	0.62	0.62
High	5670	39.69	0.62	0.62

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5510	24.00	24.00	11.00
Mid	5590	24.00	24.00	11.00
High	5670	24.00	24.00	11.00

Duty Cycle CF [dB]	0.38	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5510	10.07	10.45	24.00	-13.55
Mid	5590	10.33	10.70	24.00	-13.30
High	5670	10.28	10.66	24.00	-13.34

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5510	-2.19	-1.81	11.00	-12.81
Mid	5590	-2.12	-1.74	11.00	-12.74
High	5670	-2.45	-2.07	11.00	-13.07

9.2.10. 802.11a MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5745	20.77	0.77	0.77
Mid	5785	20.72	0.77	0.77
High	5825	20.59	0.77	0.77

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5745	24.00	24.00	30.00
Mid	5785	24.00	24.00	30.00
High	5825	24.00	24.00	30.00

Duty Cycle CF [dB]	0.18	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5745	12.54	12.72	24.00	-11.28
Mid	5785	12.67	12.85	24.00	-11.15
High	5825	12.22	12.40	24.00	-11.60

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5745	-0.25	-0.07	30.00	-30.07
Mid	5785	0.11	0.29	30.00	-29.71
High	5825	-0.74	-0.56	30.00	-30.56

9.2.11. 802.11n HT20 MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5745	21.14	0.77	0.77
Mid	5785	22.21	0.77	0.77
High	5825	21.14	0.77	0.77

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5745	24.00	24.00	30.00
Mid	5785	24.00	24.00	30.00
High	5825	24.00	24.00	30.00

Duty Cycle CF [dB]	0.16	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5745	11.08	11.24	24.00	-12.76
Mid	5785	11.77	11.93	24.00	-12.07
High	5825	11.77	11.93	24.00	-12.07

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5745	-1.73	-1.57	30.00	-31.57
Mid	5785	-1.18	-1.02	30.00	-31.02
High	5825	-1.09	-0.93	30.00	-30.93

9.2.12. 802.11n HT40 MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain

Channel	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
Low	5755	39.48	0.77	0.77
High	5795	39.39	0.77	0.77

Limits

Channel	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
Low	5755	24.00	24.00	30.00
High	5795	24.00	24.00	30.00

Duty Cycle CF [dB]	0.38	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
Low	5755	10.08	10.45	24.00	-13.55
High	5795	10.66	11.04	24.00	-12.96

PPSD Results

Channel	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
Low	5755	-5.80	-5.43	30.00	-35.43
High	5795	-5.17	-4.79	30.00	-34.79

9.2.13. 802.11a MODE AT STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5720	15.38	0.62	0.62
UNII-3	5720	5.38	0.62	0.62
Whole	5720	20.76	0.62	0.62

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
UNII-2C	5720	22.87	22.87	11.00
UNII-3	5720	18.31	18.31	11.00
Whole	5720	24.00	24.00	11.00

Duty Cycle CF [dB]	0.18	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Portion	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
UNII-2C	5720	11.76	11.94	22.87	-10.93
UNII-3	5720	3.99	4.17	18.31	-14.14
Whole	5720	12.43	12.61	24.00	-11.39

PPSD Results

Portion	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
UNII-2C	5720	2.54	2.72	11.00	-8.28
UNII-3	5720	-1.75	-1.57	30.00	-31.57

9.2.14. 802.11n HT20 MODE AT STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5720	15.48	0.62	0.62
UNII-3	5720	5.48	0.62	0.62
Whole	5720	20.97	0.62	0.62

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
UNII-2C	5720	22.90	22.90	11.00
UNII-3	5720	18.39	18.39	11.00
Whole	5720	24.00	24.00	11.00

Duty Cycle CF [dB]	0.16	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Portion	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
UNII-2C	5720	10.08	10.24	22.90	-12.66
UNII-3	5720	3.51	3.67	18.39	-14.72
Whole	5720	11.78	11.94	24.00	-12.06

PPSD Results

Portion	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
UNII-2C	5720	1.99	2.15	11.00	-8.85
UNII-3	5720	-2.44	-2.28	30.00	-32.28

9.2.15. 802.11n HT40 MODE AT STRADDLE CHANNEL

Bandwidth and Antenna Gain

Portion	Frequency [MHz]	Min 26 dB BW [MHz]	Directional Gain for Power [dBi]	Directional Gain for PPSD [dBi]
UNII-2C	5710	35.79	0.62	0.62
UNII-3	5710	5.79	0.62	0.62
Whole	5710	41.58	0.62	0.62

Limits

Portion	Frequency [MHz]	FCC Power Limit [dBm]	Power Limit [dBm]	FCC PPSD Limit [dBm]
UNII-2C	5710	24.00	24.00	11.00
UNII-3	5710	18.63	18.63	11.00
Whole	5710	24.00	24.00	11.00

Duty Cycle CF [dB]	0.38	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Portion	Frequency [MHz]	Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Power Margin [dB]
UNII-2C	5710	10.17	10.55	24.00	-13.45
UNII-3	5710	-2.70	-2.32	18.63	-20.95
Whole	5710	10.39	10.76	24.00	-13.24

PPSD Results

Portion	Frequency [MHz]	Meas PPSD [dBm]	Total Corr'd PPSD [dBm]	PPSD Limit [dBm]	PPSD Margin [dB]
UNII-2C	5710	-2.67	-2.29	11.00	-13.29
UNII-3	5710	-9.35	-8.98	30.00	-38.98

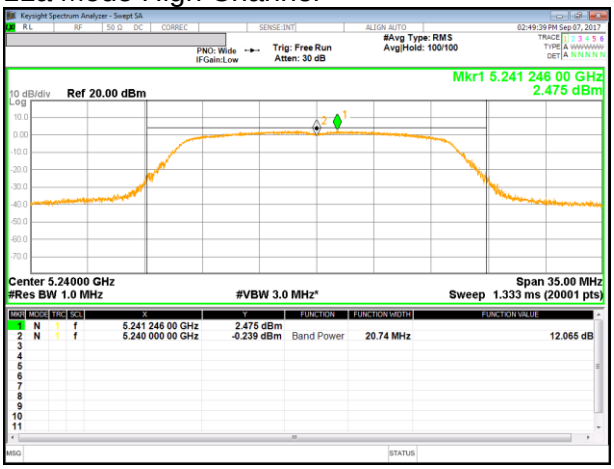
9.2.16. OUTPUT POWER AND PPSD PLOTS

UNII 5.2 GHz IEEE 802.11a mode

11a Mode Low Channel

11a Mode Middle Channel

11a Mode High Channel

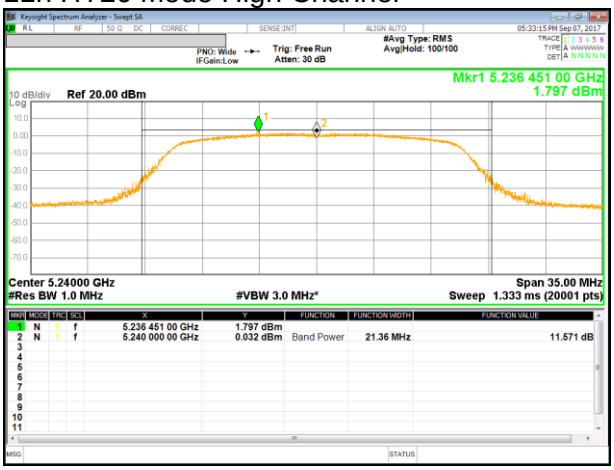


UNII 5.2 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel

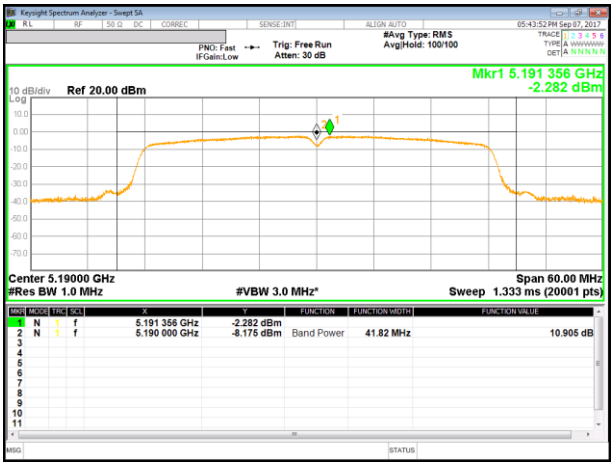
11n HT20 Mode Middle Channel

11n HT20 Mode High Channel

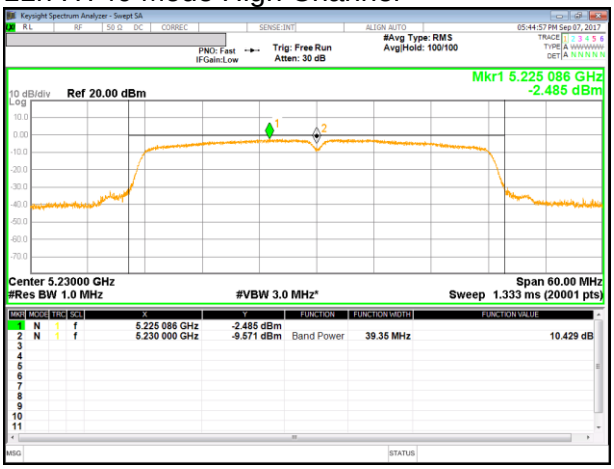


UNII 5.2 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel



11n HT40 Mode High Channel



UNII 5.3 GHz IEEE 802.11a mode

11a Mode Low Channel

11a Mode Middle Channel

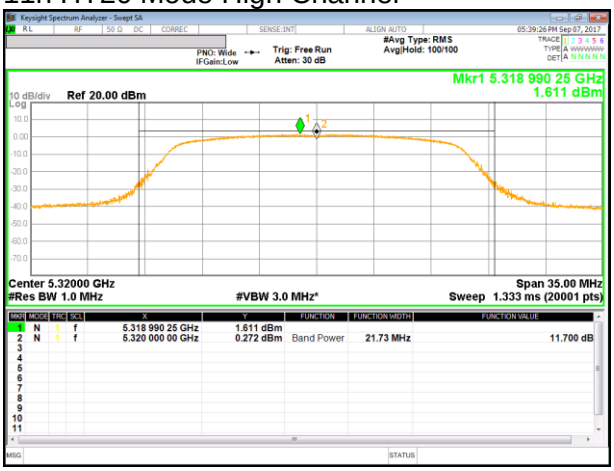
11a Mode High Channel

UNII 5.3 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel

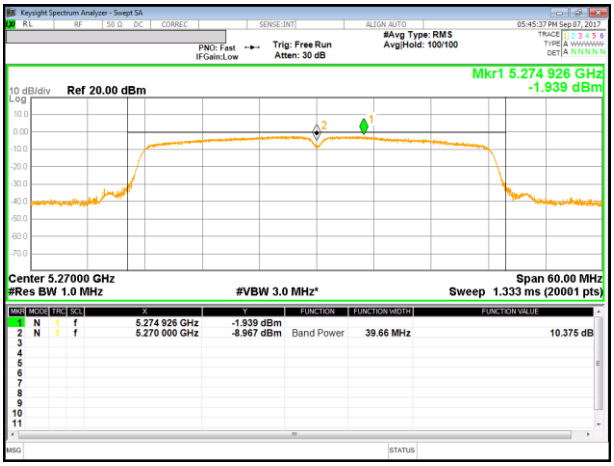
11n HT20 Mode Middle Channel

11n HT20 Mode High Channel

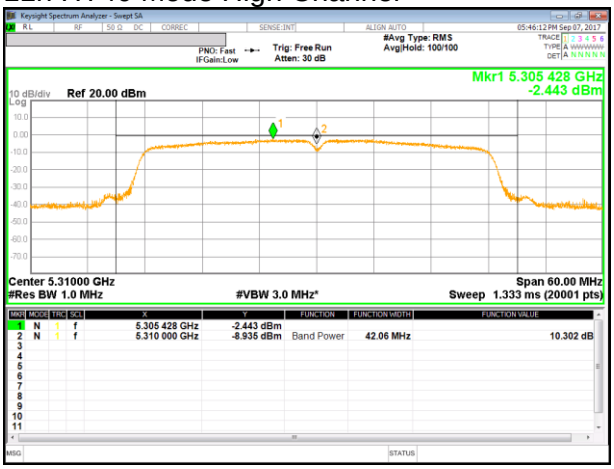


UNII 5.3 GHz IEEE 802.11n HT40 mode

11n HT40 Mode Low Channel



11n HT40 Mode High Channel

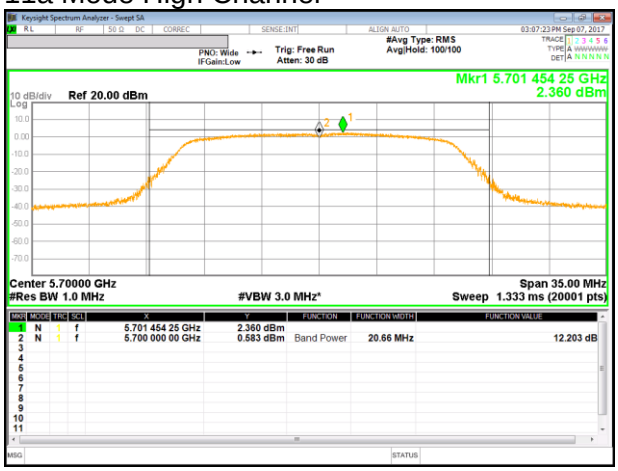


UNII 5.5 GHz IEEE 802.11a mode

11a Mode Low Channel

11a Mode Middle Channel

11a Mode High Channel



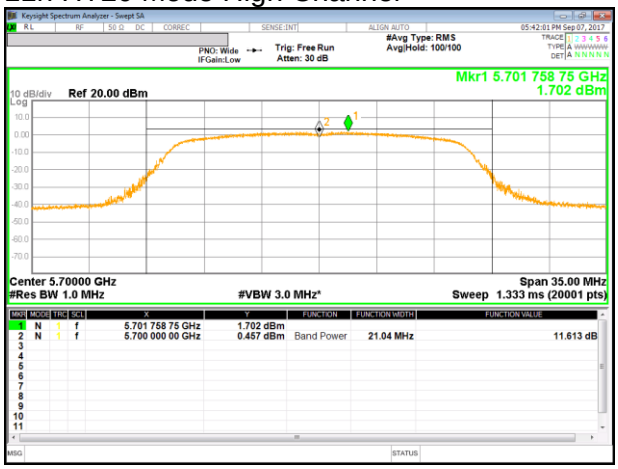
11a Mode Straddle Channel

UNII 5.5 GHz IEEE 802.11n HT20 mode

11n HT20 Mode Low Channel

11n HT20 Mode Middle Channel

11n HT20 Mode High Channel



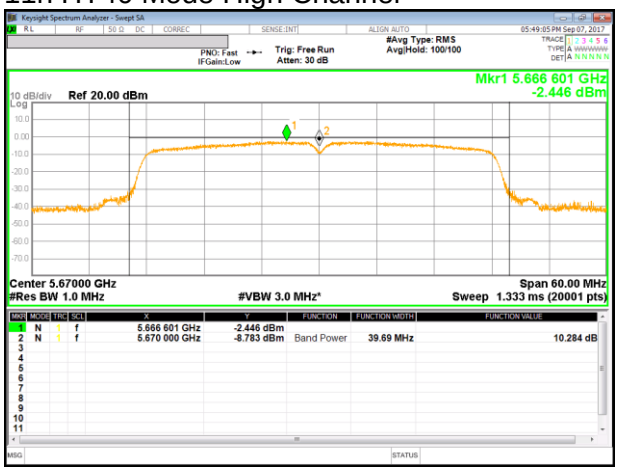
11n HT20 Mode Straddle Channel

UNII 5.5 GHz IEEE 802.11n HT40 mode

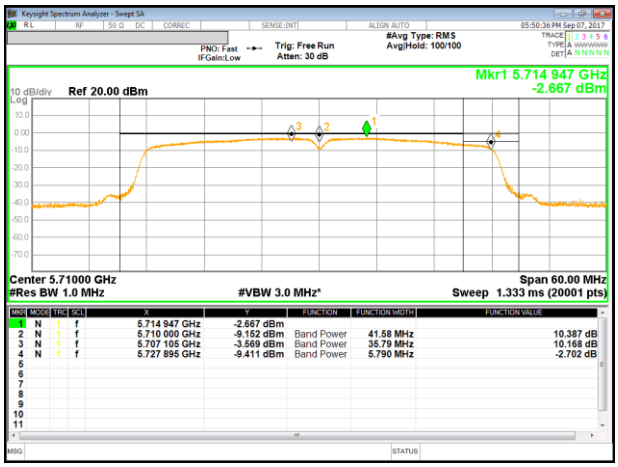
11n HT40 Mode Low Channel

11n HT40 Mode Middle Channel

11n HT40 Mode High Channel



11n HT40 Mode Straddle Channel



UNII 5.8 GHz IEEE 802.11a mode for POWER

11a Mode Straddle Channel

11a Mode Low Channel

11a Mode Middle Channel

11a Mode High Channel

UNII 5.8 GHz IEEE 802.11n HT20 mode for POWER

11n HT20 Mode Straddle Channel

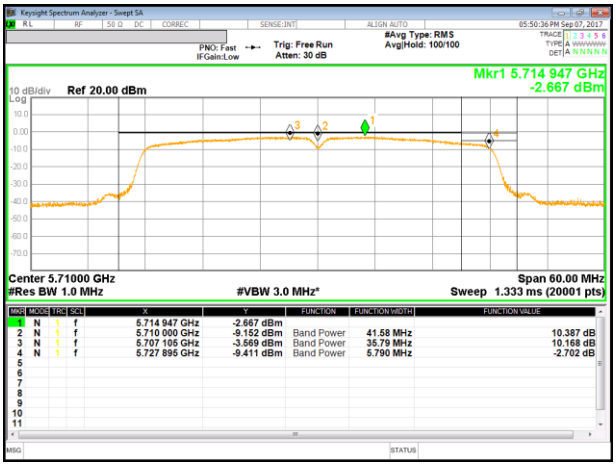
11n HT20 Mode Low Channel

11n HT20 Mode Middle Channel

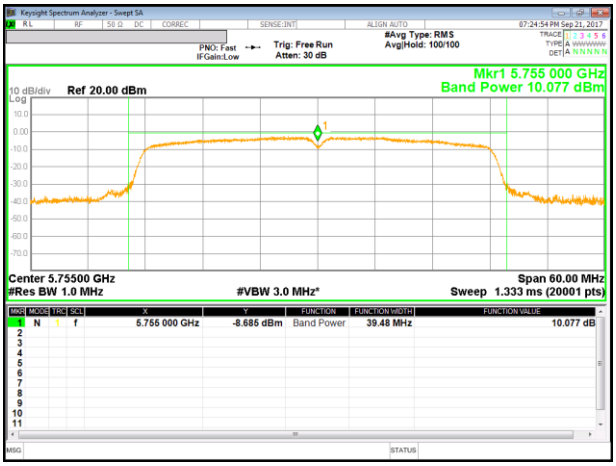
11n HT20 Mode High Channel

UNII 5.8 GHz IEEE 802.11n HT40 mode for POWER

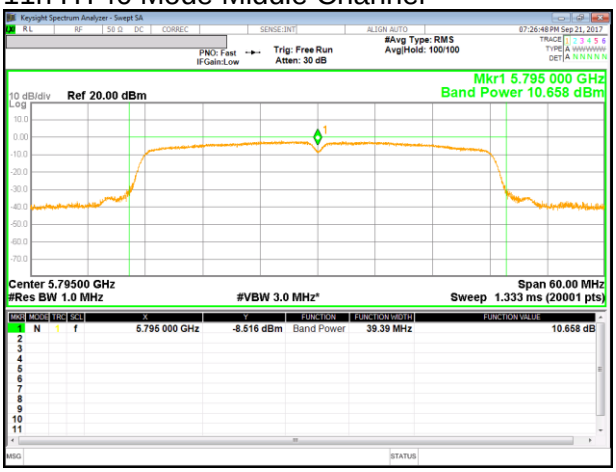
11n HT40 Mode Straddle Channel



11n HT40 Mode Low Channel



11n HT40 Mode Middle Channel

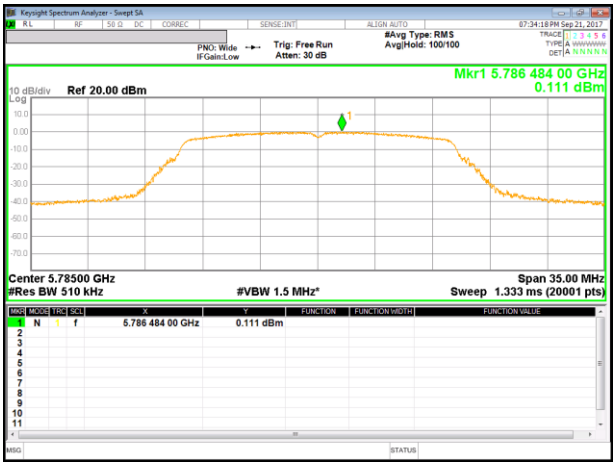


UNII 5.8 GHz IEEE 802.11a mode for PSD

11a Mode Straddle Channel

11a Mode Low Channel

11a Mode Middle Channel



11a Mode High Channel

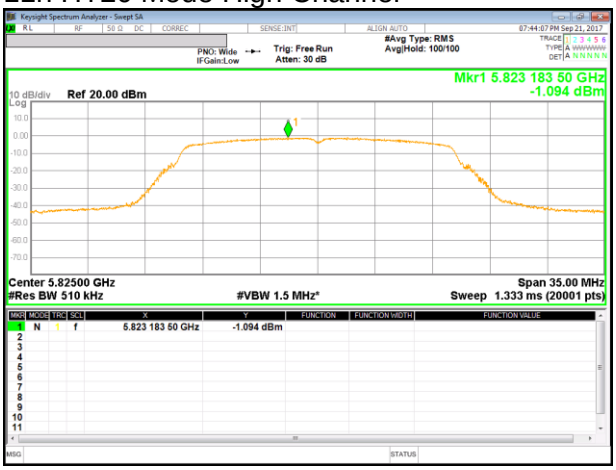
UNII 5.8 GHz IEEE 802.11n HT20 mode for PSD

11n HT20 Mode Straddle Channel

11n HT20 Mode Low Channel

11n HT20 Mode Middle Channel

11n HT20 Mode High Channel

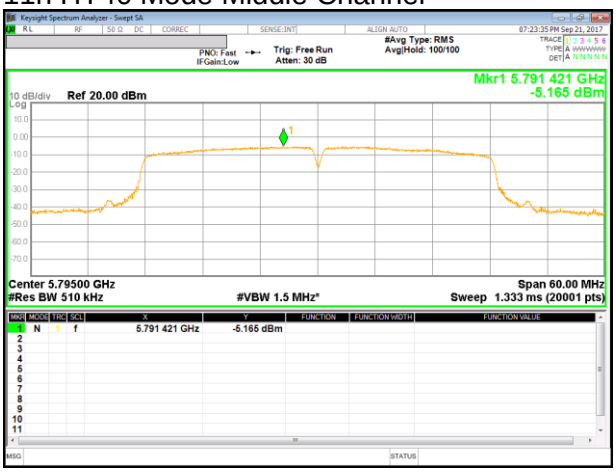


UNII 5.8 GHz IEEE 802.11n HT40 mode for PSD

11n HT40 Mode Straddle Channel

11n HT40 Mode Low Channel

11n HT40 Mode Middle Channel



10. TRANSMITTER ABOVE 1 GHz

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (μV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

FCC §15.407 (b)

(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth

in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.
(7) The provisions of §15.205 apply to intentional radiators operating under this section.
(8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

Note

- Limit translation to field strength level (FCC §15.407)

E[dBuV/m] = EIRP[dBm] + 95.2 = -27dBm + 95.2 = 68.2dBuV/m
E[dBuV/m] = EIRP[dBm] + 95.2 = -17dBm + 95.2 = 78.2dBuV/m

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Reference to KDB 789033 D02 v01r04 UNII part G) 6) c) Method AD:
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.
Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

The spectrum from 1 GHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

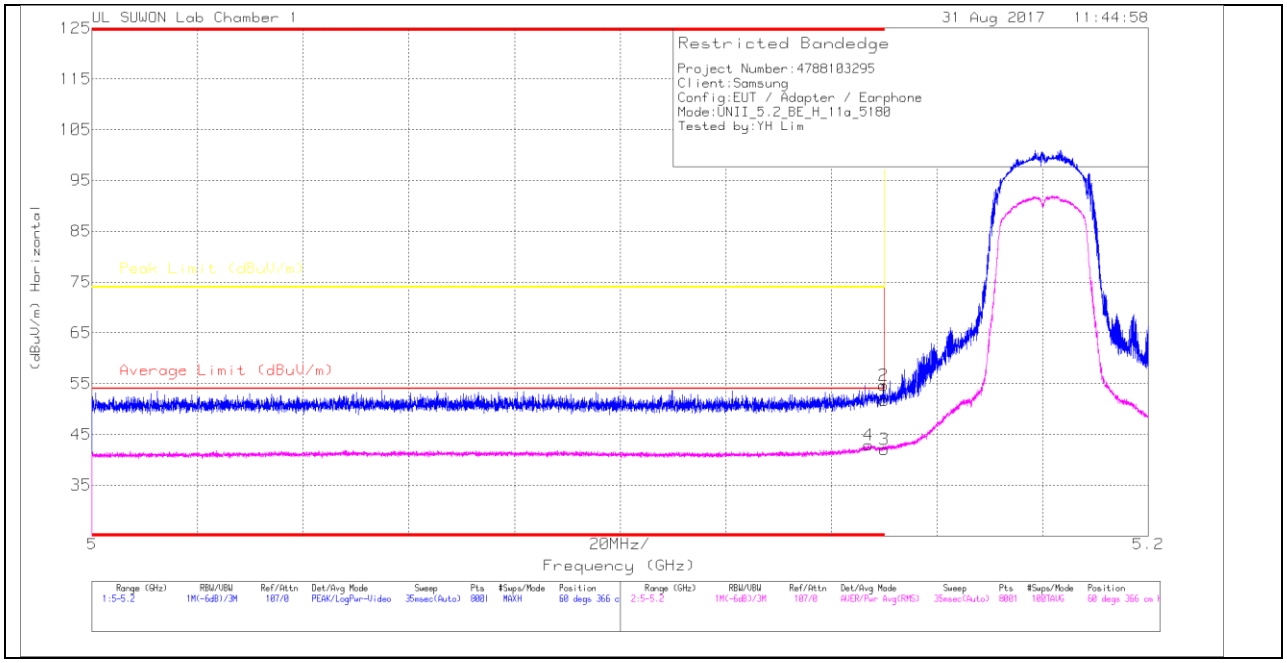
Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

10.1. 5.2 GHz

10.1.1. TX Above 1GHz 802.11a MODE IN THE 5.2GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

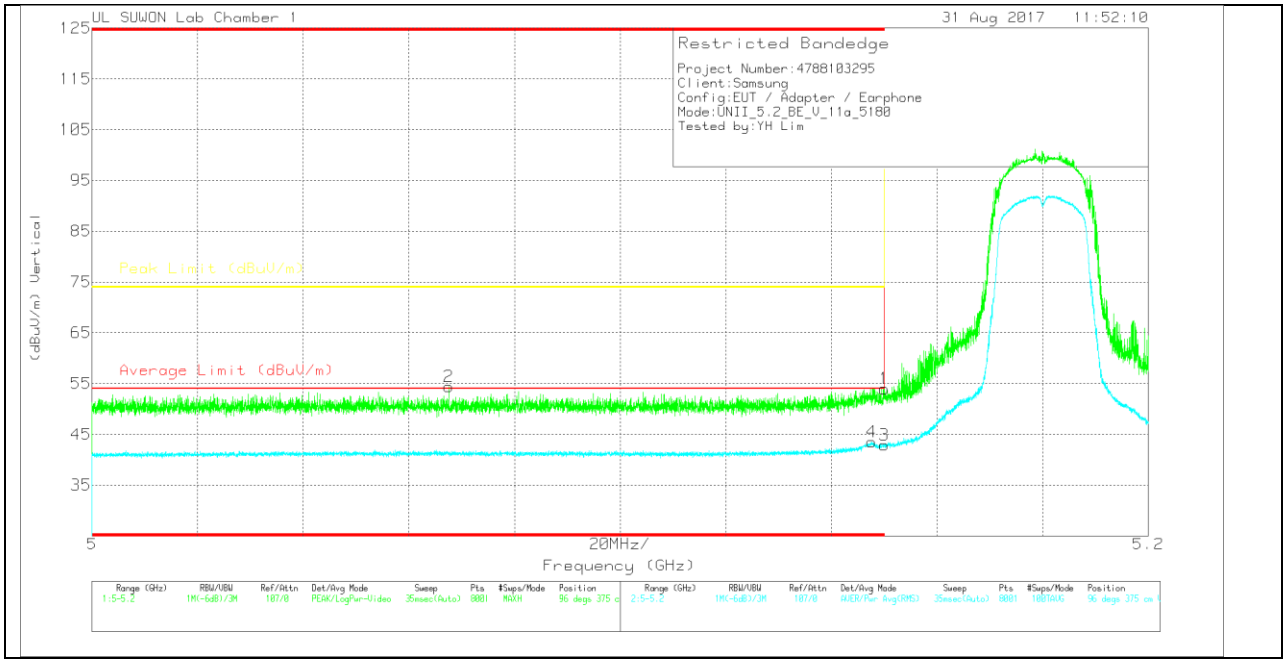
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	10dB_ATT(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	39.75	Pk	34	-22	0	51.75	-	-	74	-22.25	60	366	H
2	* 5.15	42.63	Pk	34	-22	0	54.63	-	-	74	-19.37	60	366	H
3	* 5.15	29.84	RMS	34	-22	.18	42.02	54	-11.98	-	-	60	366	H
4	* 5.147	30.78	RMS	34	-22	.18	42.96	54	-11.04	-	-	60	366	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	10dB_ATT(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	41.98	Pk	34	-22	0	53.98	-	-	74	-20.02	96	375	V
2	* 5.068	42.37	Pk	33.9	-21.9	0	54.37	-	-	74	-19.63	96	375	V
3	* 5.15	30.68	RMS	34	-22	.18	42.86	54	-11.14	-	-	96	375	V
4	* 5.148	31.34	RMS	34	-22	.18	43.52	54	-10.48	-	-	96	375	V

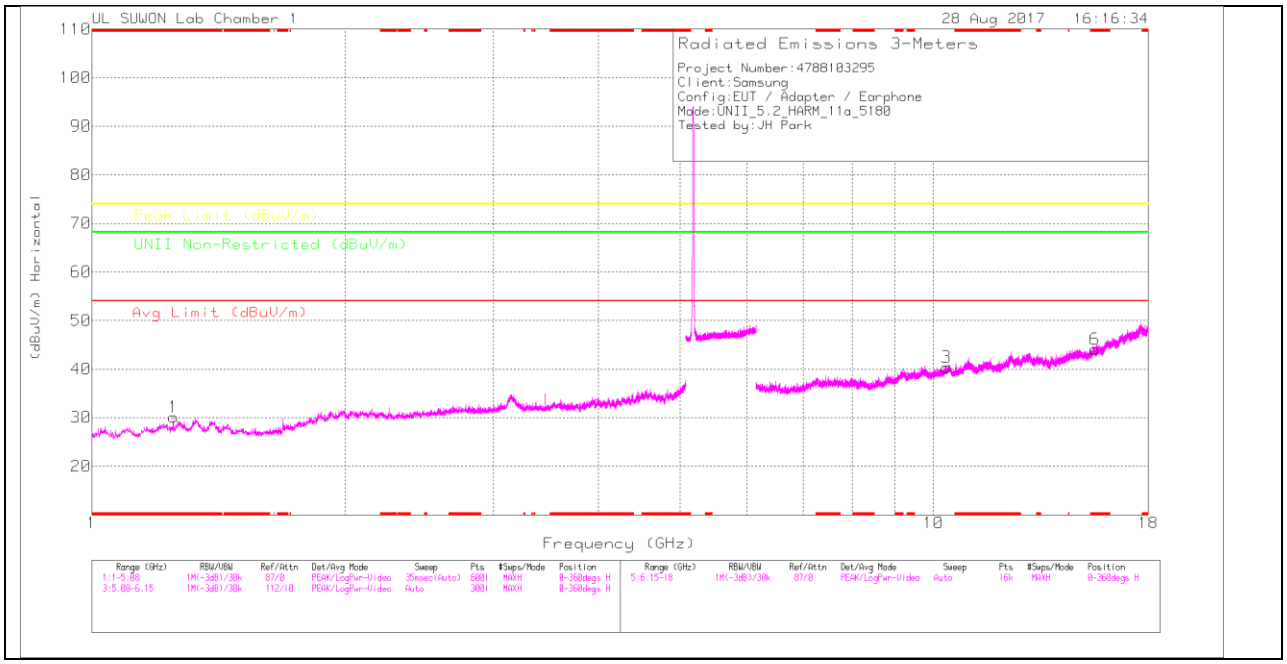
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

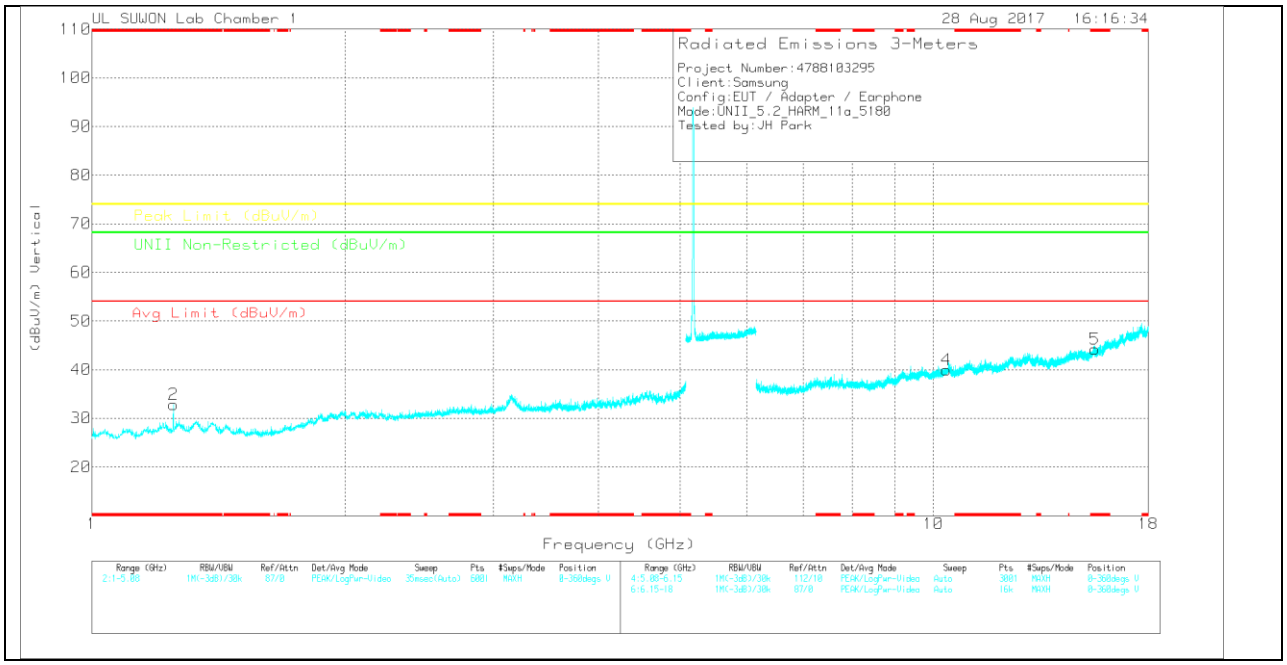
RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL HORIZONTAL



LOW CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

LOW CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	5GHz_LP(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.25	37.93	PK	29.3	-37.1	0	30.13	-	-	74	-43.87	-	-	0-360	250	H
2	* 1.25	40.66	PK	29.3	-37.1	0	32.86	-	-	74	-41.14	-	-	0-360	149	V
3	10.362	25.39	PK	37.5	-22.5	0	40.39	-	-	-	-	68.2	-27.81	0-360	150	H
6	* 15.538	25.63	PK	39.8	-21.3	0	44.13	-	-	74	-29.87	-	-	0-360	250	H
4	10.365	24.93	PK	37.5	-22.5	0	39.93	-	-	-	-	68.2	-28.27	0-360	150	V
5	* 15.537	25.73	PK	39.7	-21.2	0	44.23	-	-	74	-29.77	-	-	0-360	250	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Radiated Emissions

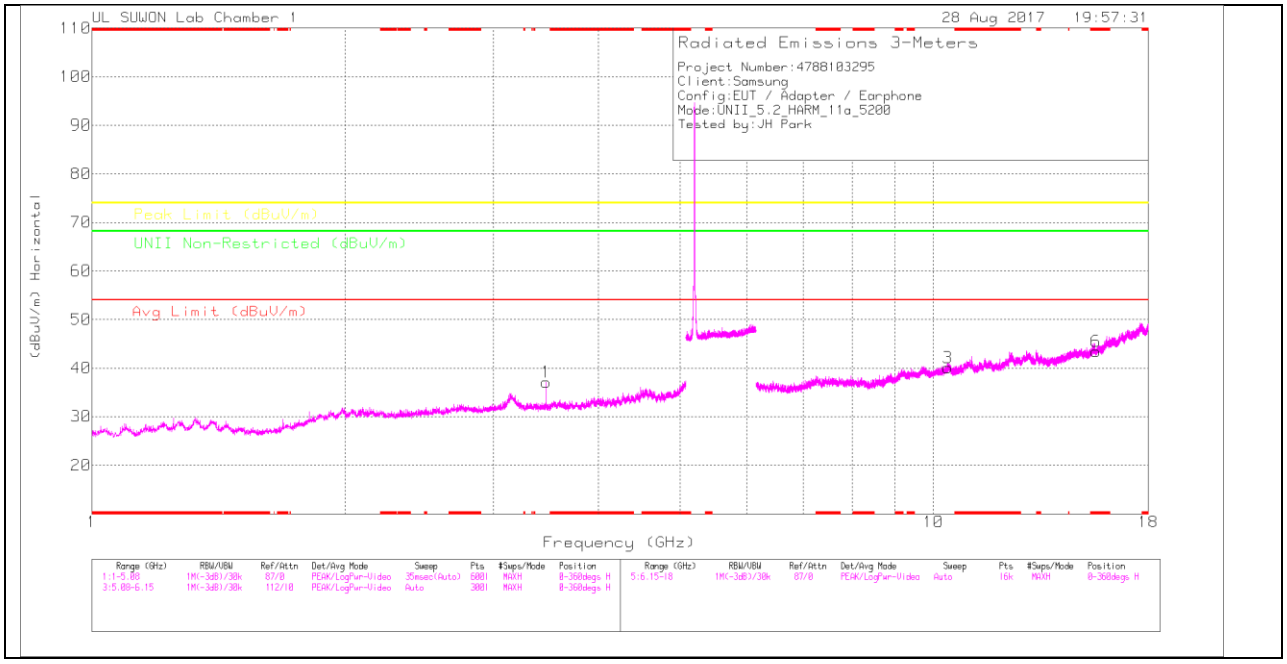
Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	5GHz_LP(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
* 1.25	46.97	PK-U	29.3	-37	0	39.27	-	-	74	-34.73	-	-	41	198	H
* 1.25	35.32	ADR	29.3	-37	.18	27.8	54	-26.2	-	-	-	-	41	198	H
* 1.25	49.16	PK-U	29.3	-37	0	41.46	-	-	74	-32.54	-	-	290	177	V
* 1.25	39.31	ADR	29.3	-37	.18	31.79	54	-22.21	-	-	-	-	290	177	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

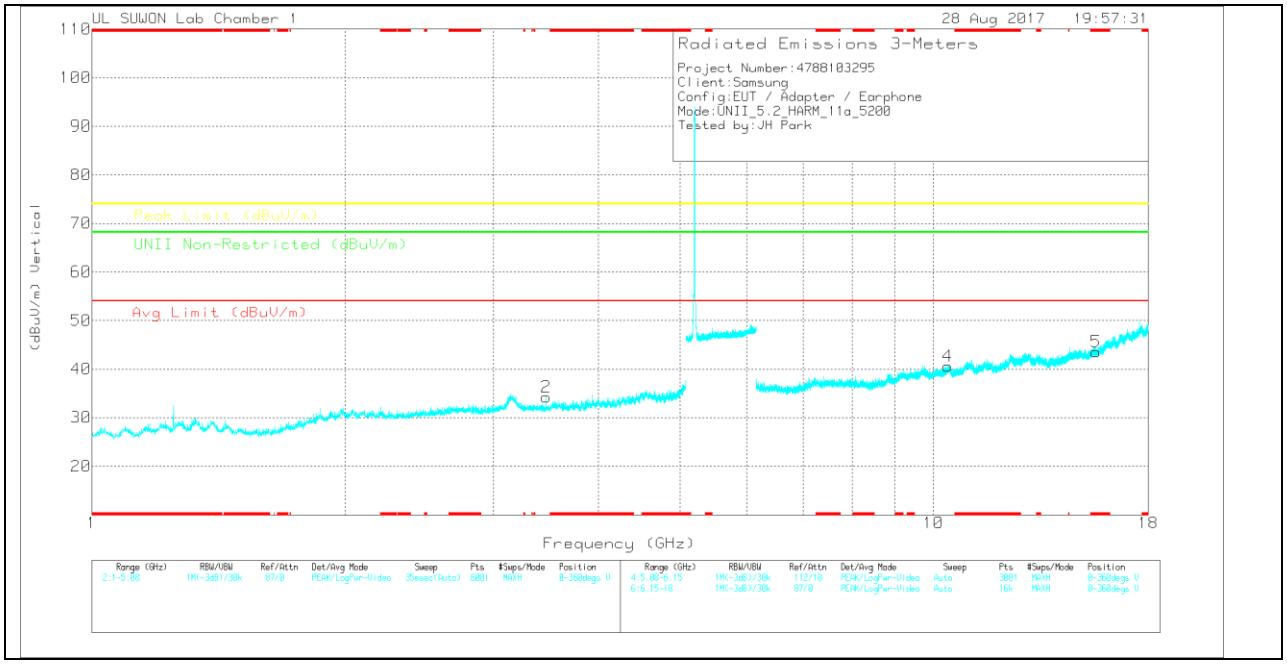
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

MID CHANNEL HORIZONTAL



MID CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

MID CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	5GHz_LP(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.467	37.74	PK	32.5	-33.2	0	37.04	-	-	-	-	68.2	-31.16	0-360	150	H
2	3.466	34.93	PK	32.5	-33.2	0	34.23	-	-	-	-	68.2	-33.97	0-360	250	V
3	10.4	24.65	PK	37.5	-22.1	0	40.05	-	-	-	-	68.2	-28.15	0-360	150	H
6	* 15.598	25.37	PK	39.8	-21.7	0	43.47	-	-	74	-30.53	-	-	0-360	150	H
4	10.405	25.06	PK	37.5	-22	0	40.56	-	-	-	-	68.2	-27.64	0-360	150	V
5	* 15.601	25.54	PK	39.8	-21.8	0	43.54	-	-	74	-30.46	-	-	0-360	150	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Radiated Emissions

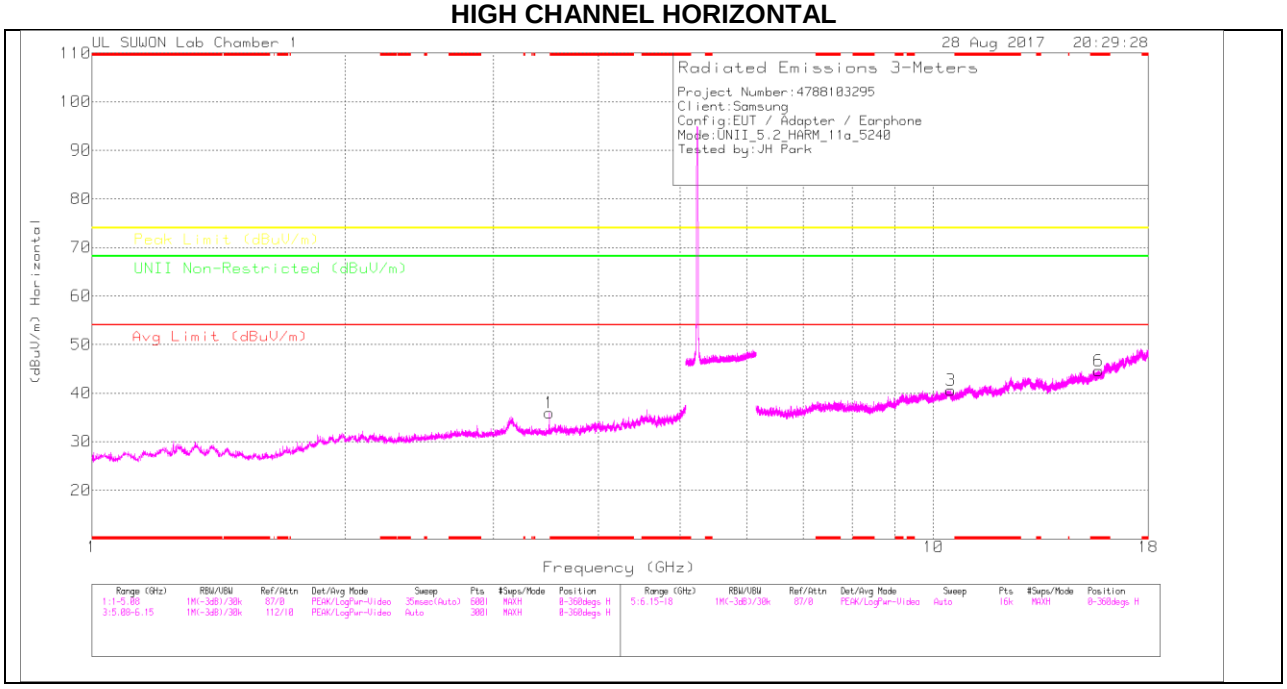
Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	5GHz_LP(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3.467	45.43	PK-U	32.5	-33.2	0	44.73	-	-	-	-	68.2	-23.47	322	142	H
3.467	44.27	PK-U	32.5	-33.2	0	43.57	-	-	-	-	68.2	-24.63	76	374	V
* 1.25	49.16	PK-U	29.3	-37	0	41.46	-	-	74	-32.54	-	-	290	177	V
* 1.25	39.31	ADR	29.3	-37	.18	31.79	54	-22.21	-	-	-	-	290	177	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

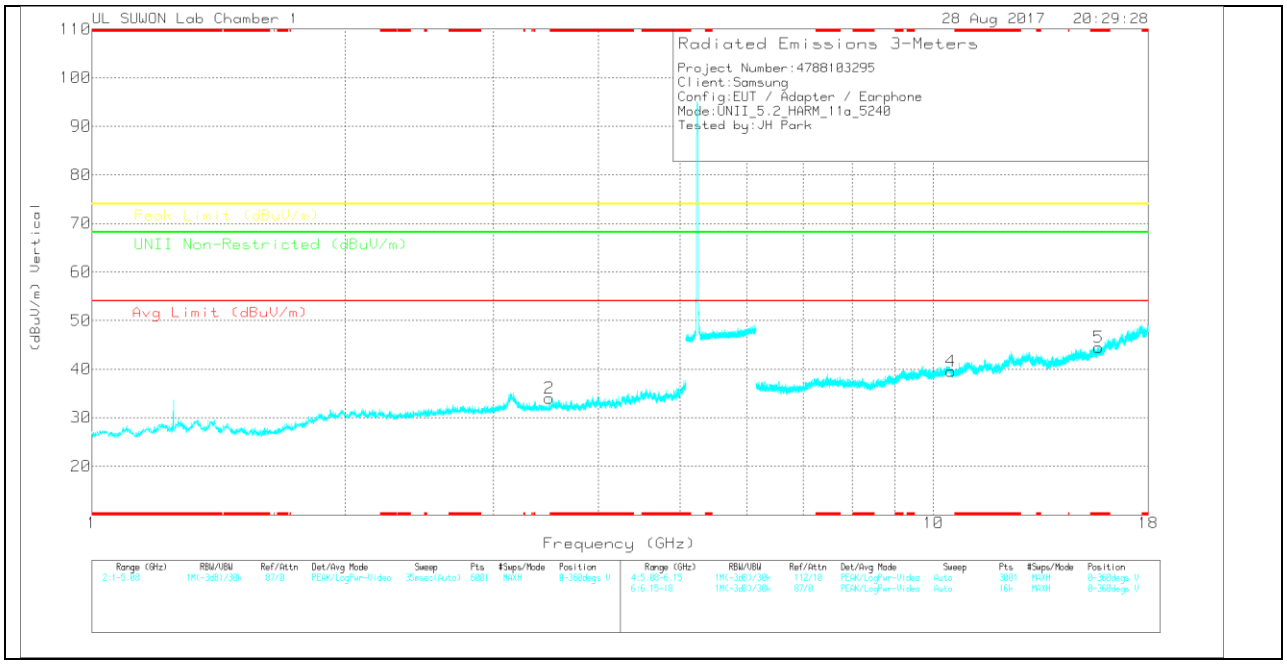
PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

HIGH CHANNEL HORIZONTAL



HIGH CHANNEL VERTICAL



Note: Emission was scanned up to 40GHz; No emissions were detected above the noise floor which was at least 20dB below the specification limit.

HIGH CHANNEL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	5GHz_LP(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	3.494	36.81	PK	32.5	-33.4	0	35.91	-	-	-	-	68.2	-32.29	0-360	150	H
2	3.494	34.85	PK	32.5	-33.4	0	33.95	-	-	-	-	68.2	-34.25	0-360	250	V
3	10.484	25.44	PK	37.5	-22.4	0	40.54	-	-	-	-	68.2	-27.66	0-360	250	H
6	* 15.722	26.23	PK	39.9	-21.5	0	44.63	-	-	74	-29.37	-	-	0-360	250	H
4	10.483	24.48	PK	37.5	-22.4	0	39.58	-	-	-	-	68.2	-28.62	0-360	250	V
5	* 15.722	26.08	PK	39.9	-21.5	0	44.48	-	-	74	-29.52	-	-	0-360	150	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK – Peak Detector

Radiated Emissions

Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	5GHz_LP(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	UNII Non-Restricted (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3.493	45.54	PK-U	32.5	-33.4	0	44.64	-	-	-	-	68.2	-23.56	330	101	H
3.493	44.54	PK-U	32.5	-33.4	0	43.64	-	-	-	-	68.2	-24.56	125	394	V
* 1.25	49.16	PK-U	29.3	-37	0	41.46	-	-	74	-32.54	-	-	290	177	V
* 1.25	39.31	ADR	29.3	-37	.18	31.79	54	-22.21	-	-	-	-	290	177	V

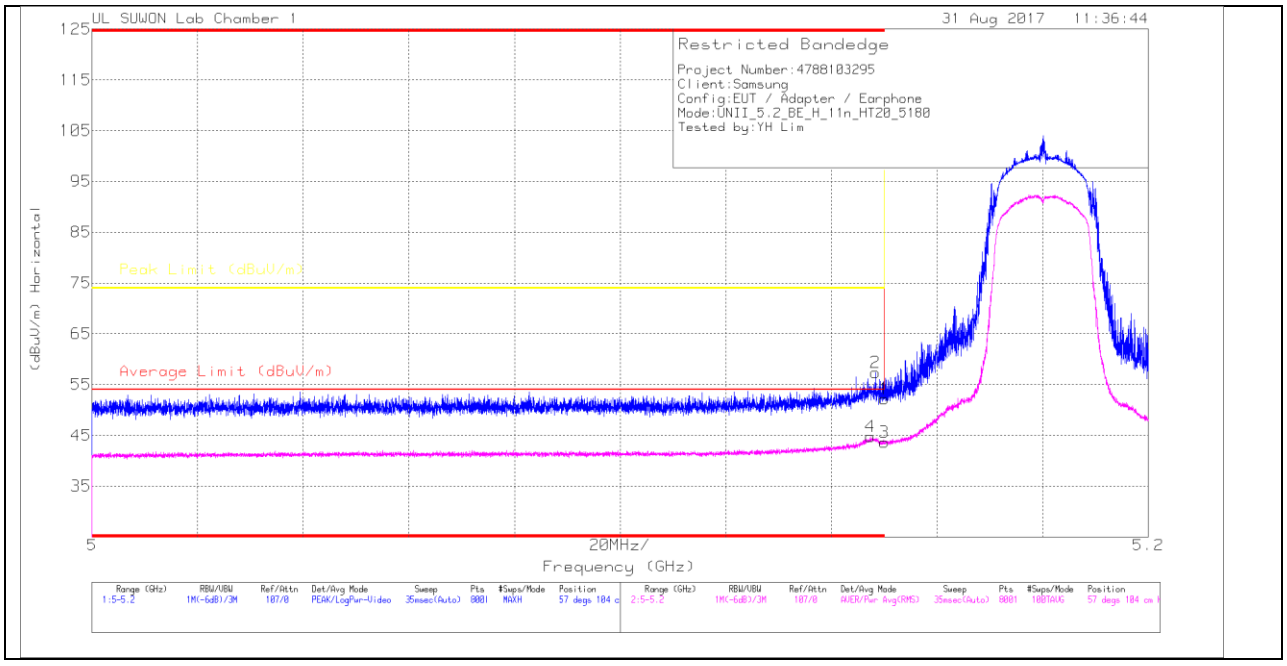
* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

PK-U - U-NII: Maximum Peak

ADR - U-NII AD primary method, RMS average

10.1.2. TX Above 1GHz 802.11n HT20 MODE IN THE 5.2GHz BAND RESTRICTED BANDEDGE (LOW CHANNEL)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

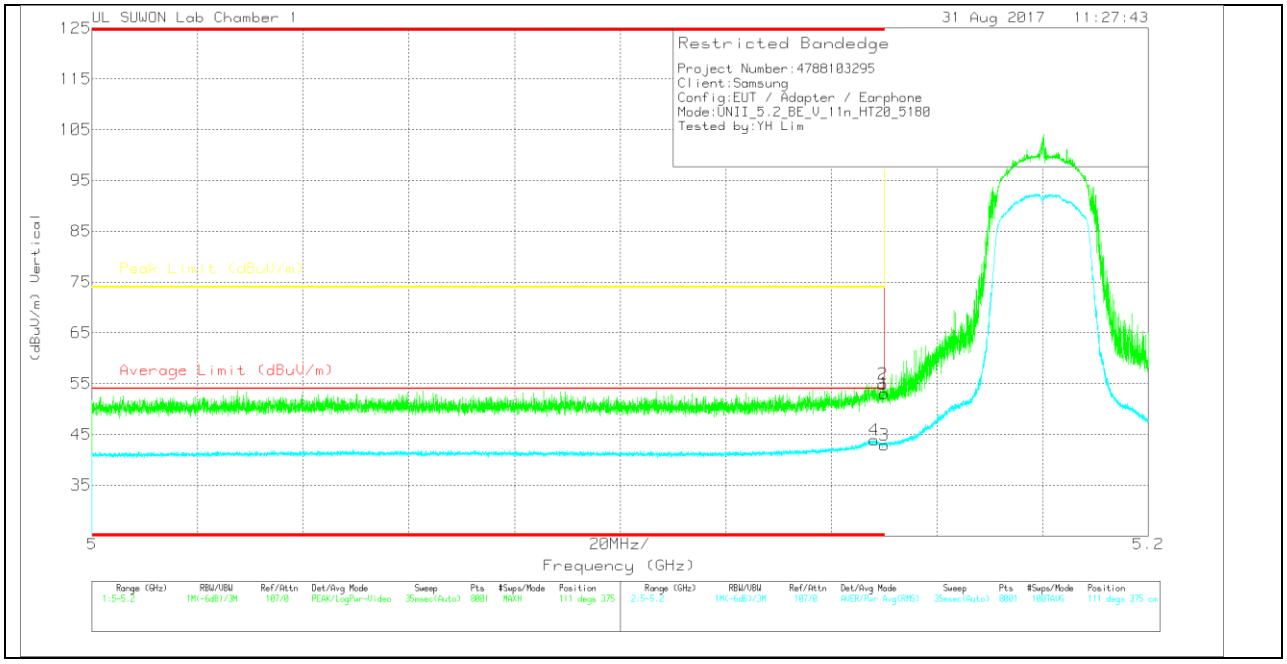
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	10dB_ATT(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	40.2	Pk	34	-22	0	52.2	-	-	74	-21.8	57	104	H
2	* 5.148	45.35	Pk	34	-22	0	57.35	-	-	74	-16.65	57	104	H
3	* 5.15	31.49	RMS	34	-22	.16	43.65	54	-10.35	-	-	57	104	H
4	* 5.147	32.63	RMS	34	-22	.16	44.79	54	-9.21	-	-	57	104	H

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection

VERTICAL PEAK AND AVERAGE PLOT



VERTICAL DATA

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	20170531_3117_00168717	10dB_ATT(dB)_170809	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 5.15	41.07	Pk	34	-22	0	53.07	-	-	74	-20.93	111	375	V
2	* 5.15	42.92	Pk	34	-22	0	54.92	-	-	74	-19.08	111	375	V
3	* 5.15	30.79	RMS	34	-22	.16	42.95	54	-11.05	-	-	111	375	V
4	* 5.148	31.7	RMS	34	-22	.16	43.86	54	-10.14	-	-	111	375	V

* - indicates frequency in CFR15.205/IC7.2.2 Restricted Band

Pk - Peak detector

RMS - RMS detection