PORT C 5,320 MHz 802.11a Legacy Peak Excursion Ratio

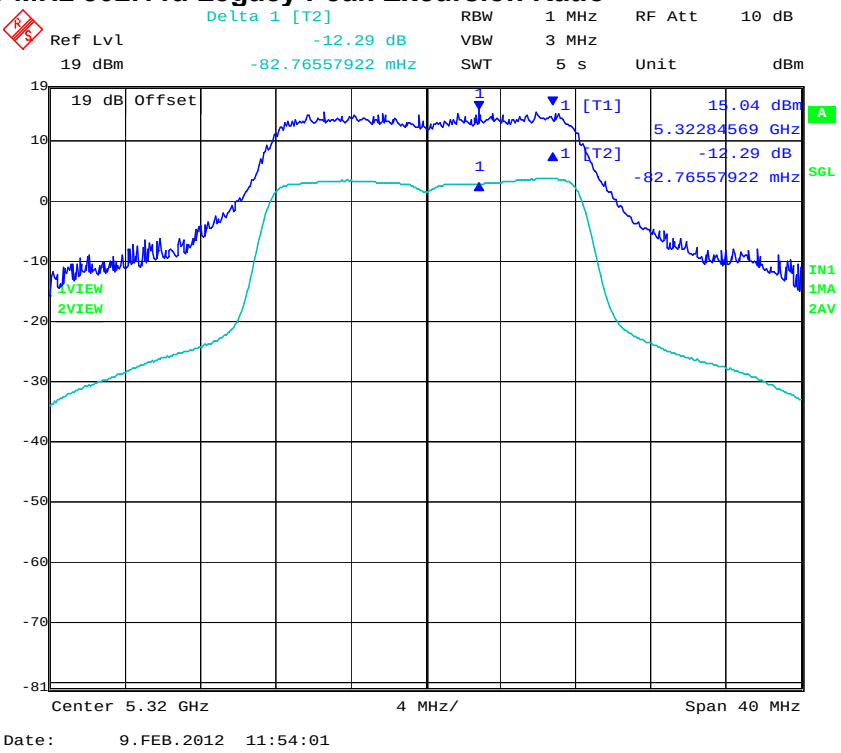


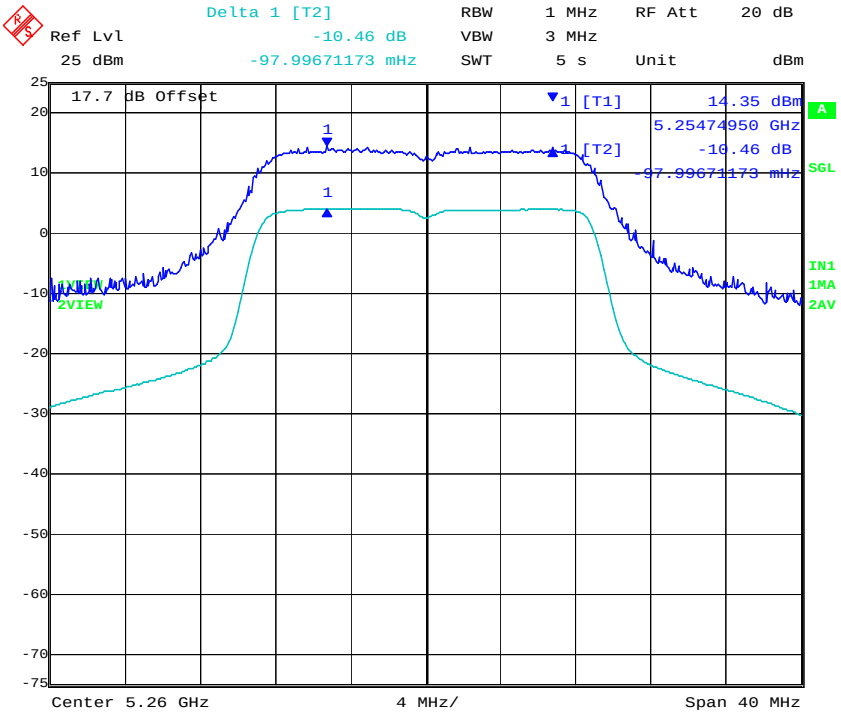
TABLE OF RESULTS – **802.11n HT-20 5250-5350 MHz**

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11 n HT-20	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	2 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

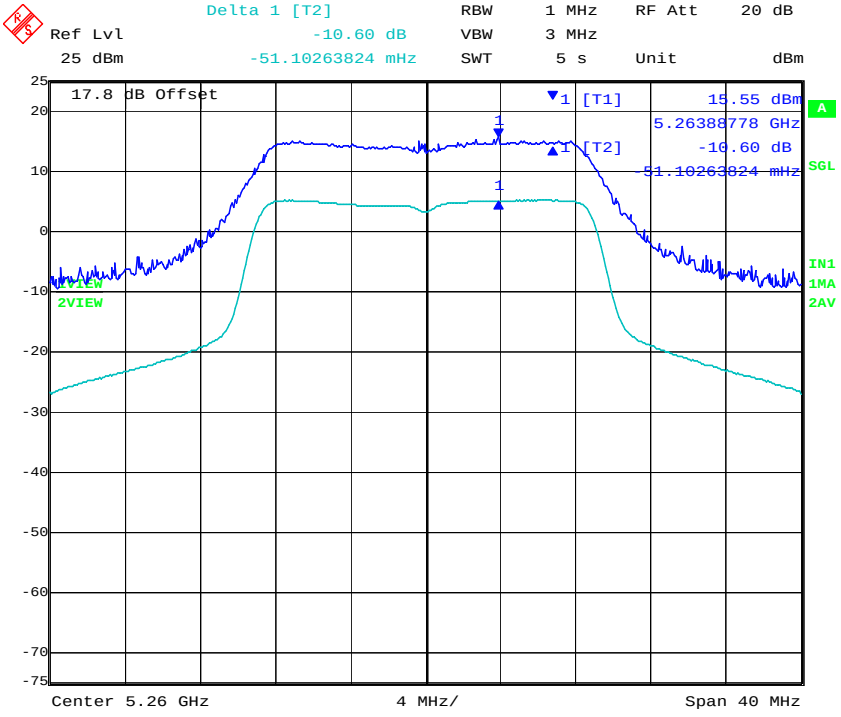
Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5260	-10.46	-10.60	-10.83	--	-13.00	-2.17
5300	-10.55	-9.88	-11.02	--		-1.98
5320	-10.51	-9.85	-11.14	--		-1.86

Measurement uncertainty:	±1.33 dB

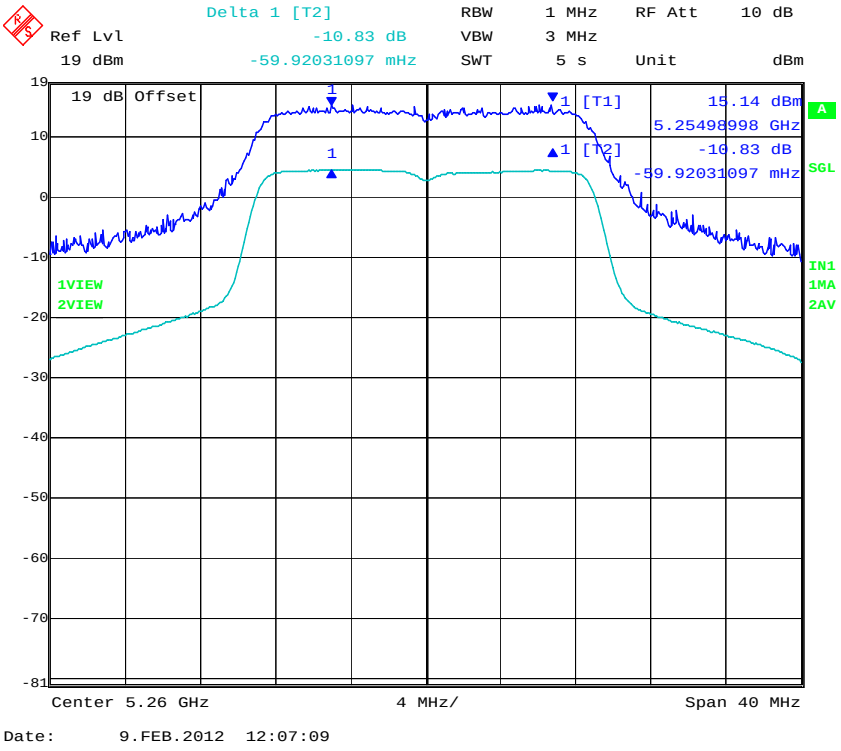
PORT A 5,260 MHz 802.11n HT-20 Peak Excursion Ratio



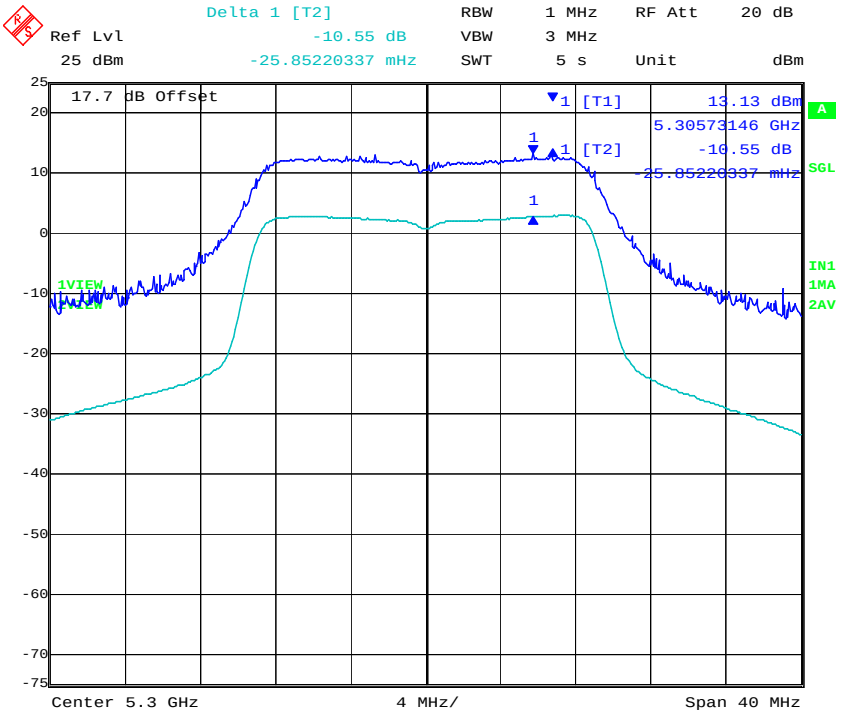
PORT B 5,260 MHz 802.11n HT-20 Peak Excursion Ratio



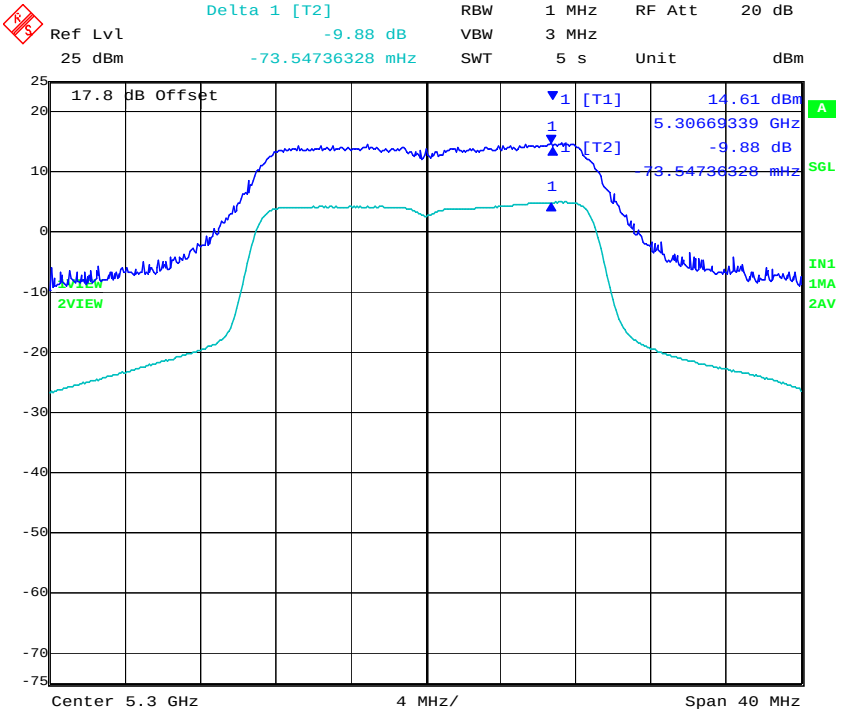
PORT C 5,260 MHz 802.11n HT-20 Peak Excursion Ratio



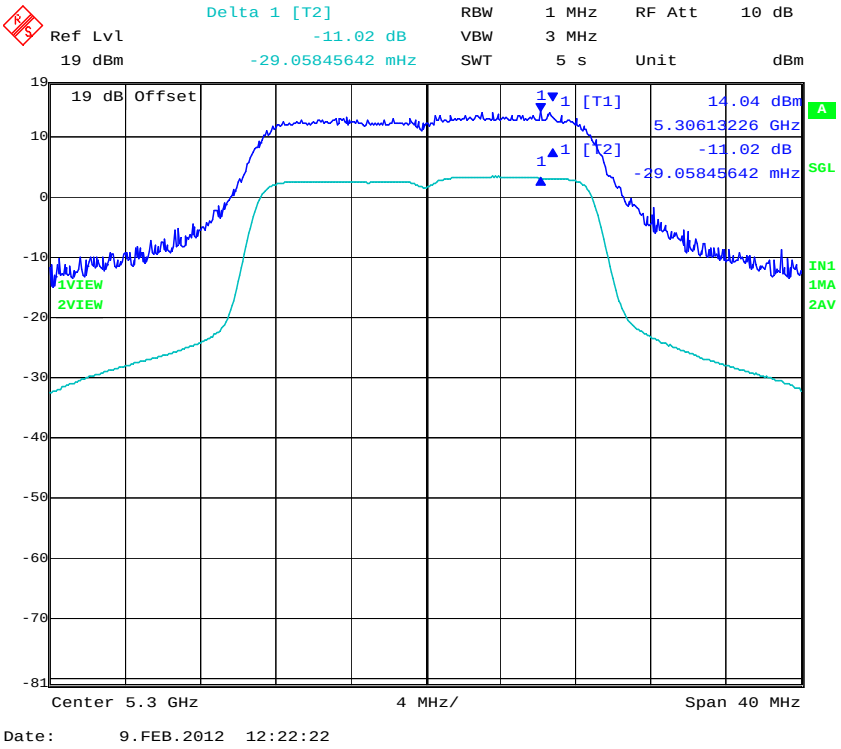
PORT A 5300 MHz 802.11n HT-20 Peak Excursion Ratio



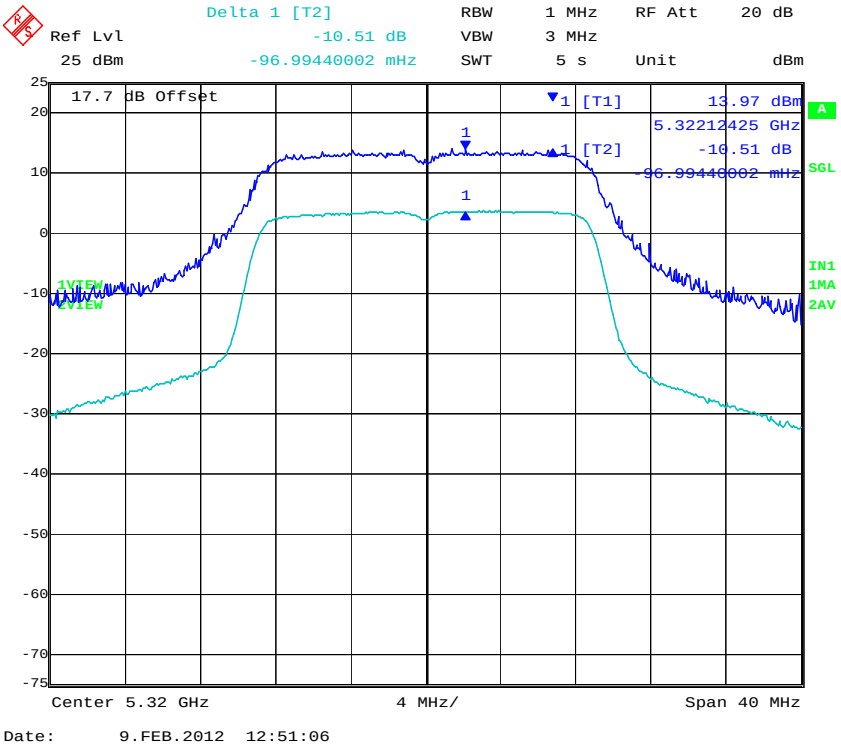
PORT B 5,300 MHz 802.11n HT-20 Peak Excursion Ratio



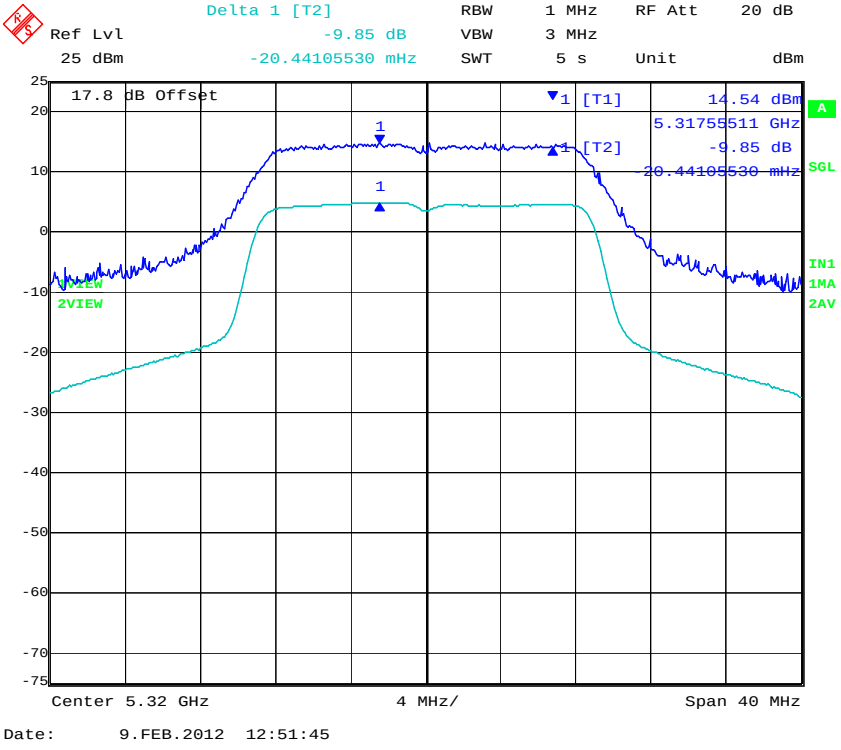
PORT C 5,300 MHz 802.11n HT-20 Peak Excursion Ratio



PORT A 5,320 MHz 802.11n HT-20 Peak Excursion Ratio



PORT B 5,320 MHz 802.11n HT-20 Peak Excursion Ratio



PORT C 5,320 MHz 802.11n HT-20 Peak Excursion Ratio

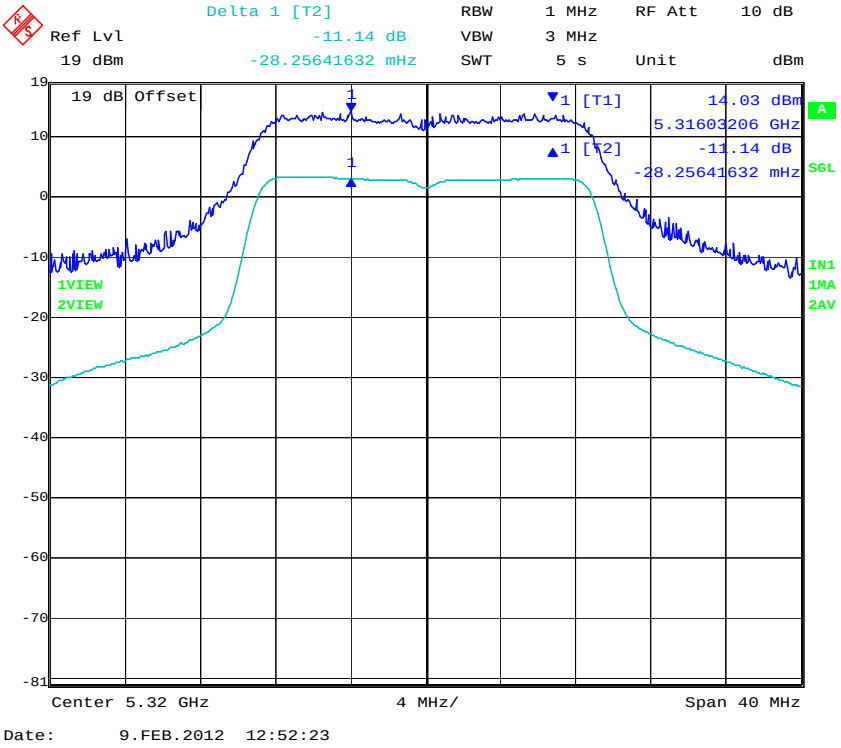


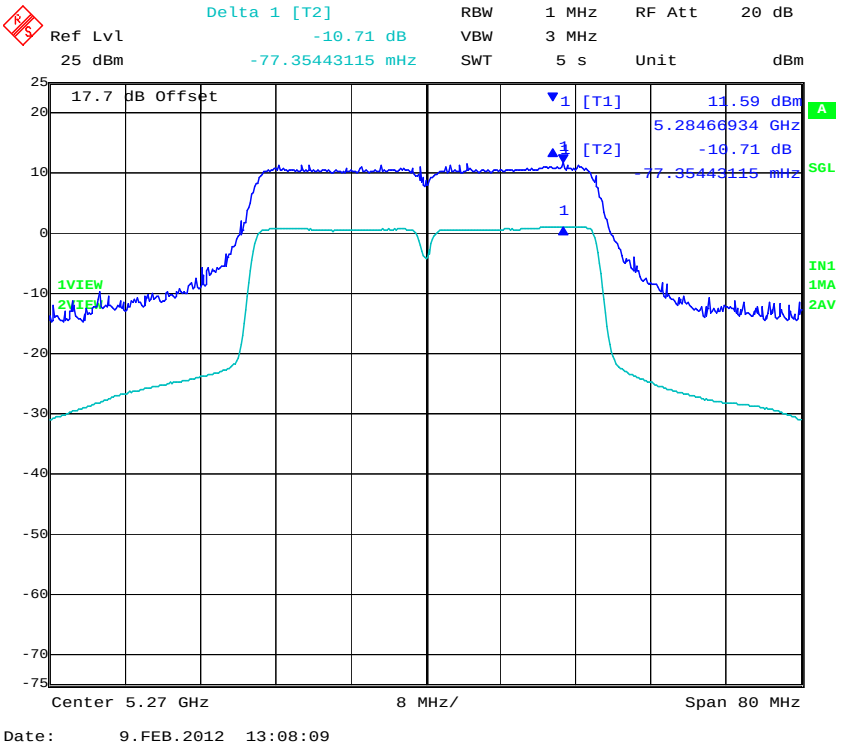
TABLE OF RESULTS – **802.11n HT-40 5250-5350 MHz**

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11 n HT-40	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	2 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

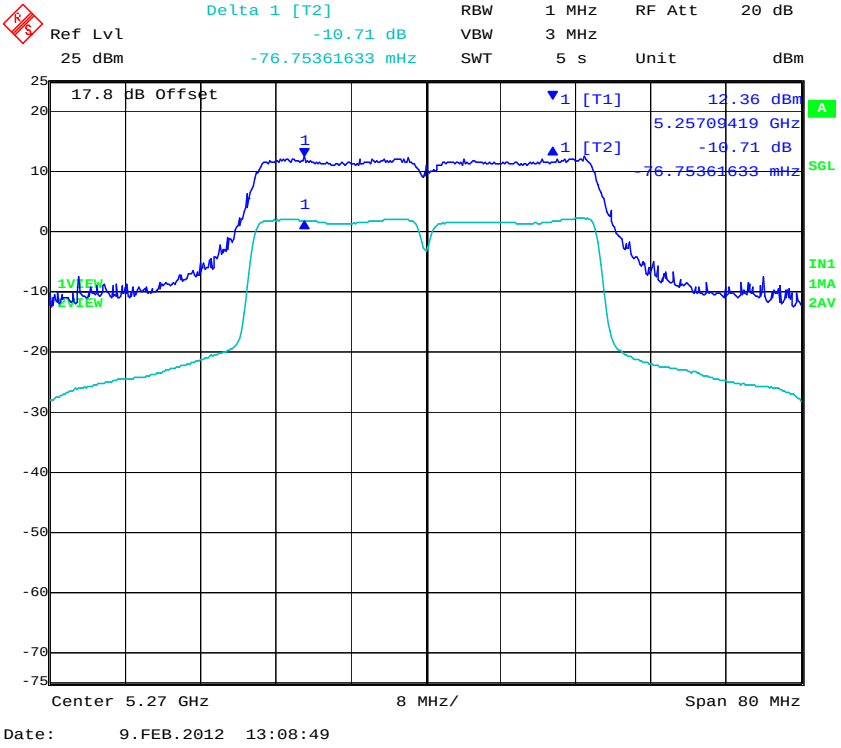
Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5270	-10.72	-10.71	-11.19	--	-13.00	-1.81
5310	-11.09	-10.53	-11.42	--		-1.58

Measurement uncertainty:	±1.33 dB

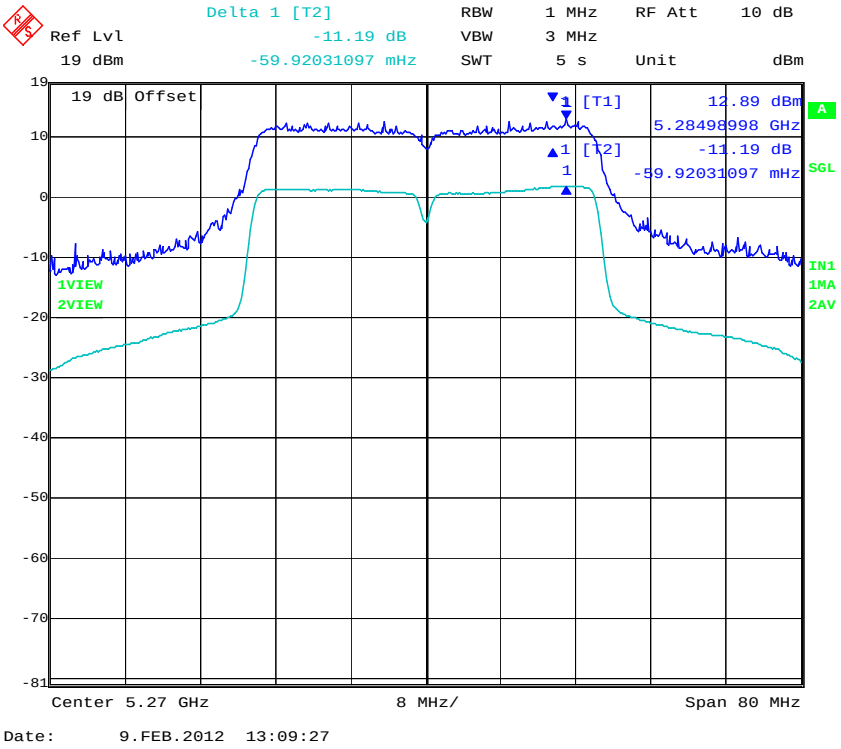
PORT A 5,270 MHz 802.11n HT-40 Peak Excursion Ratio



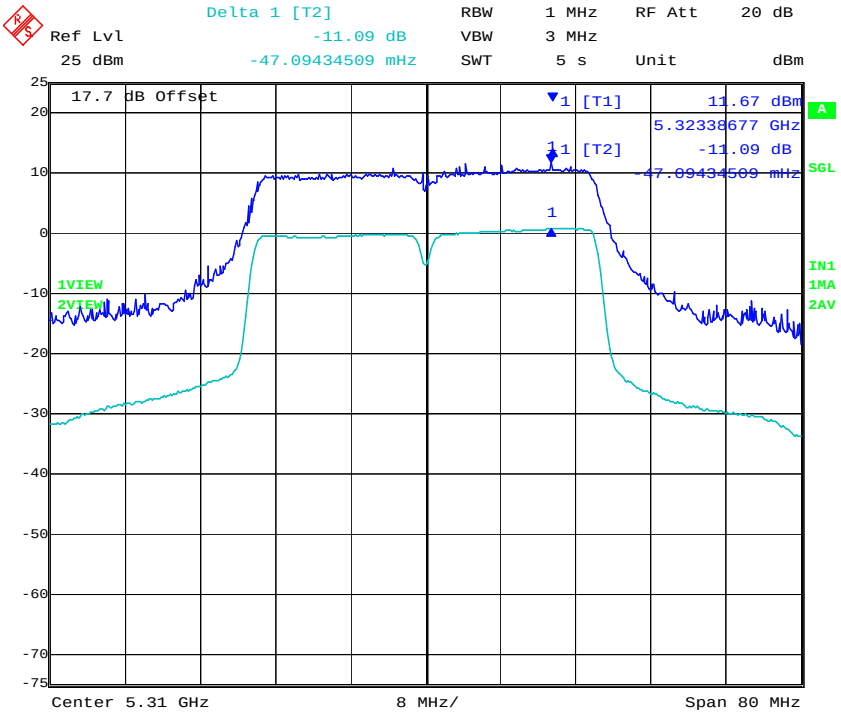
PORT B 5,270 MHz 802.11n HT-40 Peak Excursion Ratio



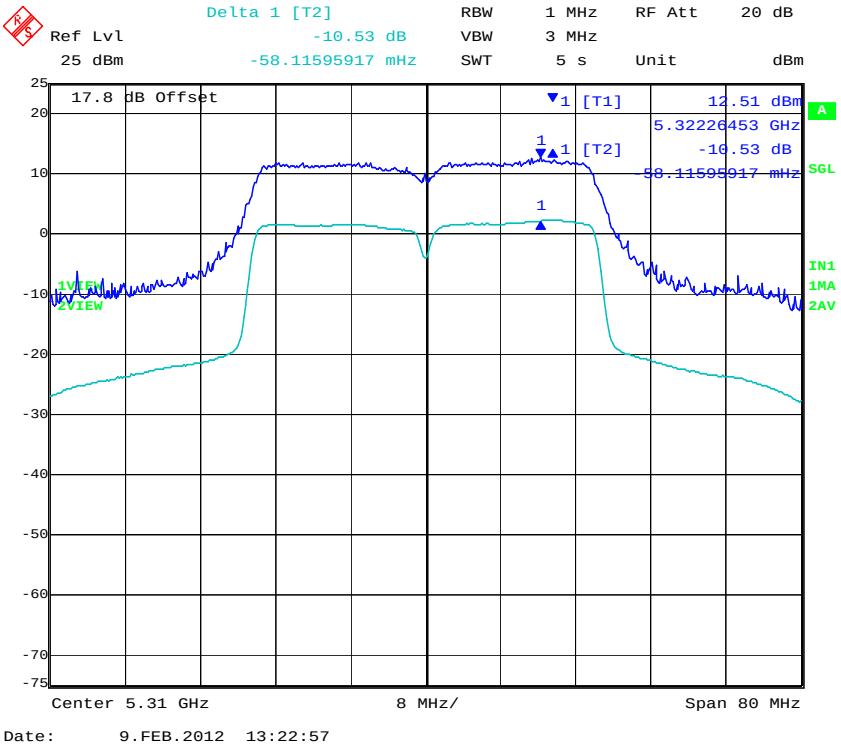
PORT C 5,270 MHz 802.11n HT-40 Peak Excursion Ratio



PORT A 5,310 MHz 802.11n HT-40 Peak Excursion Ratio



PORT B 5,310 MHz 802.11n HT-40 Peak Excursion Ratio



PORT C 5,310 MHz 802.11n HT-40 Peak Excursion Ratio

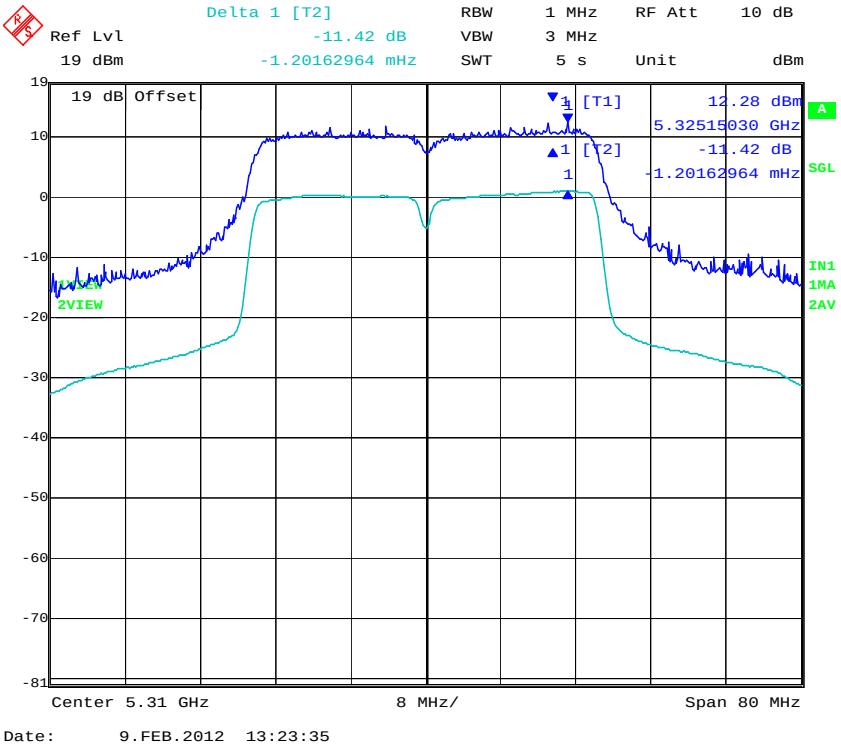


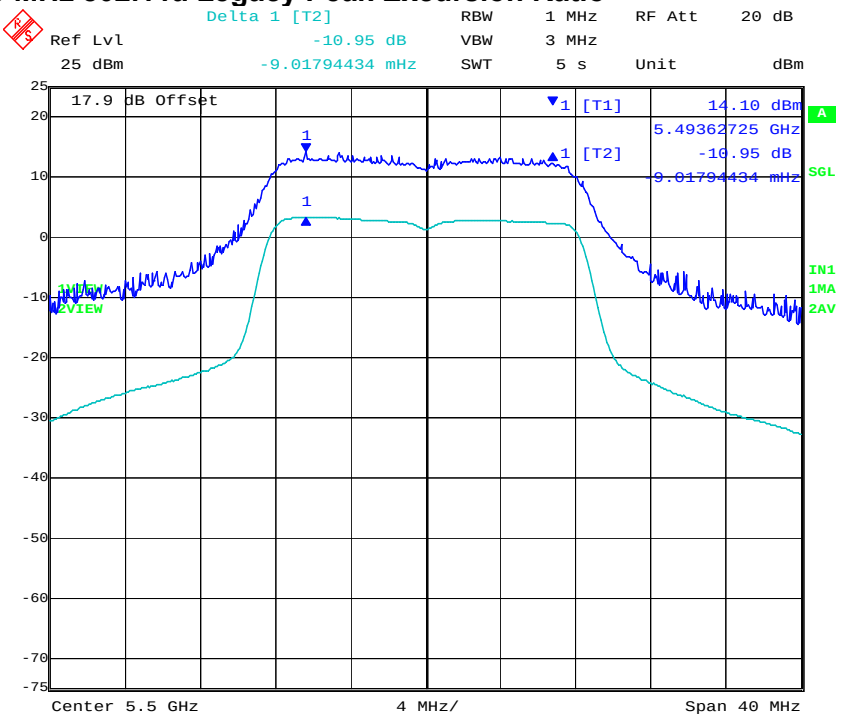
TABLE OF RESULTS – **802.11a Legacy 5500 - 5700 MHz**

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11 a	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	2 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5500	-10.95	-10.33	-11.98	--	-13.00	-1.02
5580	-10.92	-10.23	-11.82	--		-1.18
5700	-11.44	-10.61	-11.74	--		-1.26

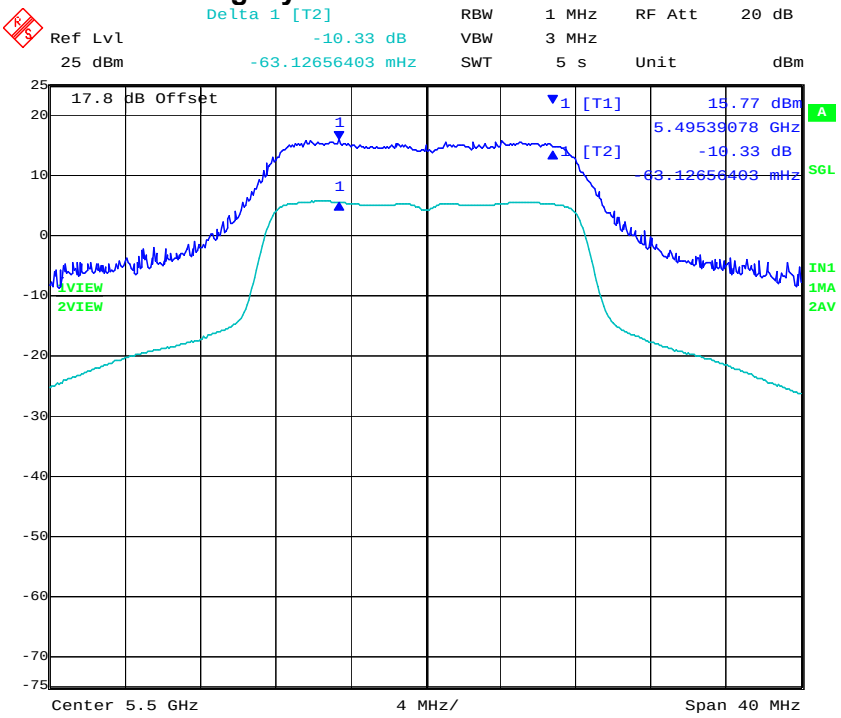
Measurement uncertainty:	±1.33 dB

PORT A 5,500 MHz 802.11a Legacy Peak Excursion Ratio



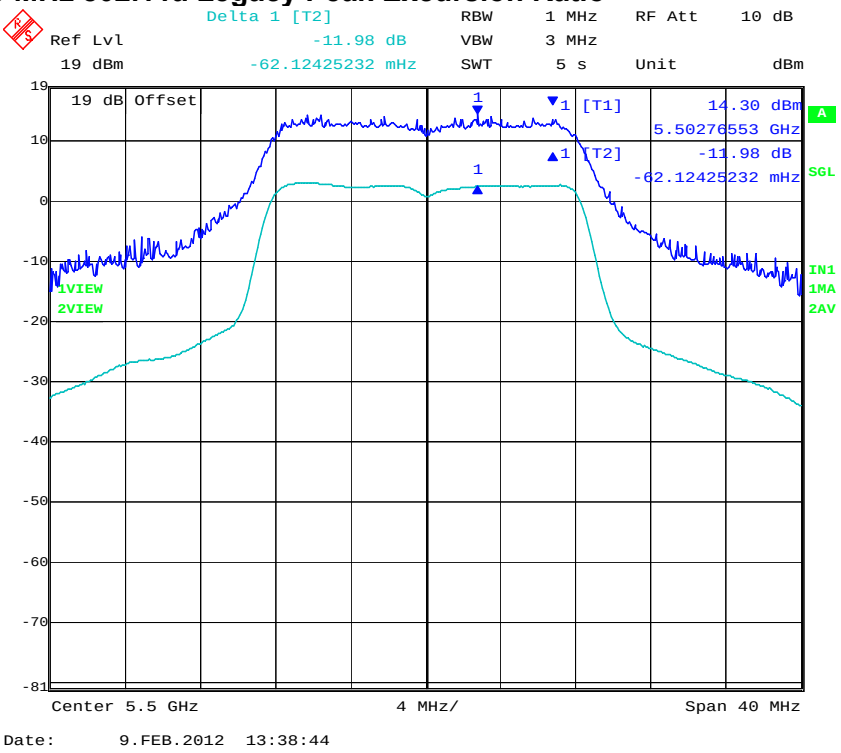
Date: 9.FEB.2012 13:37:27

PORT B 5,500 MHz 802.11a Legacy Peak Excursion Ratio

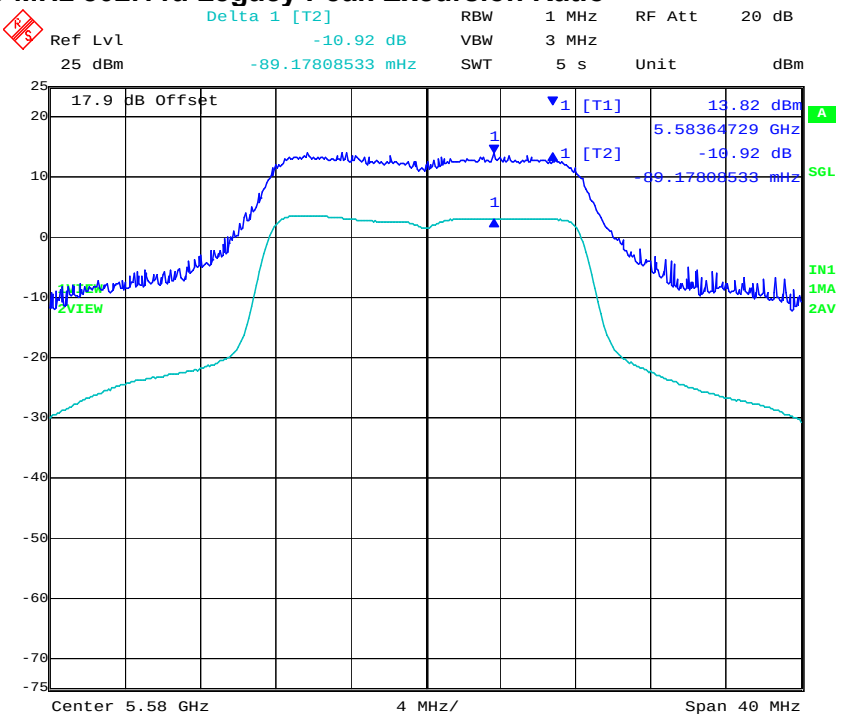


Date: 9.FEB.2012 13:38:07

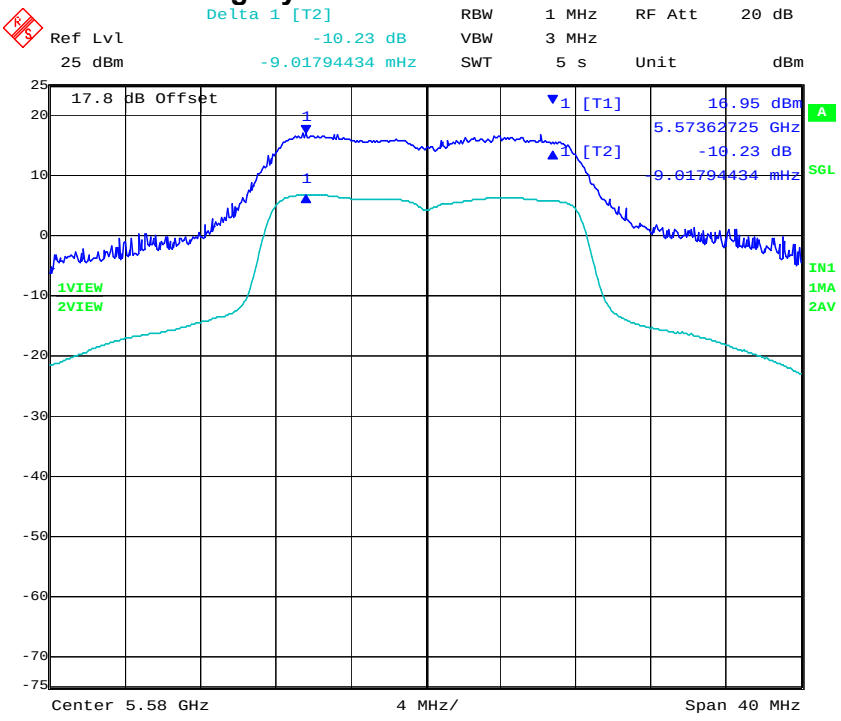
PORT C 5,500 MHz 802.11a Legacy Peak Excursion Ratio



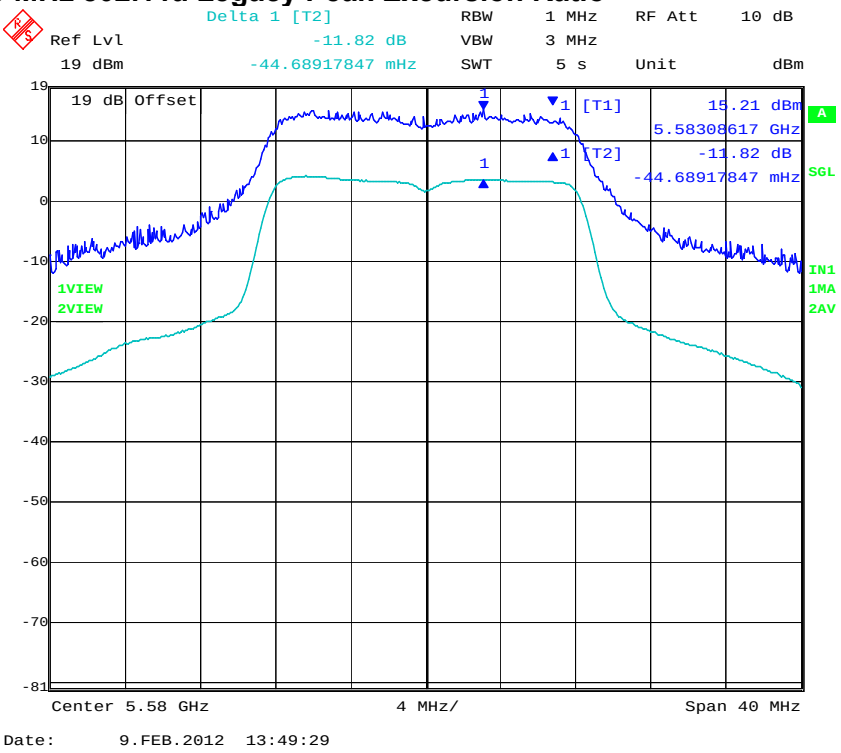
PORT A 5,580 MHz 802.11a Legacy Peak Excursion Ratio



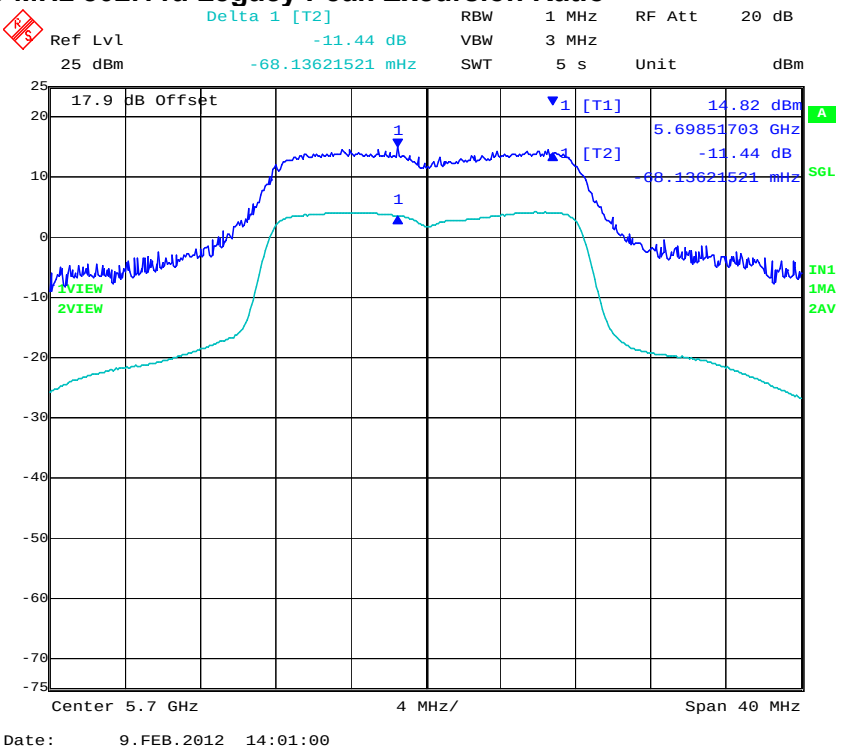
PORT B 5,580 MHz 802.11a Legacy Peak Excursion Ratio



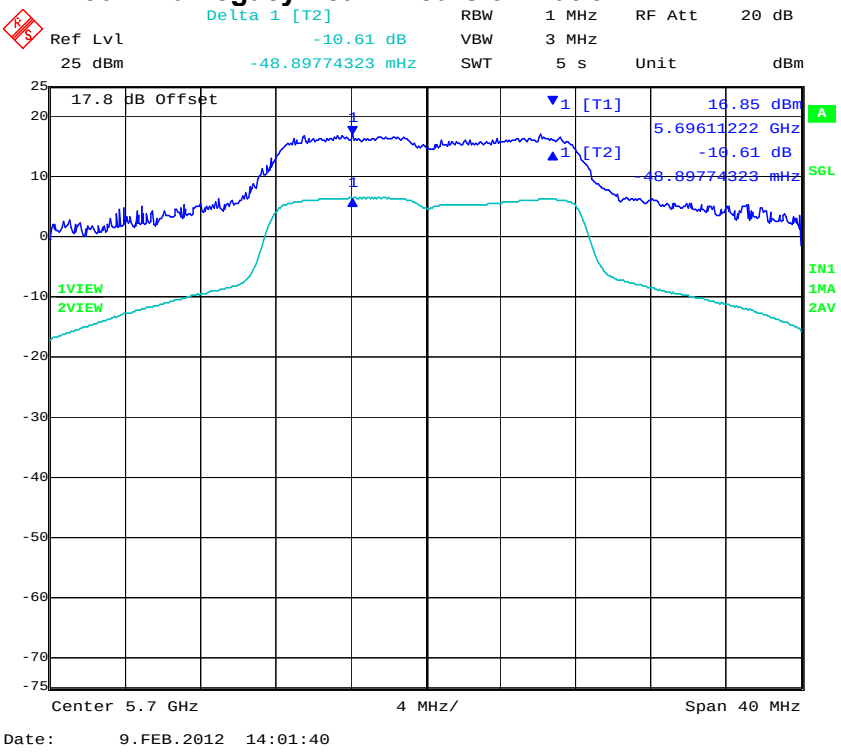
PORT C 5,580 MHz 802.11a Legacy Peak Excursion Ratio



PORT A 5,700 MHz 802.11a Legacy Peak Excursion Ratio



PORT B 5,700 MHz 802.11a Legacy Peak Excursion Ratio



PORT C 5,700 MHz 802.11a Legacy Peak Excursion Ratio

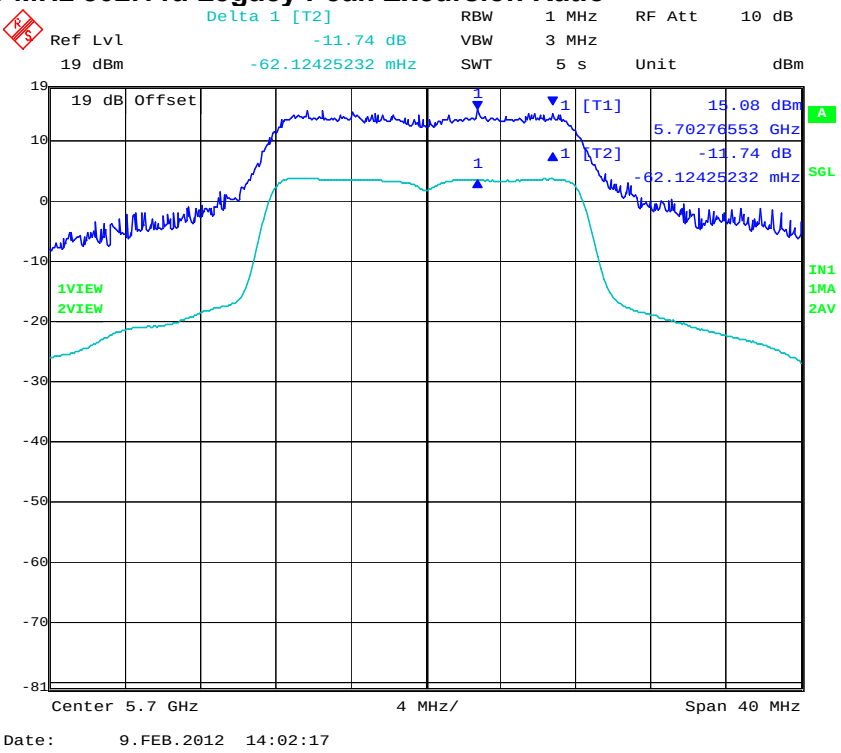


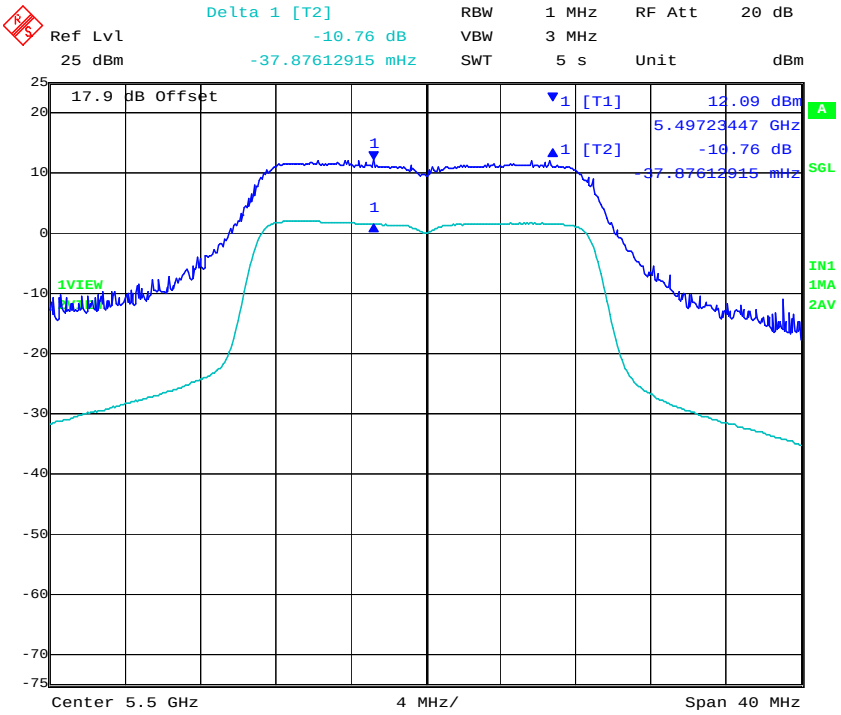
TABLE OF RESULTS – **802.11n HT-20 5500 - 5700 MHz**

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11 n HT-20	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	2 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5500	-10.76	-10.47	-11.01	--	-13.00	-1.99
5580	-10.54	-9.96	-10.86	--		-2.14
5700	-10.37	-10.05	-11.15	--		-1.85

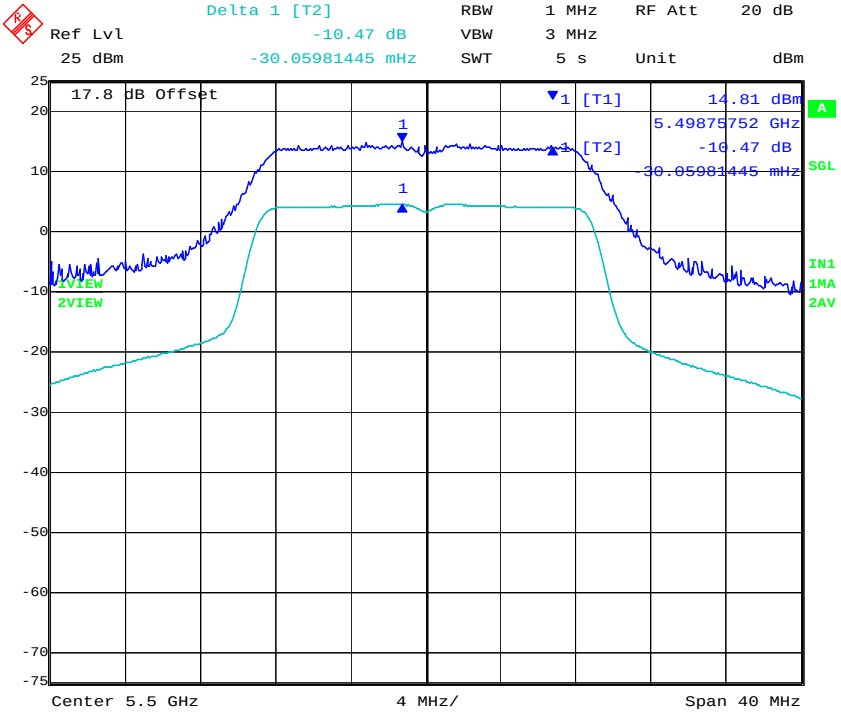
Measurement uncertainty:	±1.33 dB

PORT A 5,500 MHz 802.11n HT-20 Peak Excursion Ratio



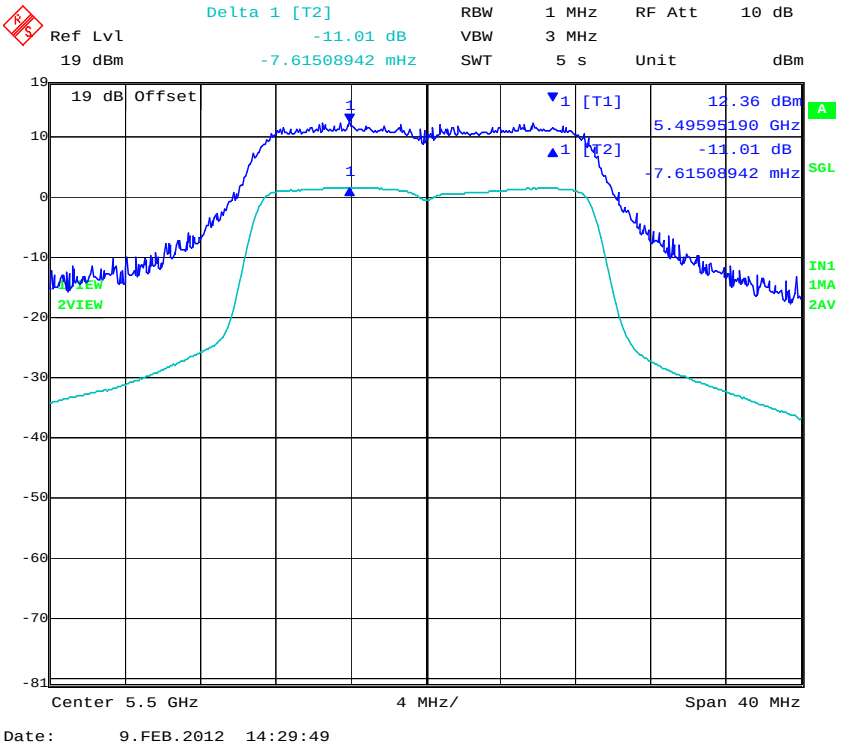
Date: 9.FEB.2012 14:28:31

PORT B 5,500 MHz 802.11n HT-20 Peak Excursion Ratio

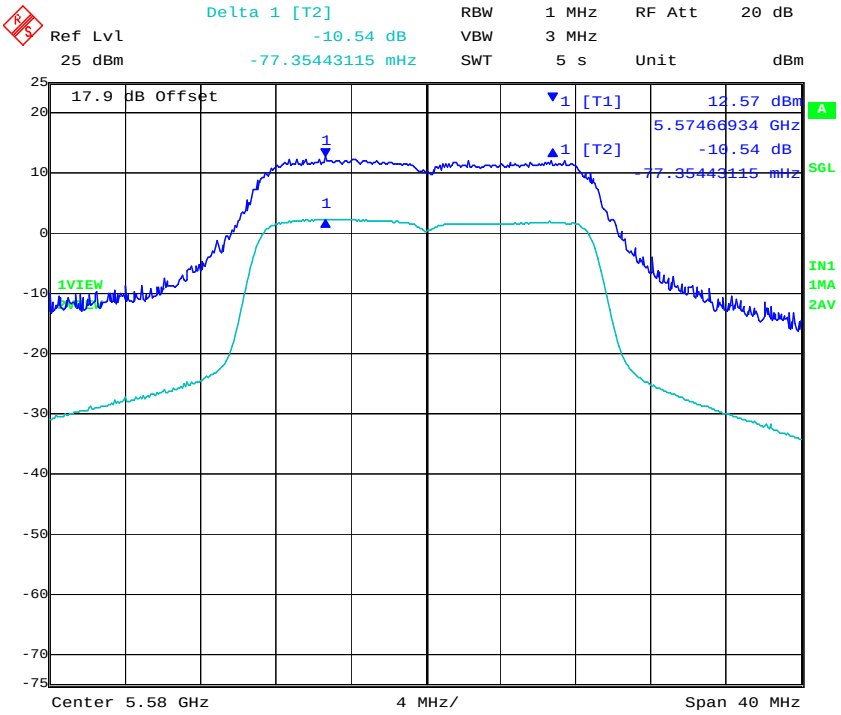


Date: 9.FEB.2012 14:29:11

PORT C 5,500 MHz 802.11n HT-20 Peak Excursion Ratio

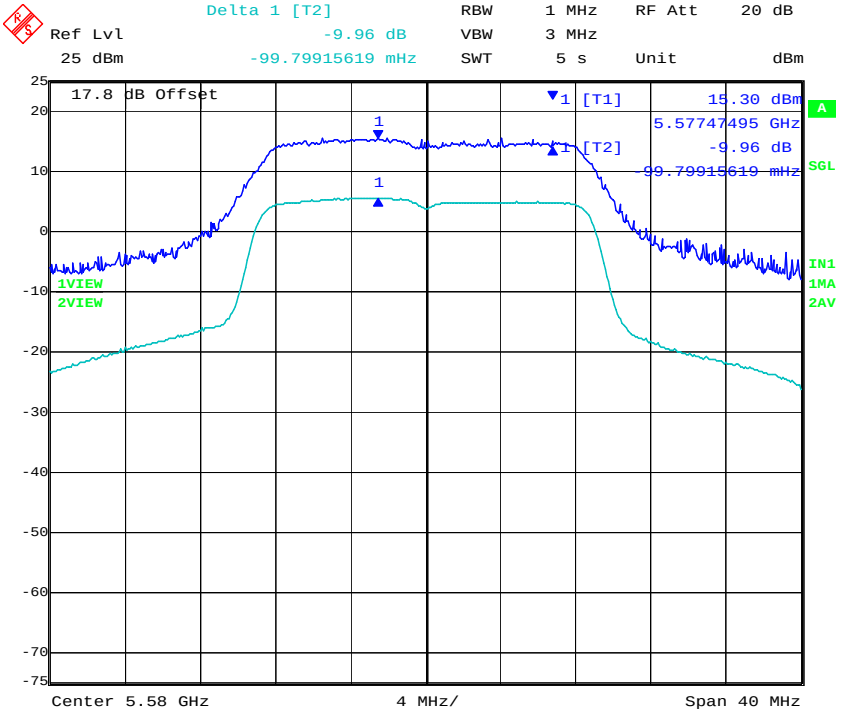


PORT A 5,580 MHz 802.11n HT-20 Peak Excursion Ratio



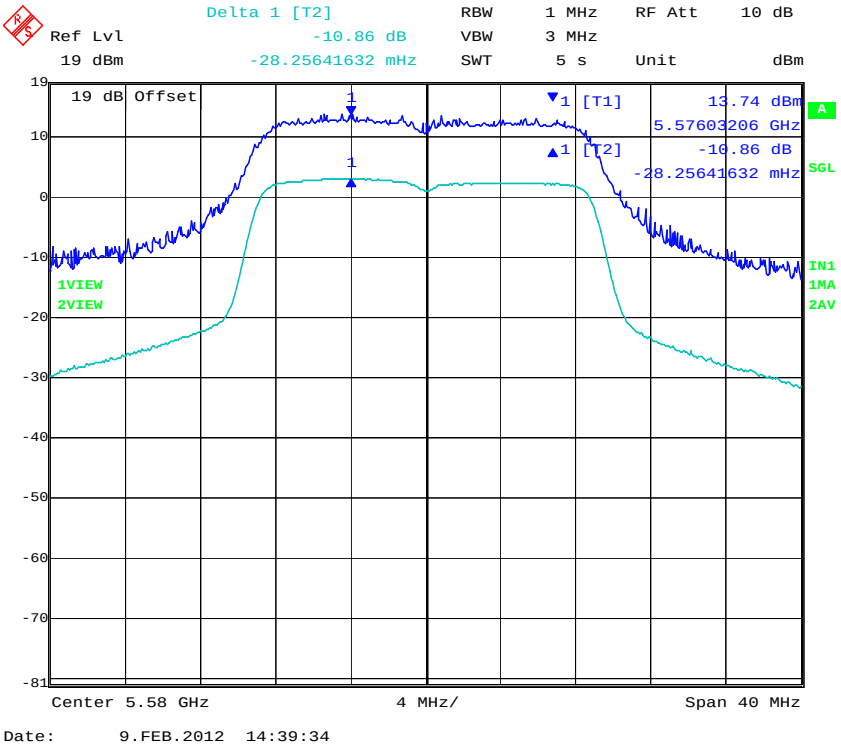
Date: 9.FEB.2012 14:38:17

PORT B 5,580 MHz 802.11n HT-20 Peak Excursion Ratio

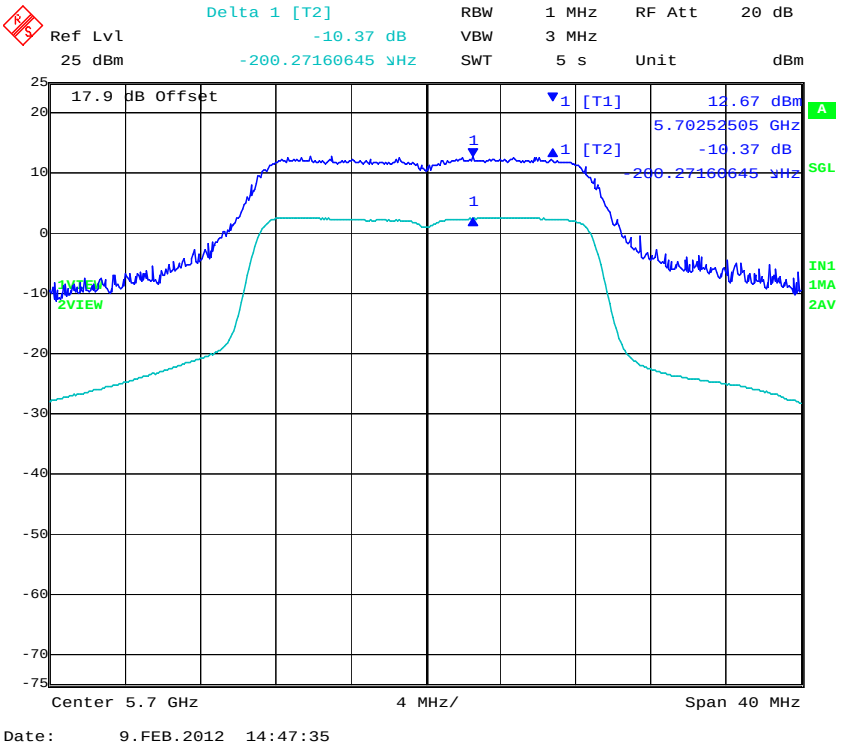


Date: 9.FEB.2012 14:38:56

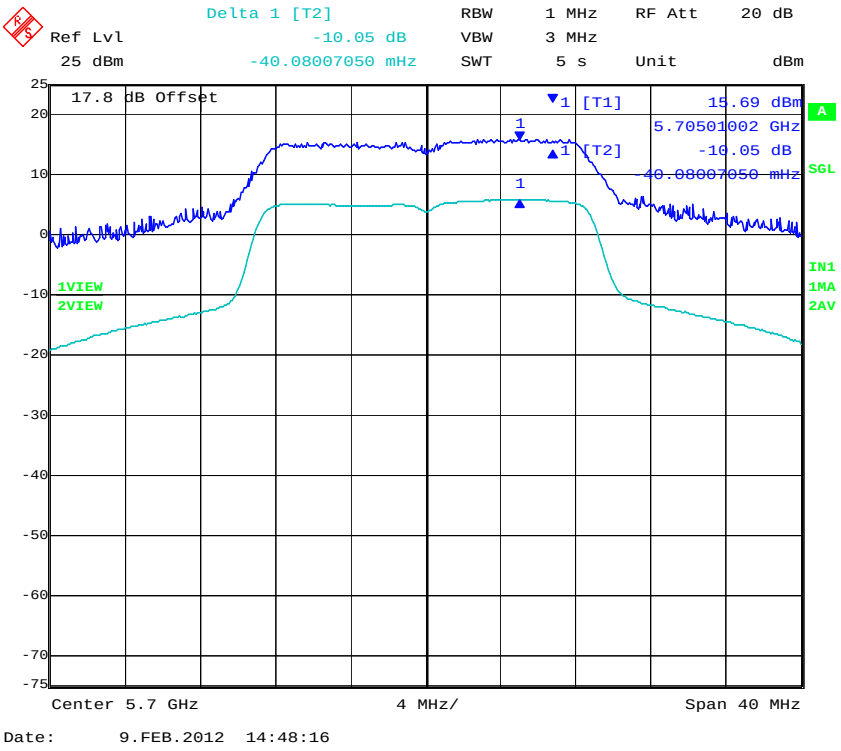
PORT C 5,580 MHz 802.11n HT-20 Peak Excursion Ratio



PORT A 5,700 MHz 802.11n HT-20 Peak Excursion Ratio



PORT B 5,700 MHz 802.11n HT-20 Peak Excursion Ratio



PORT C 5,700 MHz 802.11n HT-20 Peak Excursion Ratio

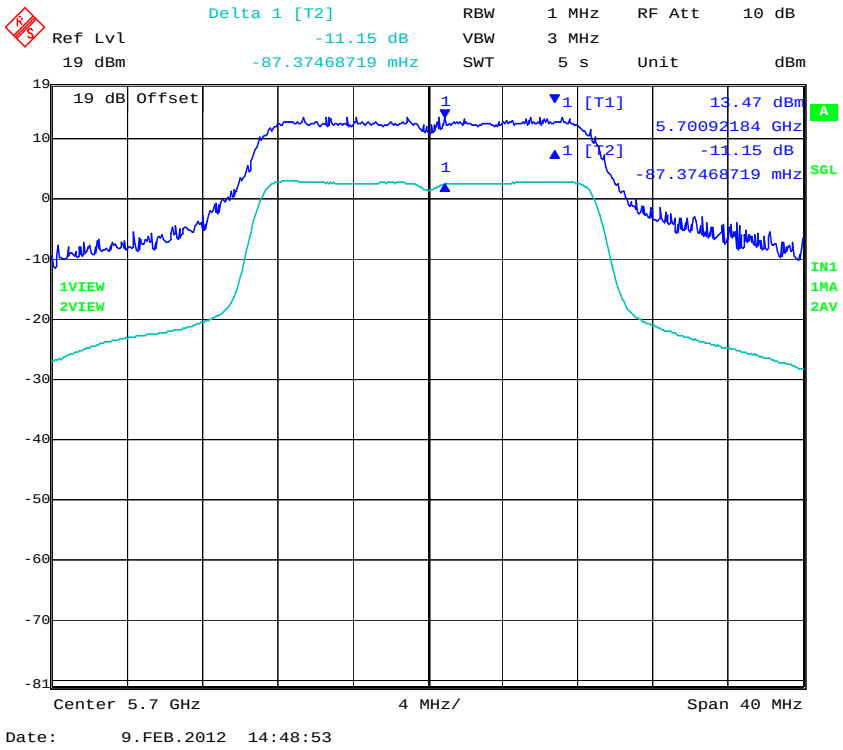


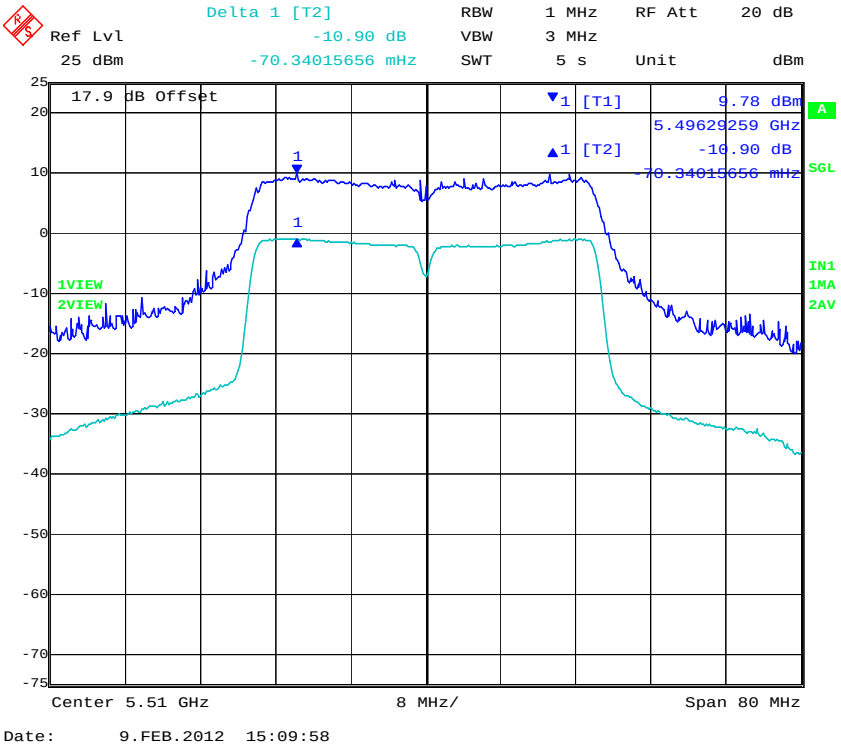
TABLE OF RESULTS – **802.11n HT-40 5500 - 5700 MHz**

Test Conditions:	15.407 (a)	**Rel. Humidity (%):**	35 to 42
Variant:	802.11 n HT-40	**Ambient Temp. (ºC):**	19 to 22
TPC:	HIGH	**Pressure (mBars):**	998 to 1003
Modulation:	ON	**Duty Cycle (%):**	100
Beam Forming Gain (Y):	N/A dB	**Antenna Gain:**	2 dBi
Applied Voltage:	48.0 Vdc		
Notes 1:			
Notes 2:			

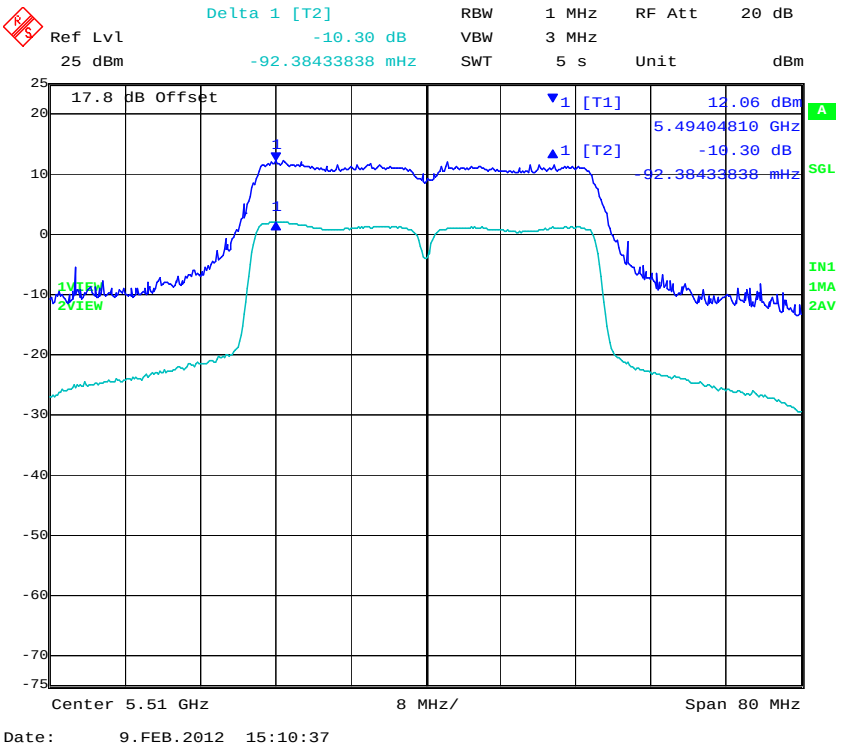
Test Frequency	Trace Δ Marker				Limit	Margin
	Port A	Port B	Port C	Port D		
MHz	dB	dB	dB	dB	dB	dB
5510	-10.90	-10.30	-11.88	--	-13.00	-1.12
5550	-11.57	-10.32	-10.89	--		-1.43
5670	-11.12	-10.98	-12.28	--		-0.72

Measurement uncertainty:	±1.33 dB

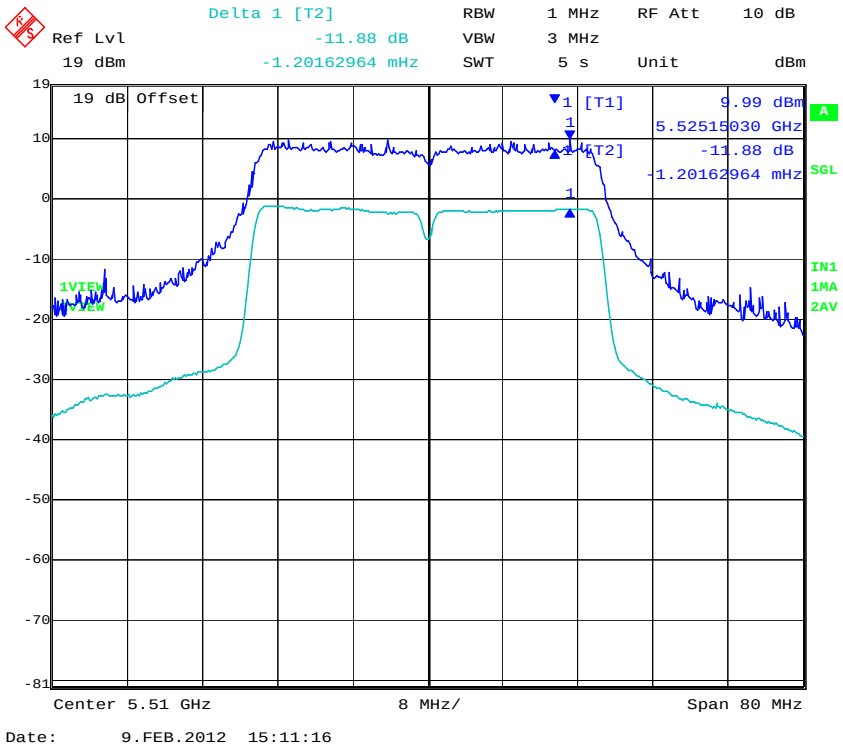
PORT A 5,510 MHz 802.11n HT-40 Peak Excursion Ratio



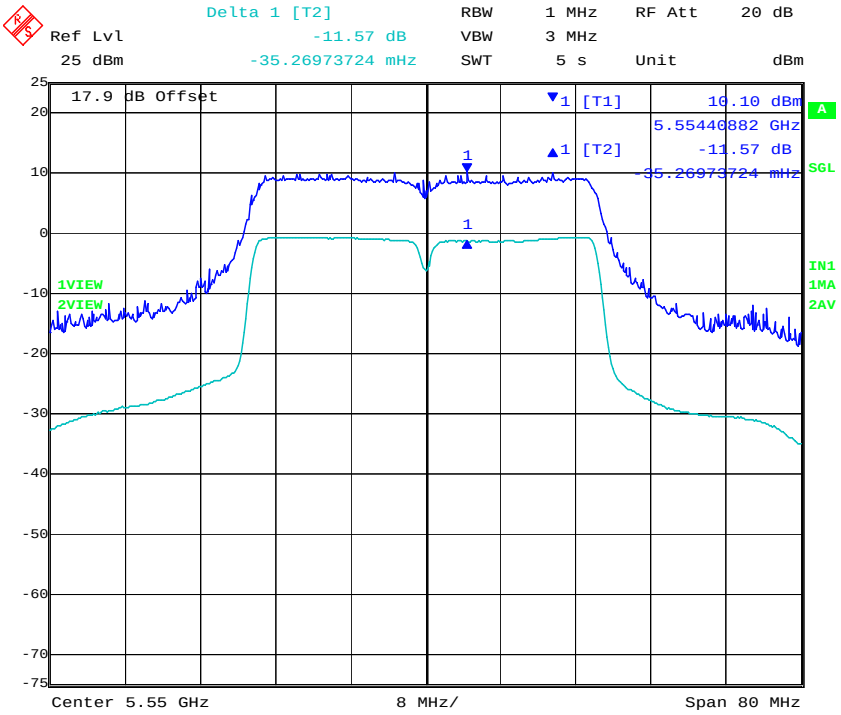
PORT B 5,510 MHz 802.11n HT-40 Peak Excursion Ratio



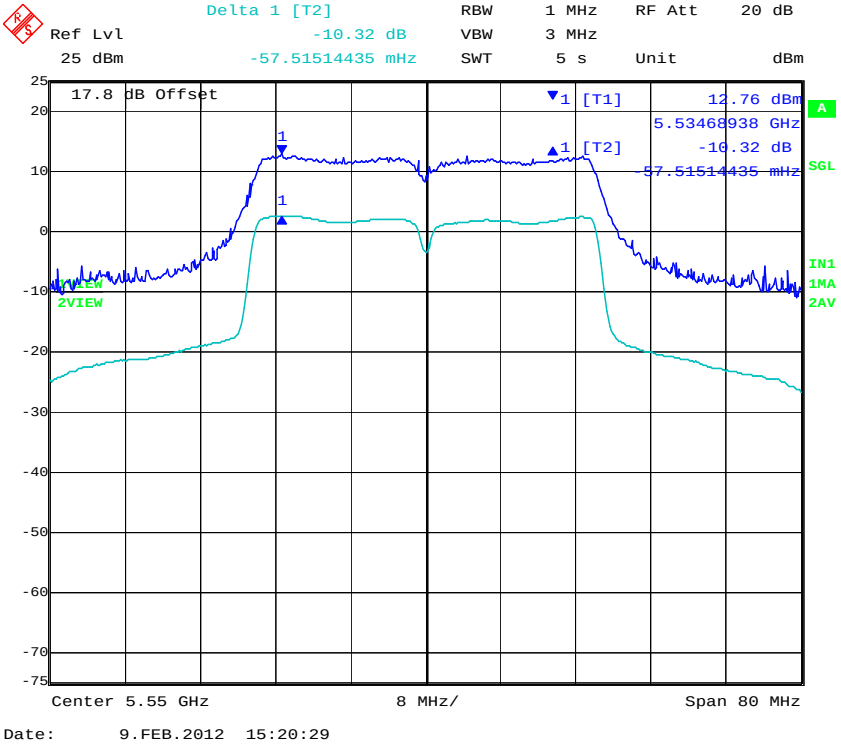
PORT C 5,510 MHz 802.11n HT-40 Peak Excursion Ratio



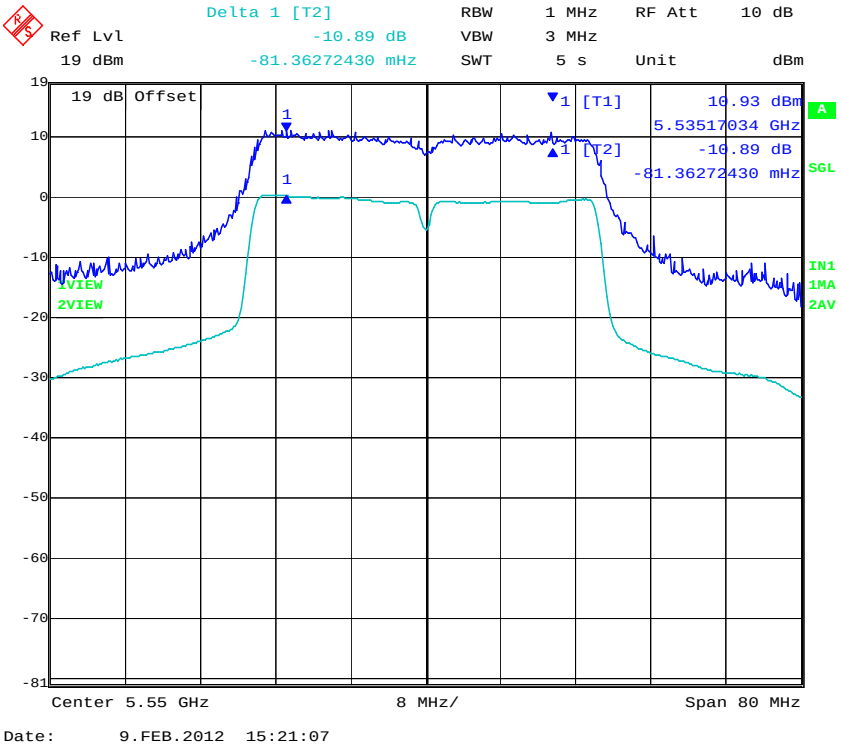
PORT A 5,550 MHz 802.11n HT-40 Peak Excursion Ratio



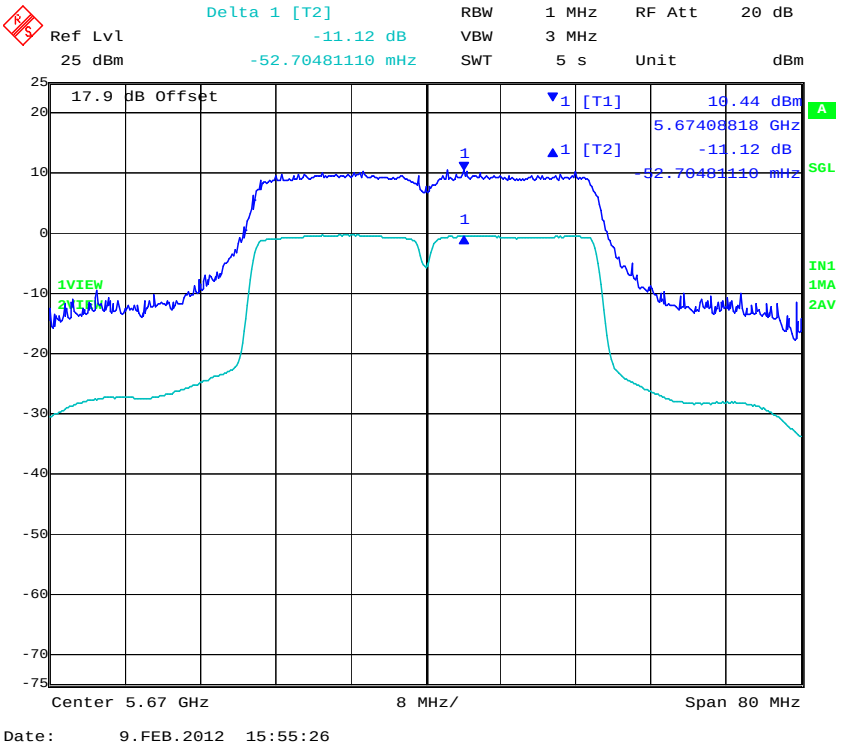
PORT B 5,550 MHz 802.11n HT-40 Peak Excursion Ratio



PORT C 5,550 MHz 802.11n HT-40 Peak Excursion Ratio

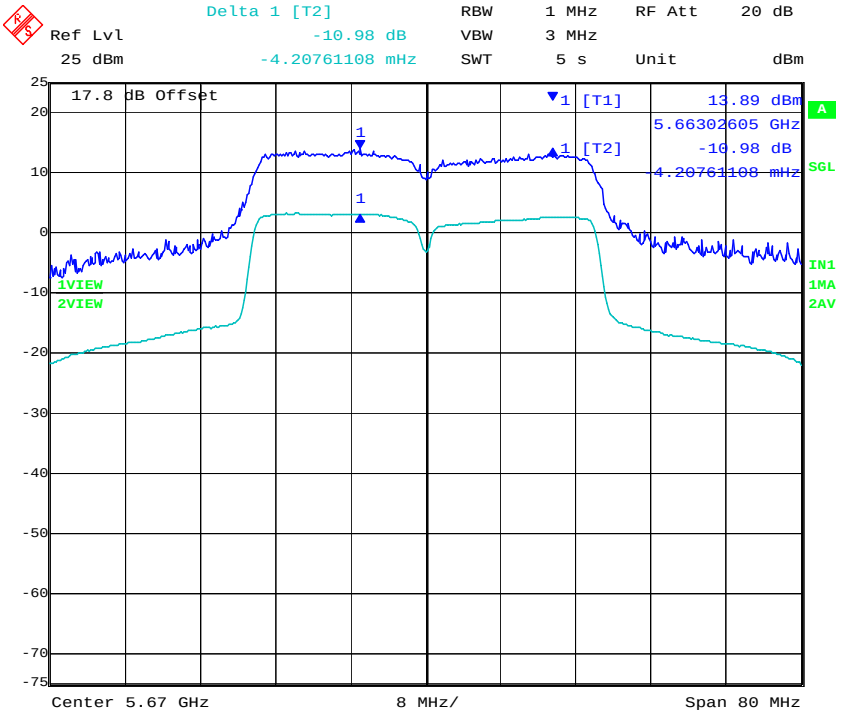


PORT A 5,670 MHz 802.11n HT-40 Peak Excursion Ratio



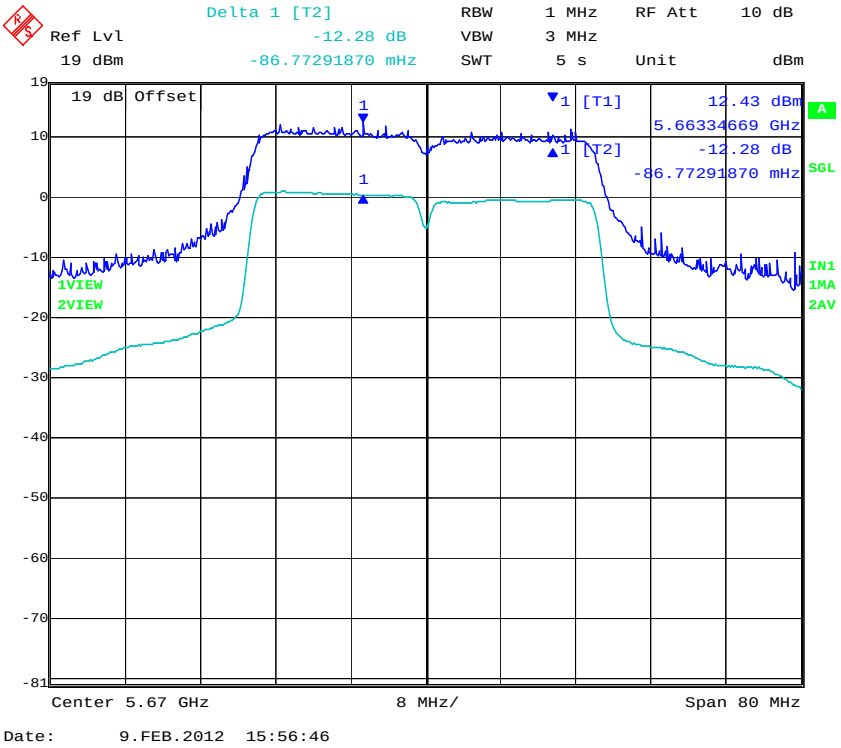
Date: 9.FEB.2012 15:55:26

PORT B 5,670 MHz 802.11n HT-40 Peak Excursion Ratio



Date: 9.FEB.2012 15:56:08

PORT C 5,670 MHz 802.11n HT-40 Peak Excursion Ratio



Specification

Limits

§15.407 (a)(6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified in this paragraph) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less

Laboratory Measurement Uncertainty for Spectrum Measurement

Measurement uncertainty	± 2.81dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of RF Spectrum Mask'	0158, 0287, 0252, 0313, 0314, 0070, 0116, 0117

5.1.5. Frequency Stability

FCC, Part 15 Subpart C §15.407(g)
Industry Canada RSS-210 §2.1

Test Procedure

The manufacturer of the equipment is responsible for ensuring that the frequency stability is such that emissions are always maintained within the band of operation under all conditions.

Manufacturer Declaration

The frequency stability of the reference oscillator sets the frequency stability of the RF transceiver signals. Therefore all of the RF signals should have ±20ppm stability.
This stability accounts for room temp tolerance of the crystal oscillator circuit, frequency variation across temperature, and crystal ageing.

±20ppm at 5.250 GHz translates to a maximum frequency shift of ±105 KHz. As the edge of the channels is at least one MHz from either of the band edges, ±105 KHz is more than sufficient to guarantee that the intentional emission will remain in the band over the entire operating range of the EUT.

Specification

Limits

§15.407 (g) 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.

5.1.6. Maximum Permissible Exposure

FCC, Part 15 Subpart C §15.407(f)
Industry Canada RSS-Gen §5.5

Calculations for Maximum Permissible Exposure Levels

Power Density = Pd (mW/cm^2) = EIRP/(4πd^2)

EIRP = P * G * 2

P = Peak output power (mW)

G = Antenna numeric gain (numeric)

d = Separation distance (cm)

Numeric Gain = 10 ^ (G (dBi)/10)

The Fluke Networks Sensor4 has three transmitters operating in each band. It also has two similar radio's. The peak power in the table below is calculated by assuming a worst case scenario where all transmitters are operating simultaneously in the same channel and x2 the maximum power found in Section 5.1.2 Peak Output Power to take into account the two radio modules operating simultaneously in the same band.

Because the EUT belongs to the General Population/Uncontrolled Exposure the limit of power density is 1.0 mW/cm^2

The following table uses the highest antenna gain for each band.

Freq. Band (MHz)	Antenna Gain (dBi)	Numeric Gain (numeric)	Peak Output Power (dBm)	Peak Output Power x 2 (mW)	Power Density (S) @ 20cm mW/cm^2
5150 – 5250	Integral 3.1	2.00	+16.92	98.4	0.04
5250 – 5350	Integral 3.1	2.00	+23.14	412.1	0.16
5470 - 5725	Integral 4.8	3.02	+22.72	374.1	0.23

Note: for mobile or fixed location transmitters the minimum separation distance is 20cm, even if calculations indicate the MPE distance to be less.

Specification
Maximum Permissible Exposure Limits

FCC §1.1310 Limit = 1mW / cm^2 from 1.310 Table 1

RSS-Gen §5.5 Before equipment certification is granted, the application requirements of RSS-102 shall be met.

Laboratory Measurement Uncertainty for Power Measurements

Measurement uncertainty	±1.33 dB

5.1.7. Radiated Emissions

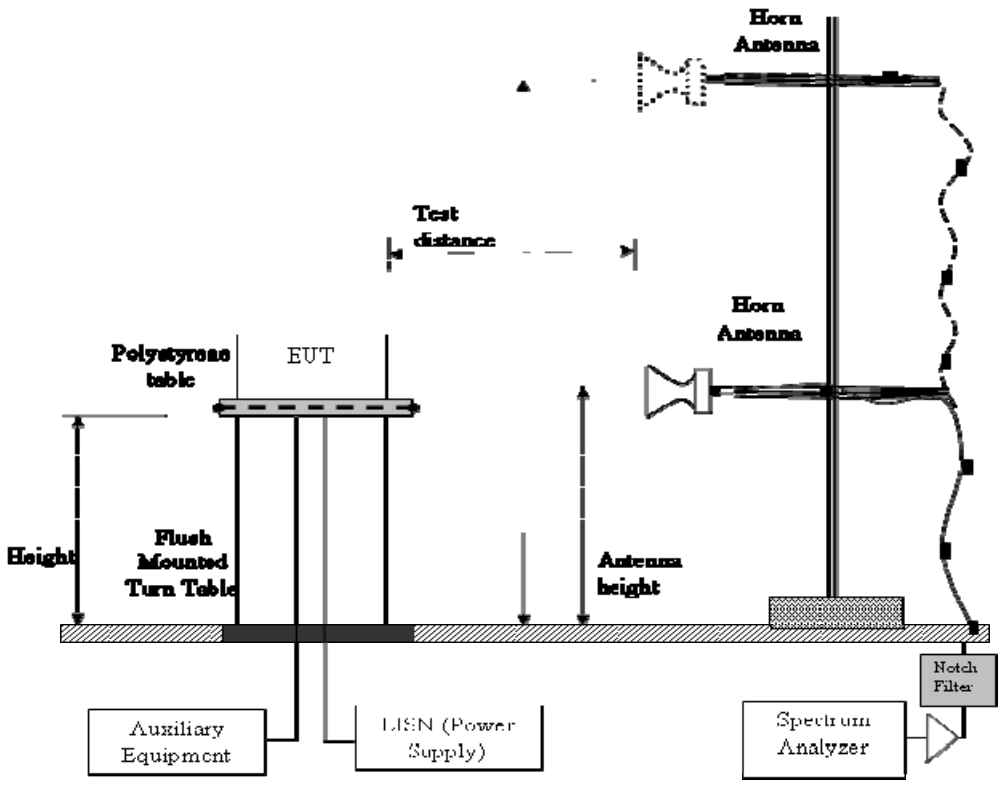
FCC, Part 15 Subpart C §15.407(b)(2), §15.205(a)/15.209(a)
Industry Canada RSS-210 §A9.3(2); §2.2; §2.6; RSS-Gen §4.7

Test Procedure

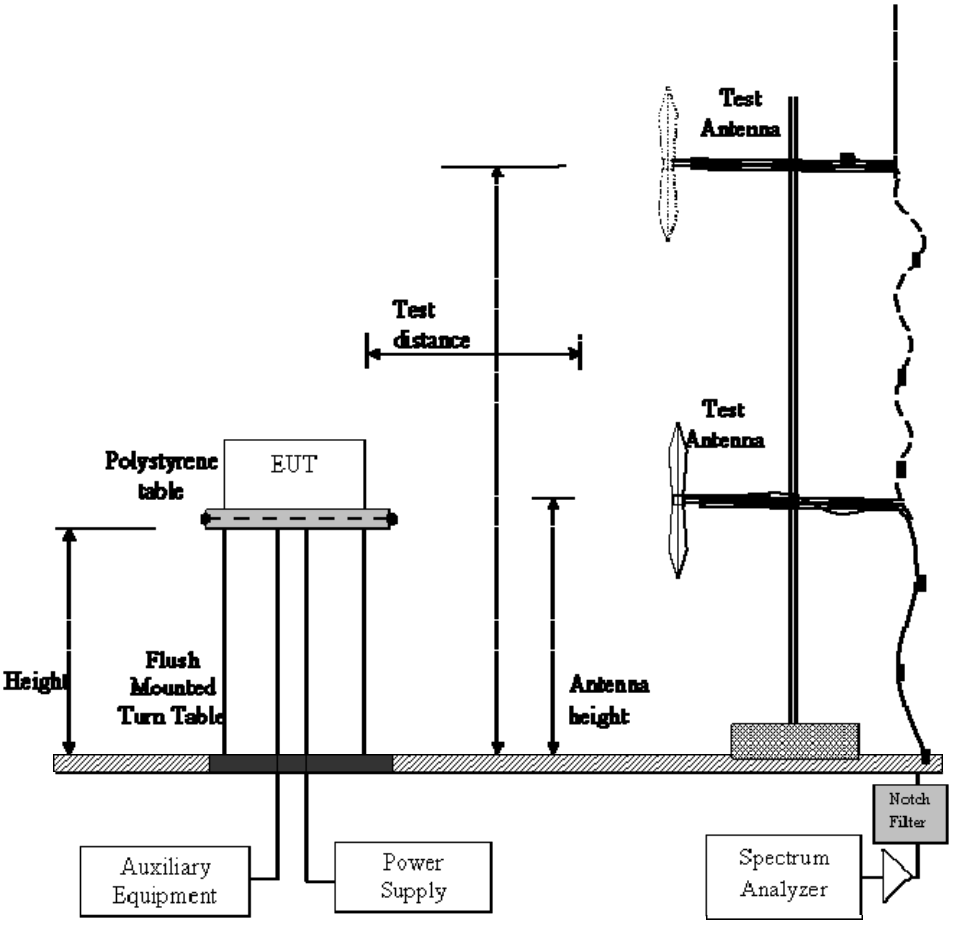
Testing was performed in a 3-meter anechoic chamber. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. Preliminary emissions were recorded with in Spectrum Analyzer mode, using a maximum peak detector while in peak hold mode. Depending on the frequency band spanned a notch filter and/or waveguide filter was used to remove the fundamental frequency.

Emissions nearest the limits were chosen for maximization and formal measurement using a CISPR compliant receiver. Emissions above 1000 MHz are measured utilizing a CISPR compliant average detector with a tuned receiver, using a bandwidth of 1 MHz. Emissions from 30 MHz – 1000 MHz are measured utilizing a CISPR compliant quasi-peak detector with a tuned receiver, using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed.

Test Measurement Set Up



Radiated Emission Measurement Setup – Above 1 GHz



Radiated Emission Measurement Setup – Below 1 GHz

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.

FS = R + AF + CORR – FO

FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor

CORR = Correction Factor = CL – AG + NFL

CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Field Strength Calculation Example:

Given receiver input reading of 51.5 dBμV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

40 dBμV/m = 100 μV/m
48 dBμV/m = 250 μV/m

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength (dBμV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \ \mu V/m$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

Note: The data in this Section identifies that the EUT is in compliance with the -27dBm/MHz EIRP limit (68.23 dBμV/m) for out of band emissions. All out of band emissions are less than 68.23 dB μV/m.

Specification

Radiated Spurious Emissions

15.407 (b)(2). All emissions outside of the 5,150-5,350MHz band shall not exceed an EIRP of -27dBm/MHz.

FCC §15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

FCC §15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

FCC §15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

RSS-210 §A9.3(2) For transmitters operating in the 5250-5350 MHz band, all emissions outside the 5150-5350 MHz band shall not exceed -27 dBm/MHz e.i.r.p. Devices operating in the 5250-5350 MHz band that generate emissions in the 5150-5250 MHz band shall not exceed out of band emission limit of 27 dBm/MHz e.i.r.p. in the 5150-5250 MHz band in order to operate indoor/outdoor, or alternatively shall comply with the spectral power density for operation within the 5150-5250 MHz band and shall be labeled “for indoor use only”.

RSS-Gen §4.7 The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate of carrier frequency), or from 30 MHz , whichever is the lowest frequency, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

RSS-Gen §6 Receiver Spurious Emission Standard
If a radiated measurement is made, all spurious emissions shall comply with the limits of the following Table. The resolution bandwidth of the spectrum analyzer shall be 100 kHz for spurious emission measurements below 1.0 GHz and 1.0 MHz for measurements above 1.0 GHz

Table 1: FCC 15.209 Spurious Emissions Limits

Frequency (MHz)	Field Strength (µV/m)	Field Strength (dBµV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Laboratory Measurement Uncertainty for Spectrum Measurement

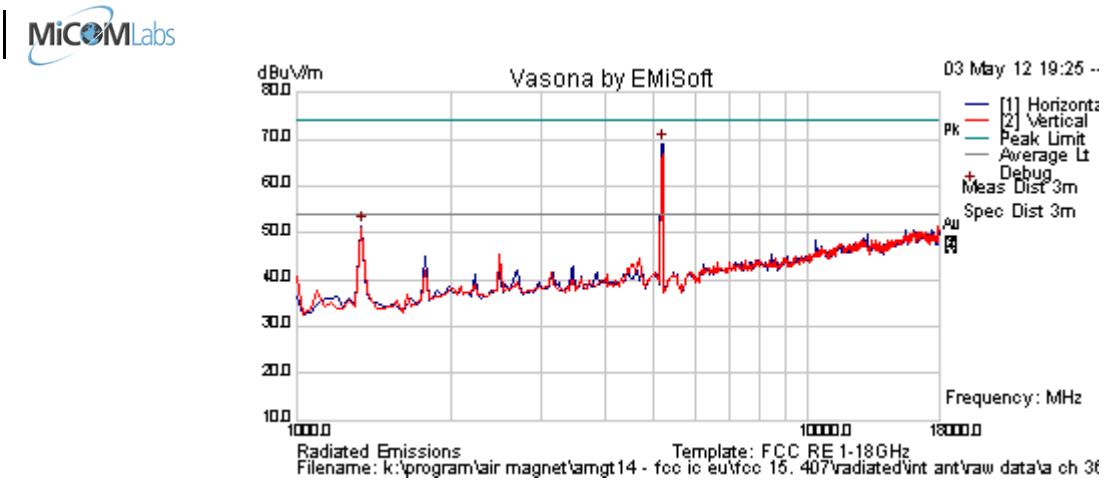
Measurement Uncertainty	+5.6/ -4.5 dB

Traceability:

Method	Test Equipment Used
Work instruction WI-03	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

5.1.7.1. Integral Antenna

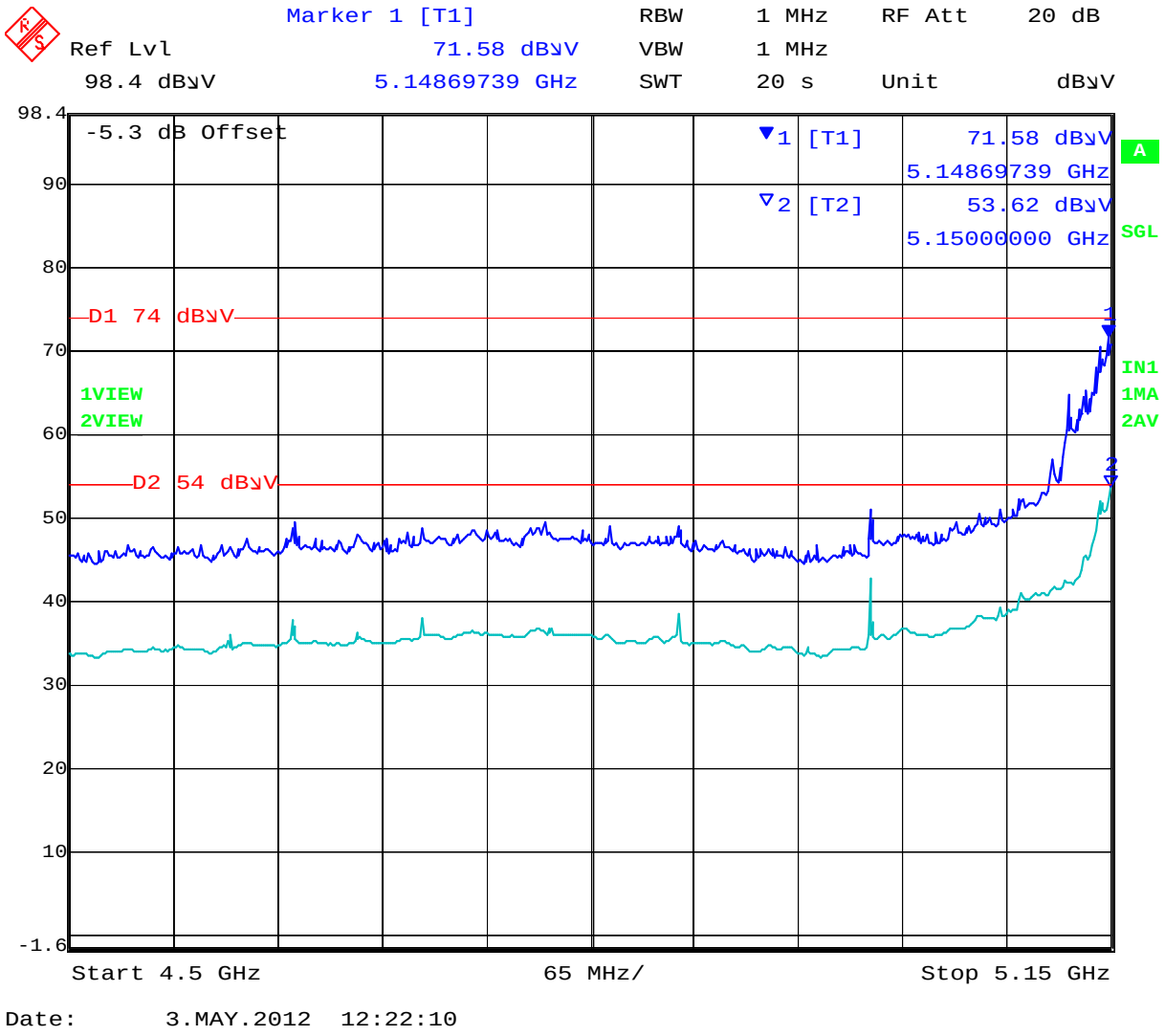
Test Freq.	5180 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	16	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

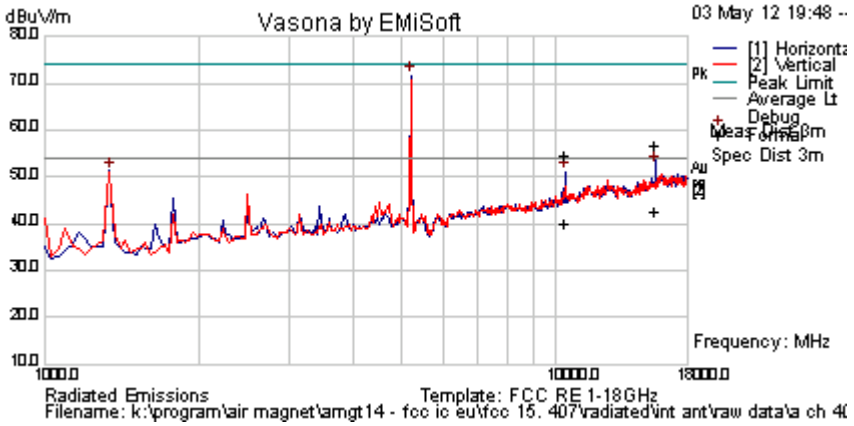
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	74.4	4.6	-9.9	69.1	Peak [Scan]	H	200	0				FUND
1340.68136	63.2	2.3	-13.9	51.5	Peak [Scan]	H	100	0	54.0	-2.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11a Channel Frequency 5180 MHz

Test Freq.	5200 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

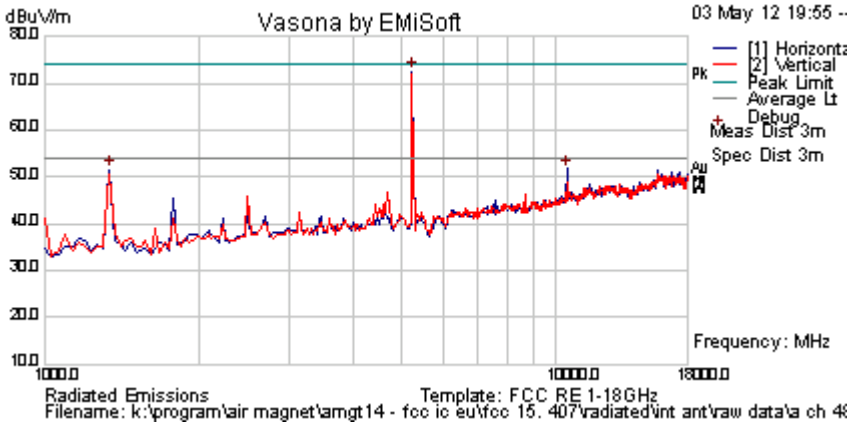


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15606.134	49.0	8.4	-0.6	56.8	Peak Max	H	100	327	74.0	-17.2	Pass	RB
10395.231	50.3	6.7	-2.5	54.5	Peak Max	H	166	345	74.0	-19.5	Pass	RB
15606.134	35.0	8.4	-0.6	42.8	Average Max	H	100	327	54.0	-11.3	Pass	RB
10395.231	35.8	6.7	-2.5	40.1	Average Max	H	166	345	54	-13.9	Pass	RB
5190.381	77.0	4.6	-9.9	71.8	Peak [Scan]	H	200	0				FUND
1340.681	62.9	2.3	-13.9	51.3	Peak [Scan]	H	100	0	54	-2.7	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

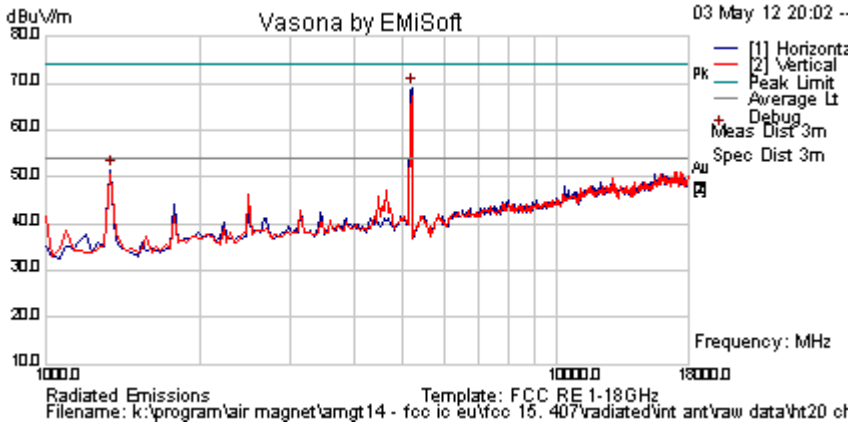


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
10505.01	50.3	6.7	-2.5	54.5	Peak Max	H	166	345	74.0	-19.5	Pass	RB
10505.01	35.8	6.7	-2.5	40.1	Average Max	H	166	345	54	-13.9	Pass	RB
1340.681	63.2	2.3	-13.9	51.6	Peak [Scan]	H	100	0	54.0	-2.4	Pass	RB
5224.449	77.7	4.6	-9.8	72.5	Peak [Scan]	H	100	0				FUND

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

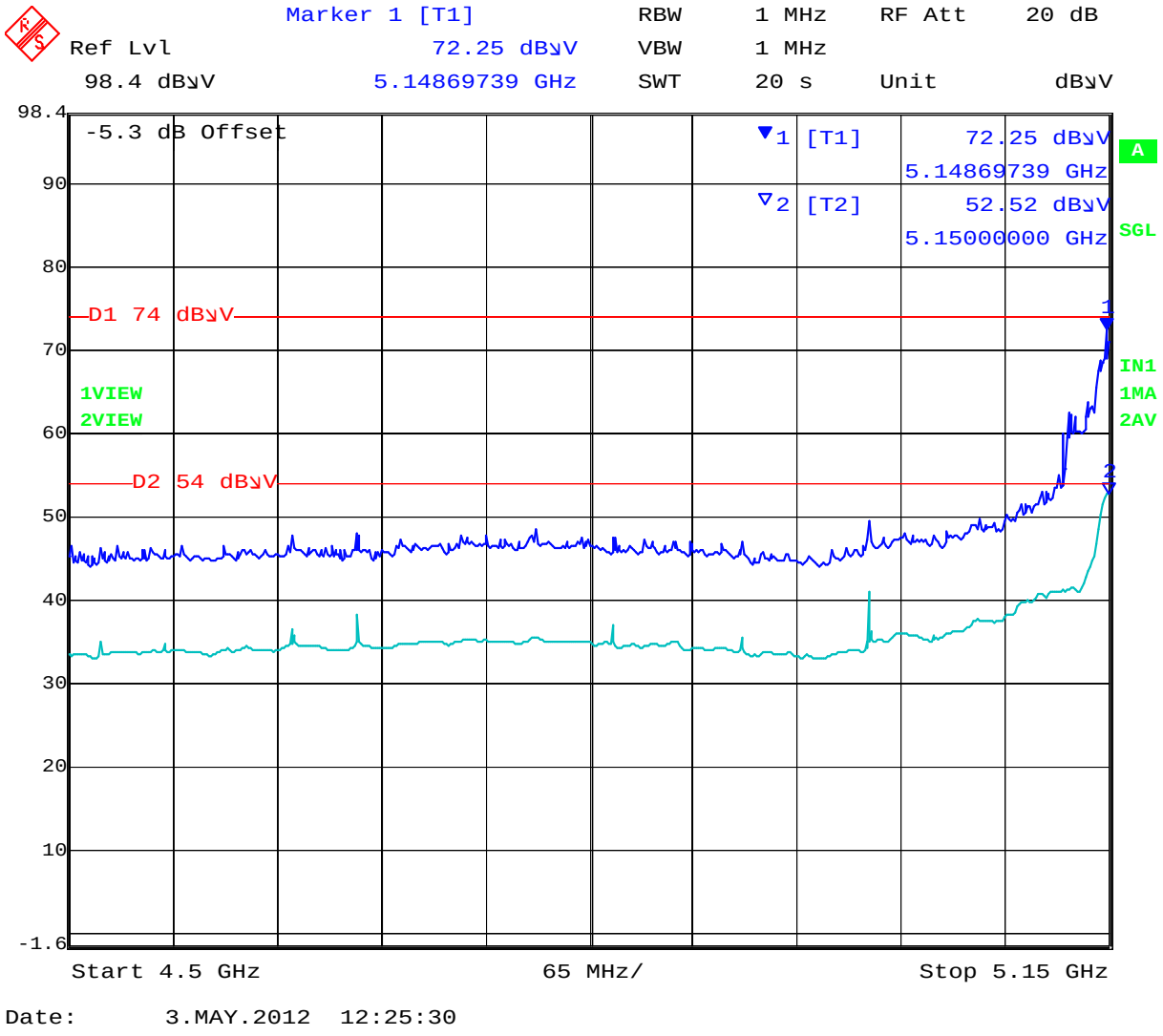
Test Freq.	5180 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	17	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

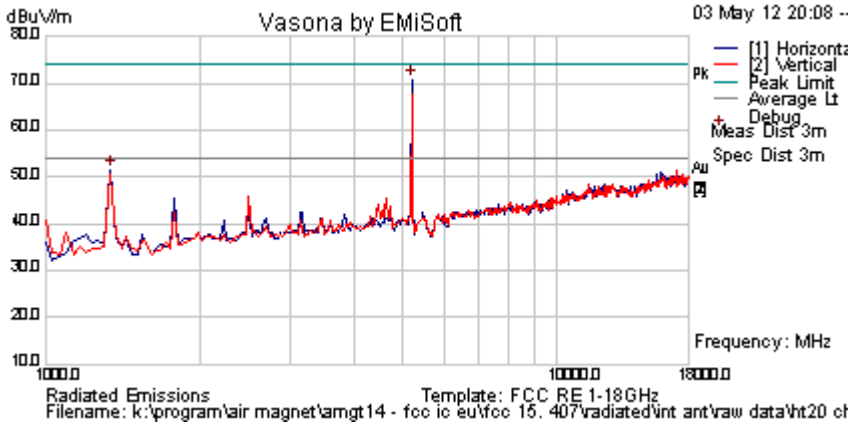
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	74.5	4.6	-9.9	69.2	Peak [Scan]	H	200	0				FUND
1340.68136	63.1	2.3	-13.9	51.5	Peak [Scan]	H	100	0	54.0	-2.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-20 Channel Frequency 5180 MHz

Test Freq.	5200 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

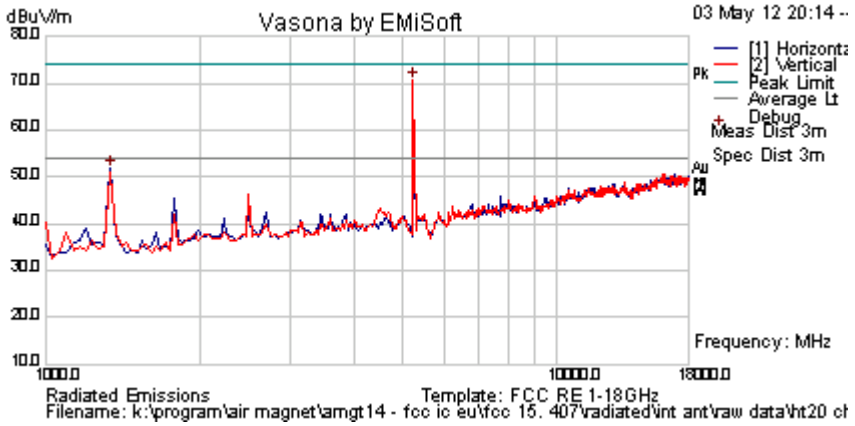


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	76.1	4.6	-9.9	70.9	Peak [Scan]	H	200	0				FUND
1340.68136	63.1	2.3	-13.9	51.5	Peak [Scan]	H	100	0	54.0	-2.6	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

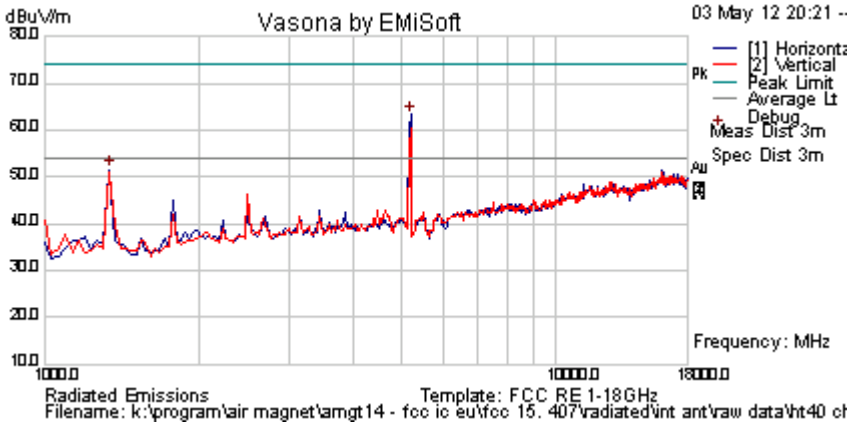


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.449	75.9	4.6	-9.8	70.7	Peak [Scan]	V	150	0				FUND
1340.68136	63.3	2.3	-13.9	51.7	Peak [Scan]	H	100	0	54.0	-2.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

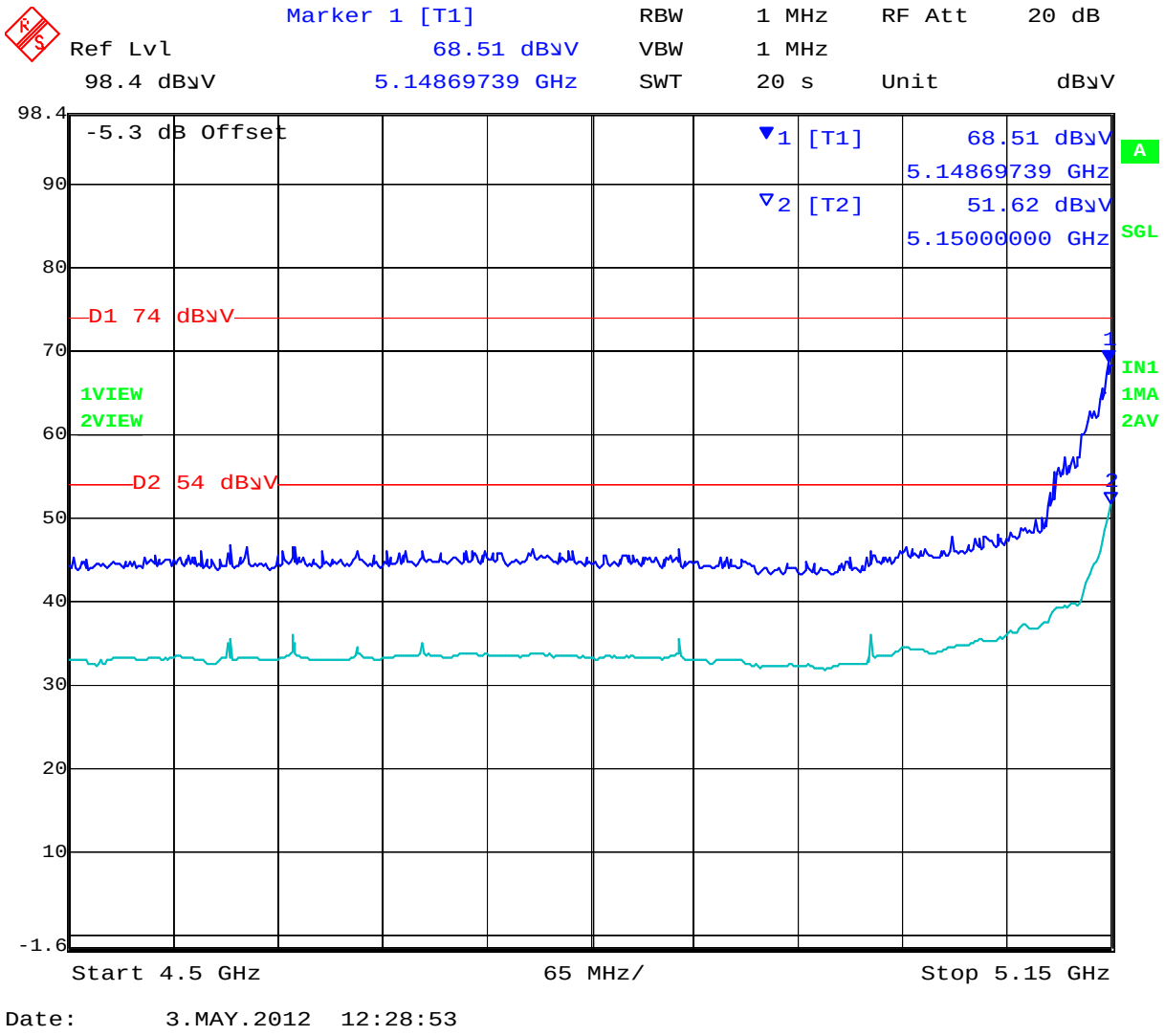
Test Freq.	5190 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	12	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

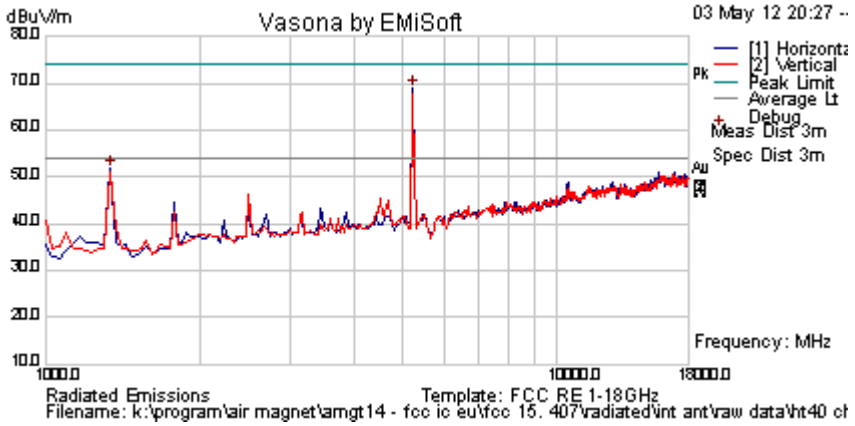
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	68.5	4.6	-9.9	63.2	Peak [Scan]	H	200	0				FUND
1340.68136	63.2	2.3	-13.9	51.6	Peak [Scan]	H	100	0	54.0	-2.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-40 Channel Frequency 5190 MHz

Test Freq.	5230 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

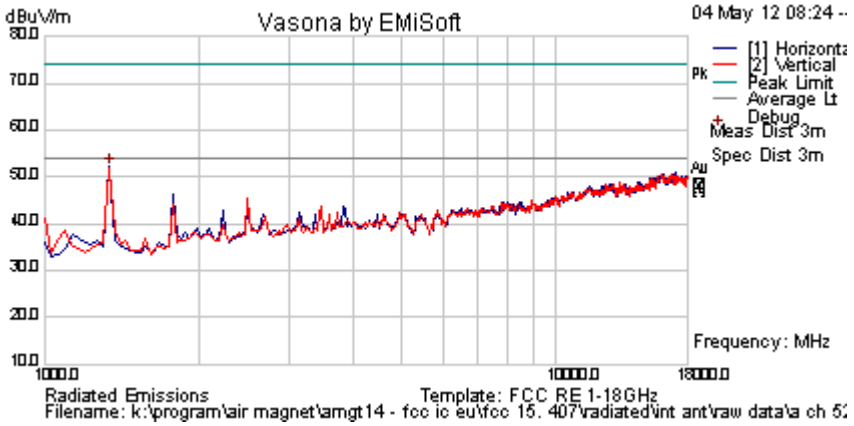


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.449	74.1	4.6	-9.8	68.9	Peak [Scan]	H	100	0				FUND
1340.68136	63.3	2.3	-13.9	51.7	Peak [Scan]	H	100	0	54.0	-2.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5260 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

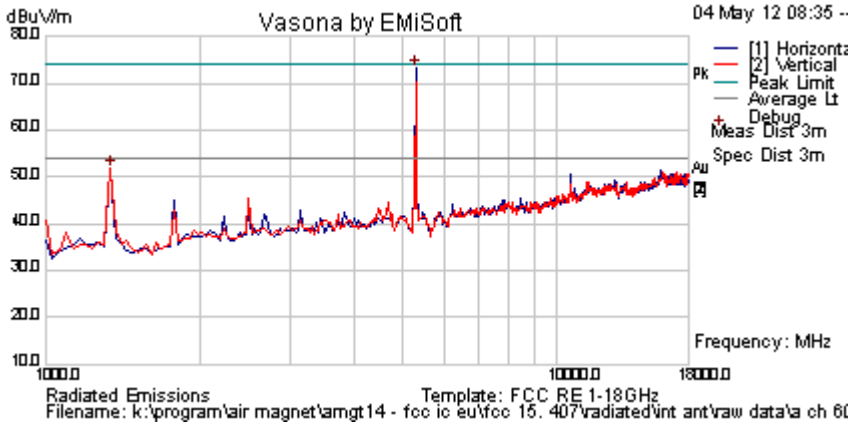


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
1340.681	63.8	2.3	-13.9	52.2	Peak [Scan]	H	100	0	54.0	-1.8	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5300 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

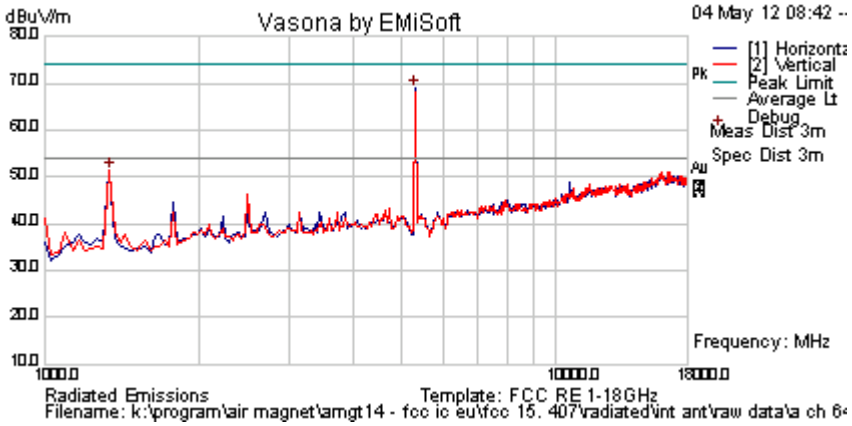


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	78.1	4.6	-9.6	73.1	Peak [Scan]	H	100	0				FUND
1340.68136	63.5	2.3	-13.9	51.9	Peak [Scan]	V	100	0	54.0	-2.2	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

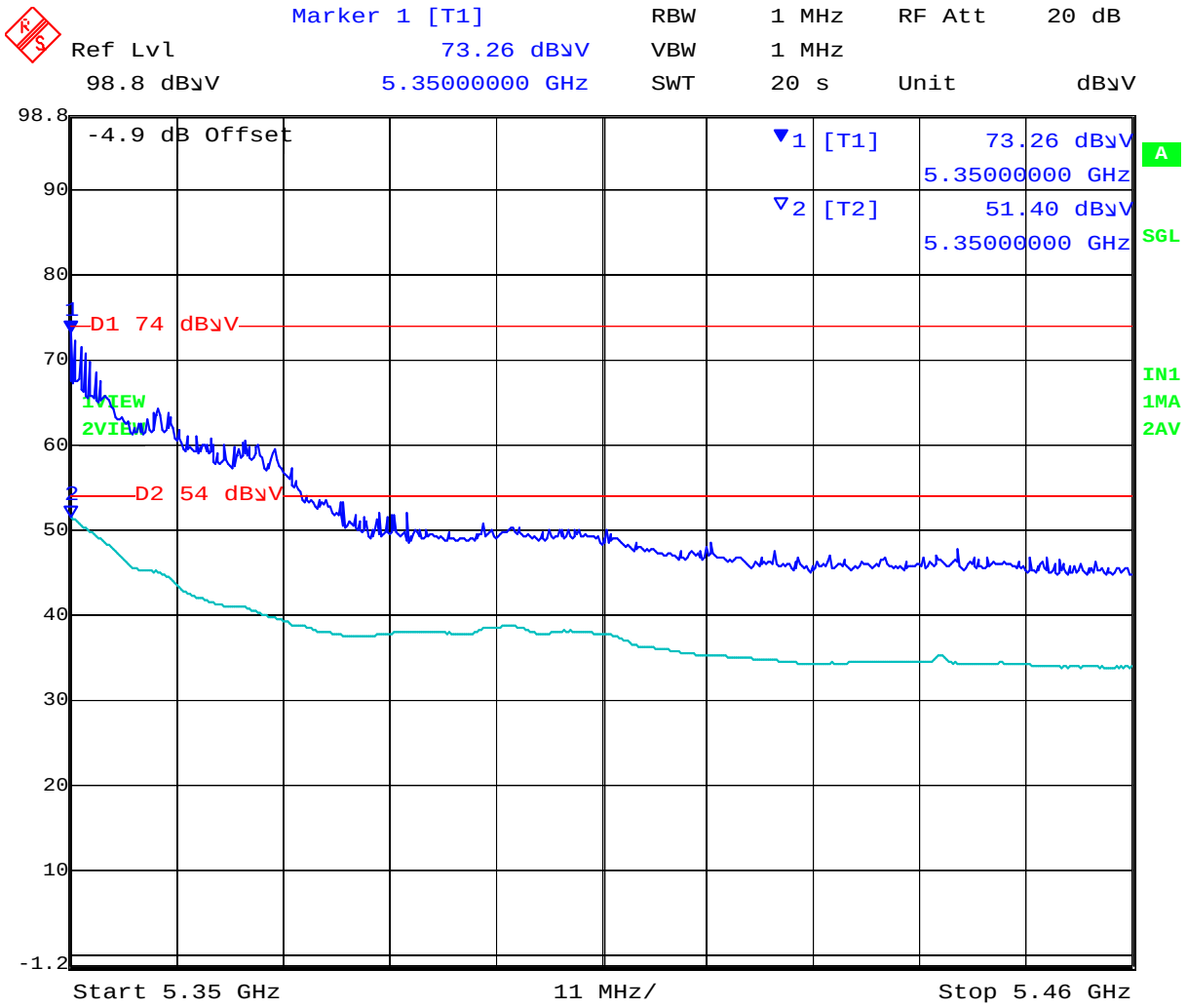
Test Freq.	5320 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	16	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

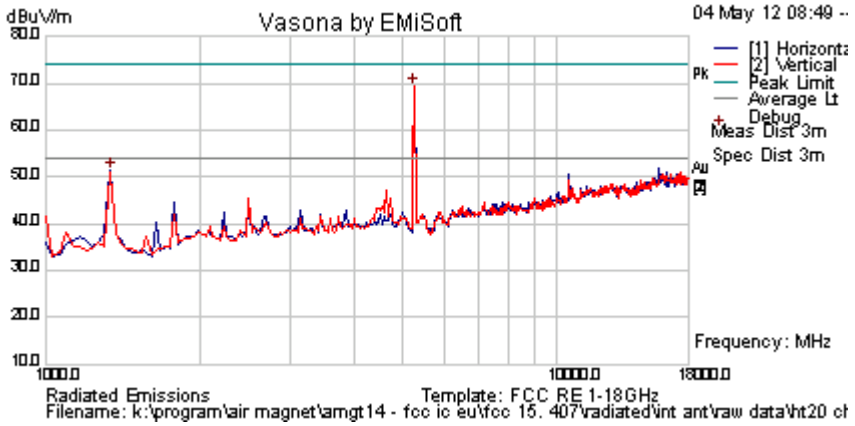
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	73.9	4.6	-9.6	68.9	Peak [Scan]	H	100	0				FUND
1340.68136	63.0	2.3	-13.9	51.4	Peak [Scan]	V	100	0	54.0	-2.6	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11a Channel Frequency 5320 MHz

Test Freq.	5260 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

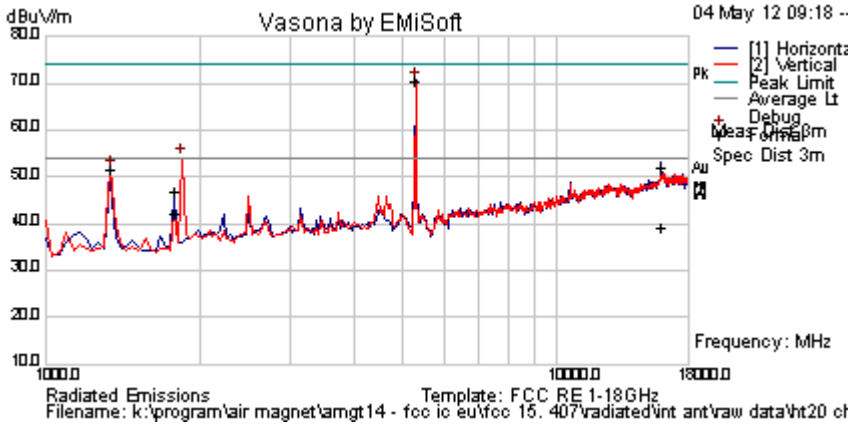


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	74.4	4.6	-9.7	69.3	Peak [Scan]	V	200	0				FUND
1340.68136	63.0	2.3	-13.9	51.4	Peak [Scan]	H	100	0	54.0	-2.6	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5300 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

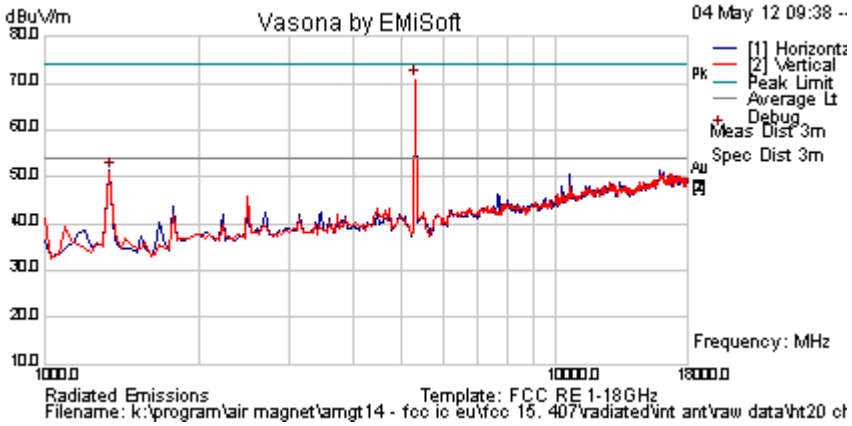


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15962.502	42.9	9.0	0.0	51.9	Peak Max	V	175	227	74.0	-22.1	Pass	RB
1799.96	57.0	2.6	-12.6	47.0	Peak Max	V	108	172	74.0	-27.0	Pass	RB
15962.502	30.2	9.0	0.0	39.2	Average Max	V	175	227	54.0	-14.8	Pass	RB
1799.960	52.3	2.6	-12.6	42.3	Average Max	V	108	172	54	-11.7	Pass	RB
5292.585	75.6	4.6	-9.6	70.7	Peak [Scan]	H	150	0				FUND
1340.681	63.4	2.3	-13.9	51.8	Peak [Scan]	V	100	0	54	-2.2	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5320 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	16	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



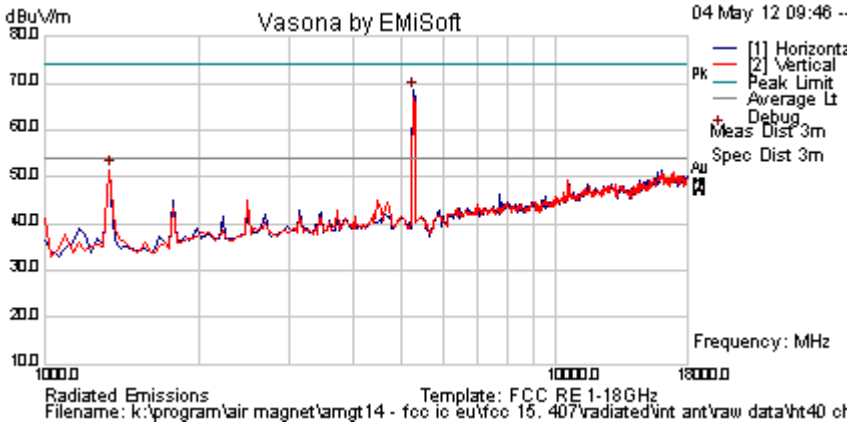
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	75.7	4.6	-9.6	70.8	Peak [Scan]	V	100	0				FUND
1340.68136	62.9	2.3	-13.9	51.2	Peak [Scan]	H	100	0	54.0	-2.8	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Band-Edge 802.11n HT-20 Channel Frequency 5320 MHz

Test Freq.	5270 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

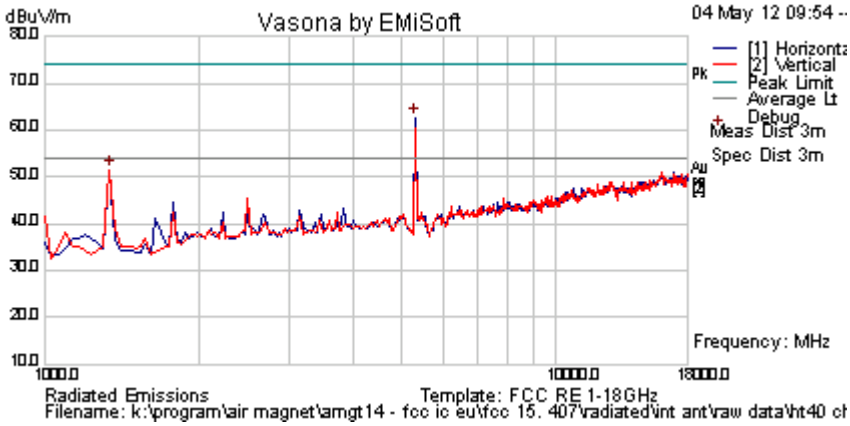


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5258.517	73.6	4.6	-9.7	68.4	Peak [Scan]	H	100	0				FUND
1340.68136	63.2	2.3	-13.9	51.6	Peak [Scan]	V	100	0	54.0	-2.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

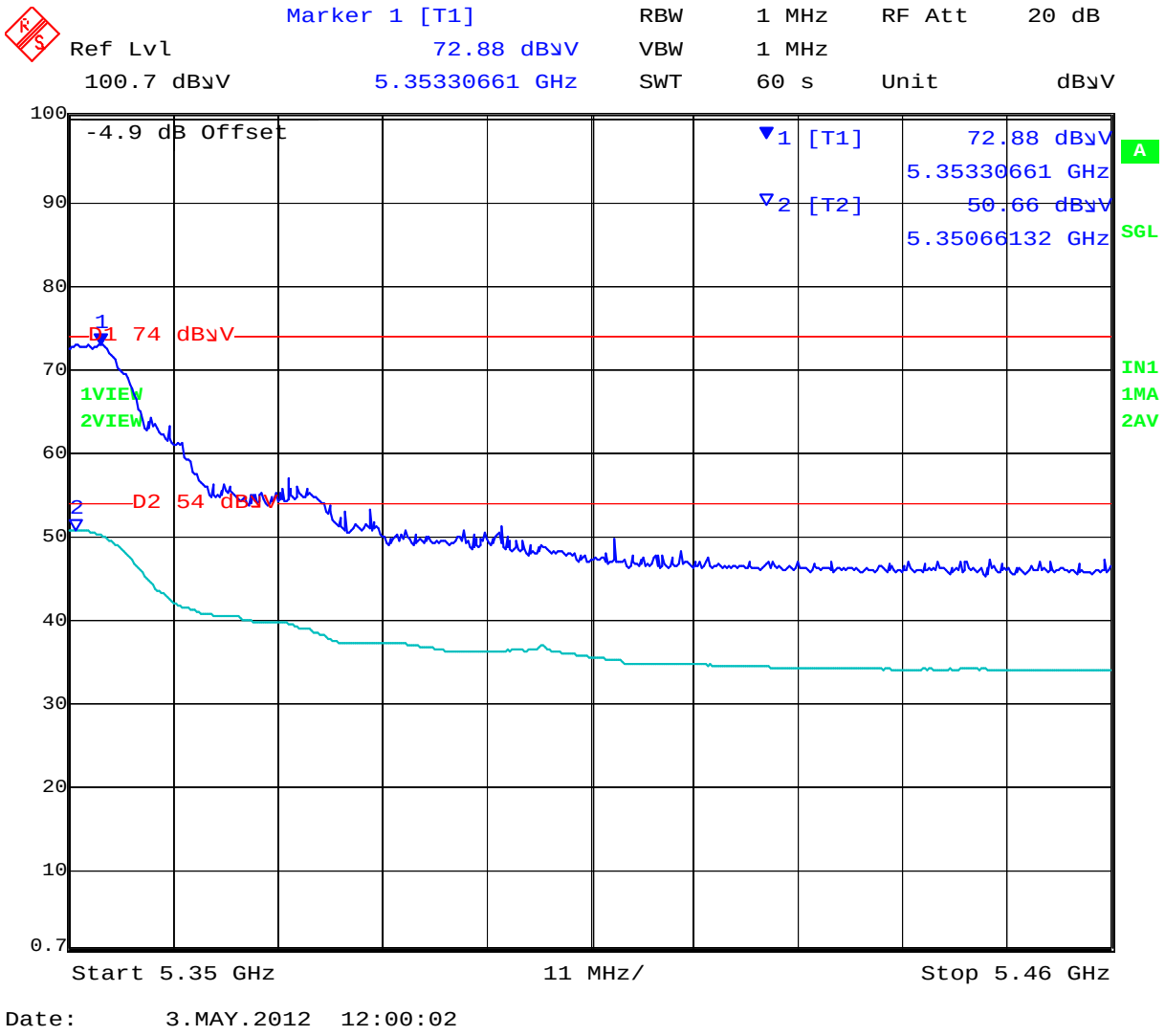
Test Freq.	5310 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	13	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

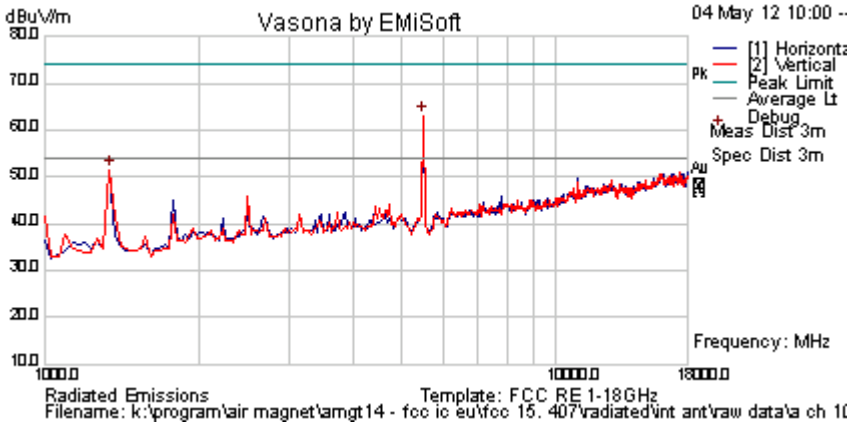
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	67.7	4.6	-9.6	62.8	Peak [Scan]	H	100	0				FUND
1340.68136	63.1	2.3	-13.9	51.5	Peak [Scan]	V	100	0	54.0	-2.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-40 Channel Frequency 5310 MHz

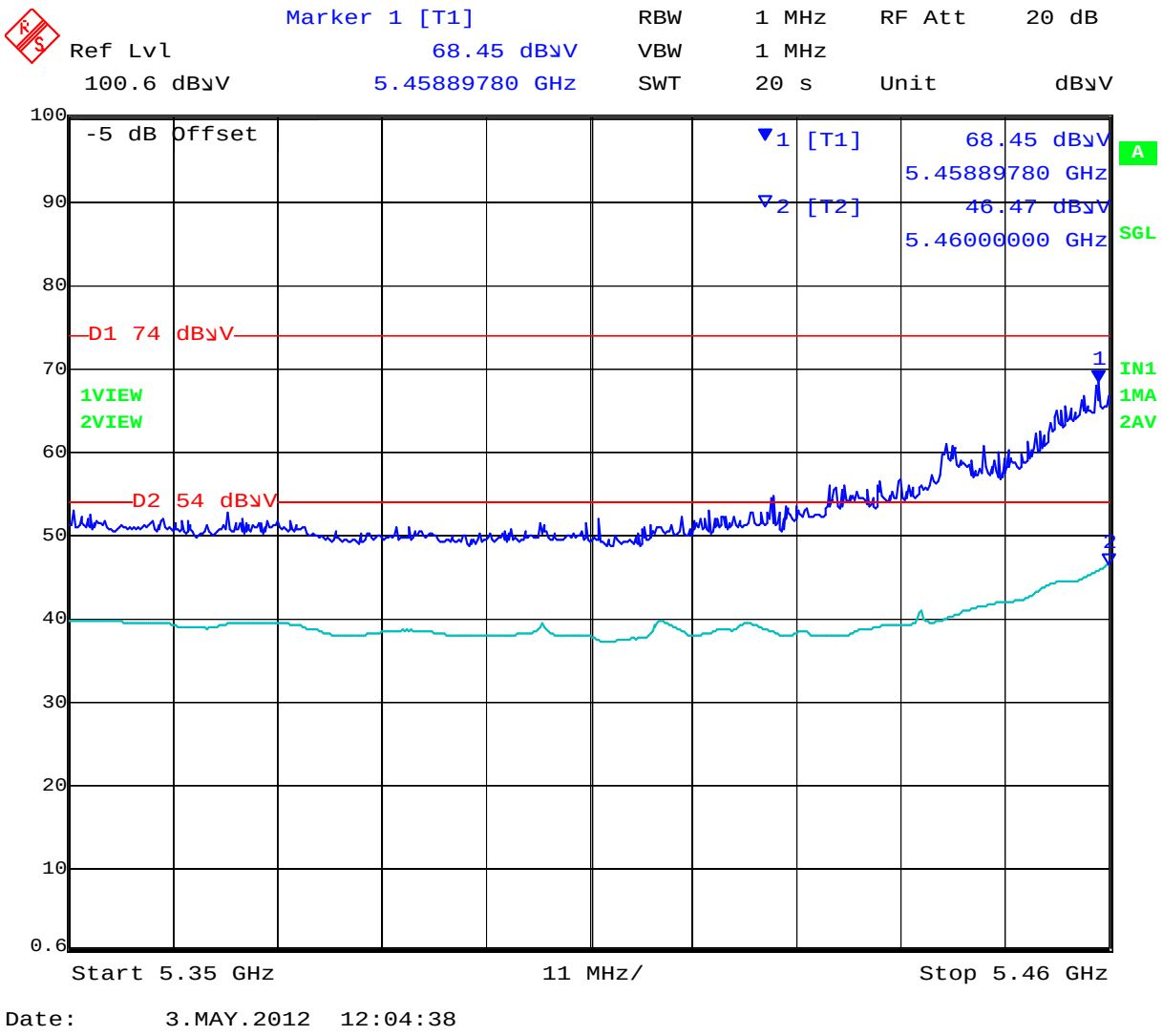
Test Freq.	5500 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

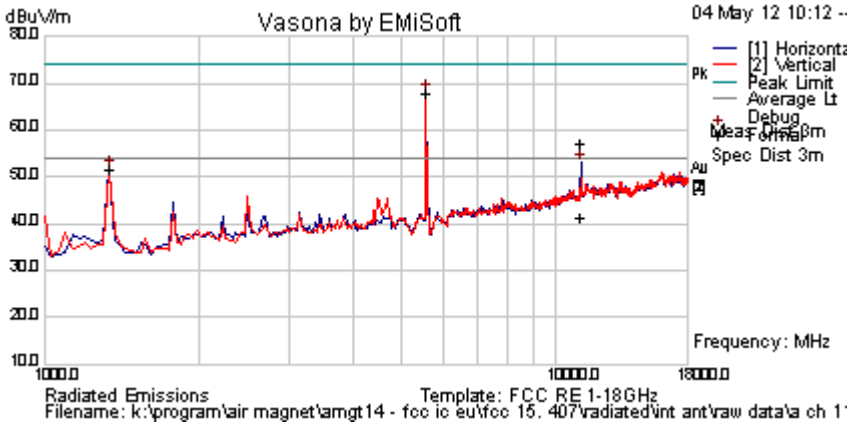
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	68.1	4.6	-9.6	63.1	Peak [Scan]	V	100	0				FUND
1340.68136	63.2	2.3	-13.9	51.6	Peak [Scan]	H	100	0	54.0	-2.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11a Channel Frequency 5500 MHz

Test Freq.	5580 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

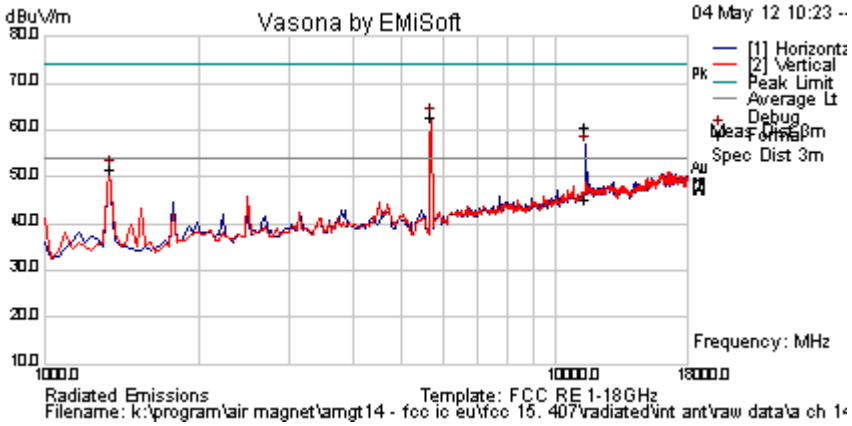


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11167.375	53.4	6.9	-3.0	57.4	Peak Max	H	144	19	74.0	-16.7	Pass	RB
11167.375	37.2	6.9	-3.0	41.2	Average Max	H	144	19	54.0	-12.8	Pass	RB
5565.130	73.1	4.7	-9.7	68.0	Peak [Scan]	V	100	0				FUND
1340.681	63.3	2.3	-13.9	51.7	Peak [Scan]	H	100	0	54	-2.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5700 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

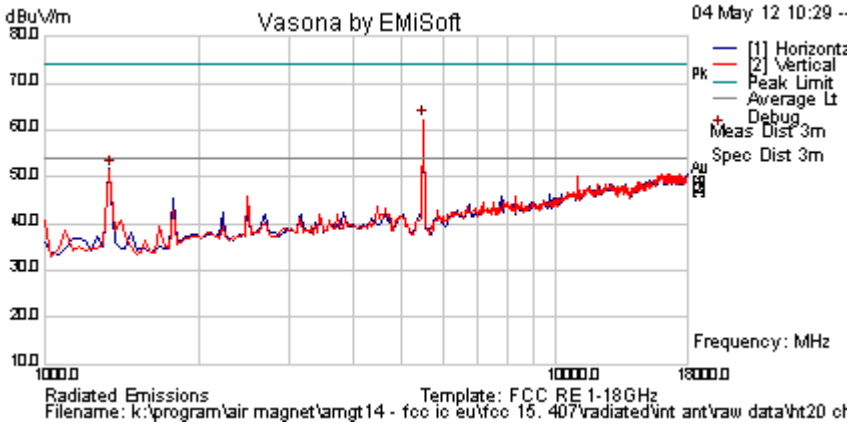


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11401.604	56.1	6.8	-2.2	60.7	Peak Max	H	122	1	74.0	-13.3	Pass	RB
11401.604	40.6	6.8	-2.2	45.2	Average Max	H	122	1	54.0	-8.8	Pass	RB
5701.403	67.6	4.7	-9.6	62.7	Peak [Scan]	V	100	0				FUND
1340.681	63.4	2.3	-13.9	51.7	Peak [Scan]	V	100	0	54	-2.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

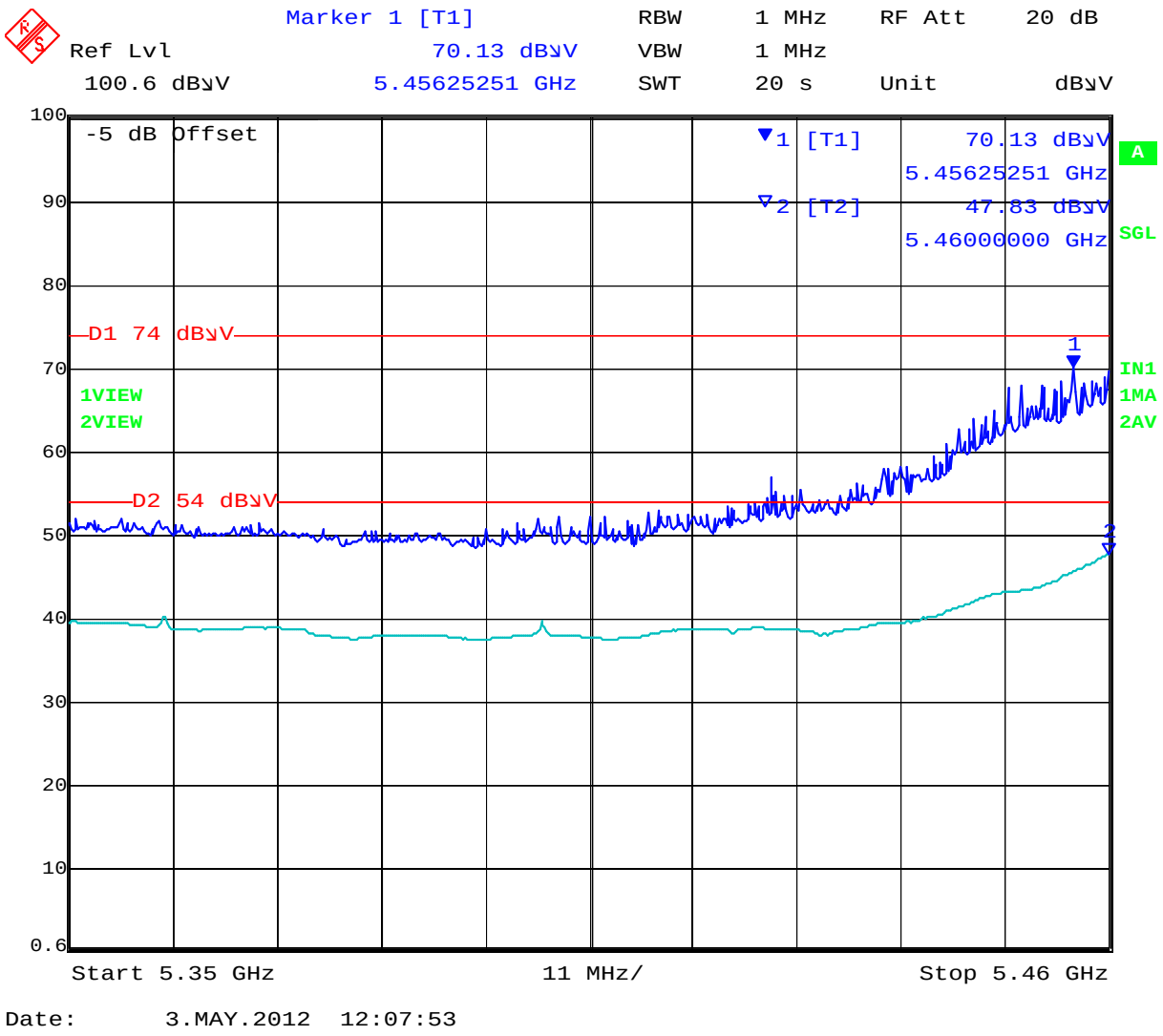
Test Freq.	5500 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

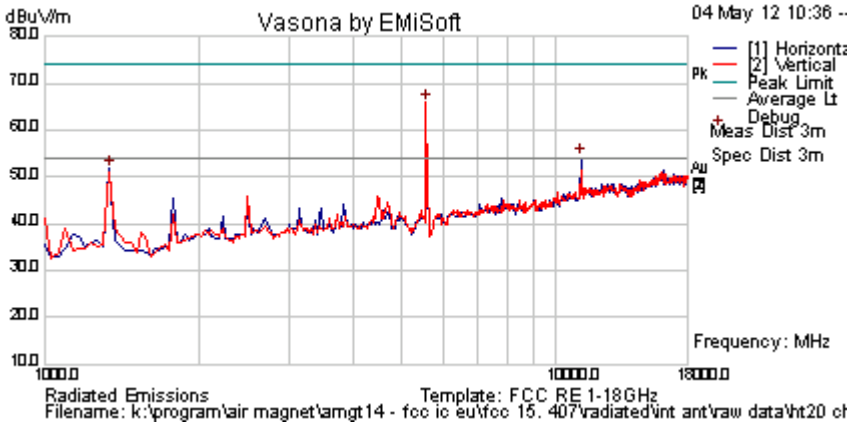
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	67.2	4.6	-9.6	62.2	Peak [Scan]	V	100	0				FUND
1340.68136	63.3	2.3	-13.9	51.7	Peak [Scan]	H	100	0	54.0	-2.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-20 Channel Frequency 5500 MHz

Test Freq.	5580 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

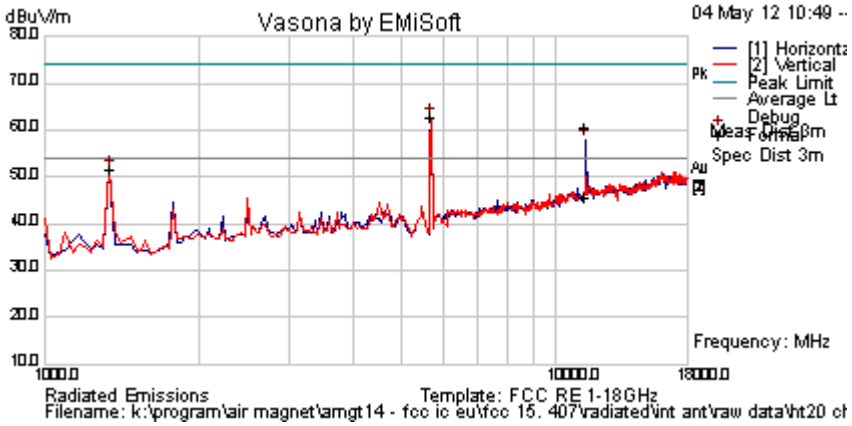


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11152.305	53.4	6.9	-3.0	57.4	Peak Max	H	144	19	74.0	-16.7	Pass	RB
11152.305	37.2	6.9	-3.0	41.2	Average Max	H	144	19	54.0	-12.8	Pass	RB
5565.130	71.0	4.7	-9.7	65.9	Peak [Scan]	V	100	0				FUND
1340.681	63.3	2.3	-13.9	51.7	Peak [Scan]	H	100	0	54.0	-2.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5700 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

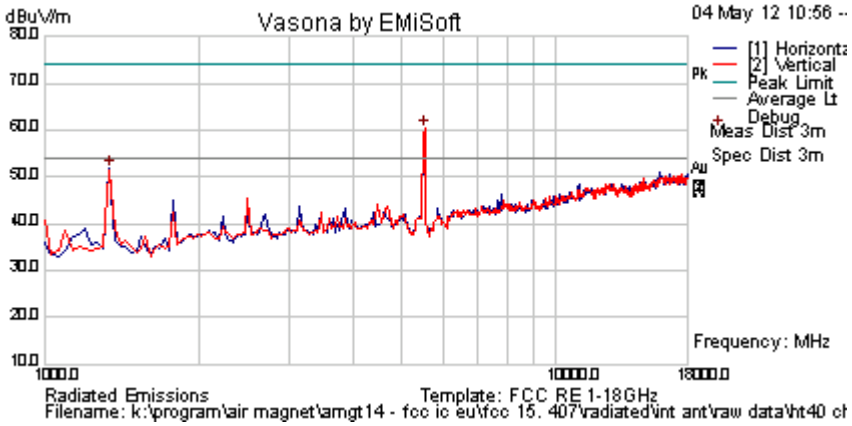


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11401.123	56.1	6.8	-2.3	60.7	Peak Max	H	111	0	74.0	-13.3	Pass	
11401.123	41.0	6.8	-2.3	45.6	Average Max	H	111	0	54.0	-8.4	Pass	
5701.40281	67.5	4.7	-9.6	62.6	Peak [Scan]	V	100	0				FUND
1340.68136	63.3	2.3	-13.9	51.7	Peak [Scan]	V	100	0	54.0	-2.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

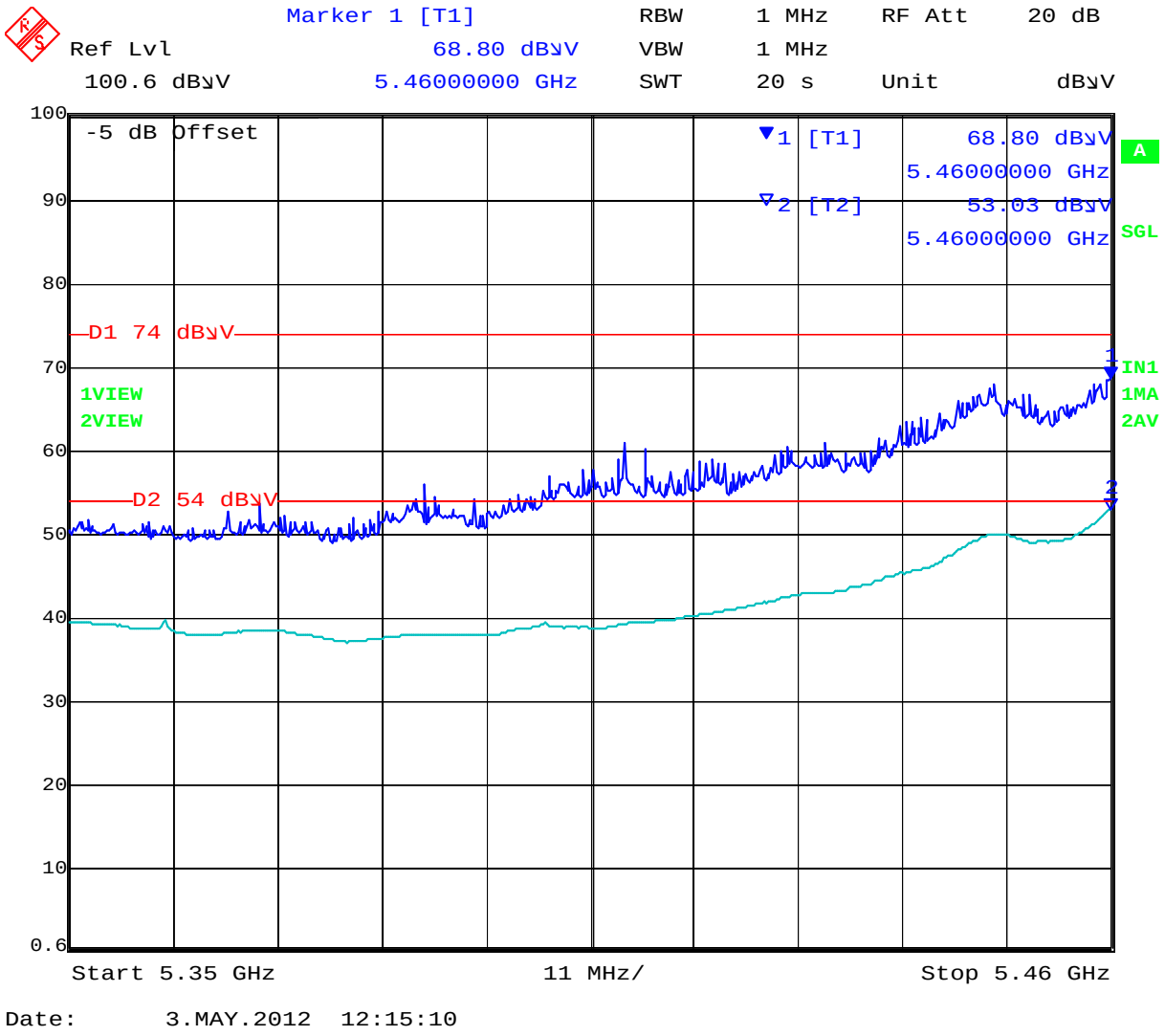
Test Freq.	5510 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

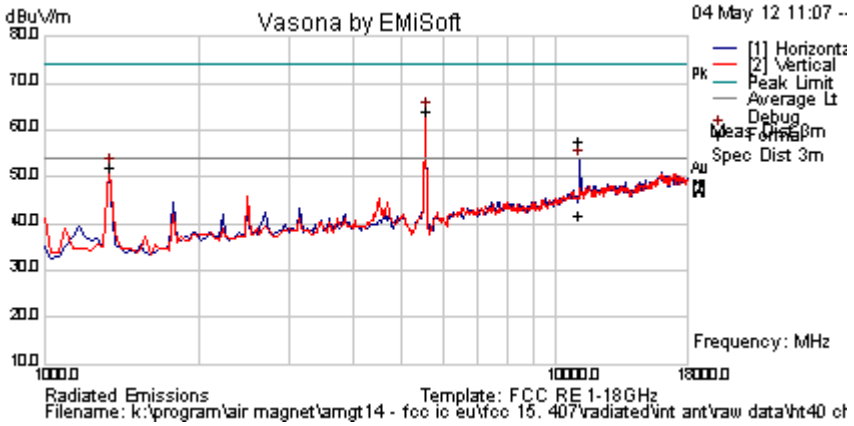
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5531.062	65.3	4.6	-9.7	60.2	Peak [Scan]	V	100	0	54.0	6.2	Fail	
1340.68136	63.4	2.3	-13.9	51.8	Peak [Scan]	H	100	0				FUND

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-40 Channel Frequency 5510 MHz

Test Freq.	5550 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

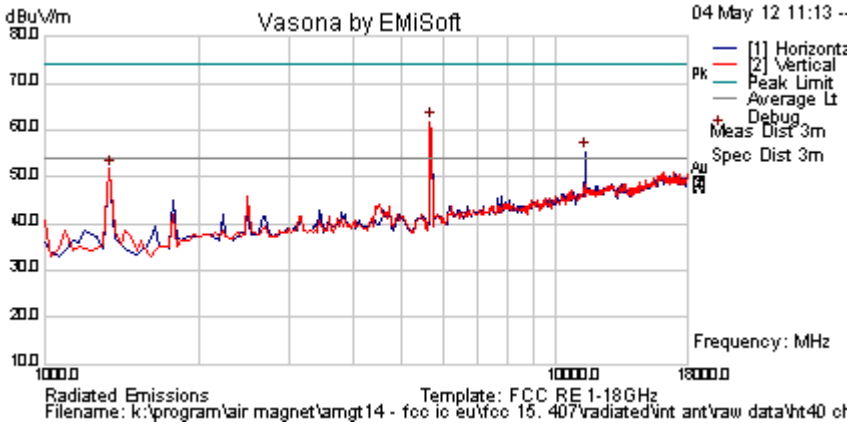


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11101.402	53.8	6.9	-3.2	57.5	Peak Max	H	109	0	74.0	-16.5	Pass	RB
11101.402	37.9	6.9	-3.2	41.7	Average Max	H	109	0	54.0	-12.3	Pass	RB
5565.130	69.0	4.7	-9.7	64.0	Peak [Scan]	V	100	0				FUND
1340.681	63.6	2.3	-13.9	52.0	Peak [Scan]	V	100	0	54	-2.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5670 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	Integral	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



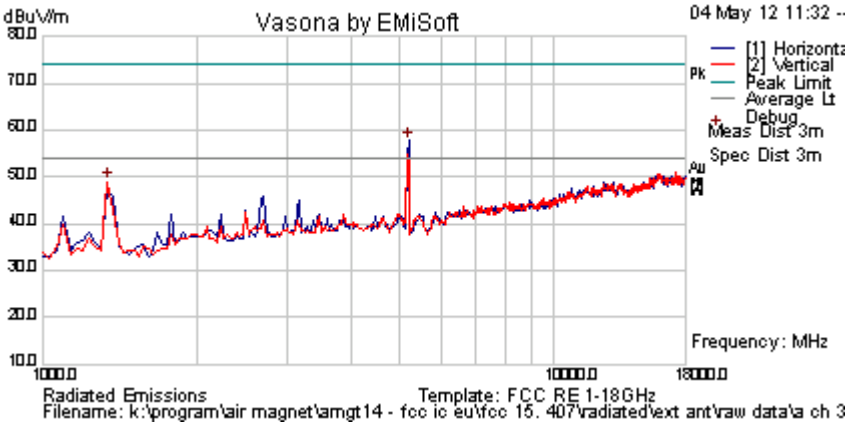
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11397.636	55.6	6.8	-2.3	60.2	Peak Max	H	132	0	74.0	-13.8	Pass	RB
1350.060	64.9	2.3	-14.0	53.2	Peak Max	H	98	1	74.0	-20.8	Pass	RB
11397.636	40.9	6.8	-2.3	45.4	Average Max	H	132	0	54.0	-8.6	Pass	RB
1350.06	61.8	2.3	-14.0	50.1	Average Max	H	98	1	54.0	-3.9	Pass	RB
5667.335	65.2	4.7	-9.7	60.2	Peak [Scan]	H	150	0				FUND

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

5.1.7.2. External Antenna

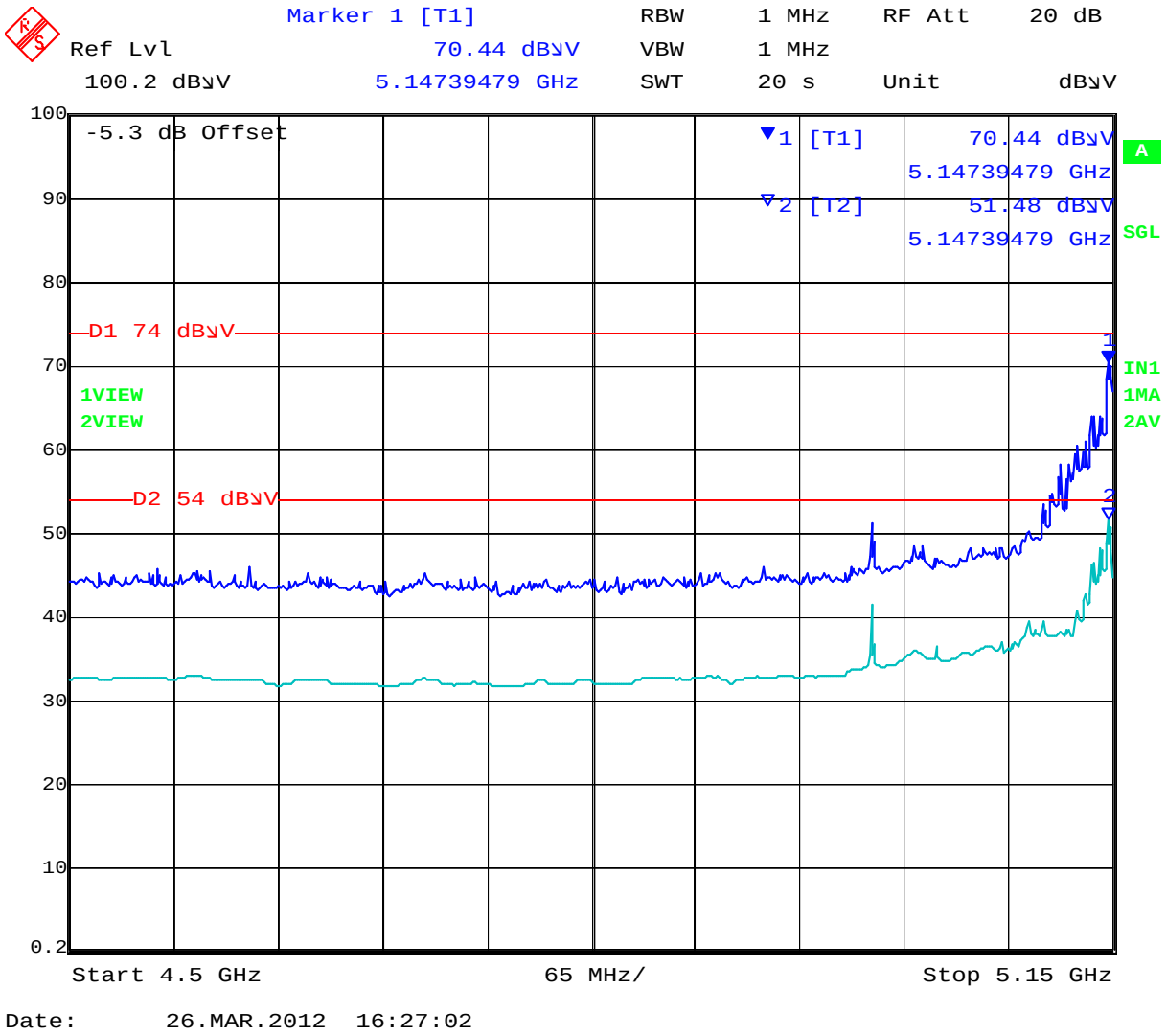
Test Freq.	5180 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	17	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

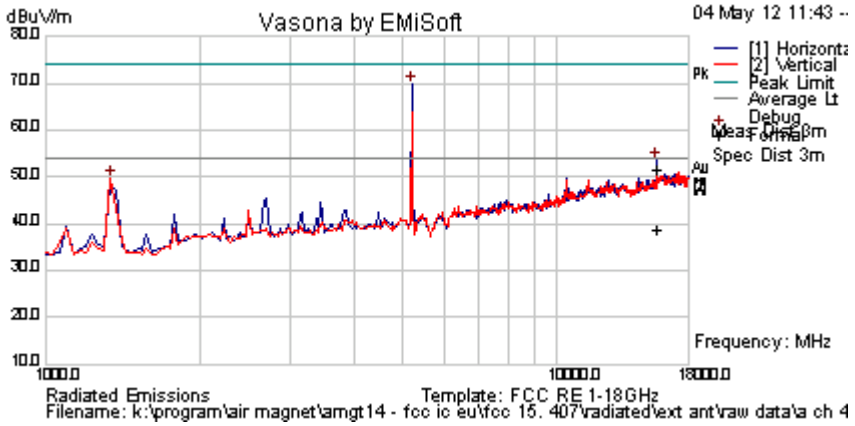
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	63.1	4.6	-9.9	57.9	Peak [Scan]	H	100	0				FUND
1340.68136	60.6	2.3	-13.9	49.0	Peak [Scan]	V	100	0	54.0	-5.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11a Channel Frequency 5180 MHz

Test Freq.	5200 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

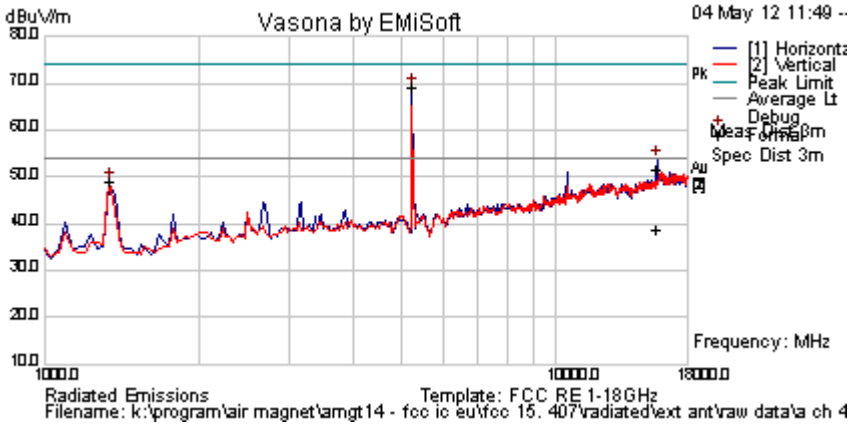


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15765.611	43.1	8.6	-0.3	51.5	Peak Max	H	113	81	74.0	-22.6	Pass	RB
15765.611	30.4	8.6	-0.3	38.8	Average Max	H	113	81	54.0	-15.2	Pass	RB
5190.381	75.1	4.6	-9.9	69.9	Peak [Scan]	H	100	0				FUND
1340.681	61.2	2.3	-13.9	49.5	Peak [Scan]	V	100	0	54	-4.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

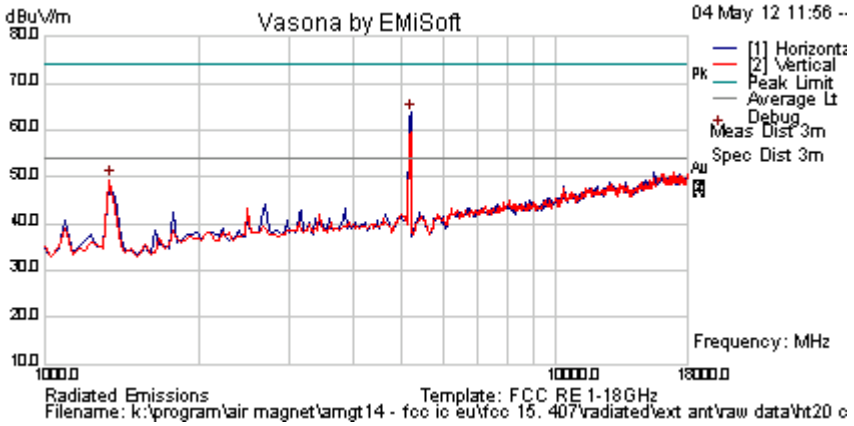


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15717.448	43.1	8.6	-0.3	51.5	Peak Max	H	113	81	74.0	-22.6	Pass	
15717.448	30.4	8.6	-0.3	38.8	Average Max	H	113	81	54.0	-15.2	Pass	
5224.449	74.4	4.6	-9.8	69.2	Peak [Scan]	H	150	0				FUND
1340.681	60.8	2.3	-13.9	49.2	Peak [Scan]	V	100	0	54	-4.8	Pass	

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

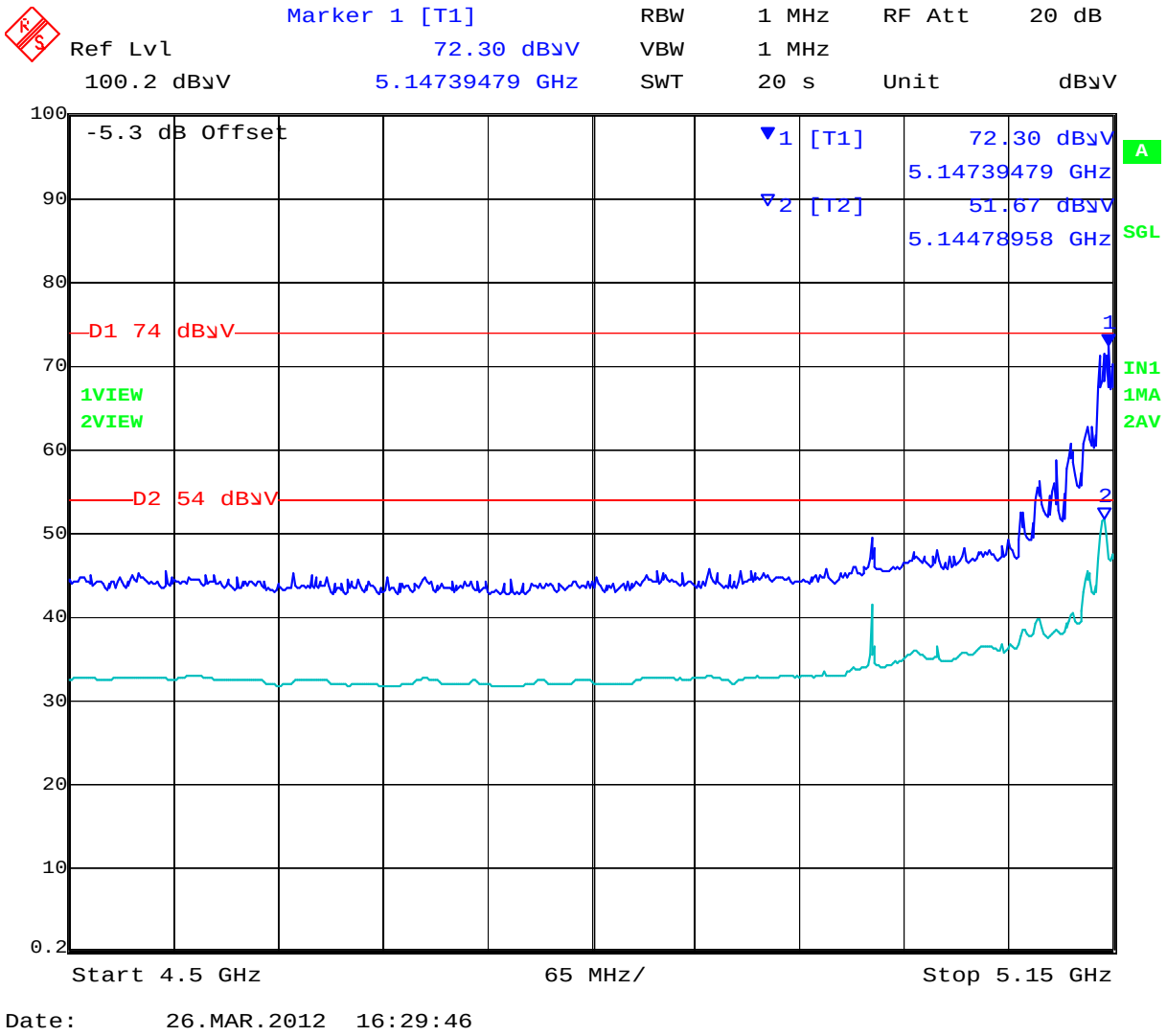
Test Freq.	5180 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	17	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

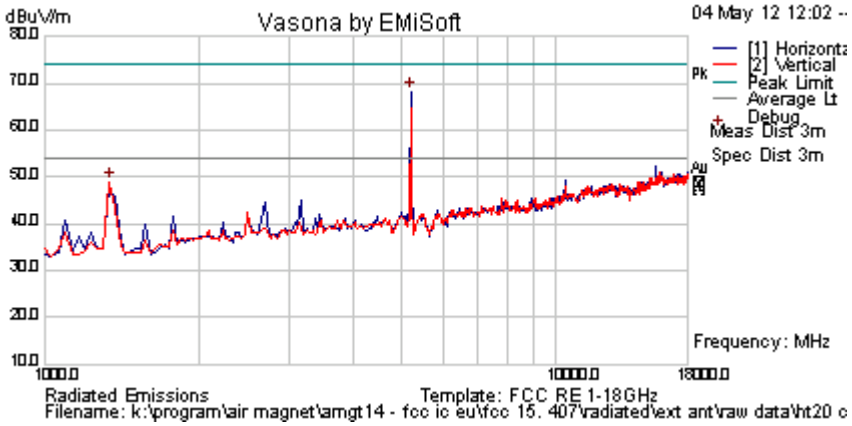
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	68.9	4.6	-9.9	63.7	Peak [Scan]	H	100	0				FUND
1340.68136	61.0	2.3	-13.9	49.4	Peak [Scan]	V	100	0	54.0	-4.6	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-20 Channel Frequency 5180 MHz

Test Freq.	5200 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

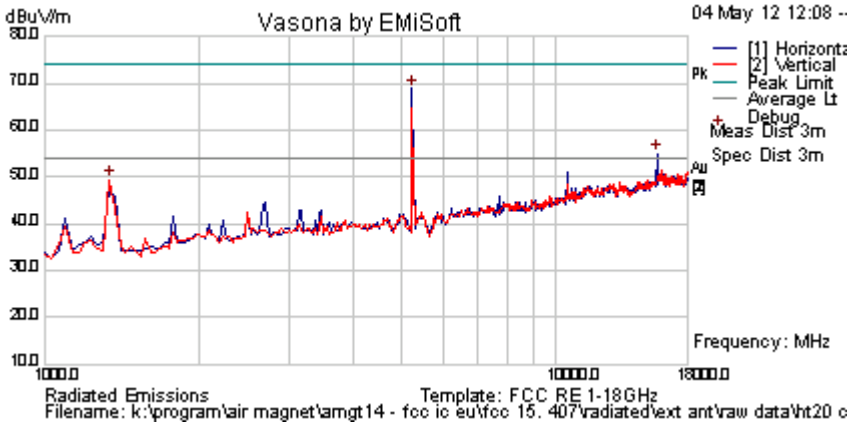


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	73.6	4.6	-9.9	68.3	Peak [Scan]	H	100	0				FUND
1340.68136	60.6	2.3	-13.9	49.0	Peak [Scan]	V	100	0	54.0	-5.0	Pass	

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5240 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

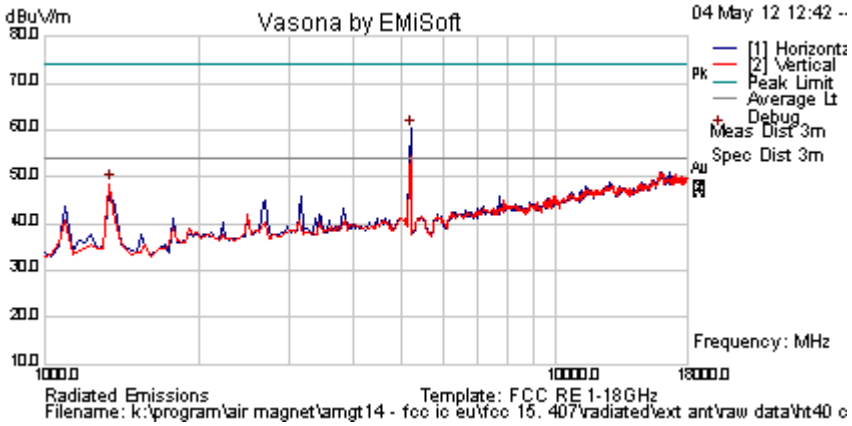


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15717.435	43.1	8.6	-0.3	51.5	Peak Max	H	113	81	74.0	-22.6	Pass	
15717.435	30.4	8.6	-0.3	38.8	Average Max	H	113	81	54.0	-15.2	Pass	
5224.449	74.2	4.6	-9.8	69.0	Peak [Scan]	H	150	0	54.0	15.0	Fail	
1340.681	61.1	2.3	-13.9	49.4	Peak [Scan]	V	100	0	54	-4.6	Pass	

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

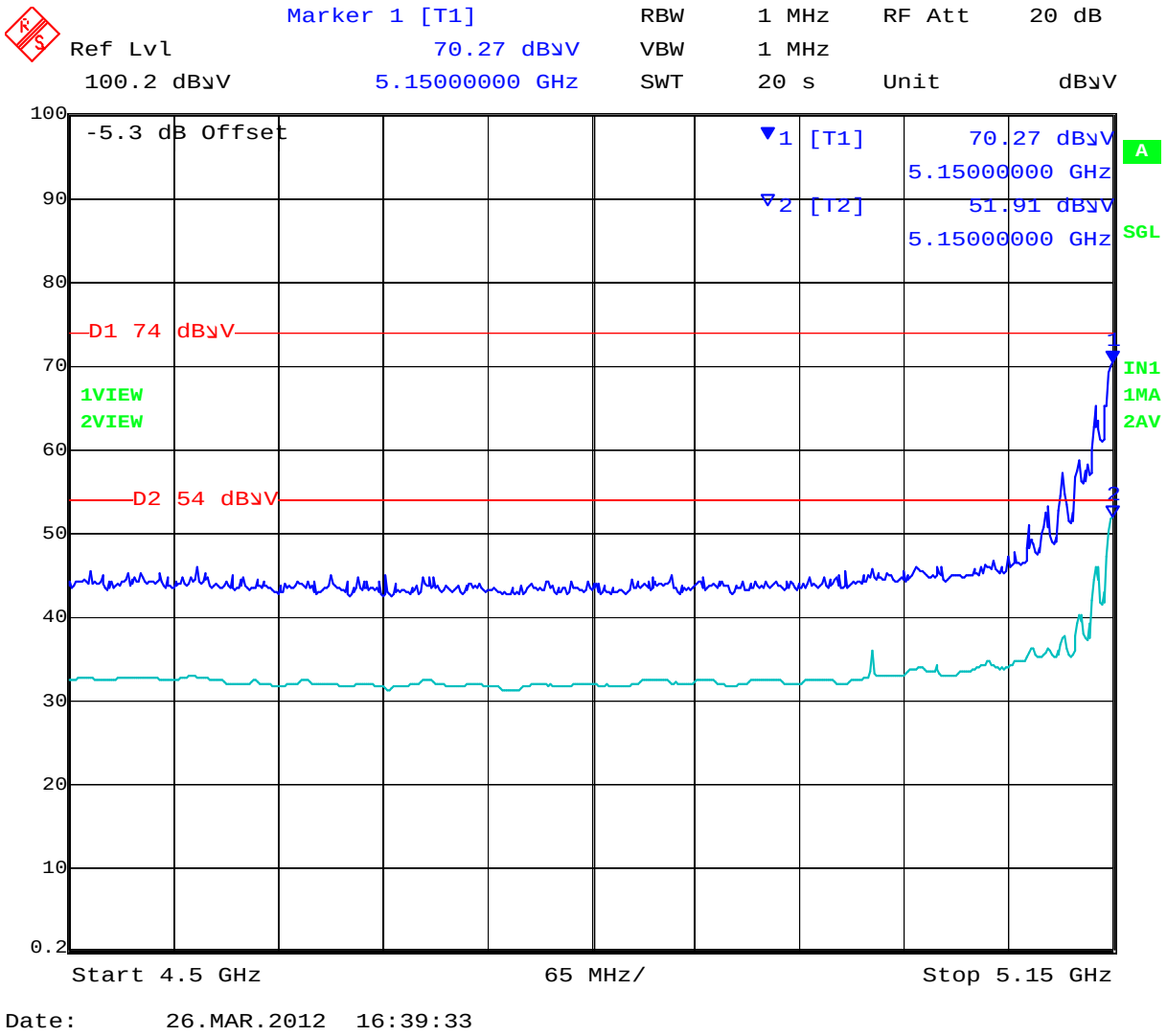
Test Freq.	5190 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	11	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

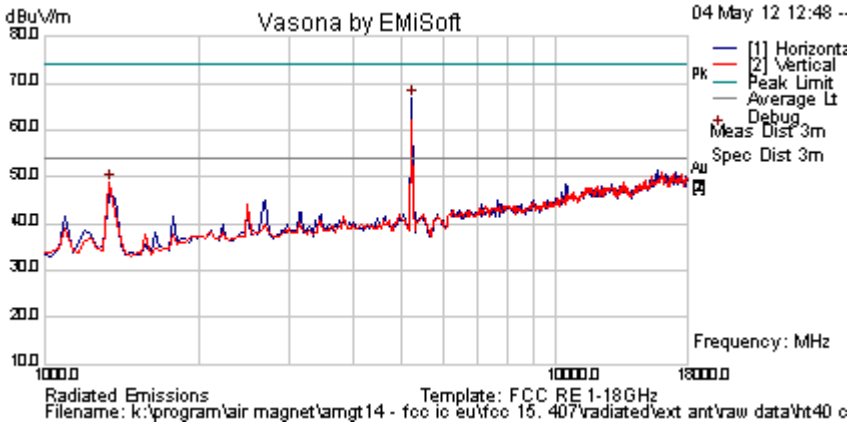
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5190.381	65.5	4.6	-9.9	60.3	Peak [Scan]	H	100	0				FUND
1340.68136	60.2	2.3	-13.9	48.5	Peak [Scan]	V	100	0	54.0	-5.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-40 Channel Frequency 5190 MHz

Test Freq.	5230 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

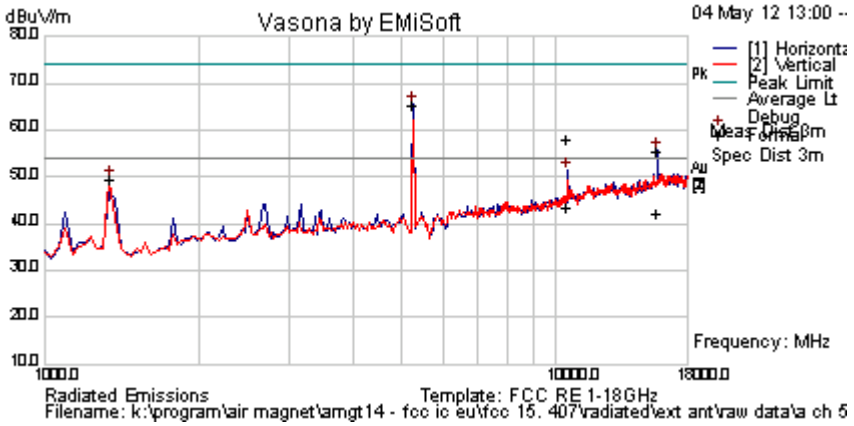


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5224.449	72.0	4.6	-9.8	66.8	Peak [Scan]	H	150	0				FUND
1340.68136	60.4	2.3	-13.9	48.8	Peak [Scan]	V	100	0	54.0	-5.2	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5260 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

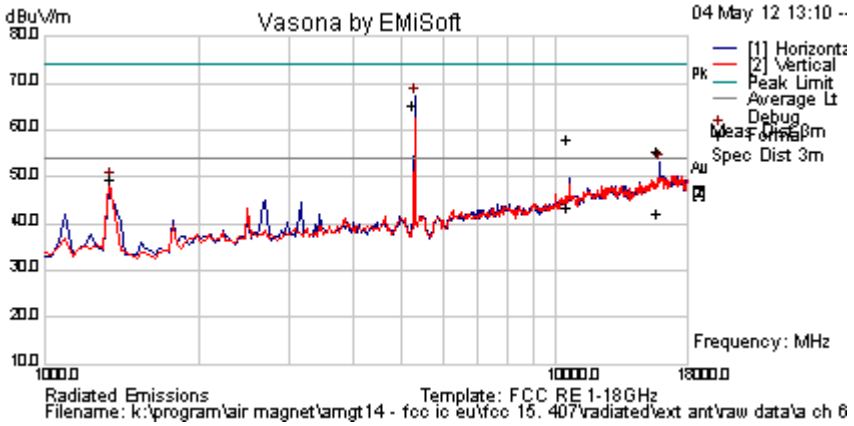


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15789.258	47.1	8.7	-0.3	55.5	Peak Max	H	109	289	74.0	-18.5	Pass	RB
10524.008	53.8	6.8	-2.4	58.1	Peak Max	H	198	350	74.0	-15.9	Pass	RB
15789.258	33.6	8.7	-0.3	42.0	Average Max	H	109	289	54	-12.0	Pass	RB
10524.008	39.0	6.8	-2.4	43.3	Average Max	H	198	350	54	-10.7	Pass	RB
5258.517	70.6	4.6	-9.7	65.5	Peak [Scan]	H	150	0				FUND
1340.681	61.1	2.3	-13.9	49.5	Peak [Scan]	V	100	0	54	-4.5	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5300 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

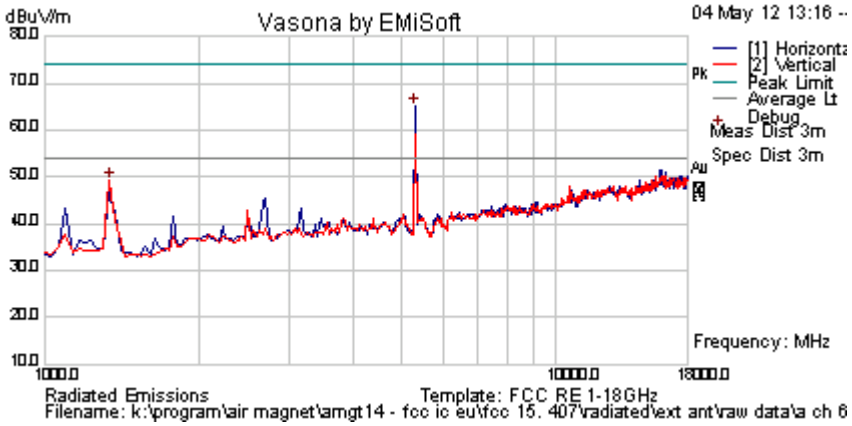


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15893.989	47.1	8.7	-0.3	55.5	Peak Max	H	109	289	74.0	-18.5	Pass	RB
15893.989	33.6	8.7	-0.3	42.0	Average Max	H	109	289	54	-12.0	Pass	RB
5292.58517	72.2	4.6	-9.6	67.3	Peak [Scan]	H	100	0				FUND
1340.681	60.7	2.3	-13.9	49.1	Peak [Scan]	V	100	0	54	-5.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

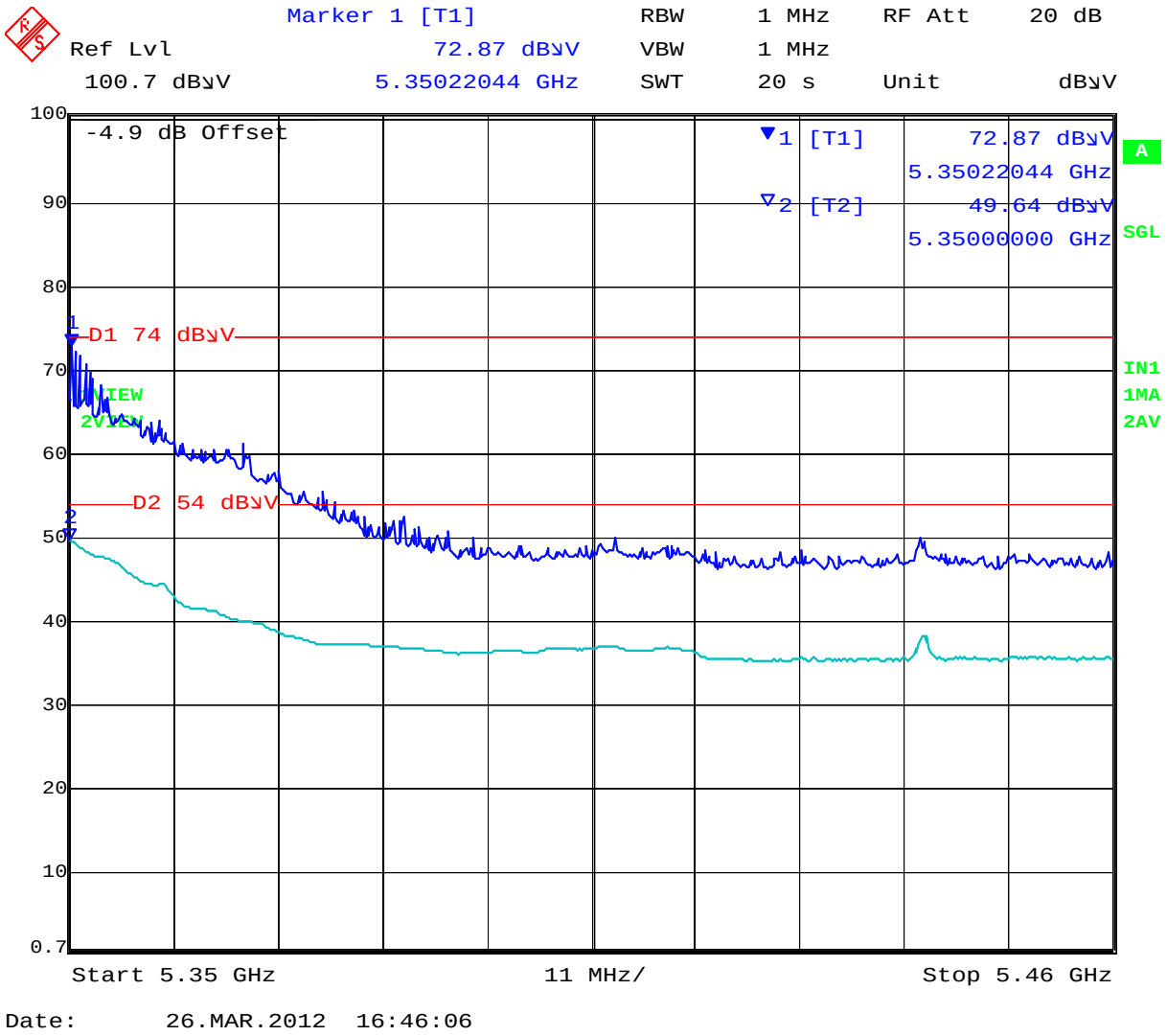
Test Freq.	5320 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	18	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

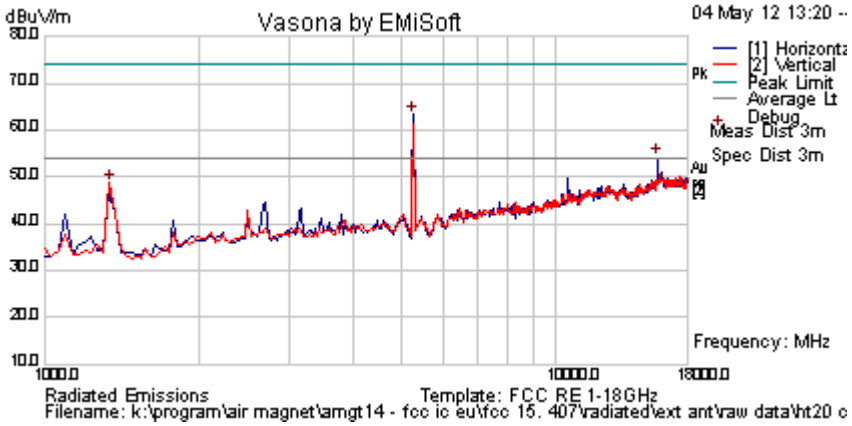
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	70.0	4.6	-9.6	65.0	Peak [Scan]	H	100	0				FUND
1340.68136	60.9	2.3	-13.9	49.3	Peak [Scan]	V	100	0	54.0	-4.7	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11a Channel Frequency 5320 MHz

Test Freq.	5260 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

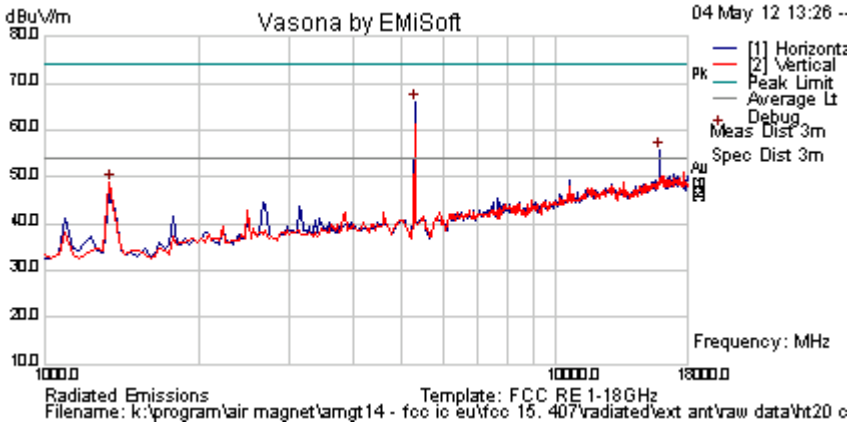


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15785.571	47.1	8.7	-0.3	55.5	Peak Max	H	109	289	74.0	-18.5	Pass	RB
15785.571	33.6	8.7	-0.3	42.0	Average Max	H	109	289	54	-12.0	Pass	RB
5258.517	68.4	4.6	-9.7	63.3	Peak [Scan]	H	100	0				FUND
1340.681	60.4	2.3	-13.9	48.8	Peak [Scan]	V	100	0	54	-5.2	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5300 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

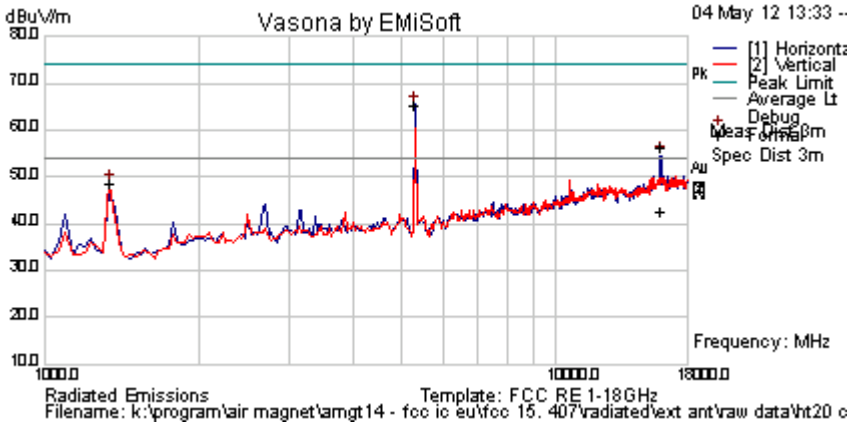


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15921.844	47.1	8.7	-0.3	55.5	Peak Max	H	109	289	74.0	-18.5	Pass	RB
15921.844	33.6	8.7	-0.3	42.0	Average Max	H	109	289	54	-12.0	Pass	RB
5292.585	70.9	4.6	-9.6	66.0	Peak [Scan]	H	100	0				FUND
1340.681	60.3	2.3	-13.9	48.7	Peak [Scan]	V	100	0	54	-5.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

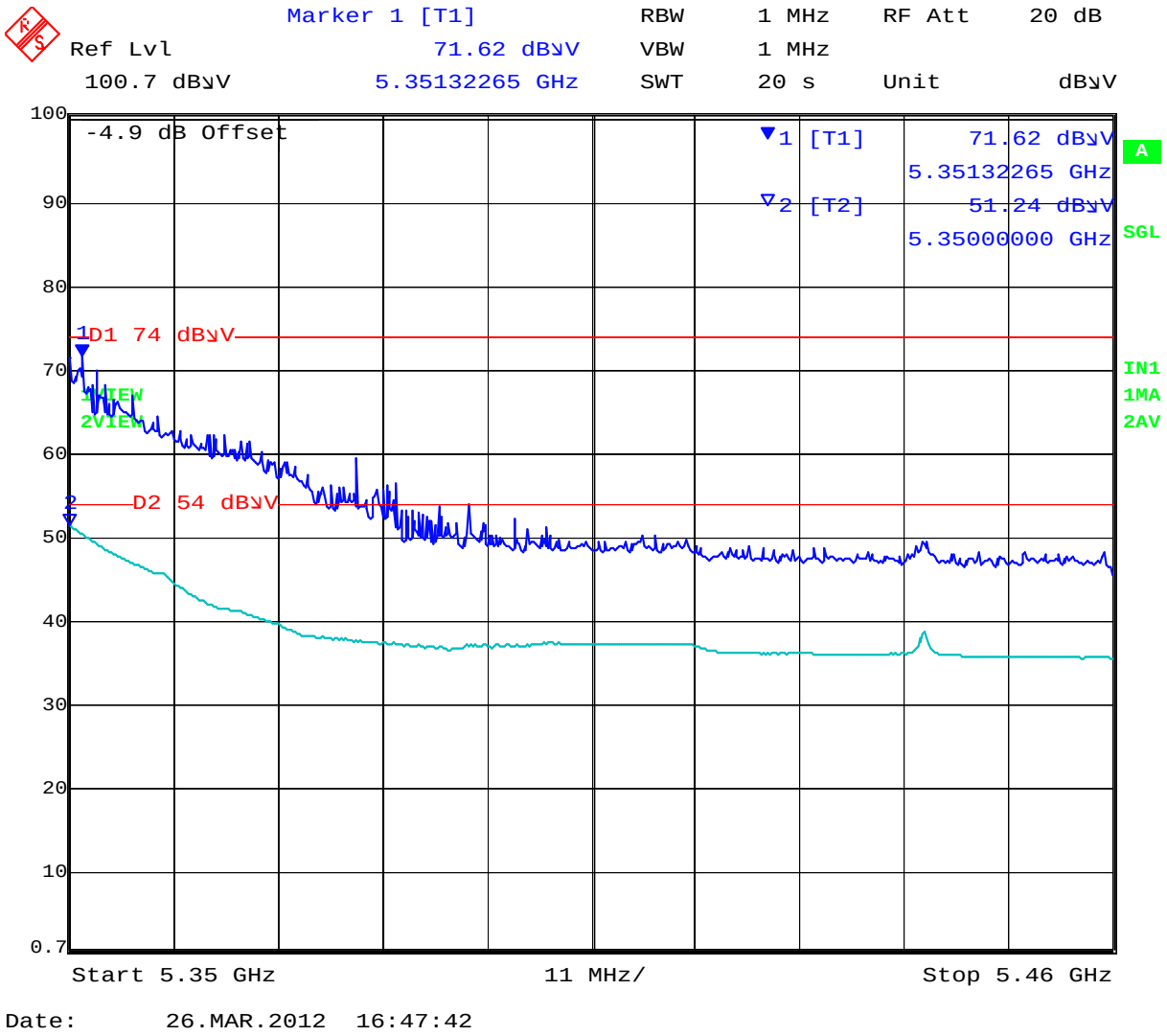
Test Freq.	5320 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	18	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

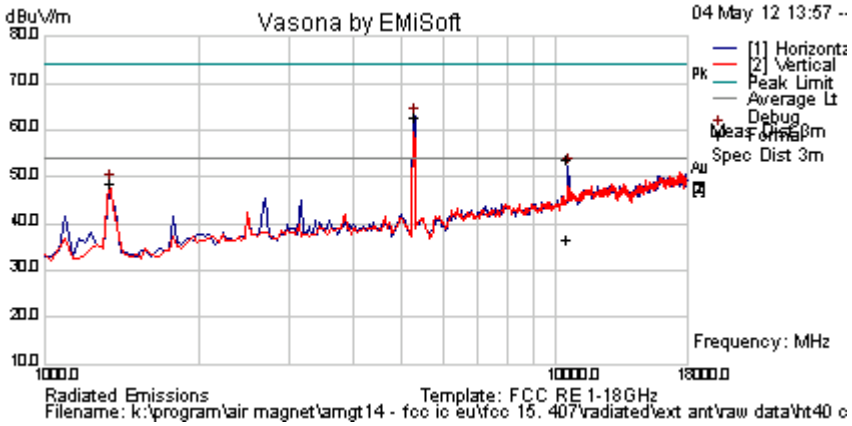
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
15961.283	47.4	9.0	0.0	56.4	Peak Max	H	111	26	74.0	-17.6	Pass	RB
15961.283	33.8	9.0	0.0	42.7	Average Max	H	111	26	54.0	-11.3	Pass	RB
5292.585	70.4	4.6	-9.6	65.5	Peak [Scan]	H	100	0				FUND
1340.681	60.3	2.3	-13.9	48.7	Peak [Scan]	V	100	0	54	-5.3	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-20 Channel Frequency 5320 MHz

Test Freq.	5270 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

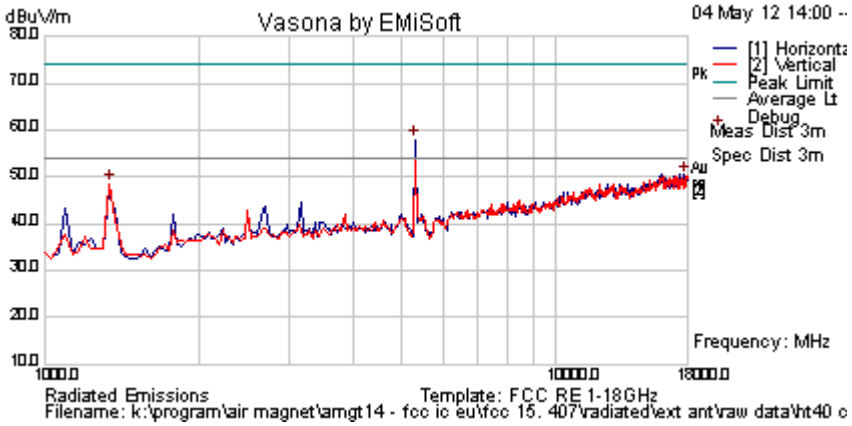


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
10534.308	49.2	6.8	-2.5	53.6	Peak Max	H	178	344	74.0	-20.4	Pass	RB
10534.308	32.3	6.8	-2.5	36.6	Average Max	H	178	344	54.0	-17.4	Pass	RB
5292.585	67.8	4.6	-9.6	62.8	Peak [Scan]	H	100	0				FUND
1340.681	60.3	2.3	-13.9	48.7	Peak [Scan]	V	100	0	54	-5.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

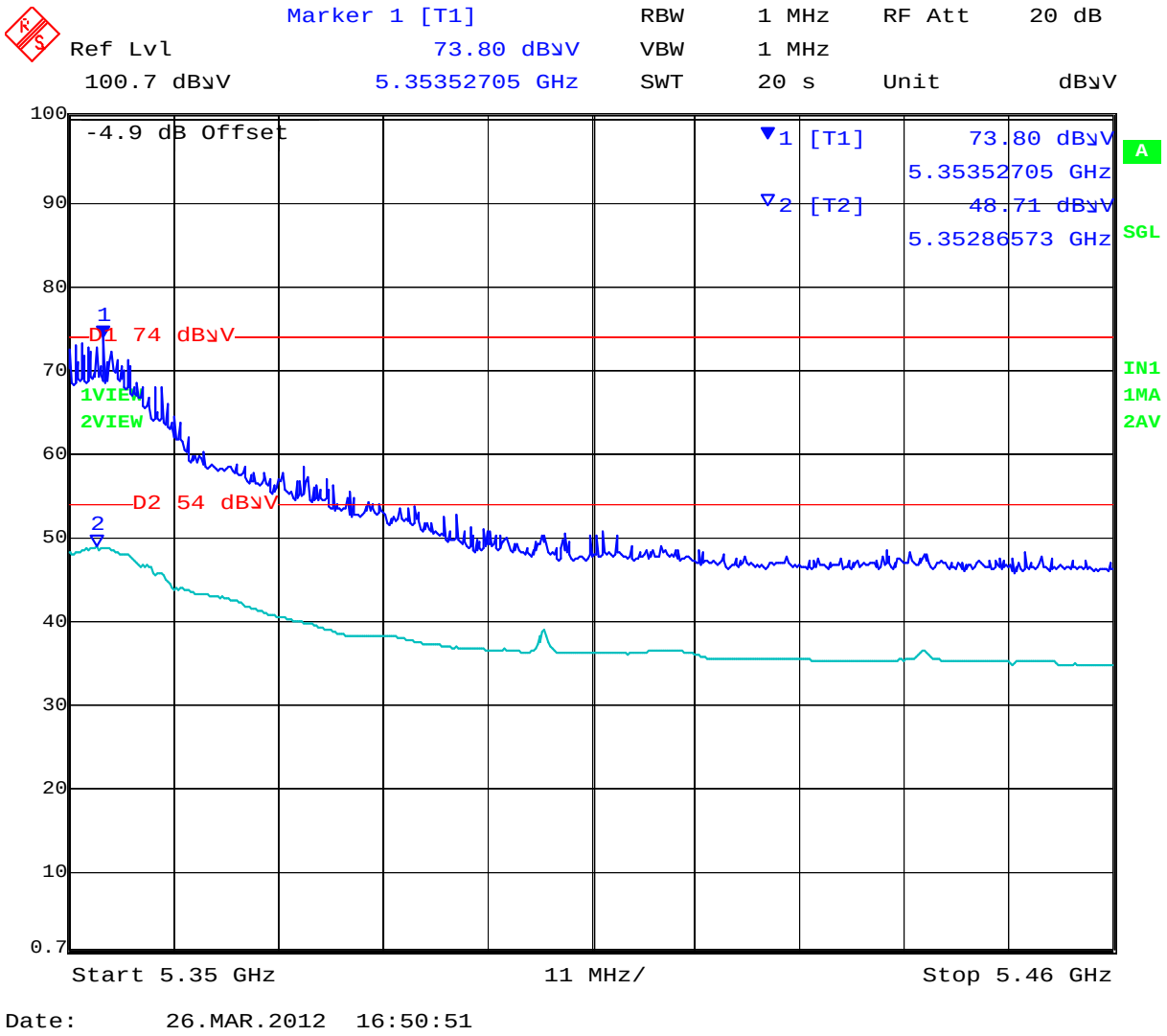
Test Freq.	5310 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

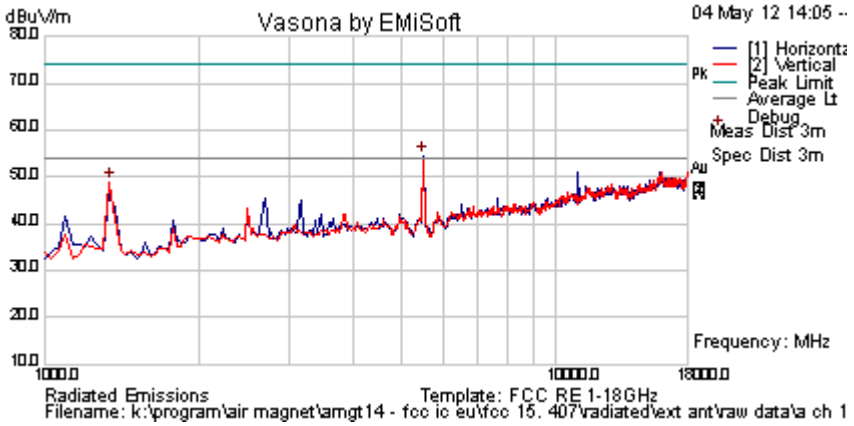
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5292.585	62.9	4.6	-9.6	58.0	Peak [Scan]	H	100	0				FUND
1340.68136	60.3	2.3	-13.9	48.6	Peak [Scan]	V	100	0	54.0	-5.4	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11n HT-40 Channel Frequency 5310 MHz

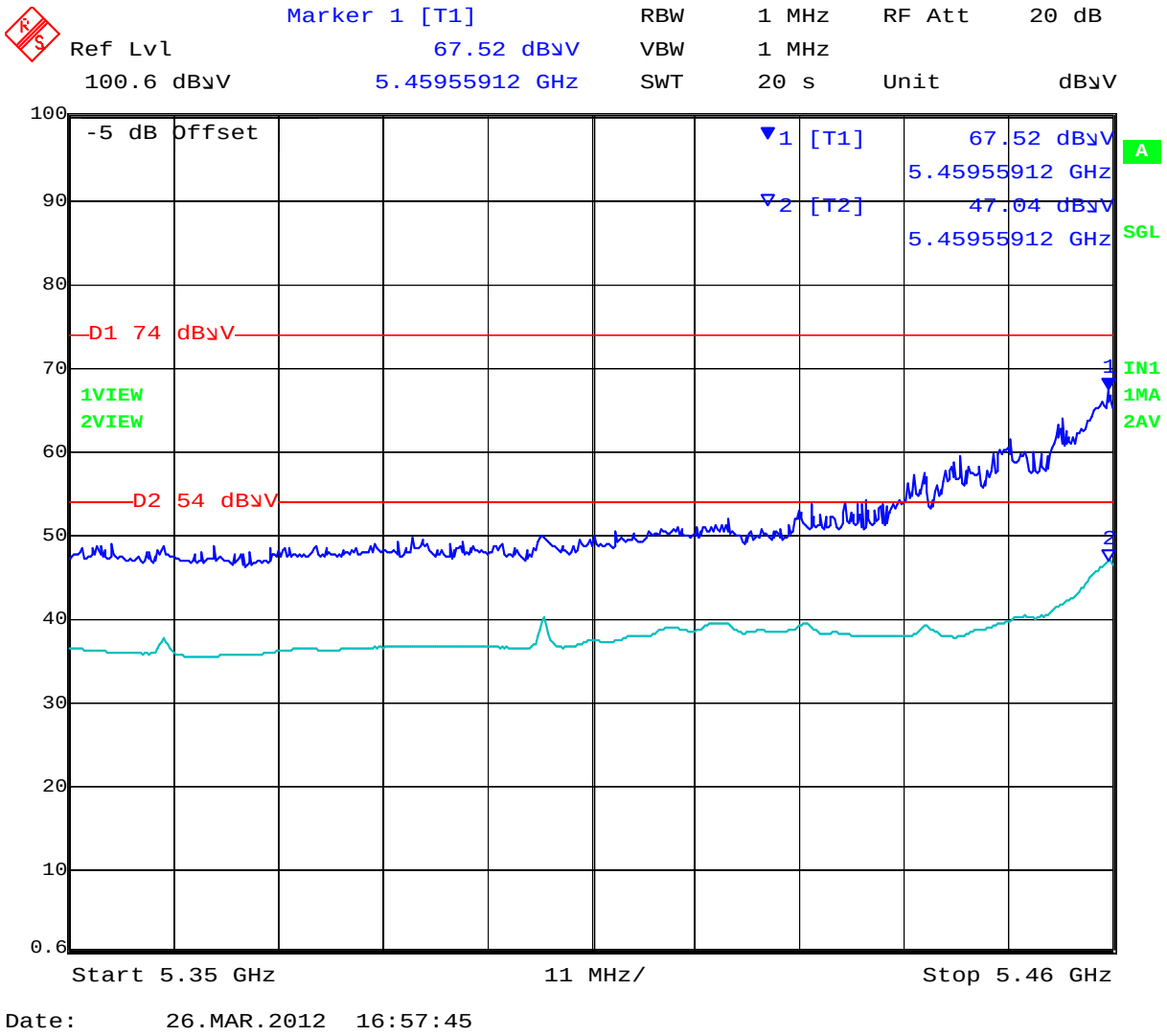
Test Freq.	5500 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

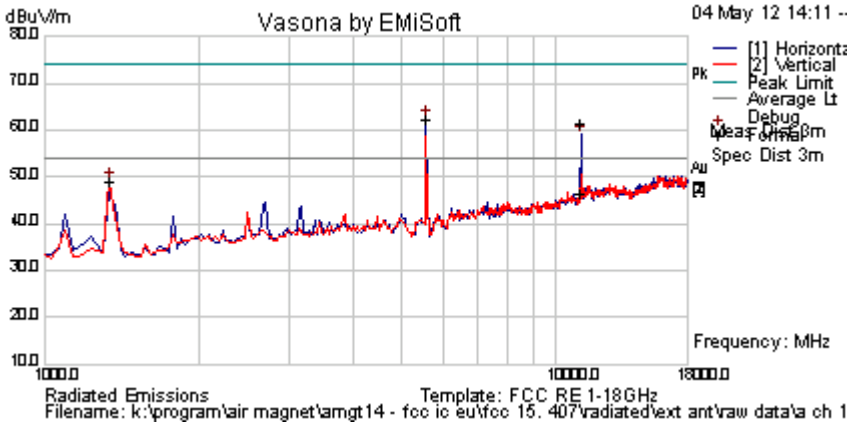
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	59.5	4.6	-9.6	54.5	Peak [Scan]	H	100	0				FUND
1340.68136	60.7	2.3	-13.9	49.1	Peak [Scan]	V	100	0	54.0	-5.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge 802.11a Channel Frequency 5500 MHz

Test Freq.	5580 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

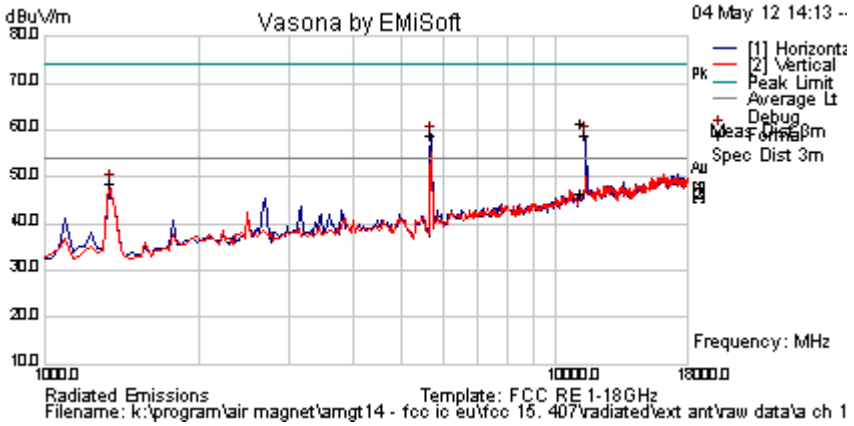


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11171.383	57.6	6.9	-2.9	61.6	Peak Max	H	112	350	74.0	-12.4	Pass	RB
11171.383	42.5	6.9	-2.9	46.5	Average Max	H	112	350	54.0	-7.5	Pass	RB
5565.130	67.5	4.7	-9.7	62.4	Peak [Scan]	H	100	0				FUND
1340.681	60.8	2.3	-13.9	49.2	Peak [Scan]	V	100	0	54	-4.8	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5700 MHz	**Engineer**	SB
Variant	802.11a; 6 Mbs	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

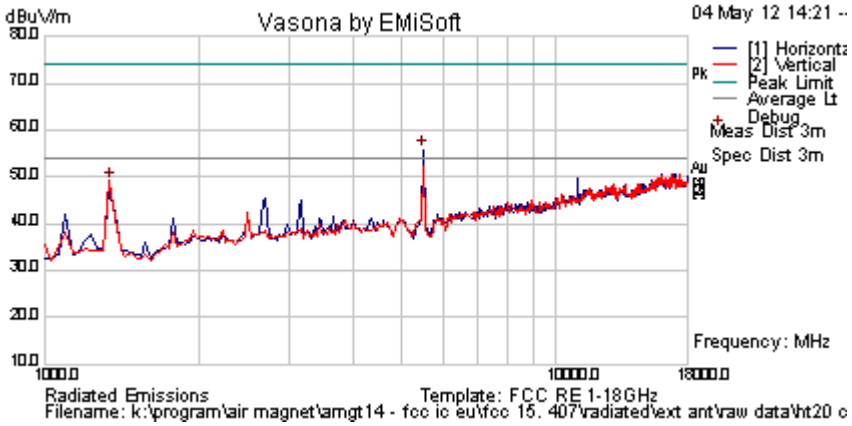


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11390.782	59.0	6.9	-2.9	63.0	Peak Max	H	112	350	74.0	-11.0	Pass	
11390.782	43.3	6.9	-2.9	47.3	Average Max	H	112	350	54.0	-6.7	Pass	
5701.403	63.8	4.7	-9.6	59.0	Peak [Scan]	H	100	0				FUND
1340.681	60.3	2.3	-13.9	48.7	Peak [Scan]	V	100	0	54	-5.3	Pass	

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

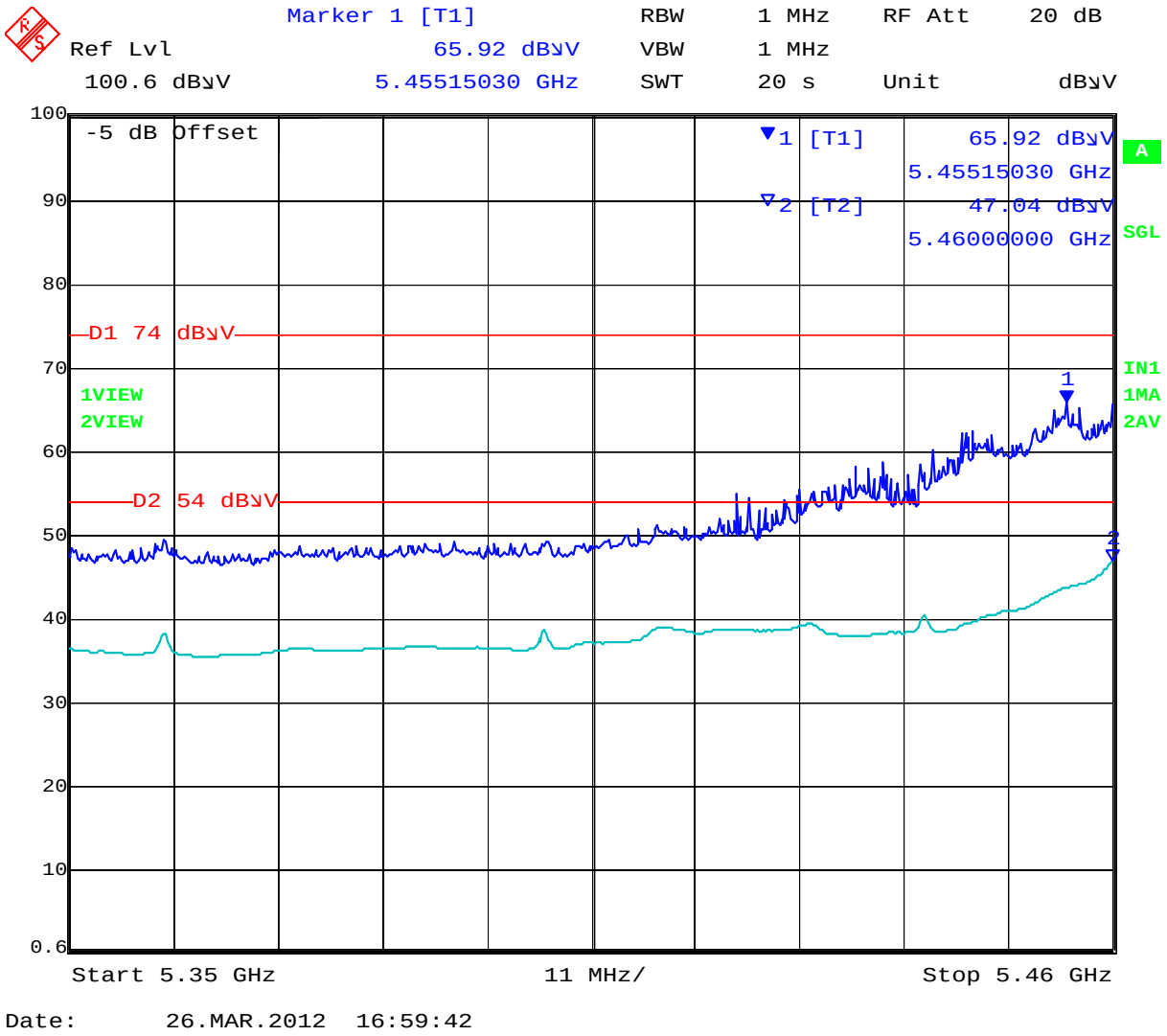
Test Freq.	5500 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

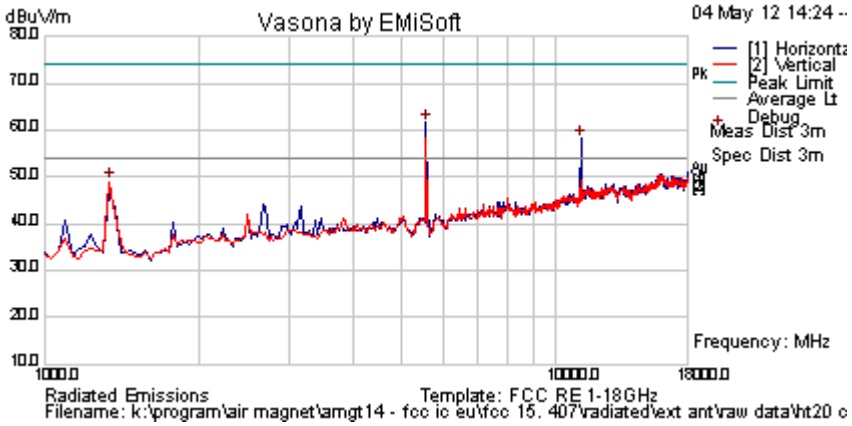
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5496.994	60.8	4.6	-9.6	55.9	Peak [Scan]	H	100	0				FUND
1340.68136	60.9	2.3	-13.9	49.3	Peak [Scan]	V	100	0	54.0	-4.7	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge HT-20 Channel Frequency 5500 MHz

Test Freq.	5580 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

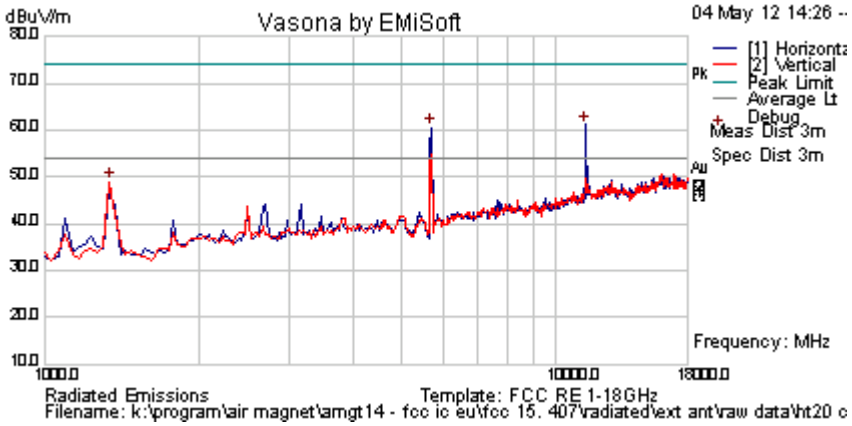


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11152.305	61.3	6.9	-2.9	65.3	Peak Max	H	112	350	74.0	-8.7	Pass	RB
11152.305	46.3	6.9	-2.9	50.3	Average Max	H	112	350	54.0	-3.7	Pass	RB
5565.130	66.7	4.7	-9.7	61.7	Peak [Scan]	H	100	0				FUND
1340.681	60.7	2.3	-13.9	49.0	Peak [Scan]	V	100	0	54	-5.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5700 MHz	**Engineer**	SB
Variant	802.11n HT-20; 6.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

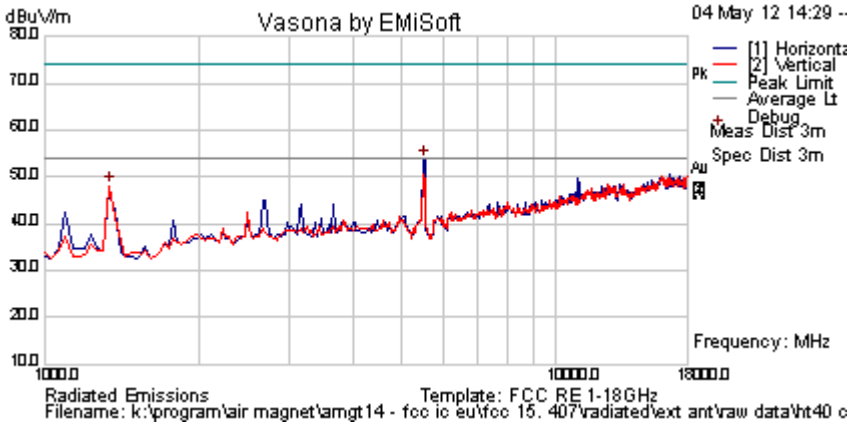


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11390.782	56.9	6.9	-2.9	60.9	Peak Max	H	112	350	74.0	-13.1	Pass	RB
11390.782	44.8	6.9	-2.9	48.8	Average Max	H	112	350	54.0	-5.2	Pass	RB
5701.40281	65.4	4.7	-9.6	60.5	Peak [Scan]	H	100	0				FUND
1340.681	60.7	2.3	-13.9	49.1	Peak [Scan]	V	100	0	54	-5.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

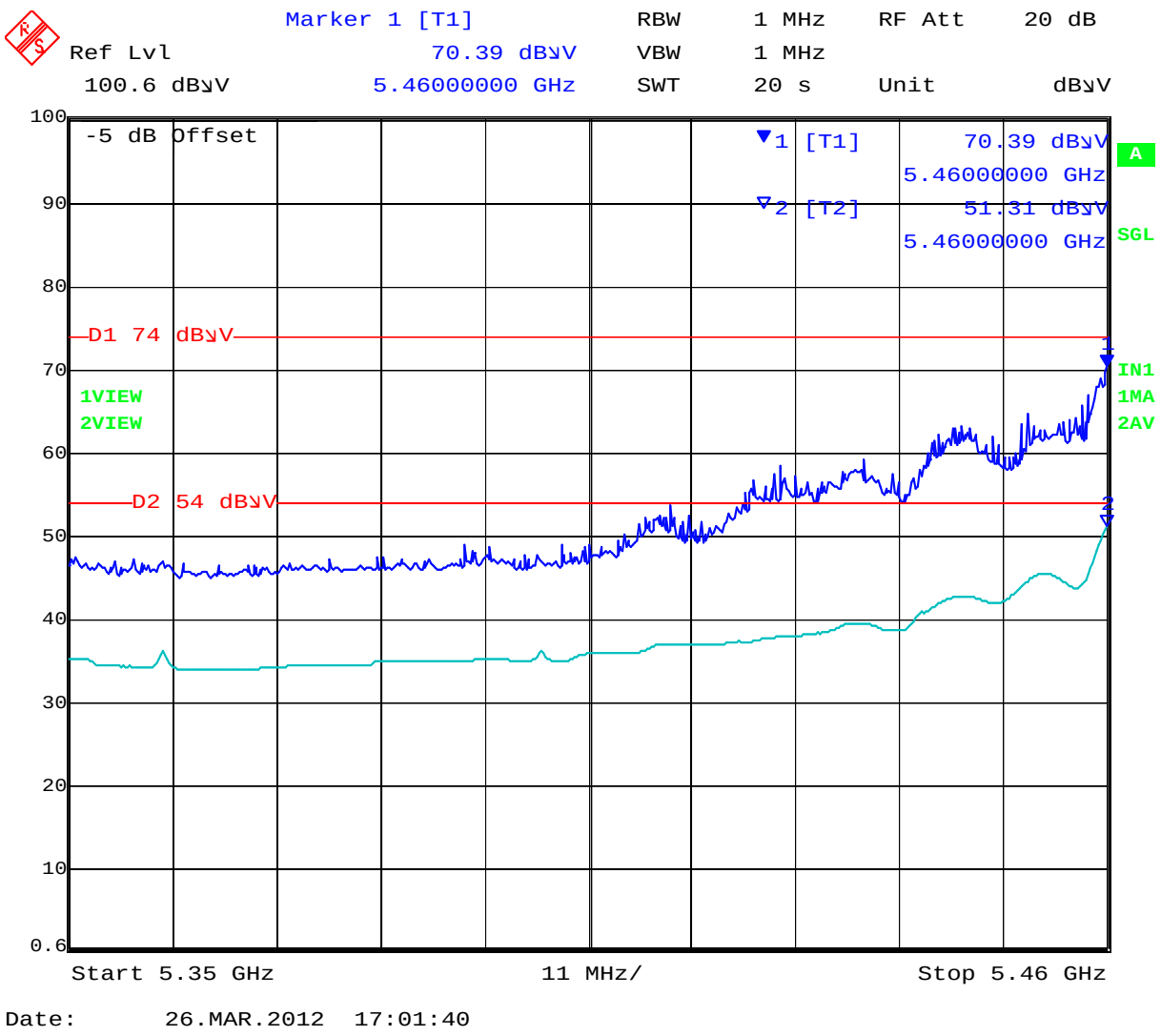
Test Freq.	5510 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

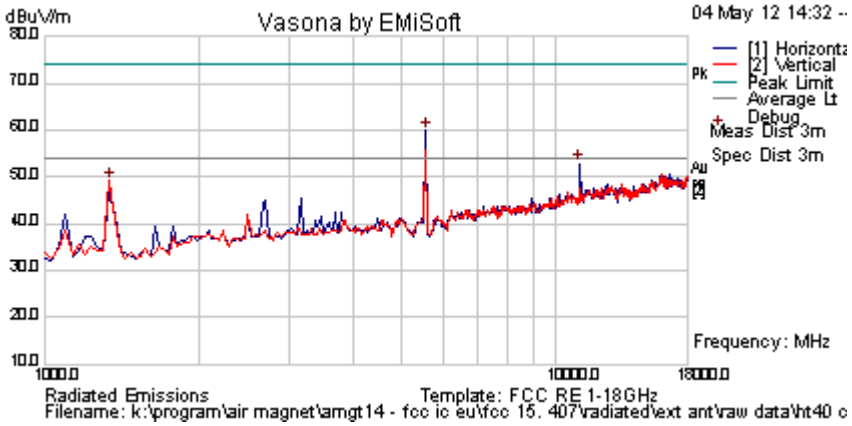
Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
5531.062	58.8	4.6	-9.7	53.8	Peak [Scan]	H	100	0	54.0	-0.2	Pass	FUND
1340.68136	59.8	2.3	-13.9	48.1	Peak [Scan]	V	100	0	54.0	-5.9	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205



Band-Edge HT-40 Channel Frequency 5510 MHz

Test Freq.	5550 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			

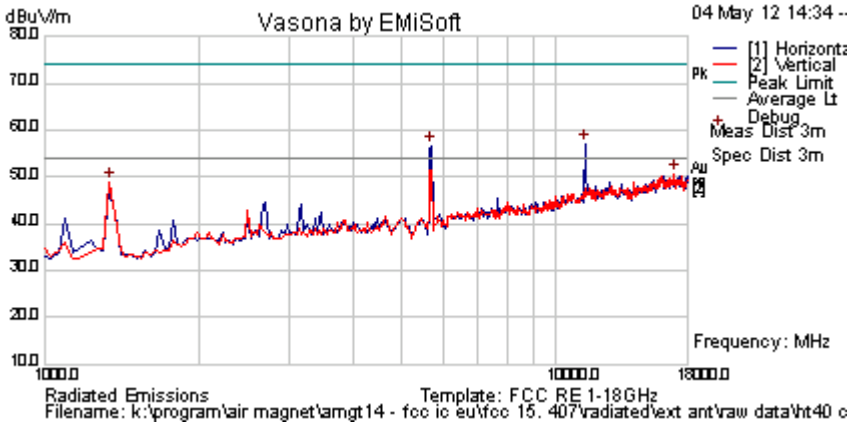


Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11118.236	50.0	6.9	-2.9	54.0	Peak Max	H	112	350	74.0	-20.0	Pass	RB
11118.236	41.3	6.9	-2.9	45.3	Average Max	H	112	350	54.0	-8.7	Pass	RB
5565.13	64.9	4.7	-9.7	59.9	Peak [Scan]	H	100	0				FUND
1340.68136	59.8	2.3	-13.9	48.1	Peak [Scan]	V	100	0	54.0	-5.9	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

Test Freq.	5670 MHz	**Engineer**	SB
Variant	802.11n HT-40; 13.5 MCS	**Temp (ºC)**	21
Freq. Range	1000 MHz - 18000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	993
Antenna	External	**Duty Cycle (%)**	100
Test Notes 1			
Test Notes 2			



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
11356.713	55.7	6.9	-2.9	59.7	Peak Max	H	112	350	74.0	-14.4	Pass	RB
11356.713	46.0	6.9	-2.9	50.0	Average Max	H	112	350	54.0	-4.0	Pass	RB
5701.40281	61.5	4.7	-9.6	56.7	Peak [Scan]	H	100	0				FUND
1340.681	60.6	2.3	-13.9	49.0	Peak [Scan]	V	100	0	54	-5.0	Pass	RB

Legend:	TX = Transmitter Emissions; DIG = Digital Emissions; FUND = Fundamental; WB = Wideband Emission
	NRB = Non-Restricted Band. Limit = 68.23 dBuV/m; RB = Restricted Band. Limits per 15.205

5.1.7.3. Radiated Spurious Emissions – 30MHz – 1000MHz

FCC, Part 15 Subpart C §15.205/ §15.209
Industry Canada RSS-210 §2.2

Test Procedure

Testing 30M-1 GHz was performed in a 3-meter anechoic chamber using a CISPR compliant receiver. Preliminary radiated emissions were measured on every azimuth and with the receiving antenna in both horizontal and vertical polarizations. To further maximize emissions the receive antenna was varied between 1 and 4 meters. The emissions are recorded with receiver in peak hold mode. Emissions closest to the limits are measured in the quasi-peak mode with the tuned receiver using a bandwidth of 120 kHz. Only the highest emissions relative to the limit are listed. The anechoic chamber test set-up is identified in Section 6 Test Set-Up Photographs.

The EUT had two methods of powering on ac/dc converter and Power over Ethernet (POE). Both modes were tested for emissions below 1GHz.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. In this test facility, the Antenna Factor, Cable Loss, and Amplifier Gains are loaded into the Rohde & Schwarz Receiver and the corrected field strength can be read directly on the receiver.

$$FS = R + AF + CORR$$

where:

FS = Field Strength
R = Measured Receiver Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain

For example:
Given a Receiver input reading of 51.5dBμV; Antenna Factor of 8.5dB; Cable Loss of 1.3dB; Falloff Factor of 0dB, an Amplifier Gain of 26dB and Notch Filter Loss of 1dB. The Field Strength of the measured emission is:

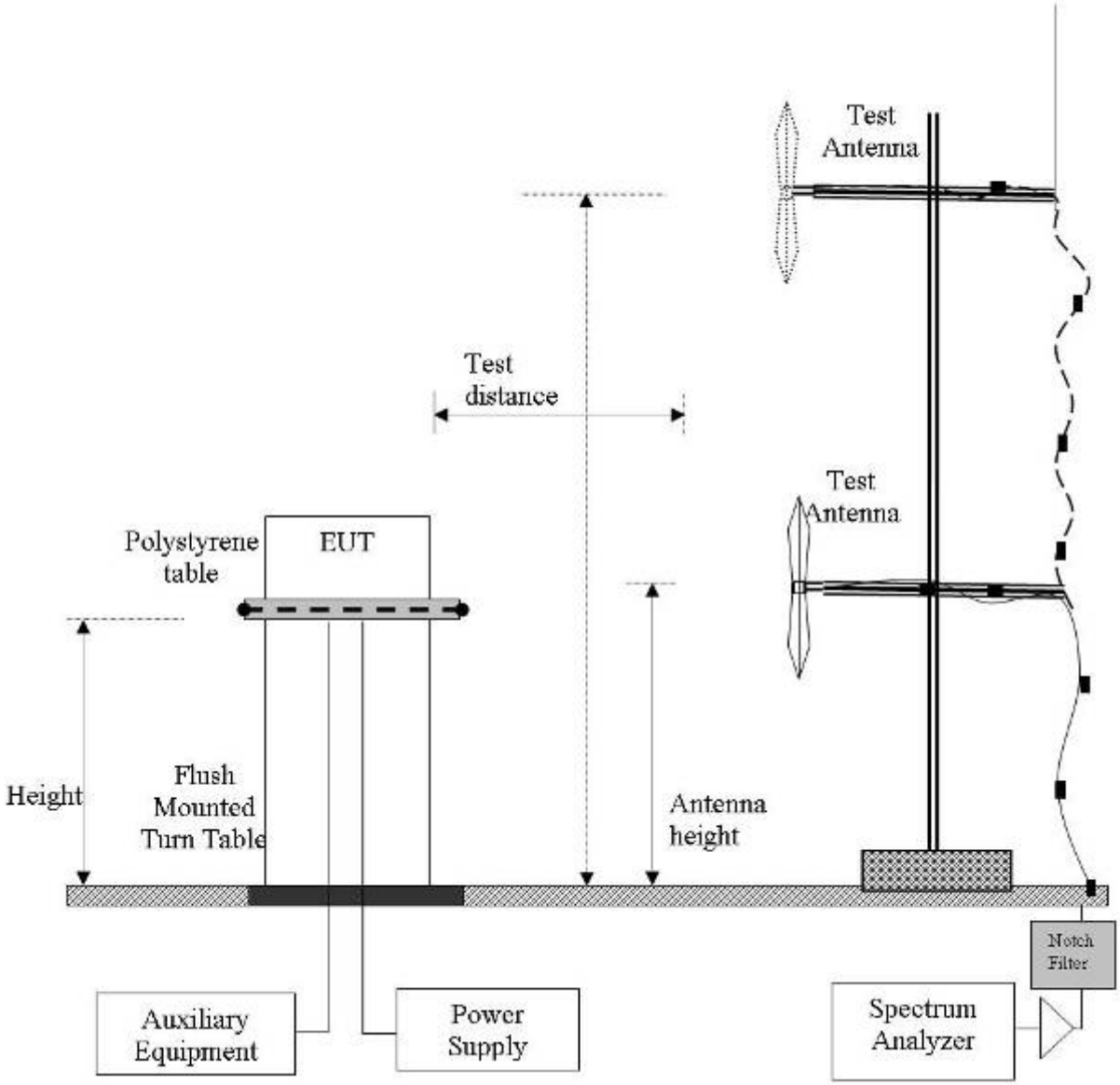
FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3dBμV/m

Conversion between dBμV/m (or dBμV) and μV/m (or μV) are done as:

Level (dBμV/m) = 20 * Log (level (μV/m))

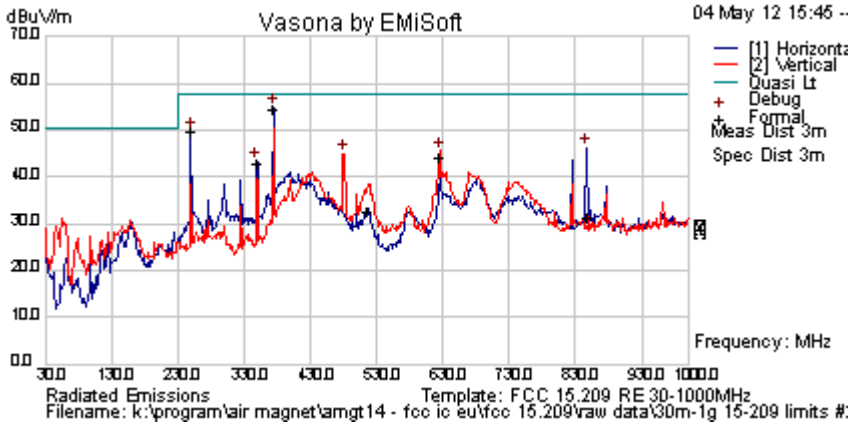
40 dBμV/m = 100μV/m
48 dBμV/m = 250μV/m

Radiated Emission Measurement Setup – Below 1 GHz



Ferrites clamped-on antenna cables

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	19.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	1004
Antenna	external ant		
Test Notes 1			
Test Notes 2	ac/dc adaptor 110Vac 60 Hz		



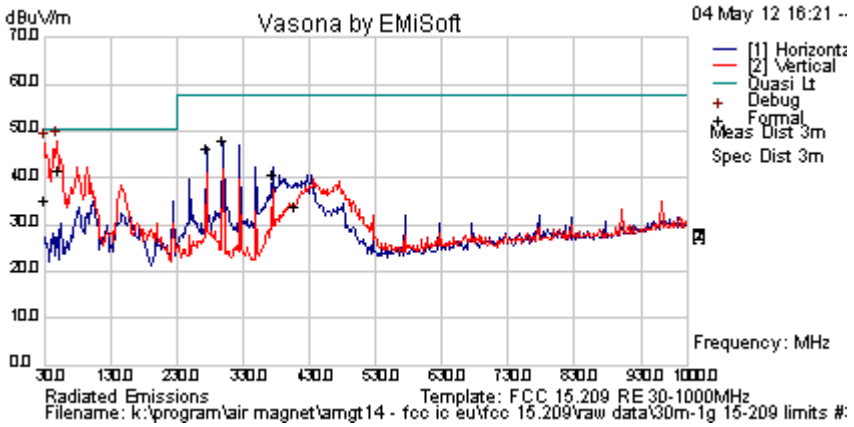
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
375.020	64.5	5.4	-15.4	54.5	Quasi Max	H	208	184	57.5	-3.0	Pass	
249.984	64.0	4.9	-19.0	49.8	Quasi Max	H	104	167	57.5	-7.7	Pass	
850.080	32.8	7.0	-8.3	31.5	Quasi Max	H	251	273	57.5	-26.1	Pass	
624.985	49.1	6.3	-11.0	44.4	Quasi Max	V	187	342	57.5	-13.1	Pass	
516.381	39.6	5.9	-12.7	32.8	Quasi Max	V	155	159	57.5	-24.7	Pass	
350.016	53.3	5.3	-15.7	42.8	Quasi Max	H	98	187	57.5	-14.7	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Ferrites clamped-on antenna cables

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	19.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	1004
Antenna	external ant		
Test Notes 1			
Test Notes 2	POE 110Vac 60 Hz		



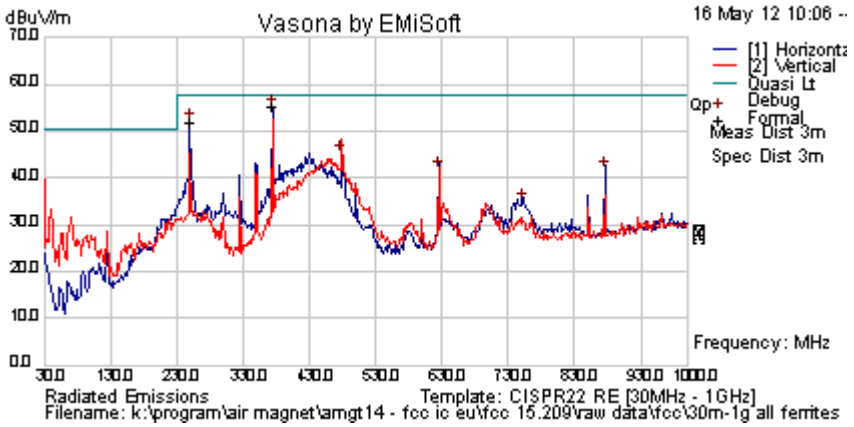
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
49.816	61.1	3.7	-23.1	41.7	Quasi Max	V	139	184	50.5	-8.8	Pass	
30.001	41.5	3.5	-9.7	35.3	Quasi Max	V	132	201	50.5	-15.2	Pass	
299.982	59.9	5.1	-17.2	47.8	Quasi Max	H	103	29	57.5	-9.7	Pass	
274.980	58.8	5.0	-17.4	46.4	Quasi Max	H	101	3	57.5	-11.1	Pass	
374.979	50.6	5.4	-15.4	40.6	Quasi Max	H	212	3	57.5	-16.9	Pass	
409.043	42.9	5.5	-14.5	33.9	Quasi Max	H	223	178	57.5	-23.6	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Ferrites removed from antenna cables

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	19.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	1004
Antenna	external ant		
Test Notes 1	All ferrites removed except for one which is located on the cable to the dedicated RX Ant		
Test Notes 2	ac/dc adaptor 110Vac 60 Hz		



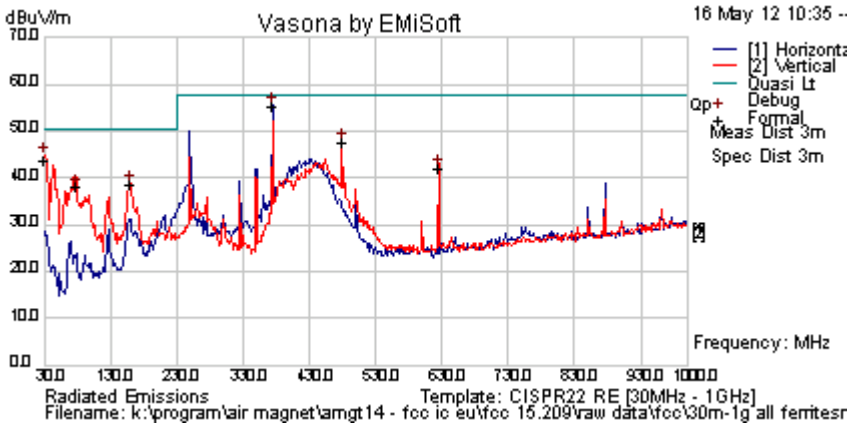
Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
375.018	65.2	5.4	-15.4	55.2	Quasi Max	H	208	12	57.5	-2.3	Pass	
249.993	66.2	4.9	-19.0	52.0	Quasi Max	H	122	178	57.5	-5.5	Pass	
478.140	52.3	5.8	-12.9	45.2	Peak [Scan]	H	122	178	57.5	-12.3	Pass	
624.888	46.4	6.3	-11.0	41.8	Peak [Scan]	H	122	178	57.5	-15.8	Pass	
753.135	37.5	6.7	-9.4	34.8	Peak [Scan]	H	122	178	57.5	-22.7	Pass	
875.483	42.8	7.1	-8.1	41.8	Peak [Scan]	H	122	178	57.5	-15.7	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Ferrites removed from antenna cables

Test Freq.	2437 MHz	**Engineer**	SB
Variant	Digital Emissions	**Temp (ºC)**	19.5
Freq. Range	30 MHz - 1000 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	1004
Antenna	external ant		
Test Notes 1	All ferrites removed except for one which is located on the cable to the dedicated RX Ant		
Test Notes 2	POE 110Vac 60 Hz		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBuV/m	Margin dB	Pass /Fail	Comments
375.006	65.2	5.4	-15.4	55.3	Quasi Max	H	98	212	57.5	-2.2	Pass	
30.628	50.6	3.5	-10.3	43.8	Quasi Max	V	98	360	50.5	-6.7	Pass	
479.055	54.5	5.8	-12.9	47.5	Peak [Scan]	V	98	0	57.5	-10.1	Pass	
624.709	46.6	6.3	-11.0	41.9	Peak [Scan]	V	98	0	57.5	-15.6	Pass	
79.470	57.6	3.9	-23.5	38.0	Peak [Scan]	V	98	0	50.5	-12.5	Pass	
160.950	53.0	4.4	-18.8	38.6	Peak [Scan]	V	98	0	50.5	-11.9	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Specification

Limits

§15.205 (a) Except as shown in paragraph (d) of 15.205 (a), only spurious emissions are permitted in any of the frequency bands listed.

§15.205 (a) Except as shown in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table.

§15.209 (a) and **RSS-Gen §2.2** Limit Matrix

Frequency(MHz)	Field Strength (μV/m)	Field Strength (dBμV/m)	Measurement Distance (meters)
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Laboratory Measurement Uncertainty for Radiated Emissions

Measurement uncertainty	+5.6/ -4.5 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-03 'Measurement of Radiated Emissions'	0088, 0158, 0134, 0304, 0311, 0315, 0310, 0312

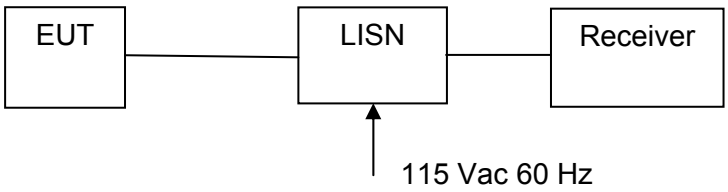
5.1.8. AC Wireline Conducted Emissions (150 kHz – 30 MHz)

FCC, Part 15 Subpart C §15.207
Industry Canada RSS-Gen §7.2.2

Test Procedure

The EUT is configured in accordance with ANSI C63.4. The conducted emissions are measured in a shielded room with a spectrum analyzer in peak hold in the first instance. Emissions closest to the limit are measured in the quasi-peak mode (QP) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation. The highest emissions relative to the limit are listed.

Test Measurement Set up

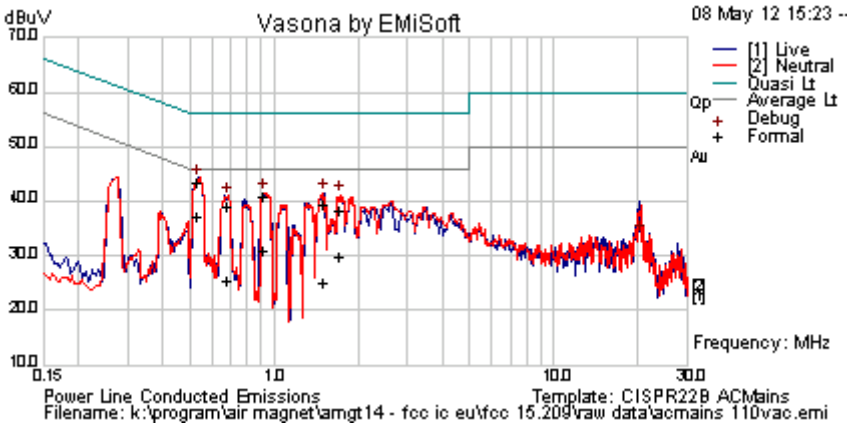


Measurement set up for AC Wireline Conducted Emissions Test

Measurement Results for AC Wireline Conducted Emissions (150 kHz – 30 MHz)

Ambient conditions.
Temperature: 17 to 23 °C Relative humidity: 31 to 57 % Pressure: 999 to 1012 mbar

Test Freq.	N/A	**Engineer**	SB
Variant	AC Line Emissions	**Temp (ºC)**	19.5
Freq. Range	0.150 MHz - 30 MHz	**Rel. Hum.(%)**	35
Power Setting	20	**Press. (mBars)**	1004
Antenna	N/A		
Test Notes 1			
Test Notes 2	Ac adaptor 110Vac 60 Hz		



Formally measured emission peaks

Frequency MHz	Raw dBuV	Cable Loss	Factors dB	Level dBuV	Measurement Type	Line	Limit dBuV	Margin dB	Pass /Fail	Comments
0.535	33.4	9.9	0.1	43.4	Quasi Peak	Neutral	56	-12.6	Pass	
1.502	29.4	10.0	0.1	39.5	Quasi Peak	Neutral	56	-16.5	Pass	
0.926	30.8	9.9	0.1	40.8	Quasi Peak	Neutral	56	-15.2	Pass	
1.734	28.4	10.0	0.1	38.5	Quasi Peak	Neutral	56	-17.5	Pass	
0.686	29.2	10.0	0.1	39.2	Quasi Peak	Neutral	56	-16.8	Pass	
0.535	27.2	9.9	0.1	37.2	Average	Neutral	46	-8.8	Pass	
1.502	14.9	10.0	0.1	25.0	Average	Neutral	46	-21.0	Pass	
0.926	20.9	9.9	0.1	30.9	Average	Neutral	46	-15.1	Pass	
1.734	19.9	10.0	0.1	30.1	Average	Neutral	46	-16.0	Pass	
0.686	15.6	10.0	0.1	25.6	Average	Neutral	46	-20.4	Pass	
20.594	22.7	10.5	0.8	34.0	Peak [Scan]	Neutral	50	-16.0	Pass	

Legend:	DIG = Digital Device Emission; TX = Transmitter Emission; FUND = Fundamental Frequency
	NRB = Non-Restricted Band, Limit is 20 dB below Fundamental; RB = Restricted Band

Specification

Limit

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μΩ line impedance stabilization network (LISN), see §15.207 (a) matrix below. Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

RSS-Gen §7.2.2
The radio frequency voltage that is conducted back into the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table below. The tighter limit applies at the frequency range boundaries.

§15.207 (a) and **RSS-Gen §7.2.2** Limit Matrix
The lower limit applies at the boundary between frequency ranges

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency

Laboratory Measurement Uncertainty for Conducted Emissions

Measurement uncertainty	±2.64 dB

Traceability

Method	Test Equipment Used
Measurements were made per work instruction WI-EMC-01 'Measurement of Conducted Emissions'	0158, 0184, 0287, 0190, 0293, 0307

5.1.9. DFS (Dynamic Frequency Selection)

5.1.9.1. Test Procedure and Setup

FCC, Part 15 Subpart C §15.407(h)
FCC 06-96 Memorandum Opinion and Order
Industry Canada RSS-210 A9.4

5.1.9.1.1. Interference Threshold values, Master or Client incorporating In-Service Monitoring

Maximum Transmit Power	**Value (see note)**
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna	

5.1.9.1.2. DFS Response requirement values

Parameter	**Value**
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds See Note 1.
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60 milliseconds over remaining 10 second period. See Notes 1 and 2.
U-NII Detection Bandwidth	Minimum 80% of the 99% power bandwidth See Note 3.

Note 1: The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

- For the Short pulse radar Test Signals this instant is the end of the *Burst*.
- For the Frequency Hopping radar Test Signal, this instant is the end of the last radar *Burst* generated.
- For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

Note 2: The *Channel Closing Transmission Time* is comprised of 200 milliseconds starting at the beginning of the *Channel Move Time* plus any additional intermittent control signals required to facilitate *Channel* changes (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Note 3: During the *U-NII Detection Bandwidth* detection test, radar type 1 is used and for each frequency step the minimum percentage of detection is 90%. Measurements are performed with no data traffic.

5.1.9.1.3. Radar Test Waveforms

This section provides the parameters for required test waveforms, minimum percentage of successful detections, and the minimum number of trials that must be used for determining DFS conformance. Step intervals of 0.1 microsecond for Pulse Width, 1 microsecond for PRI, 1 MHz for chirp width and 1 for the number of pulses will be utilized for the random determination of specific test waveforms.

Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (µsec)	PRI (µsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

A minimum of 30 unique waveforms are required for each of the short pulse radar types 2 through 4. For short pulse radar type 1, the same waveform is used a minimum of 30 times. If more than 30 waveforms are used for short pulse radar types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms. The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

Long Pulse Radar Test Waveform

Radar Type	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Number of Pulses per *Burst*	Number of *Bursts*	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

The parameters for this waveform are randomly chosen. Thirty unique waveforms are required for the Long Pulse radar test signal. If more than 30 waveforms are used for the Long Pulse radar test signal, then each additional waveform must also be unique and not repeated from the previous waveforms.

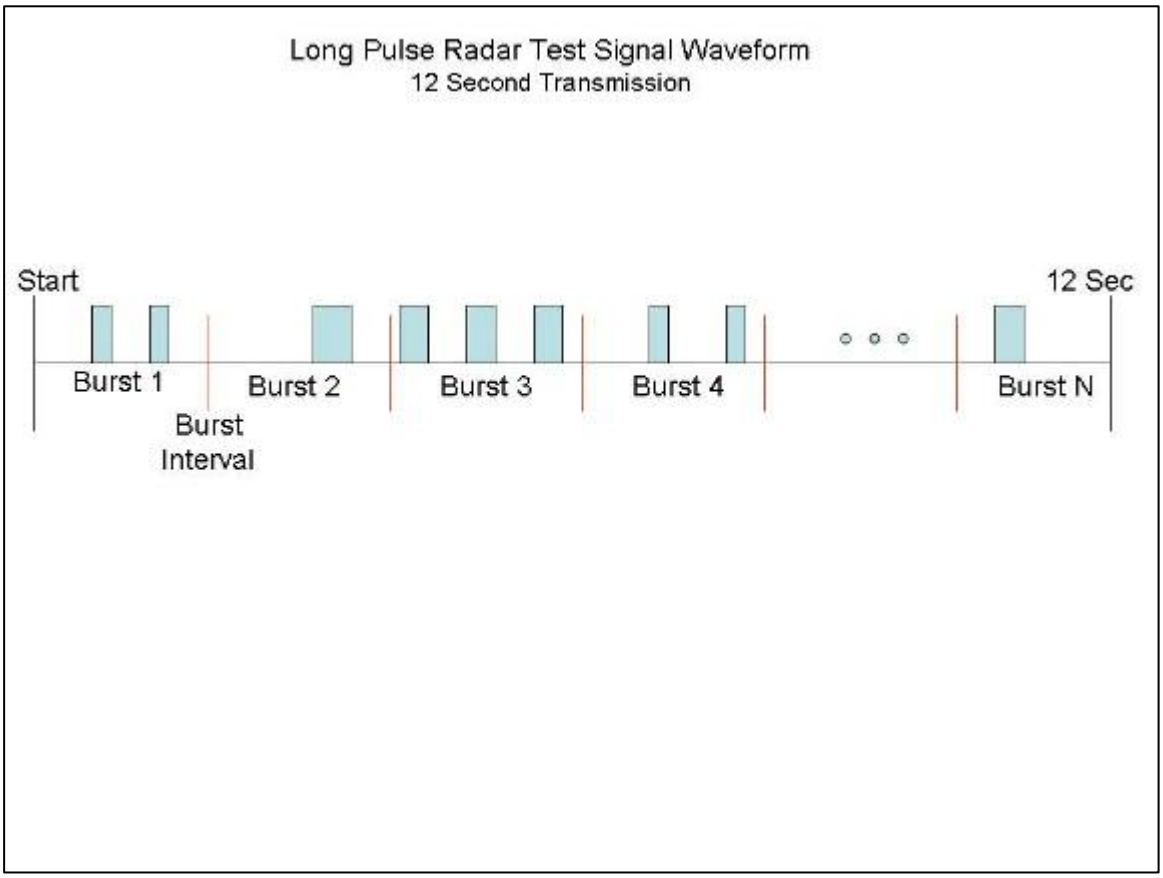
Each waveform is defined as follows:

1) The transmission period for the Long Pulse Radar test signal is 12 seconds.
2) There are a total of 8 to 20 *Bursts* in the 12 second period, with the number of *Bursts* being randomly chosen. This number is *Burst Count*.
3) Each *Burst* consists of 1 to 3 pulses, with the number of pulses being randomly chosen. Each *Burst* within the 12 second sequence may have a different number of pulses.
4) The pulse width is between 50 and 100 microseconds, with the pulse width being randomly chosen. Each pulse within a *Burst* will have the same pulse width. Pulses in different *Bursts* may have different pulse widths.
5) Each pulse has a linear FM chirp between 5 and 20 MHz, with the chirp width being randomly chosen. Each pulse within a *Burst* will have the same chirp width. Pulses in different *Bursts* may have different chirp widths. The chirp is centered on the pulse. For example, with a radar frequency of 5300 MHz and a 20 MHz chirped signal, the chirp starts at 5290 MHz and ends at 5310 MHz.
6) If more than one pulse is present in a *Burst*, the time between the pulses will be between 1000 and 2000 microseconds, with the time being randomly chosen. If three pulses are present in a *Burst*, the time between the first and second pulses is chosen independently of the time between the second and third pulses.
7) The 12 second transmission period is divided into even intervals. The number of intervals is equal to *Burst_Count*. Each interval is of length (12,000,000 / *Burst_Count*) microseconds. Each interval contains one *Burst*. The start time for the *Burst*, relative to the beginning of the interval, is between 1 and [(12,000,000 / *Burst_Count*) – (Total *Burst* Length) + (One Random PRI Interval)] microseconds, with the start time being randomly chosen. The step interval for the start time is 1 microsecond. The start time for each *Burst* is chosen independently.

A representative example of a Long Pulse radar test waveform:

1) The total test signal length is 12 seconds.
2) 8 *Bursts* are randomly generated for the *Burst_Count*.
3) *Burst* 1 has 2 randomly generated pulses.
4) The pulse width (for both pulses) is randomly selected to be 75 microseconds.
5) The PRI is randomly selected to be at 1213 microseconds.
6) *Bursts* 2 through 8 are generated using steps 3 – 5.
7) Each *Burst* is contained in even intervals of 1,500,000 microseconds. The starting location for Pulse 1, *Burst* 1 is randomly generated (1 to 1,500,000 minus the total *Burst* 1 length + 1 random PRI interval) at the 325,001 microsecond step. *Bursts* 2 through 8 randomly fall in successive 1,500,000 microsecond intervals (i.e. *Burst* 2 falls in the 1,500,001 – 3,000,000 microsecond range).

Graphical representation of the Long Pulse radar Test Waveform.



5.1.9.1.4. Frequency Hopping Radar Test Waveform

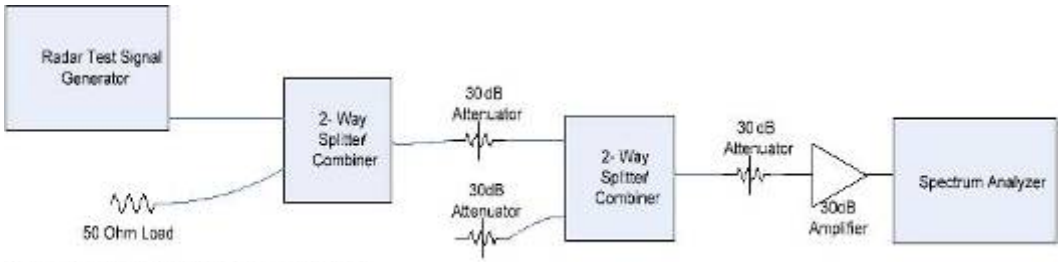
Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (µsec)	PRI (µsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	.333	300	70%	30

For the Frequency Hopping Radar Type, the same *Burst* parameters are used for each waveform. The hopping sequence is different for each waveform and a 100-length segment is selected from the hopping sequence defined by the following algorithm:

5.1.9.1.5. Radar Waveform Calibration

The following equipment setup was used to calibrate the conducted Radar Waveform. A spectrum analyzer was used to establish the test signal level for each radar type. During this process there were no transmissions by either the Master or Client Device. The spectrum analyzer was switched to the zero span (Time Domain) mode at the frequency of the Radar Waveform generator. Peak detection was utilized. The spectrum analyzer resolution bandwidth (RBW) and video bandwidth (VBW) were set to 3 MHz.
The signal generator amplitude was set so that the power level measured at the spectrum analyzer was -61dBm (Ref Section 5.1). The 30dB amplifier gain was entered as an amplitude offset on the spectrum analyzer.

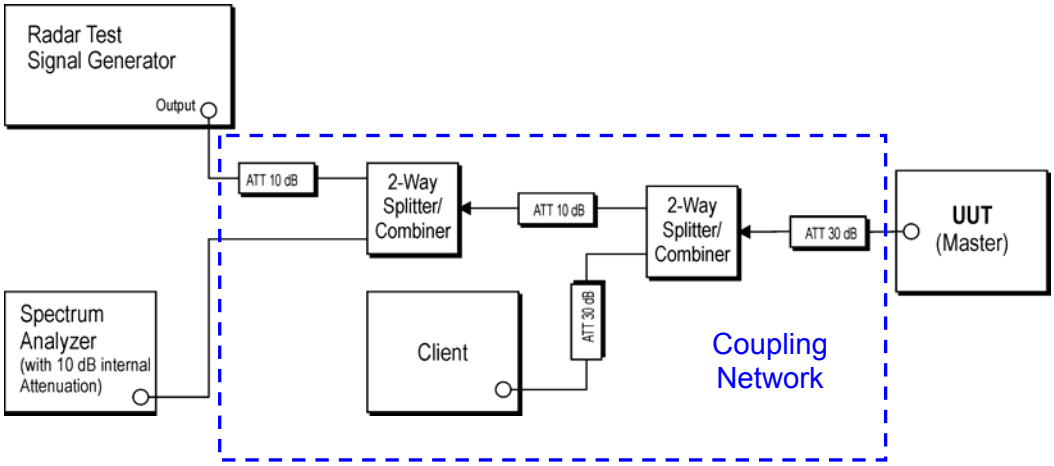


Conducted Calibration Setup

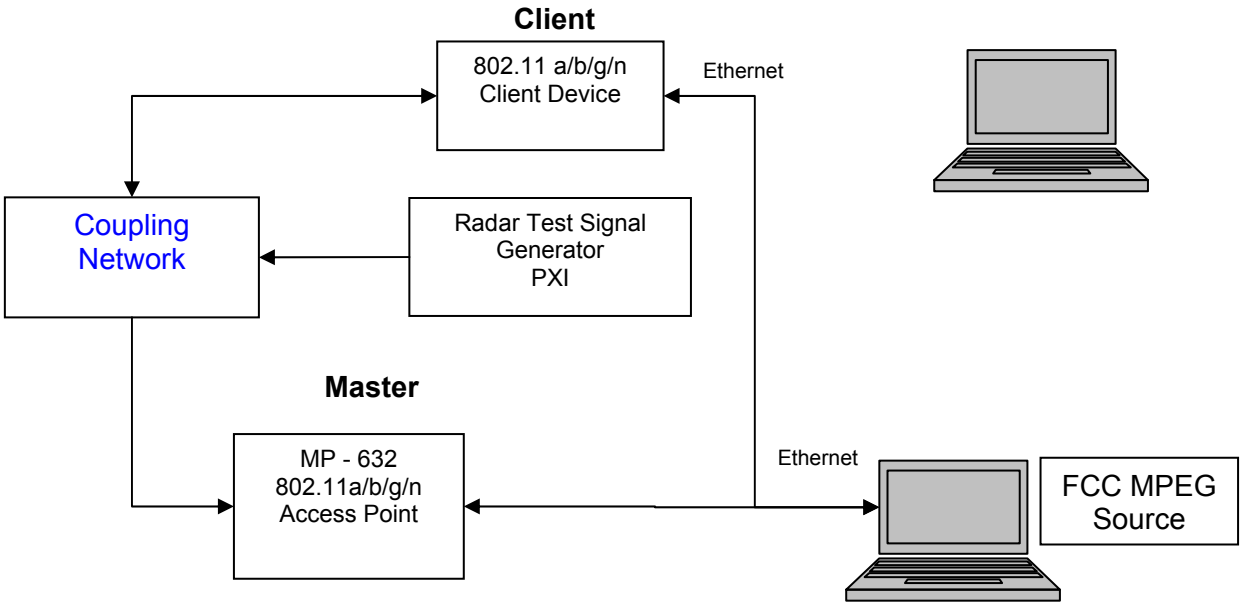
5.1.9.1.6. Block Diagram(s) of Test Setup

Block Diagram(s) of Test Setup

Setup for Conducted Measurements where the EUT is the Master with injection of Radar Test Waveforms at the Master.



Support Equipment Configuration



The EUT is a Client Device without radar detection.

Applicability of DFS Requirements Prior to Use of a Channel

(Ref Table 1 of FCC 06-96)

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Yes	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required
U-NII Detection Bandwidth	Yes	Not required	Yes

Applicability of DFS requirements during normal operation

(Ref Table 2 of FCC 06-96)

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes
U-NII Detection Bandwidth	Yes	Not required	Yes

5.2. Dynamic Frequency Selection (DFS) Test Results

5.2.1. In-Service Monitoring for Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

FCC §15.407(h)(2)(iii)

The steps below define the procedure to determine the above mentioned parameters when a radar Burst with a level equal to the DFS Detection Threshold is generated on the Operating Channel of the U-NII device.

A U-NII device operating as a Client Device will associate with the EUT (Master). The requisite MPEG video file ("TestFile.mpg" available on the NTIA website at the following link http://ntiacsd.ntia.doc.gov/dfs/) is streamed from the master device (AP) to the client.

Channel Closing Transmission Time - Measurement

A Type 1 waveform was introduced to the EUT, from which a 12 second transmission record was digitally captured, collecting nearly 250M samples of data, which included in excess of 600 ms of pre-trigger data. This Type 1 waveform had an integral marker built into its construction, marking the start of the radar waveform play, which directly triggered the PXI digitizer's data capture via the PXI backplane trigger bus.

The test system was set-up to capture all transmission data for access point events above a threshold level of -50 dBm. The test equipment time stamps all captured events with respect to T0 (zero time indicating the start of the measurements sequence) starting the 612.1 ms pre-trigger period followed by the radar type 1 burst period.

Radar (Type 1) Pre-trigger period	612.1 ms
Type 1 burst period	25.70 ms

(The period of the 18 pulse burst includes [18 pulses *1.428mS PRI] = 25.704 ms. Then add 1 µs pulse width for the final pulse.)

Total	637.8 ms

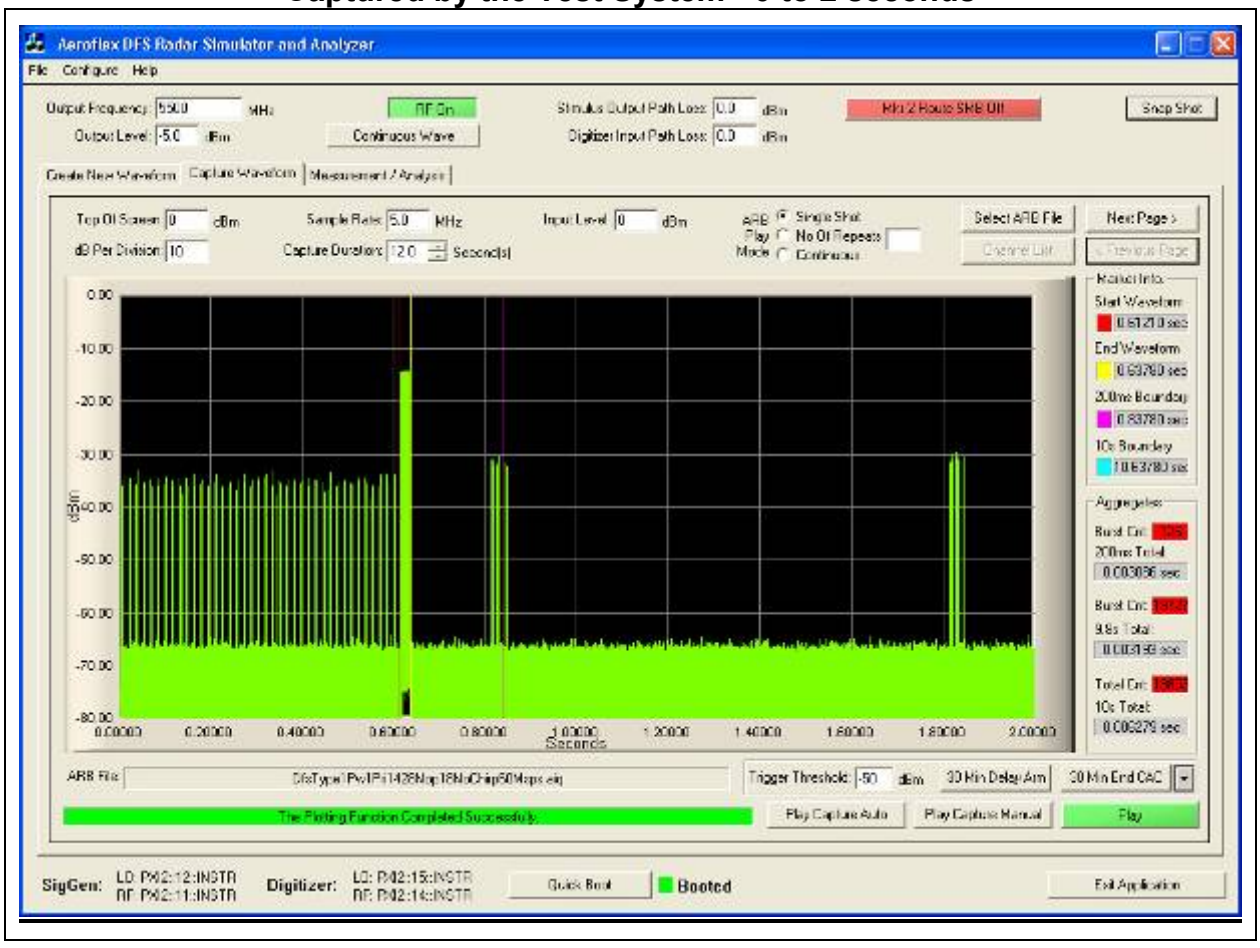
Channel Closing Transmission Time starts immediately after the last radar pulse is transmitted i.e. 637.8 ms after the start of the trace capture period.

Therefore, pulses seen after this 637.8 ms boundary are identified and totaled to provide an aggregate total of transmissions in order to determine whether the EUT is compliant with the Channel Closing Transmission Time requirements as described in MO&O FCC 06-96. In this case, it was found that an aggregate total of 0.00 ms of transmission time accrued. This value is found at the right hand side at the foot of the following plot (10s Total).

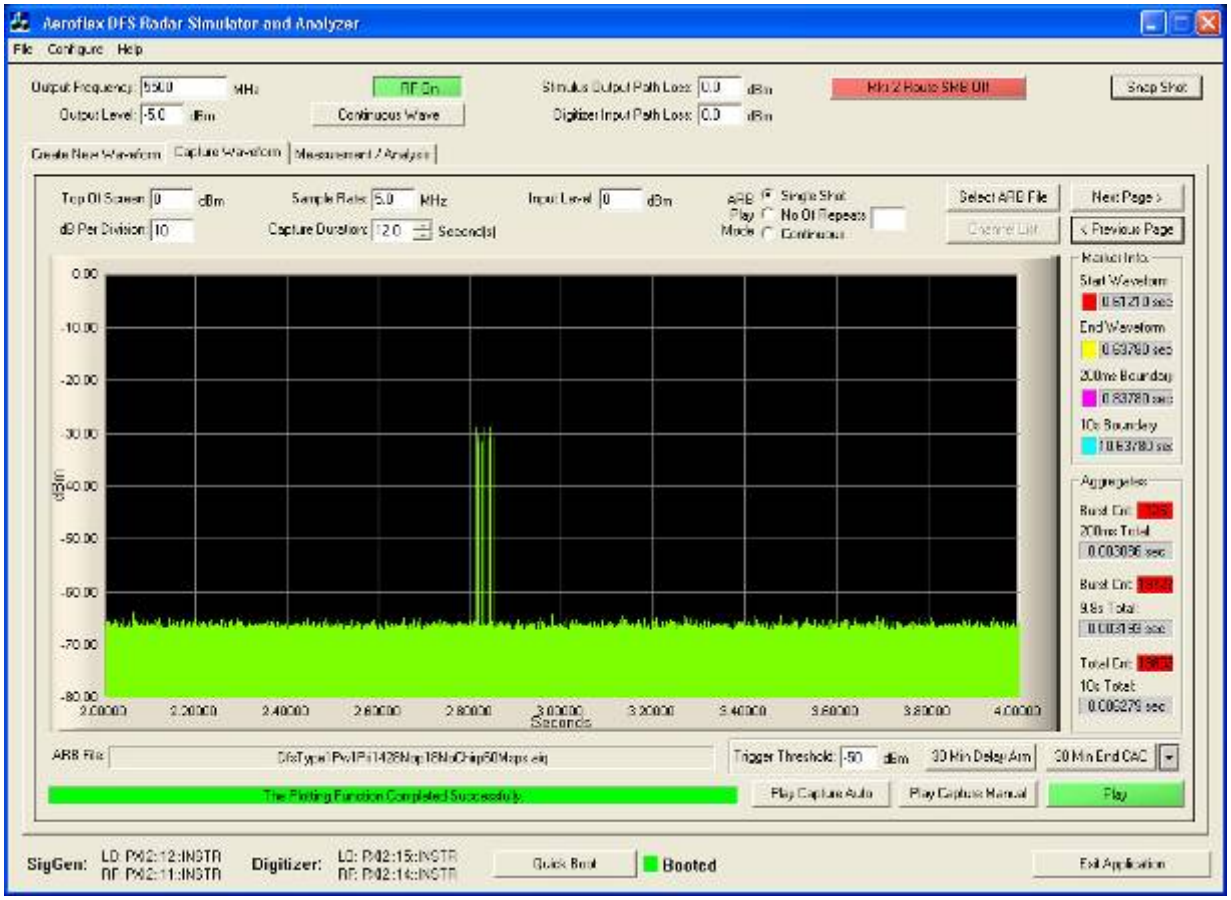
Channel Closing Transmission Time
5,500 MHz (802.11a) = 6.279 mSecs (limit 260 mSecs)

Channel Move Time
5,500MHz (802.11a) = 2.2622 Secs (limit 10 Secs)

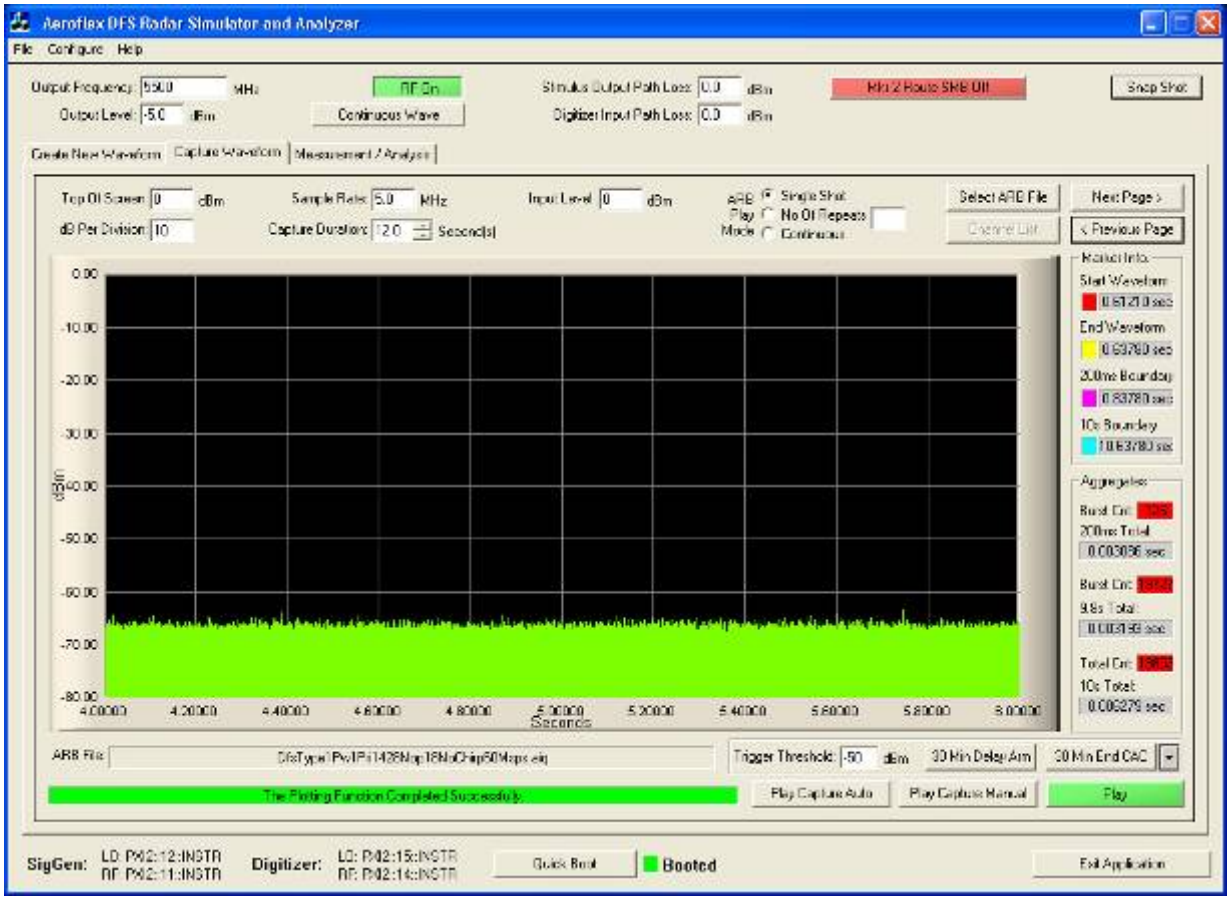
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 0 to 2 seconds



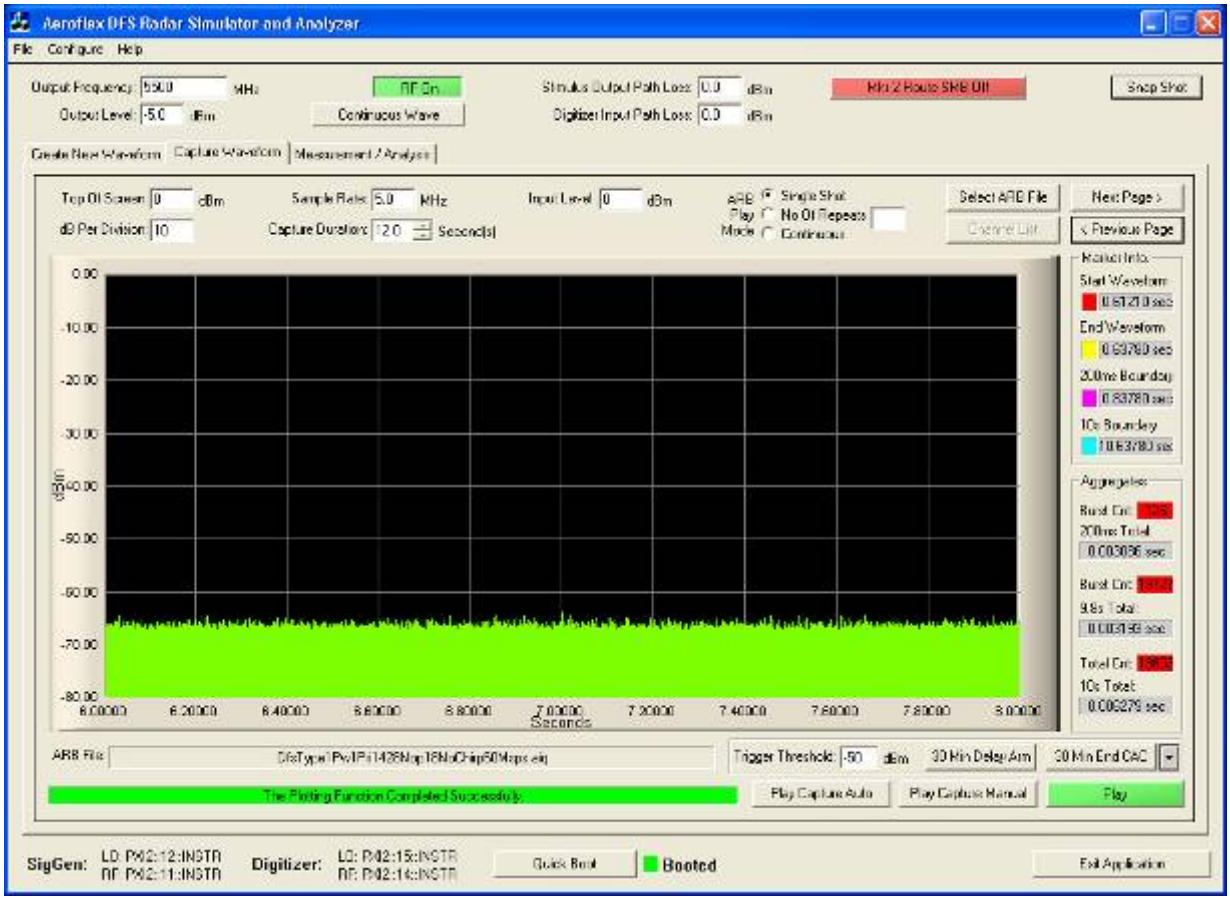
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 2 to 4 seconds



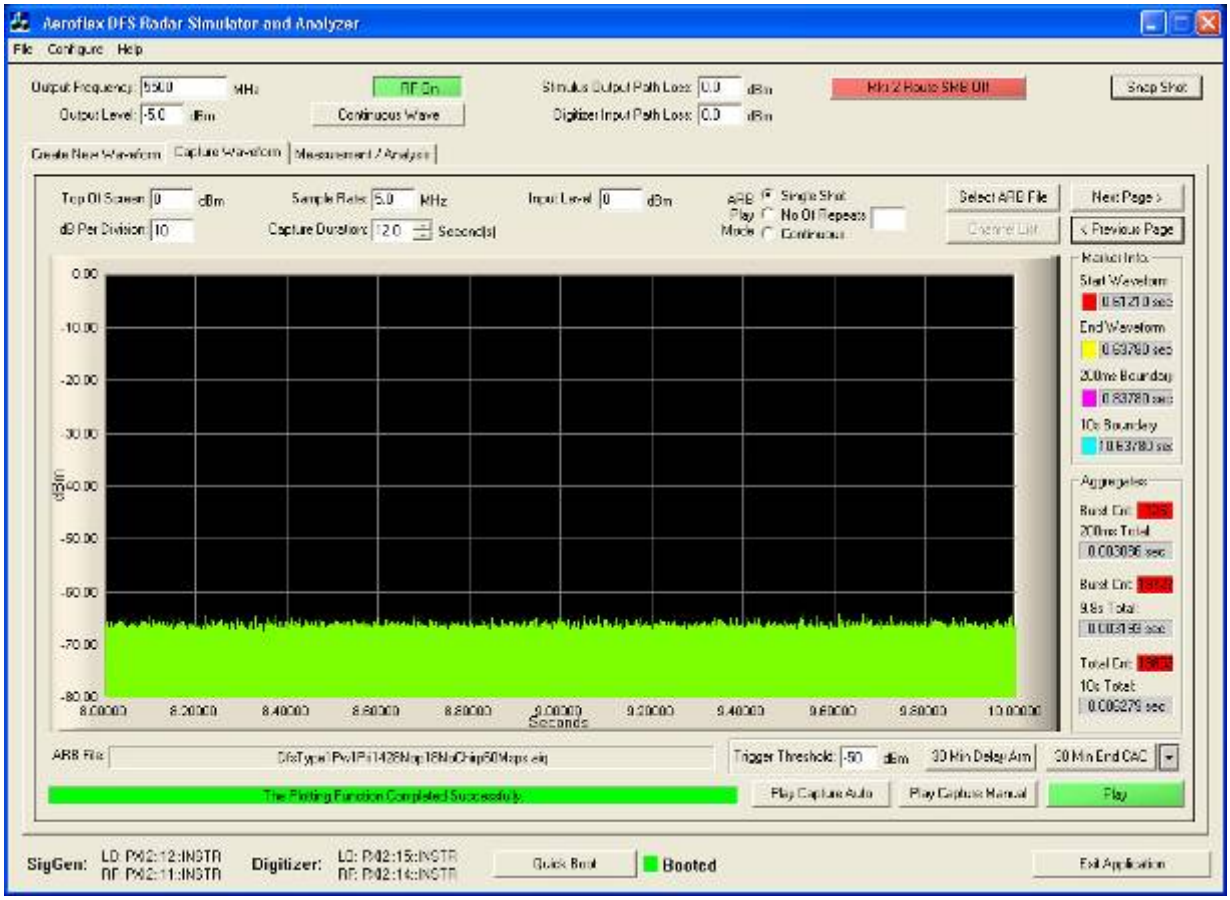
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 4 to 6 seconds



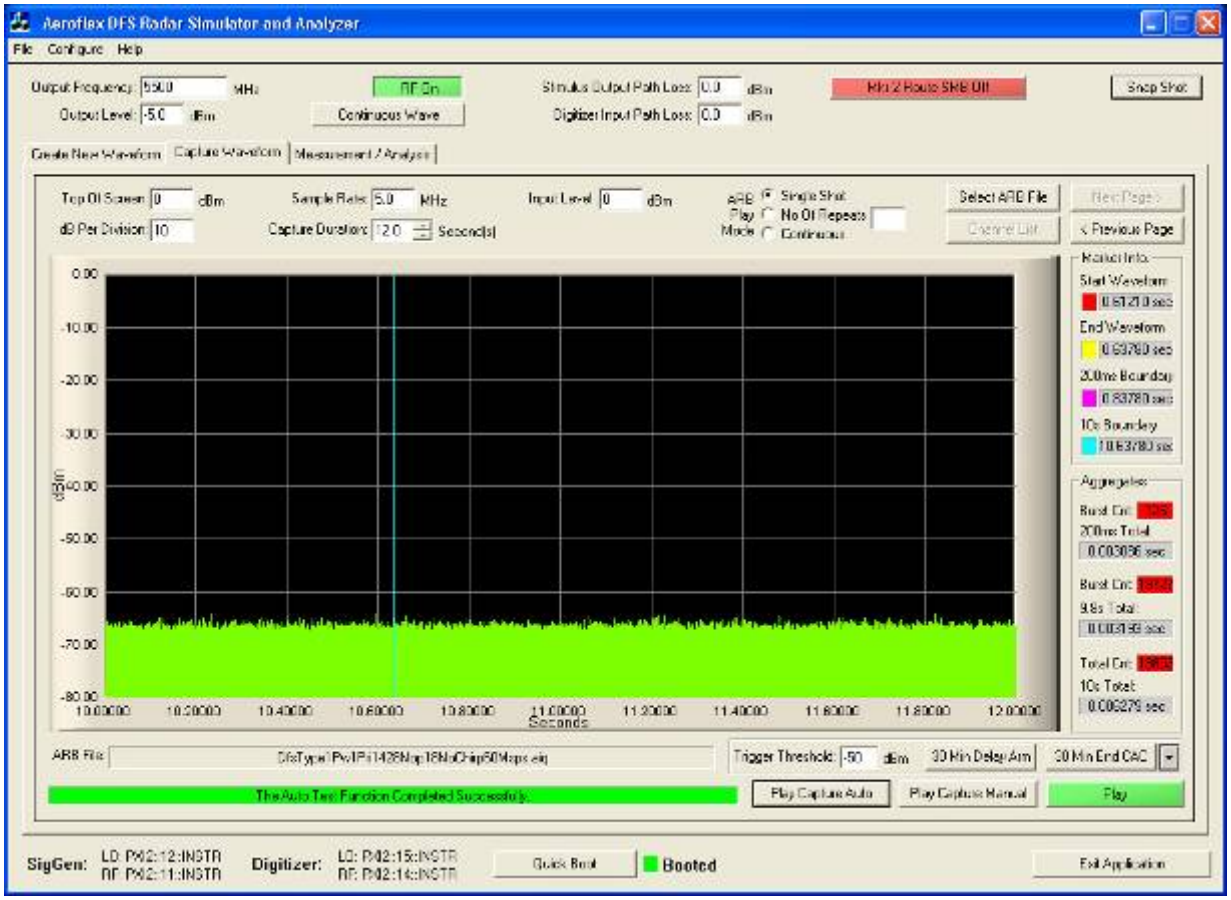
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 6 to 8 seconds



Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 8 to 10 seconds



Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 10 to 12 seconds

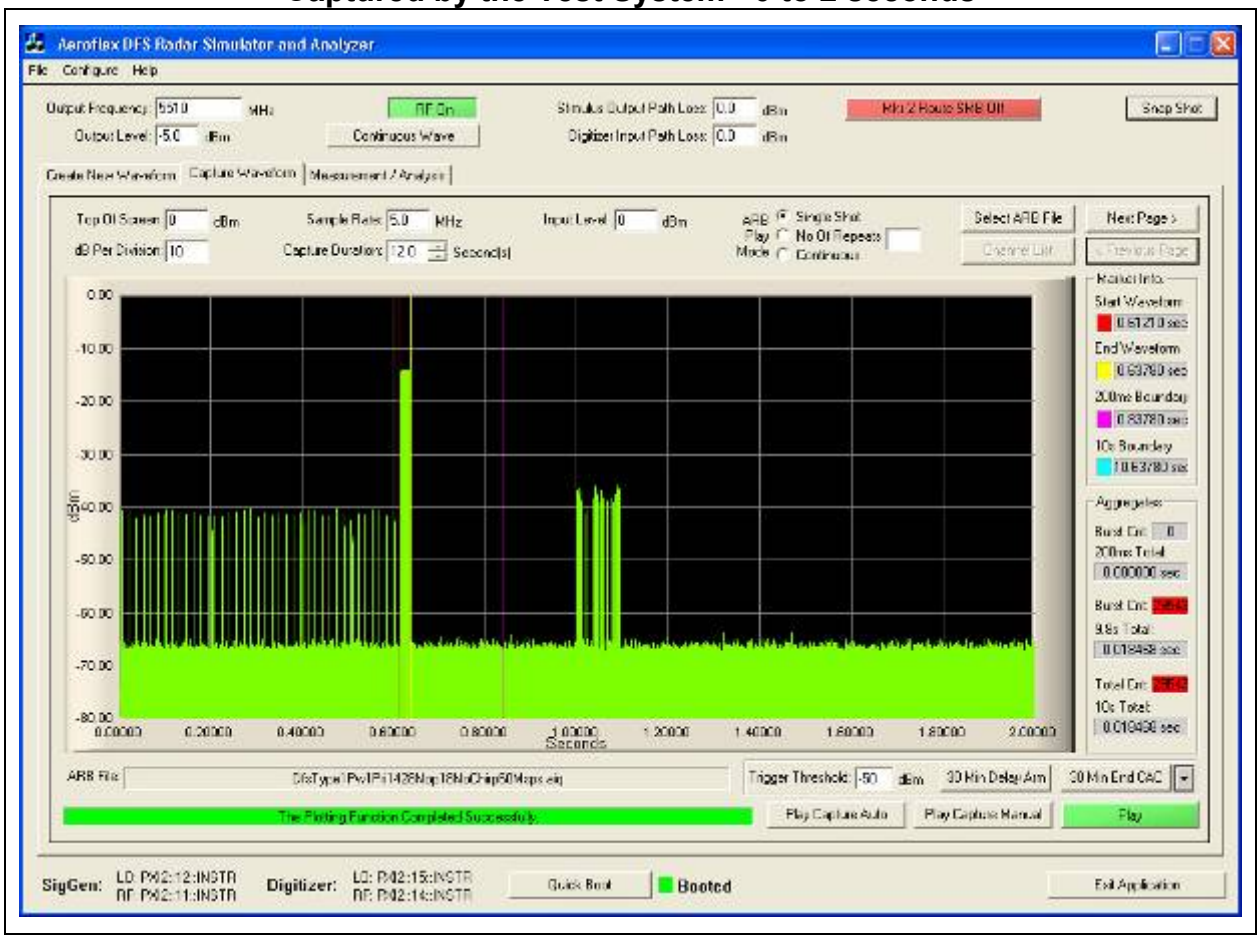


Therefore, pulses seen after this 637.8 ms boundary are identified and totaled to provide an aggregate total of transmissions in order to determine whether the EUT is compliant with the Channel Closing Transmission Time requirements as described in MO&O FCC 06-96. In this case, it was found that an aggregate total of 0.00 ms of transmission time accrued. This value is found at the right hand side at the foot of the following plot (10s Total).

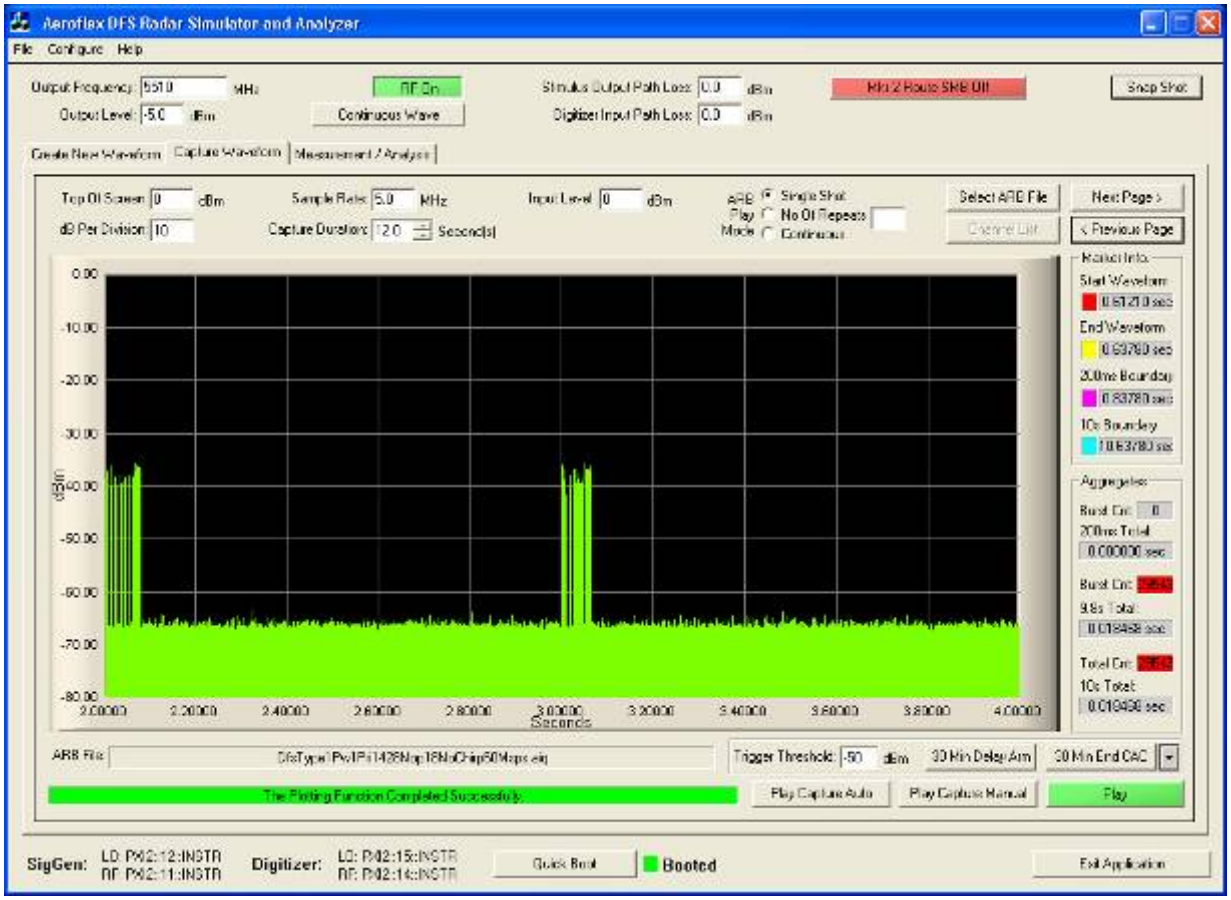
Channel Closing Transmission Time
5,510 MHz (802.11 n HT40) = 18.468 mSecs (limit 260 mSecs)

Channel Move Time
5,510MHz (802.11n HT40) = 2.4622 Secs (limit 10 Secs)

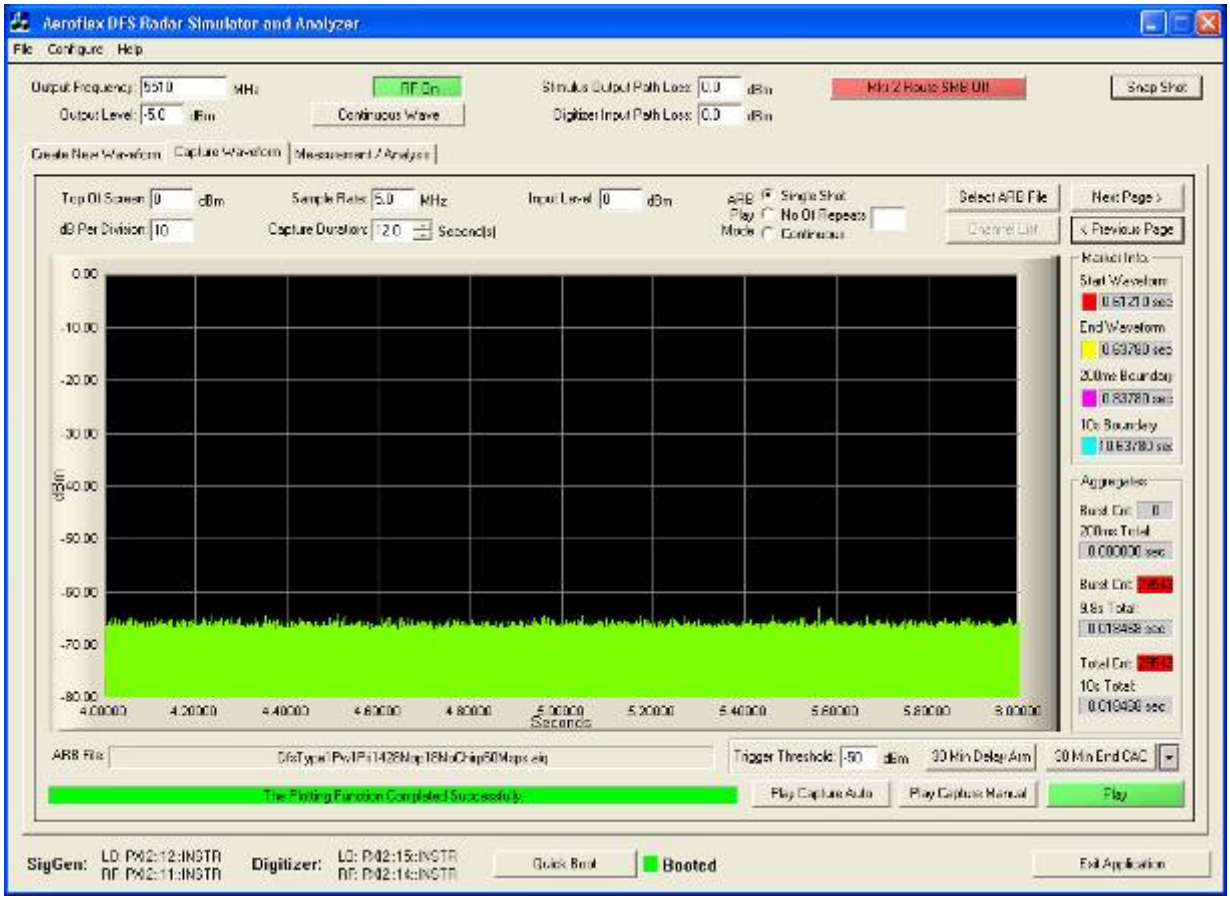
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 0 to 2 seconds



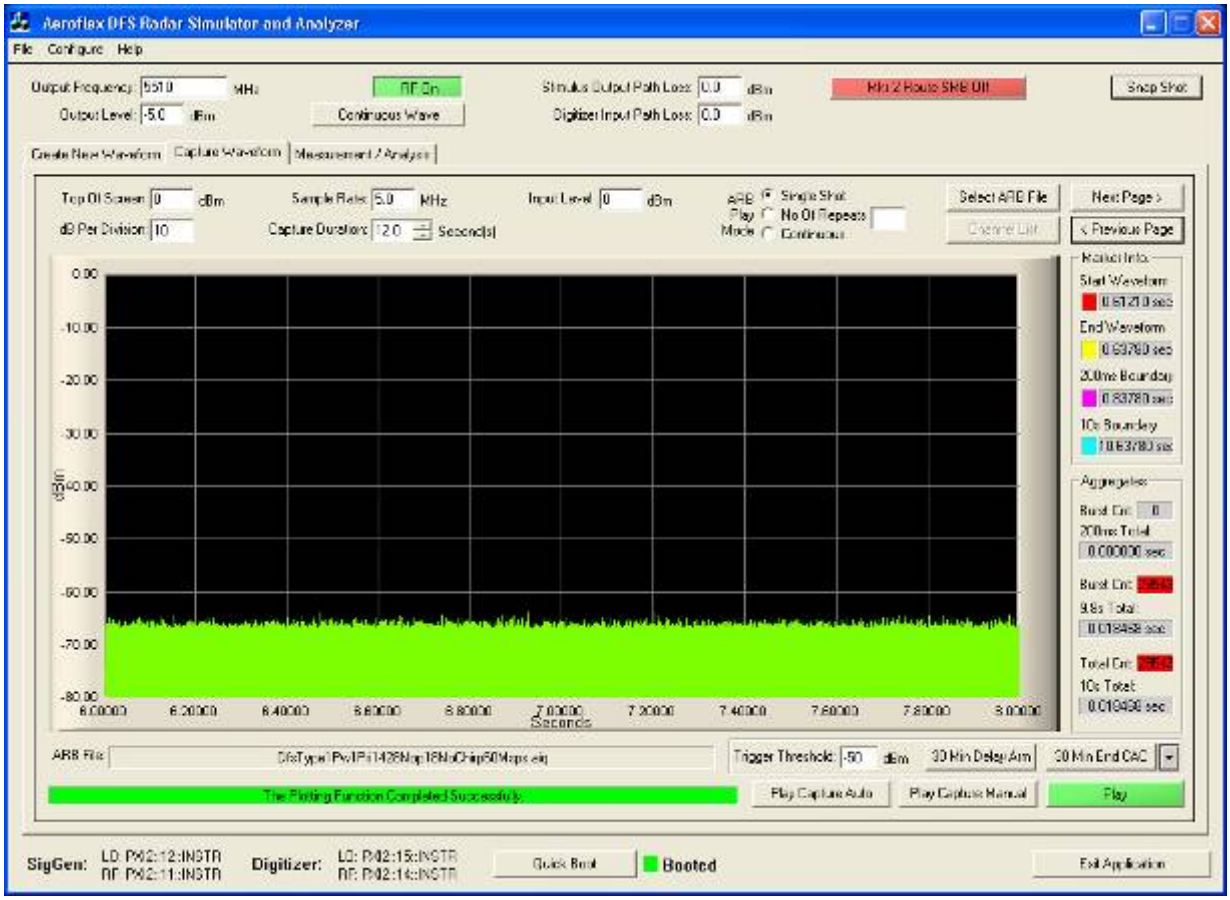
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 2 to 4 seconds



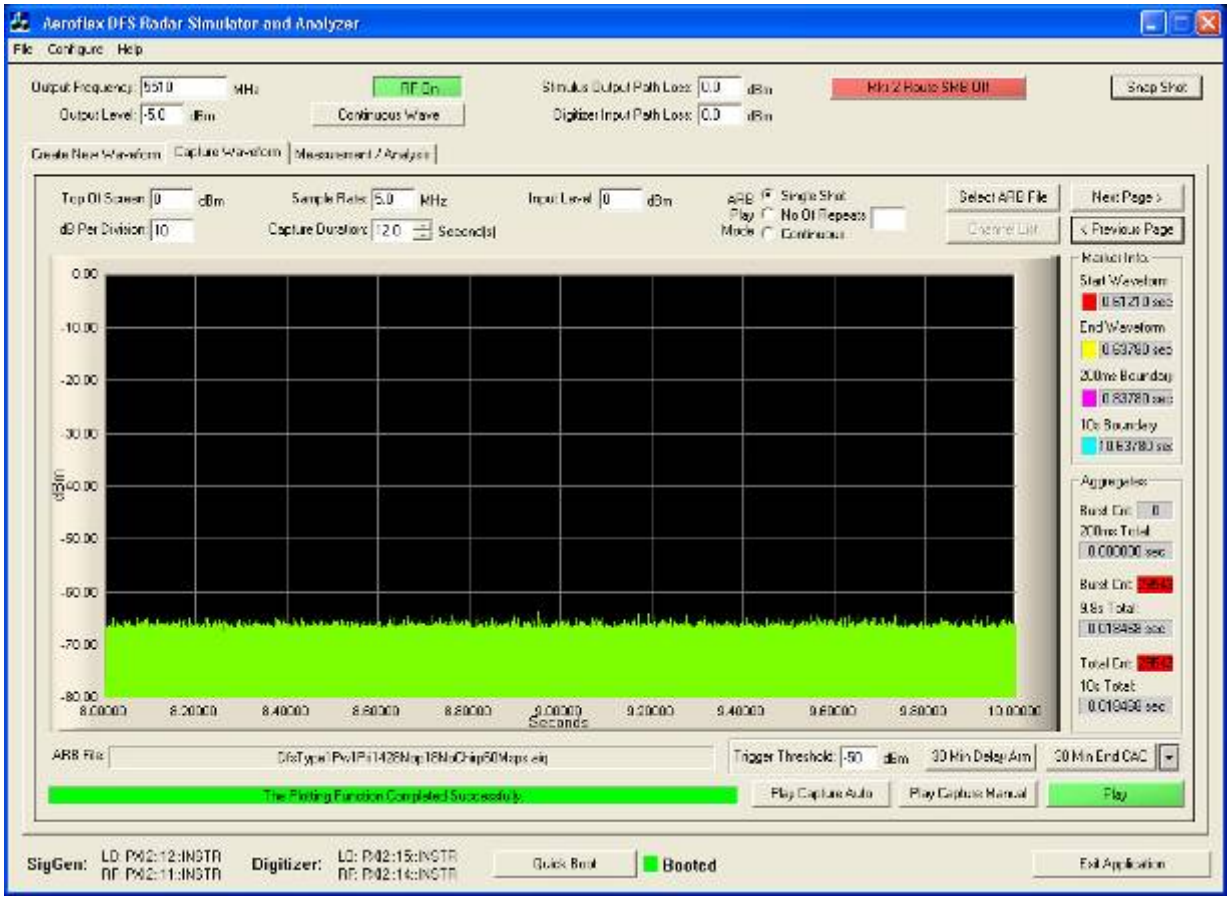
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 4 to 6 seconds



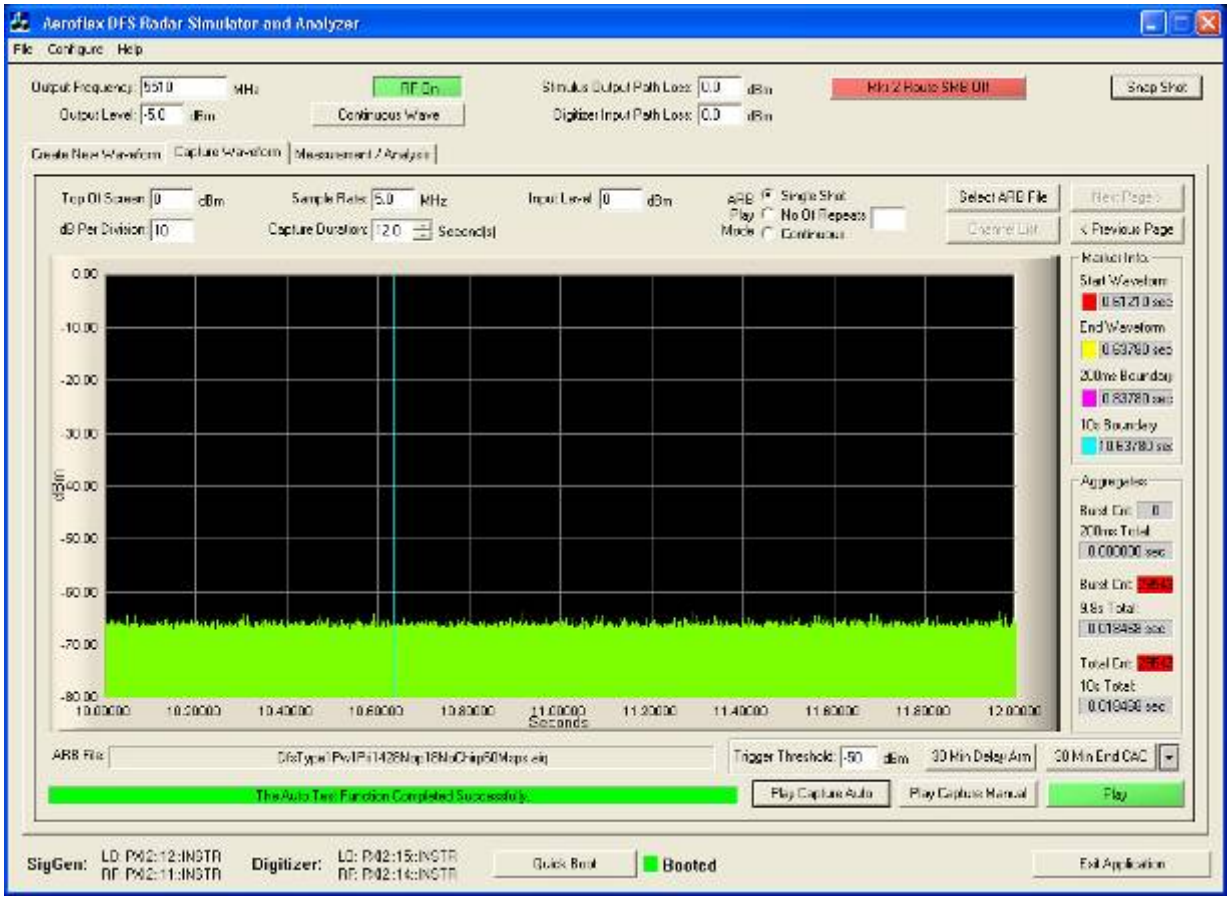
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 6 to 8 seconds



Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 8 to 10 seconds



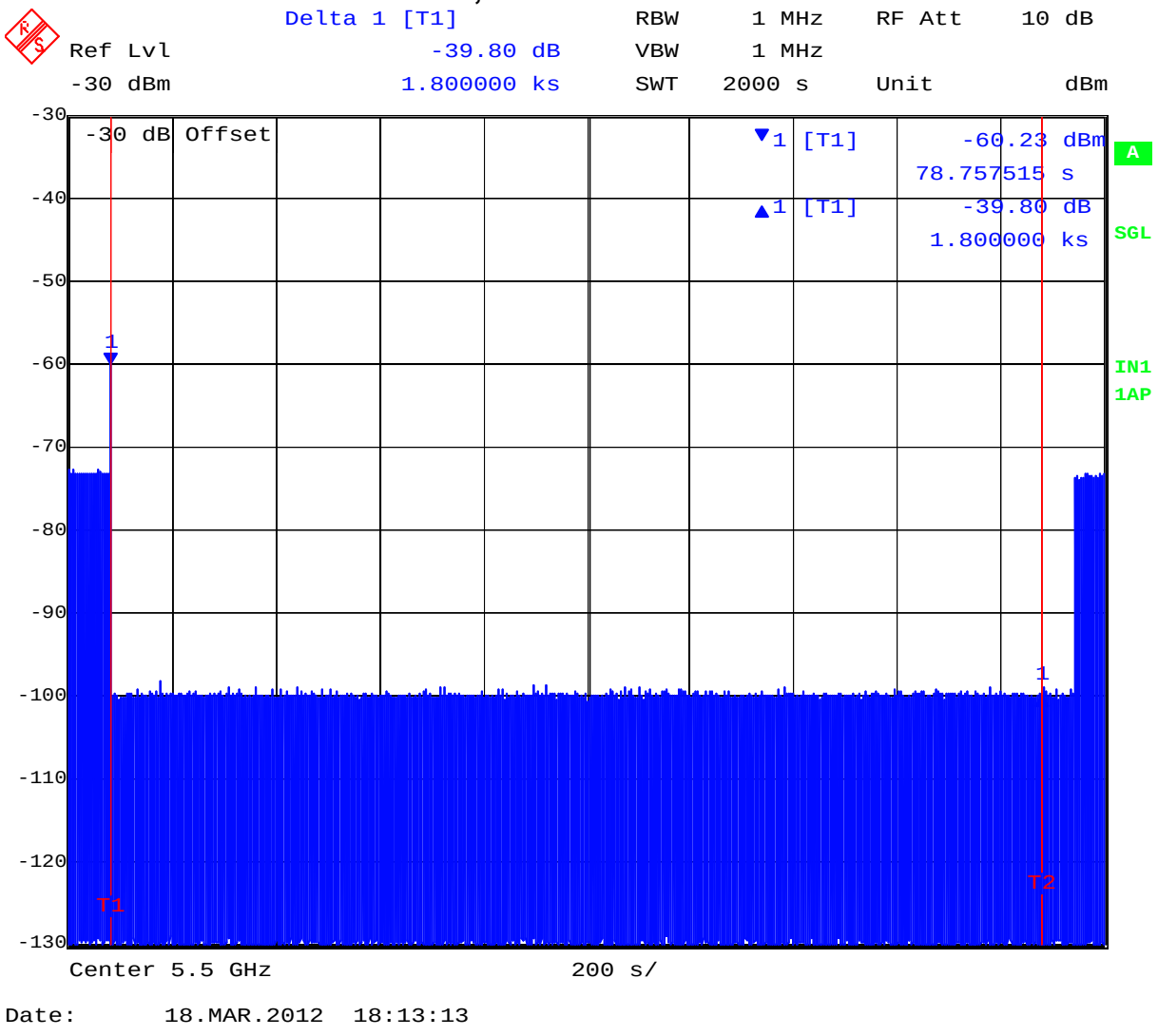
Channel Move Time, Channel Closing Transmission Time for Type 1 Radar Captured by the Test System - 10 to 12 seconds



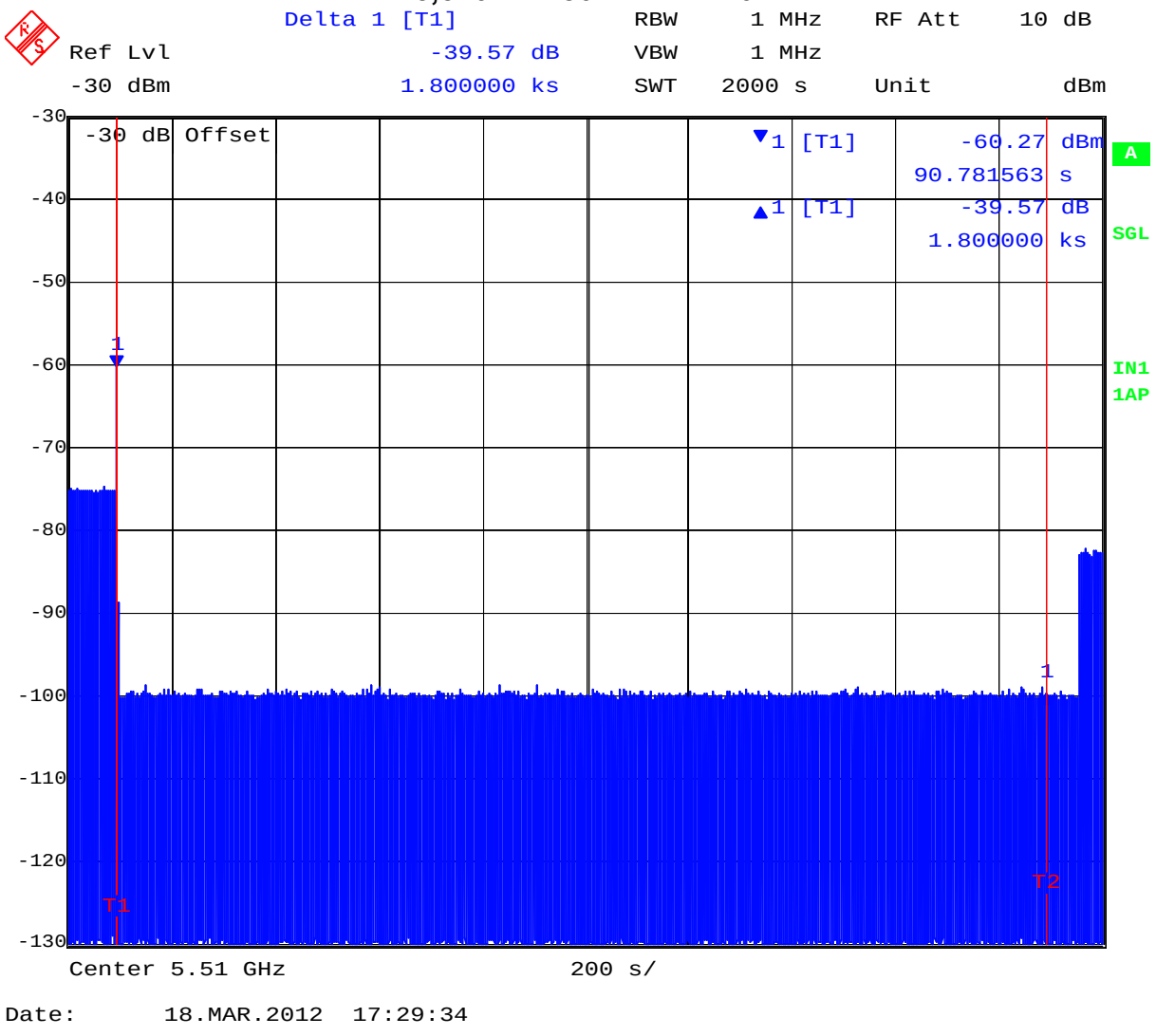
30 Minute Non-Occupancy Period

The EUT is monitored for more than 30 minutes following the channel close/move time to verify no transmissions resume on this Channel.

30 Minute Non-Occupancy Period Type 1 Radar
5,500MHz 802.11a



30 Minute Non-Occupancy Period Type 1 Radar
5,510MHz 802.11n HT40



Measurement Uncertainty Time/Power

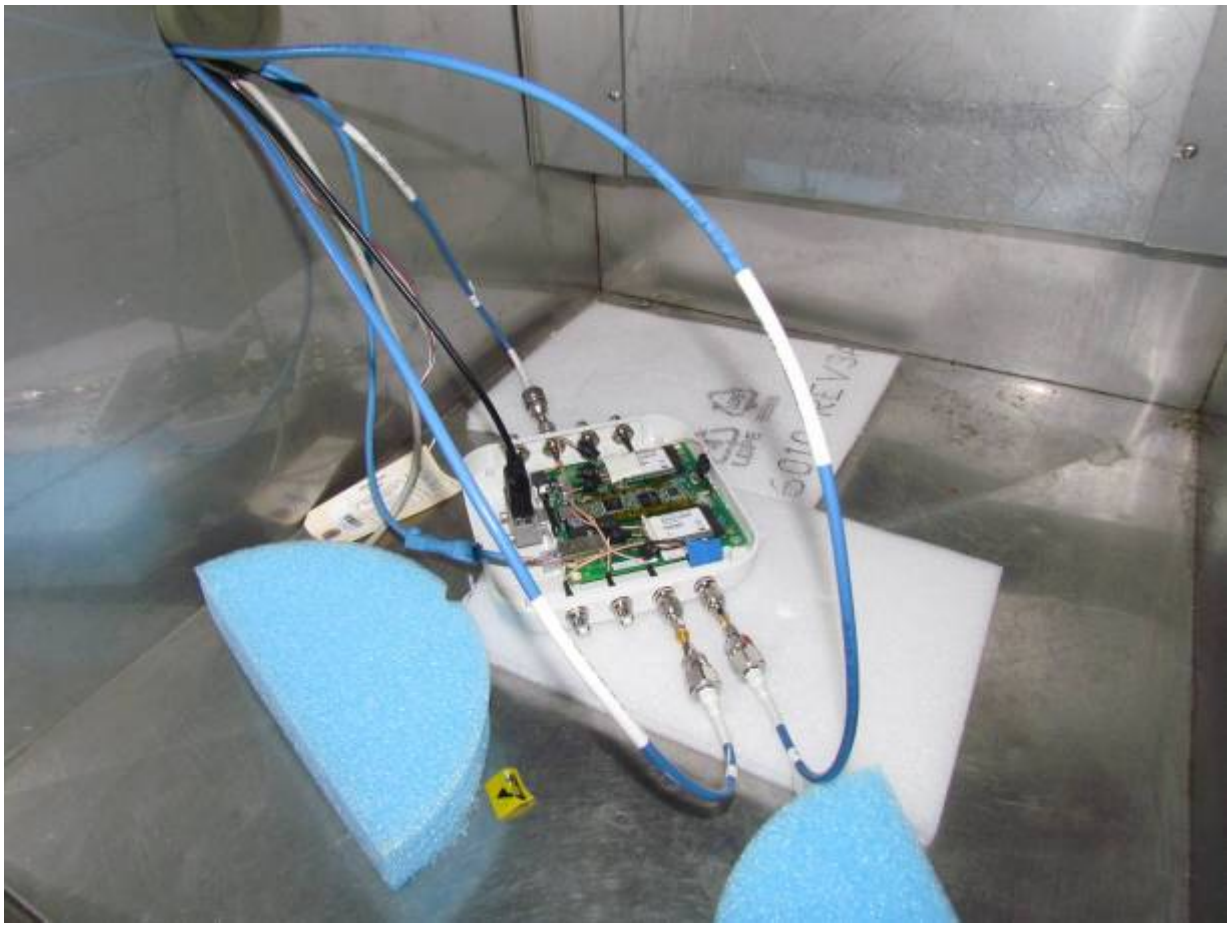
Measurement uncertainty - Time - Power	 4% 1.33dB

Traceability

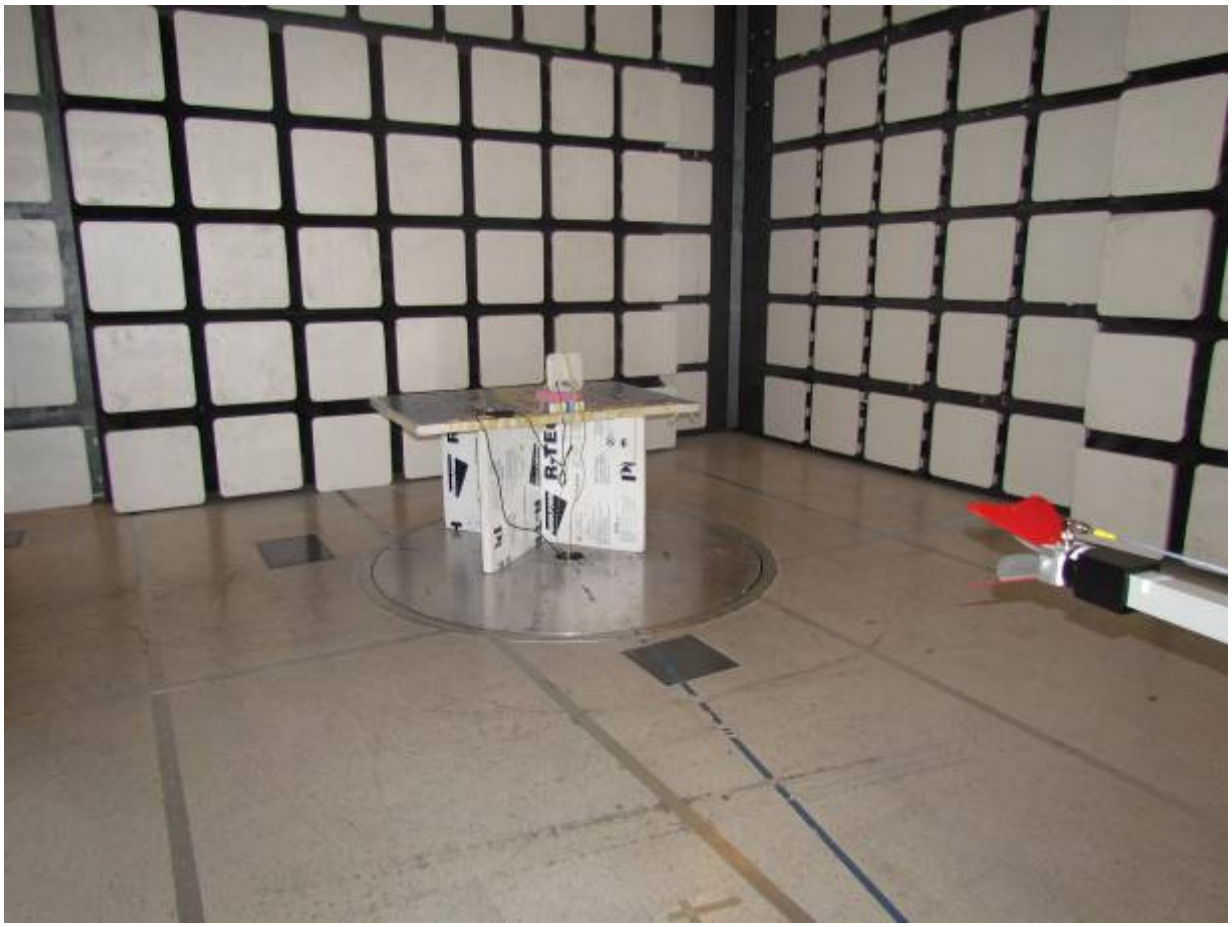
Test Equipment Used
0072, 0083, 0098, 0116, 0132, 0158, 0313, 0314, 0193, 0223, 0252, 0253, 0251, 0256, 0328, 0329

6. PHOTOGRAPHS

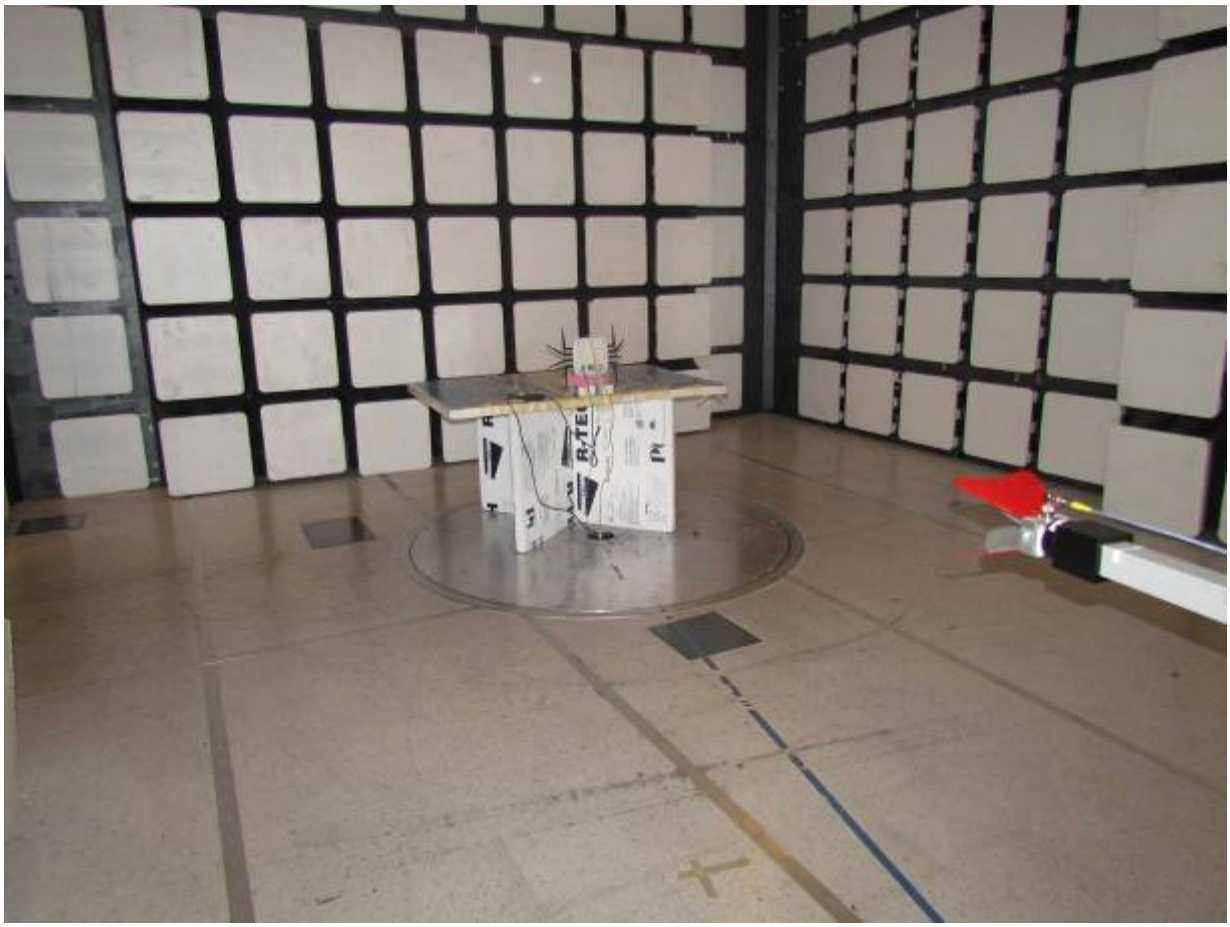
6.1. Conducted Test Setup



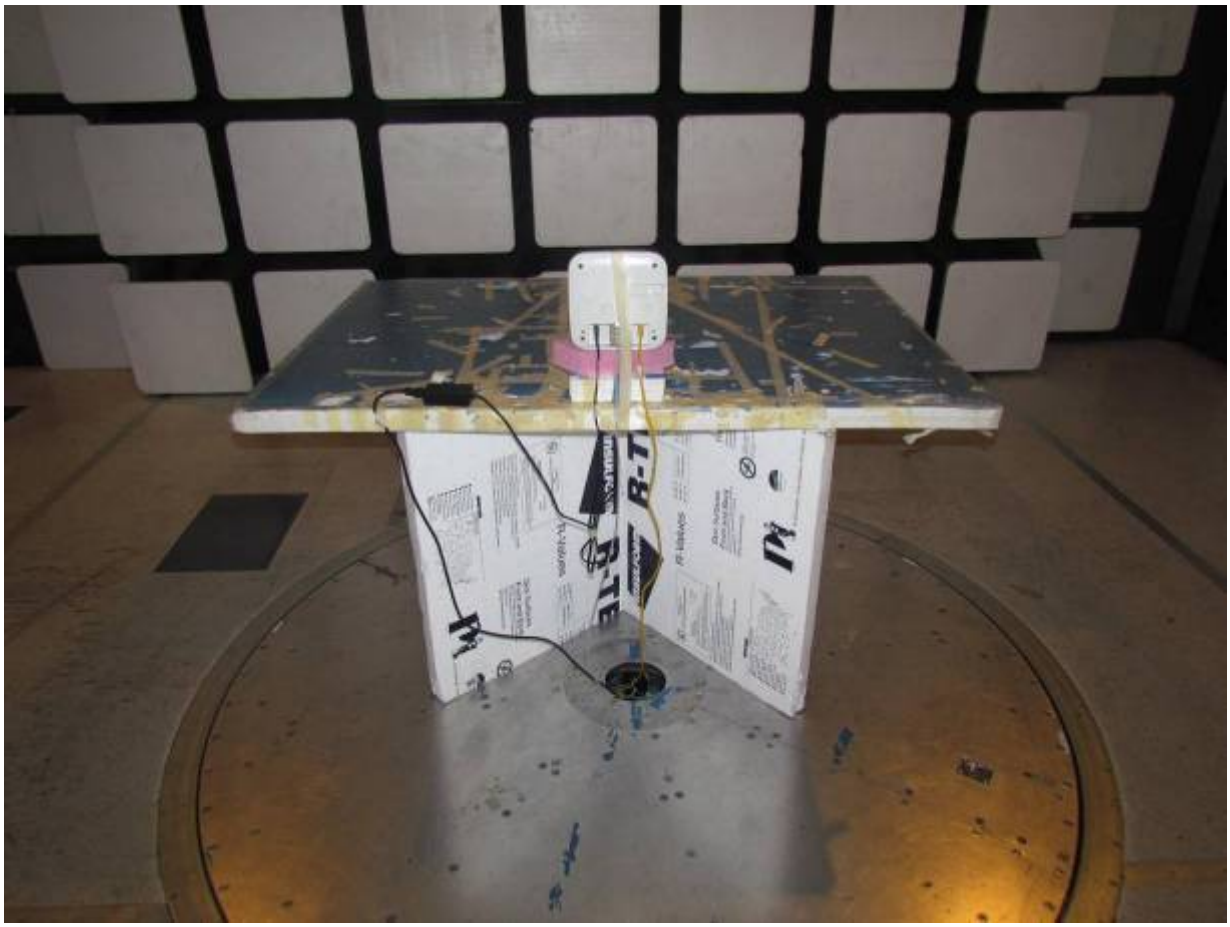
6.2. Radiated Test Setup > 1 GHz (Integral Antenna)



6.3. Radiated Test Setup > 1 GHz (External Antenna)

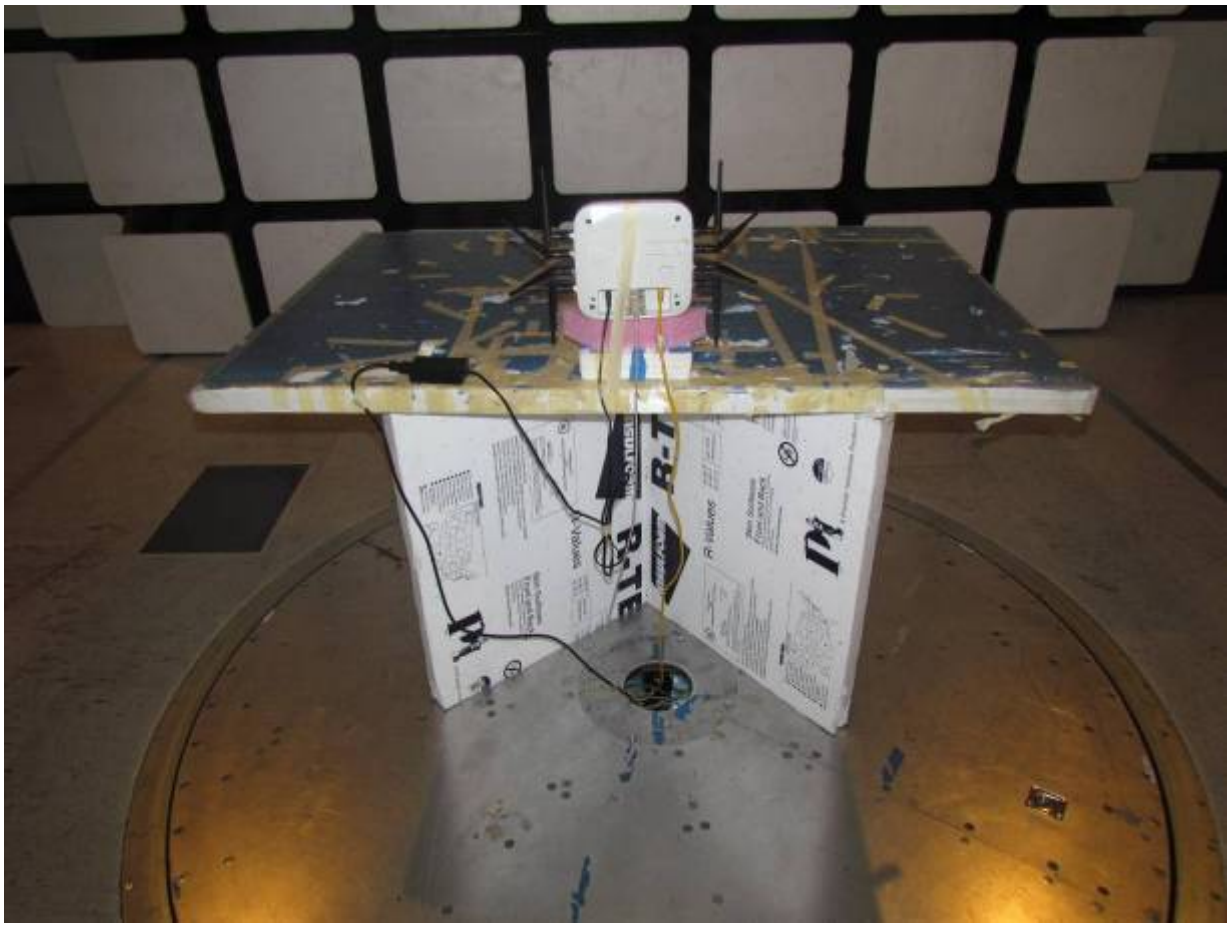


6.4. Radiated Test Table-top Setup (Integral Antenna)



6.5. Radiated Test Setup < 1 GHz (External Antenna)

6.6. Radiated Test Table-top Setup (External Antenna)



6.7. ac Wireline Emissions

6.8. Dynamic Frequency Selection Test Set-Up

General DFS Test Setup

DFS Test Equipment

7. TEST EQUIPMENT DETAILS

Asset #	Instrument	Manufacturer	Part #	Serial #
0088	Spectrum Analyzer	Hewlett Packard	8564E	3410A00141
0134	Amplifier	Com Power	PA 122	181910
0158	Barometer /Thermometer	Control Co.	4196	E2846
0287	EMI Receiver	Rhode & Schwartz	ESIB 40	100201
0252	SMA Cable	Megaphase	Sucoflex 104	None
0310	2m SMA Cable	Micro-Coax	UFA210A-0-0787-3G03G0	209089-001
0312	3m SMA Cable	Micro-Coax	UFA210A-1-1181-3G0300	209092-001
0313	Coupler	Hewlett Packard	86205A	3140A01285
0314	30dB N-Type Attenuator	ARRA	N9444-30	1623
0070	Power Meter	Hewlett Packard	437B	3125U11552
0116	Power Sensor	Hewlett Packard	8485A	3318A19694
0117	Power Sensor	Hewlett Packard	8487D	3318A00371
0184	Pulse Limiter	Rhode & Schwartz	ESH3Z2	357.8810.52
0190	LISN	Rhode & Schwartz	ESH3Z5	836679/006
0293	BNC Cable	Megaphase	1689 1GVT4	15F50B001
0301	5.6 GHz Notch Filter	Micro-Tronics	RBC50704	001
0302	5.25 GHz Notch Filter	Micro-Tronics	BRC50703	002
0303	5.8 GHz Notch Filter	Micro-Tronics	BRC50705	003
0304	2.4GHzHz Notch Filter	Micro-Tronics	--	001
0307	BNC Cable	Megaphase	1689 1GVT4	15F50B002
0335	1-18GHz Horn Antenna	ETS- Lindgren	3117	00066580
0337	Amplifier	MiCOM Labs	--	--
0338	Antenna	Sunol Sciences	JB-3	A052907

440 Boulder Court, Suite 200
Pleasanton, CA 94566, USA
Tel: 1.925.462.0304
Fax: 1.925.462.0306
www.micomlabs.com