



## **SDT 500 UB ARK 1**

### **Cabinet Radiation**



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## 1.1 PURPOSE

The purpose of this document is to give the sufficient and necessary information about:

### SDT 500 UB CABINET RADIATION

At rated output power which is 20.0 W under ATSC standard

By the results below it turns out that:

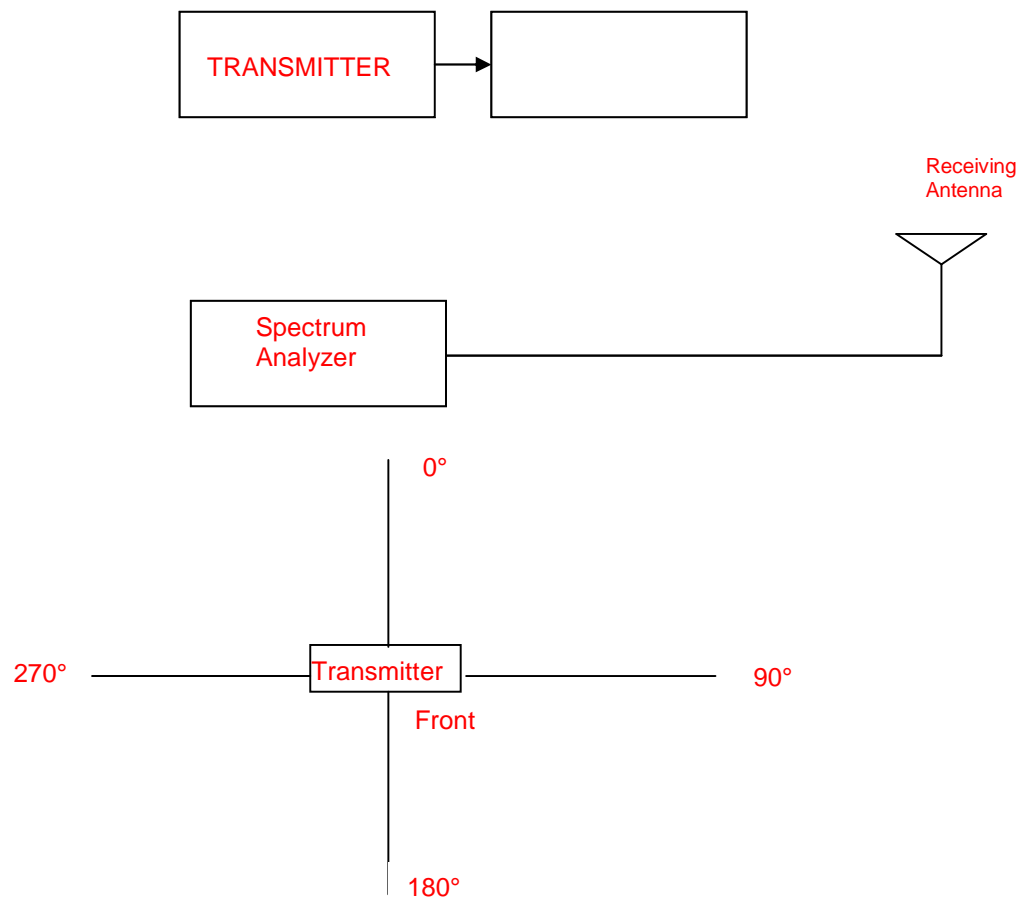
- The requirement at TOP, MIDDLE and BOTTOM frequency matches the FCC RULES

No harmonics are present with a level higher than **-60 dBc** with reference to the nominal rated output power.

### **1.1.1 CABINET RADIATED EMISSION**

The transmitter and test equipment are configured as described above including the angles of measurement with respect to the transmitter cabinet. The transmitter has been checked at three frequencies so covering the whole required FCC range with 20W average power into a dummy load and cabinet radiation measurements were taken at those channels (14, 25 and 36). The free space path loss, cable loss and antenna gain characteristics are obtained at the fundamental frequency and at each of the harmonics up to the 10<sup>th</sup> harmonic of the center frequency of in order to accurately assess the level of the signal radiated from the cabinet. (The spectrum analyzer and receiving antenna are placed 10 meters away from the transmitter and dummy load with no obstructions in the path.) Radiation from the cabinet was measured at a distance of ~10 meters in 4 different physical rotation angles: 0 (front), 90(left), 180(rear) and 270 (right) degrees (0 degrees being the front of the cabinet) by rotating the transmitter. The transmitter is energized and the spectrum analyzer is adjusted to search for the harmonic (or other spurious products) signal. For each measurement made, the receiving antenna is rotated in polarization (between 0 degrees—totally Horizontal polarization and 90 degrees being totally vertical polarization) and adjusted for the maximum displayed signal on the spectrum analyzer. The level of the signal measured on the spectrum analyzer is recorded in the table in the column for “measured value”. For digital waveforms, the largest value in the frequency range of the harmonic on the display is where the center frequency of the spectrum analyzer is selected. The measurement have been done with the measurement bandwidth set at 100 KHz All spectral components above the noise floor radiated from the cabinet were recorded. The values are tabulated in the table on the next pages following the test equipment configuration drawing. Once the value is recorded for this frequency the next highest harmonic or spurious frequency is evaluated.

## 1.2 Test Bench block diagram



### 1.3 Test Bench picture and details



#### 5.6 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 6.

##### 5.6.1 Description of the test location

Test location: Anechoic chamber

##### 5.6.2 Photo documentation of the test set-up



DEVICE UNDER TEST



NETWORK ANALYSER



MPEG GENERATOR



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SPECTRUM ANALYSER



POWER METER



## 1.4 Results of the measurements

In the following spreadsheets there are reported the results of the measurements.

As per FCC requirement the Harmonics are better than 60 dBc corresponding to a maximum required level not exceeding -17 dBm.

The rated power is 20 W (43 dBm) and the measurements have been done at three channels 14,25 and 36.

The measurement at the fundamental is considered NOT APPLICABLE.

### 1.4.1 XMTR CABINET RADIATION SPREADSHEET ch 14

EUT:  
 Description: **SDT 500 UB ARK 1 Transmitter**  
 TX Frequency (MHz): **473 ch 14** Front View  
 Output Power (Wrms): **20** dBm Value: **43** dBm  
 Corrected level must be less than: **-17** dBm  
 Distance (m): **10**

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	473	-54,0	1	5	45,95	-12,0	-17	N/A
2nd	946	-70,8	1.3	6	51,97	-23,5	-17	PASS
3rd	1419	-77,1	1.6	6.5	55,49	-26,5	-17	PASS
4th	1892	-75,7	2	12	57,99	-27,7	-17	PASS
5th	2365	-78,3	2.2	12.5	59,93	-28,7	-17	PASS
6th	2838	-78,0	2.5	13	61,51	-27,0	-17	PASS
7th	3311	-83,6	2.8	14	62,85	-31,9	-17	PASS
8th	3784	-80,3	3.1	14.5	64,01	-27,7	-17	PASS
9th	4257	-81,5	3.4	15.6	65,04	-28,7	-17	PASS
10th	4730	-86,7	3.7	16	65,95	-33,0	-17	PASS

## Left View

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	473	-55,2	1	5	45,95	-13,2	-17	N/A
2nd	946	-71,4	1.3	6	51,97	-24,1	-17	PASS
3rd	1419	-77,7	1.6	6.5	55,49	-27,1	-17	PASS
4th	1892	-76,3	2	12	57,99	-28,3	-17	PASS
5th	2365	-78,9	2.2	12.5	59,93	-29,3	-17	PASS
6th	2838	-78,6	2.5	13	61,51	-27,6	-17	PASS
7th	3311	-84,2	2.8	14	62,85	-32,5	-17	PASS
8th	3784	-80,9	3.1	14.5	64,01	-28,3	-17	PASS
9th	4257	-82,1	3.4	15.6	65,04	-29,3	-17	PASS
10th	4730	-87,3	3.7	16	65,95	-33,6	-17	PASS

## REAR View

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	473	-52,2	1	5	45,95	-10,2	-17	N/A
2nd	946	-67,1	1.3	6	51,97	-19,8	-17	PASS
3rd	1419	-73,4	1.6	6.5	55,49	-22,8	-17	PASS
4th	1892	-72,0	2	12	57,99	-24,0	-17	PASS
5th	2365	-74,6	2.2	12.5	59,93	-25,0	-17	PASS
6th	2838	-74,3	2.5	13	61,51	-23,3	-17	PASS
7th	3311	-79,9	2.8	14	62,85	-28,2	-17	PASS
8th	3784	-76,6	3.1	14.5	64,01	-24,0	-17	PASS
9th	4257	-77,8	3.4	15.6	65,04	-25,0	-17	PASS
10th	4730	-83,0	3.7	16	65,95	-29,3	-17	PASS

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Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	473	-57,1	1	5	45,95	-15,1	-17	N/A
2nd	946	-71,6	1.3	6	51,97	-24,3	-17	PASS
3rd	1419	-77,9	1.6	6.5	55,49	-27,3	-17	PASS
4th	1892	-76,5	2	12	57,99	-28,5	-17	PASS
5th	2365	-79,1	2.2	12.5	59,93	-29,5	-17	PASS
6th	2838	-78,8	2.5	13	61,51	-27,8	-17	PASS
7th	3311	-84,4	2.8	14	62,85	-32,7	-17	PASS
8th	3784	-81,1	3.1	14.5	64,01	-28,5	-17	PASS
9th	4257	-82,3	3.4	15.6	65,04	-29,5	-17	PASS
10th	4730	-87,5	3.7	16	65,95	-33,8	-17	PASS

### 1.4.2 XMTR CABINET RADIATION SPREADSHEET ch 25

EUT:  
 Description: **SDT 500 UB ARK 1 Transmitter**  
 TX Frequency (MHz): **539 ch 25** Front View  
 Output Power (Wrms): **20** dBm Value: **43** dBm  
 Corrected level must be less than: **-17** dBm  
 Distance (m): **10**

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	539	-52,1	1	5	47,09	-9,0	-17	N/A
2nd	1078	-73,6	1.3	6	53,11	-25,2	-17	PASS
3rd	1617	-79,9	1.6	6.5	56,63	-28,2	-17	PASS
4th	2156	-78,5	2	12	59,13	-29,4	-17	PASS
5th	2695	-81,2	2.2	12.5	61,06	-30,4	-17	PASS
6th	3234	-80,9	2.5	13	62,65	-28,7	-17	PASS
7th	3773	-86,4	2.8	14	63,99	-33,6	-17	PASS
8th	4312	-83,2	3.1	14.5	65,15	-29,4	-17	PASS
9th	4851	-84,4	3.4	15.6	66,17	-30,4	-17	PASS
10th	5390	-89,5	3.7	16	67,09	-34,7	-17	PASS

## Left View

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	539	-56,2	1	5	47,09	-13,1	-17	N/A
2nd	1078	-76,6	1.3	6	53,11	-28,2	-17	PASS
3rd	1617	-82,9	1.6	6.5	56,63	-31,2	-17	PASS
4th	2156	-81,5	2	12	59,13	-32,4	-17	PASS
5th	2695	-84,2	2.2	12.5	61,06	-33,4	-17	PASS
6th	3234	-83,9	2.5	13	62,65	-31,7	-17	PASS
7th	3773	-89,4	2.8	14	63,99	-36,6	-17	PASS
8th	4312	-86,2	3.1	14.5	65,15	-32,4	-17	PASS
9th	4851	-87,4	3.4	15.6	66,17	-33,4	-17	PASS
10th	5390	-92,5	3.7	16	67,09	-37,7	-17	PASS

## REAR View

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	539	-49,6	1	5	47,09	-6,5	-17	N/A
2nd	1078	-67,9	1.3	6	53,11	-19,5	-17	PASS
3rd	1617	-74,2	1.6	6.5	56,63	-22,5	-17	PASS
4th	2156	-72,8	2	12	59,13	-23,7	-17	PASS
5th	2695	-75,5	2.2	12.5	61,06	-24,7	-17	PASS
6th	3234	-75,2	2.5	13	62,65	-23,0	-17	PASS
7th	3773	-80,7	2.8	14	63,99	-27,9	-17	PASS
8th	4312	-77,5	3.1	14.5	65,15	-23,7	-17	PASS
9th	4851	-78,7	3.4	15.6	66,17	-24,7	-17	PASS
10th	5390	-83,8	3.7	16	67,09	-29,0	-17	PASS



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Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	539	-61,6	1	5	47,09	-18,5	-17	N/A
2nd	1078	-77,9	1.3	6	53,11	-29,5	-17	PASS
3rd	1617	-84,2	1.6	6.5	56,63	-32,5	-17	PASS
4th	2156	-82,8	2	12	59,13	-33,7	-17	PASS
5th	2695	-85,5	2.2	12.5	61,06	-34,7	-17	PASS
6th	3234	-85,2	2.5	13	62,65	-33,0	-17	PASS
7th	3773	-90,7	2.8	14	63,99	-37,9	-17	PASS
8th	4312	-87,5	3.1	14.5	65,15	-33,7	-17	PASS
9th	4851	-88,7	3.4	15.6	66,17	-34,7	-17	PASS
10th	5390	-93,8	3.7	16	67,09	-39,0	-17	PASS

### 1.4.3 XMTR CABINET RADIATION SPREADSHEET ch 36

EUT:  
 Description: **SDT 500 UB ARK 1 Transmitter**  
 TX Frequency (MHz): **605 ch 36** Front View  
 Output Power (Wrms): **20** dBm Value: **43** dBm  
 Corrected level must be less than: **-17** dBm  
 Distance (m): **10**

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	605	-52,7	1	5	48,09	-8,6	-17	N/A
2nd	1210	-70,9	1.3	6	54,11	-21,5	-17	PASS
3rd	1815	-77,2	1.6	6.5	57,63	-24,5	-17	PASS
4th	2420	-75,8	2	12	60,13	-25,7	-17	PASS
5th	3025	-78,5	2.2	12.5	62,07	-26,7	-17	PASS
6th	3630	-78,1	2.5	13	63,64	-25,0	-17	PASS
7th	4235	-83,7	2.8	14	64,99	-29,9	-17	PASS
8th	4840	-80,5	3.1	14.5	66,15	-25,7	-17	PASS
9th	5445	-81,7	3.4	15.6	67,17	-26,7	-17	PASS
10th	6050	-86,8	3.7	16	68,09	-31,0	-17	PASS

## Left View

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	605	-59,7	1	5	48,09	-15,6	-17	N/A
2nd	1210	-76,9	1.3	6	54,11	-27,5	-17	PASS
3rd	1815	-83,2	1.6	6.5	57,63	-30,5	-17	PASS
4th	2420	-81,8	2	12	60,13	-31,7	-17	PASS
5th	3025	-84,5	2.2	12.5	62,07	-32,7	-17	PASS
6th	3630	-84,1	2.5	13	63,64	-31,0	-17	PASS
7th	4235	-89,7	2.8	14	64,99	-35,9	-17	PASS
8th	4840	-86,5	3.1	14.5	66,15	-31,7	-17	PASS
9th	5445	-87,7	3.4	15.6	67,17	-32,7	-17	PASS
10th	6050	-92,8	3.7	16	68,09	-37,0	-17	PASS

## REAR View

Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	605	-60,6	1	5	48,09	-16,5	-17	N/A
2nd	1210	-80,9	1.3	6	54,11	-31,5	-17	PASS
3rd	1815	-87,2	1.6	6.5	57,63	-34,5	-17	PASS
4th	2420	-85,8	2	12	60,13	-35,7	-17	PASS
5th	3025	-88,5	2.2	12.5	62,07	-36,7	-17	PASS
6th	3630	-88,1	2.5	13	63,64	-35,0	-17	PASS
7th	4235	-93,7	2.8	14	64,99	-39,9	-17	PASS
8th	4840	-90,5	3.1	14.5	66,15	-35,7	-17	PASS
9th	5445	-91,7	3.4	15.6	67,17	-36,7	-17	PASS
10th	6050	-96,8	3.7	16	68,09	-41,0	-17	PASS

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Harmonic	Frequency	Measured	Cable	Antenna	Path	Corrected	Required	Status
	MHz	Level	Loss	Gain	Loss	Level	Level	Pass/Fail
Xmit freq.	605	-51,6	1	5	48,09	-7,5	-17	N/A
2nd	1210	-68,3	1.3	6	54,11	-18,9	-17	PASS
3rd	1815	-74,6	1.6	6.5	57,63	-21,9	-17	PASS
4th	2420	-73,2	2	12	60,13	-23,1	-17	PASS
5th	3025	-75,9	2.2	12.5	62,07	-24,1	-17	PASS
6th	3630	-75,5	2.5	13	63,64	-22,4	-17	PASS
7th	4235	-81,1	2.8	14	64,99	-27,3	-17	PASS
8th	4840	-77,9	3.1	14.5	66,15	-23,1	-17	PASS
9th	5445	-79,1	3.4	15.6	67,17	-24,1	-17	PASS
10th	6050	-84,2	3.7	16	68,09	-28,4	-17	PASS