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TEST REPORT

Product : Intelligent Automotive Detection Tool

SmartSafe Trade mark

Model/Type reference iSmartTool 601Max,

iSmartTool 601,

iSmartTool 601BT, iSmartTool 601TT

Serial Number N/A

Report Number EED32N80831504

FCC ID 2AYANISMARTTOOL

Date of Issue : Oct. 25, 2021

Test Standards 47 CFR Part 15 Subpart C

Test result **PASS**

Prepared for:

SHENZHEN SMARTSAFE TECH CO., LTD. 3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen, China

Prepared by:

Centre Testing International Group Co., Ltd. Hongwei Industrial Zone, Bao'an 70 District, Shenzhen, Guangdong, China

> TEL: +86-755-3368 3668 FAX: +86-755-3368 3385



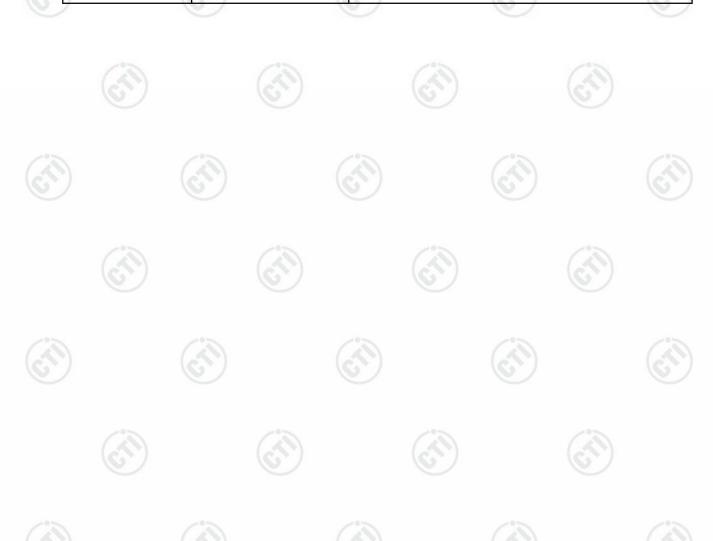






1 Version

Version No.	Date	Description
00	Oct. 25, 2021	Original





















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2 **Test Summary**

Test Item	Test Requirement	Test method	Result	
Antenna Requirement	47 CFR Part 15 Subpart C Section 15.203	ANSI C63.10:2013	PASS	
AC Power Line Conducted Emission	47 CFR Part 15 Subpart C Section 15.207	ANSI C63.10:2013	PASS	
Radiated Spurious Emissions	47 CFR Part 15 Subpart C Section 15.209	ANSI C63.10:2013	PASS	
20dB Bandwidth	47 CFR Part 15 Subpart C Section 2.1049	ANSI C63.10:2013	PASS	

Only the model iSmartTool 601Max was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being software, and model name.



^{1.} Company Name and Address shown on Report, the sample(s) and sample Information were provided by the applicant who should be responsible for the authenticity which CTI hasn't verified.

^{2.}Model No.: iSmartTool 601Max,iSmartTool 601,iSmartTool 601BT,iSmartTool 601TT



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4 General Information

4.1 Client Information

Applicant:	SHENZHEN SMARTSAFE TECH CO., LTD.
Address of Applicant:	3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen, China
Manufacturer:	SHENZHEN SMARTSAFE TECH CO., LTD.
Address of Manufacturer:	3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen, China
Factory:	SHENZHEN SMARTSAFE TECH CO., LTD.
Address of Factory:	3F, Building B, Qiao'an Technology Industrial Park, Guanlan, Longhua New District, Shenzhen, China

4.2 General Description of EUT

Intelligent Automoti	ve Detection Tool			
iSmartTool 601Max				
iSmartTool 601,				
iSmartTool 601BT,				
iSmartTool 601TT				
SmartS.	afe (1)			
☐ Mobile ⊠ Po	ortable			
125kHz				
ASK				
1				
Internal antenna				
0dBi				
AC Adapter	Model:C1902XZ/C1902XA/C1902XJ Input:100-240V~50/60Hz 0.5A Output:PD:5.0V,3.0A/9.0V,2.22A/12.0V,1.67A MAX:20.0W			
Rechargeable lithium ion battery	Model:KPL3878100-2S1P DC 7.6V,4500mAh,34.2Wh			
Rechargeable lithiu	m ion battery DC 7.6V			
Sep. 06, 2021				
Sep. 06, 2021 to O	ct. 25, 2021			
	iSmartTool 601Max iSmartTool 601, iSmartTool 601BT, iSmartTool 601TT ☐ Mobile ☐ Po 125kHz ASK 1 Internal antenna 0dBi AC Adapter Rechargeable lithium ion battery Rechargeable lithiu Sep. 06, 2021			



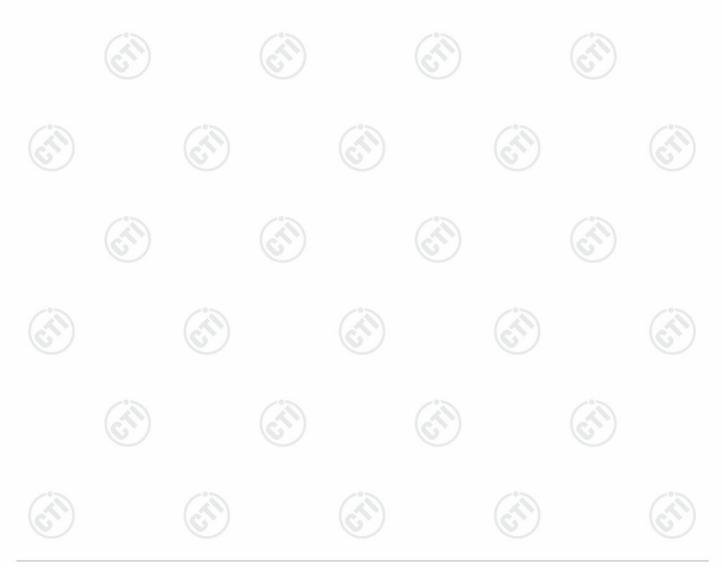
Hotline:400-6788-333 www.cti-cert.com E-mail:info@cti-cert.com Complaint call:0755-33681700 Complaint E-mail:complaint@cti-cert.com



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4.3 Test Environment and Mode

Operating Environment	:					
Radiated Spurious Emis	sions:					
Temperature:	22~25.0 °C					
Humidity:	50~55 % RH					
Atmospheric Pressure:	1010mbar	100		(1)		(3)
Conducted Emissions:						
Temperature:	22~25.0 °C					
Humidity:	50~55 % RH					
Atmospheric Pressure:	1010mbar		/°>		13	
RF Conducted:						
Temperature:	22~25.0 °C					
Humidity:	50~55 % RH					
Atmospheric Pressure:	1010mbar	-0-		-0-		
Test mode:						
Transmitting mode:	Keep the EUT	Γ in transmi	tting mode w	ith modulatio	n.	





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4.4 Description of Support Units

The EUT has been tested with associated equipment below.

1) support equipment

Description	Manufacturer	Model No.	Certification	Supplied by
/	SHENZHEN		(6,	6,
Sensor	SMARTSAFE	LTR-01	CE&FCC	Client
	TECH CO., LTD.		NCC .	

4.5 Test Location

All tests were performed at:

Centre Testing International Group Co., Ltd

Building C, Hongwei Industrial Park Block 70, Bao'an District, Shenzhen, China

Telephone: +86 (0) 755 33683668 Fax:+86 (0) 755 33683385

No tests were sub-contracted. FCC Designation No.: CN1164

4.6 Deviation from Standards

None.

4.7 Abnormalities from Standard Conditions

None.

4.8 Other Information Requested by the Customer

None.

4.9 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio Frequency	7.9 x 10 ⁻⁸
2	DE nower conducted	0.46dB (30MHz-1GHz)
2	RF power, conducted	0.55dB (1GHz-18GHz)
	(0,)	3.3dB (9kHz-30MHz)
3	Radiated Spurious emission test	4.3dB (30MHz-1GHz)
		4.5dB (1GHz-12.75GHz)
4	Conduction emission	3.5dB (9kHz to 150kHz)
(4)	Conduction emission	3.1dB (150kHz to 30MHz)
5	Temperature test	0.64°C
6	Humidity test	3.8%
7	DC power voltages	0.026%
	1 10 11	7

Hotline:400-6788-333 www.cti-cert.com E-mail:info@cti-cert.com Complaint call:0755-33681700 Complaint E-mail:complaint@cti-cert.com



Equipment List

1.20.00	1.79.5		100		6.7		
	RF test system						
Carrie and and	Manufacturer Mode No.	Made No	Serial	Cal. Date	Cal. Due date		
Equipment		Number	(mm-dd-yyyy)	(mm-dd-yyyy)			
Spectrum Analyzer	R&S	FSV40	101200	08-26-2021	08-25-2022		

3M Semi/full-anechoic Chamber							
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)		
3M Chamber & Accessory Equipment	TDK	SAC-3		05-24-2019	05-23-2022		
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	9163-618	05-16-2021	05-15-2022		
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-076	04-15-2021	04-14-2024		
Deseiver	R&S	F0017	ESCI7 100938-003	10-16-2020	10-15-2021		
Receiver	R&S	ESCIT		10-15-2021	10-14-2022		
Multi device Controller	maturo	NCD/070/107 11112					
Temperature/ Humidity Indicator	Shanghai qixiang	HM10	1804298	06-24-2021	06-23-2022		
Communication test set	Agilent	E5515C	GB4705053 4	03-01-2019	02-28-2022		
Cable line	Fulai(7M)	SF106	5219/6A				
Cable line	Fulai(6M)	SF106	5220/6A	(4)	(A		
Cable line	Fulai(3M)	SF106	5216/6A	(G)	(6)		
Cable line	Fulai(3M)	SF106	5217/6A				
band rejection filter	Sinoscite	FL5CX01CA 08CL12- 0393-001			<u> </u>		

Conducted disturbance Test						
Equipment	Manufacturer	Model No.	Serial Number	Cal. date (mm-dd-yyyy)	Cal. Due date (mm-dd-yyyy)	
Receiver	R&S	ESCI	100435	04-15-2021	04-14-2022	
Temperature/ Humidity Indicator	Defu	TH128	1			
LISN	R&S	ENV216	100098	03-04-2021	03-03-2022	
Barometer	changchun	DYM3	1188	/		











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6 Test results and Measurement Data

6.1 Antenna Requirement

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT Antenna: Please see Internal photos

The antenna is Internal antenna. The best case gain of the antenna is 0dBi.





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6.2 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.2	207						
Test Method:	ANSI C63.10: 2013							
Test Frequency Range:	150kHz to 30MHz							
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto							
Limit:	Frequency range (MHz)	Limit (d Quasi-peak	BuV) 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.							
Test Setup:	Shielding Room	AE LISN2 AC Main	Test Receiver					
Test Procedure:	The mains terminal disturb	ance voltage test was	conducted in a shielded					
	room. 2) The EUT was connected Impedance Stabilization N impedance. The power connected to a second LIS plane in the same way a multiple socket outlet strip single LISN provided the ra 3) The tabletop EUT was pla ground reference plane. A placed on the horizontal gr 4) The test was performed with the EUT shall be 0.4 m vertical ground reference reference plane. The LISN unit under test and bon mounted on top of the ground the closest points of the LISN and associated equipment in order to find the maximuland all of the interface calcance.	to AC power source etwork) which provides cables of all other in the second of the LISN was not all out of the the second of a vertical ground reference plane. The second of the	through a LISN 1 (Line is a $50\Omega/50\mu H + 5\Omega$ linear units of the EUT were d to the ground reference unit being measured. A multiple power cables to a ot exceeded. Ilic table 0.8m above the trangement, the EUT was been also the horizontal ground from the boundary of the erence plane for LISNs his distance was between all other units of the EUT in the LISN 2.					
Test Mode:	All modes were tested, only th	e worst case was reco	rded in the report.					
Test Voltage:	AC 120V/60Hz							
Test Results:	Pass							



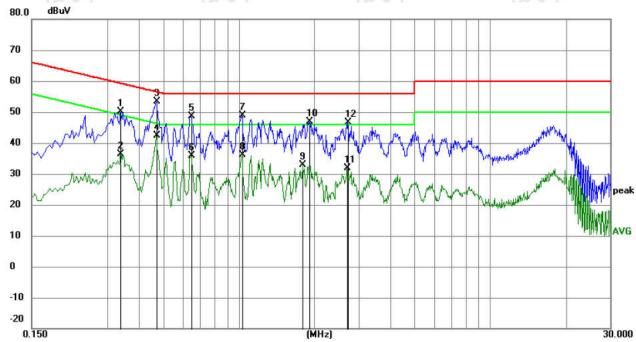




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Measurement Data





No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin			
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment	
1	0.3390	40.03	10.03	50.06	59.23	-9.17	peak		
2	0.3390	26.31	10.03	36.34	49.23	-12.89	AVG		
3 *	0.4695	43.40	9.96	53.36	56.52	-3.16	peak		
4	0.4695	32.49	9.96	42.45	46.52	-4.07	AVG		
5	0.6450	38.60	9.98	48.58	56.00	-7.42	peak		
6	0.6450	25.83	9.98	35.81	46.00	-10.19	AVG		
7	1.0275	39.16	9.83	48.99	56.00	-7.01	peak		
8	1.0320	26.33	9.83	36.16	46.00	-9.84	AVG		
9	1.7970	23.01	9.80	32.81	46.00	-13.19	AVG		
10	1.9050	36.99	9.79	46.78	56.00	-9.22	peak		
11	2.6970	22.06	9.79	31.85	46.00	-14.15	AVG		
12	2.7105	36.76	9.79	46.55	56.00	-9.45	peak		

Remark:

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.







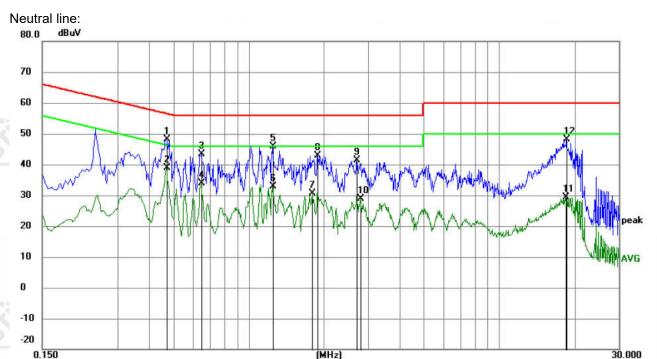








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No.	Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		
3		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4695	38.23	9.96	48.19	56.52	-8.33	peak	
2	*	0.4695	29.02	9.96	38.98	46.52	-7.54	AVG	
3		0.6495	33.48	9.98	43.46	56.00	-12.54	peak	
4		0.6495	23.81	9.98	33.79	46.00	-12.21	AVG	
5		1.2435	36.09	9.82	45.91	56.00	-10.09	peak	
6		1.2435	23.09	9.82	32.91	46.00	-13.09	AVG	
7		1.7970	20.95	9.80	30.75	46.00	-15.25	AVG	
8		1.8870	33.14	9.79	42.93	56.00	-13.07	peak	
9		2.7015	31.65	9.79	41.44	56.00	-14.56	peak	-
10		2.7960	19.14	9.79	28.93	46.00	-17.07	AVG	
11		18.3750	19.51	9.96	29.47	50.00	-20.53	AVG	
12		18.6180	38.28	9.96	48.24	60.00	-11.76	peak	

- 1. The following Quasi-Peak and Average measurements were performed on the EUT:
- 2. Final Test Level =Receiver Reading + LISN Factor + Cable Loss.
- 3. If the Peak value under Average limit, the Average value is not recorded in the report.













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6.3 Radiated Spurious Emissions

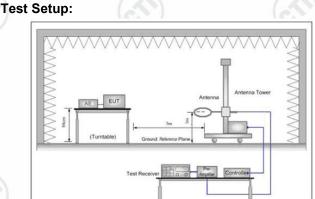
Test Requirement: 47 CFR Part 15C Section 15.231(b) and 15.209

Test Method: ANSI C63.10 2013

Test Site: Measurement Distance: 3m (Semi-Anechoic Chamber)

Frequency	Detector	RBW	VBW	Remark
0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak
0.009MHz-0.090MHz	Average	10kHz	30kHz	Average
0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak
0.110MHz-0.490MHz	Average	10kHz	30kHz	Average
0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak
30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
Above IGHZ	Peak	1MHz	10Hz	Average

Receiver Setup:



Test Receiver Ground Reference Plane

Figure 1. Below 30MHz

Figure 2. 30MHz to 1GHz

Test Procedure:

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rota table table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be retested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

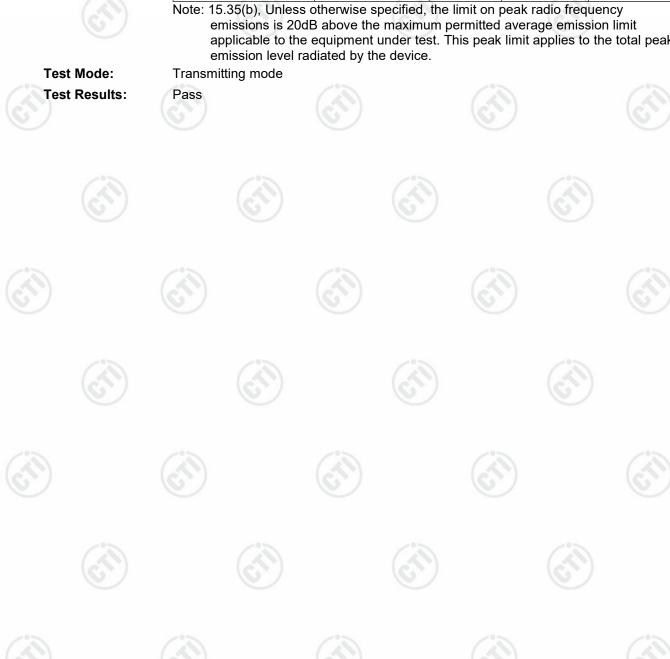


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Frequency	Field strength (microvolt/meter)	Limit (dBµV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F(kHz)) -	-(6:2)	300
0.490MHz-1.705MHz	24000/F(kHz)	-		30
1.705MHz-30MHz	30	-	-	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3

Limit: (Spurious Emissions)

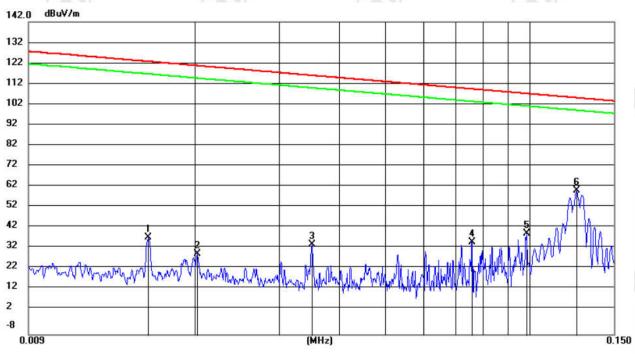
> emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak





Measurement Data

9kHz~150kHz:



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No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin		Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	0.0160	17.37	21.17	38.54	122.96	-84.42	peak			
2	0.0202	9.99	20.93	30.92	120.99	-90.07	peak			
3	0.0351	14.76	20.37	35.13	116.33	-81.20	peak			
4	0.0759	15.93	20.35	36.28	109.83	-73.55	peak			
5	0.0986	20.19	20.40	40.59	107.62	-67.03	peak			
6 *	0.1253	40.86	20.37	61.23	105.60	-44.37	peak			

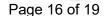
Remark:

- 1. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:
 - Final Test Level =Receiver Reading Correct Factor
 - Correct Factor = Preamplifier Factor Antenna Factor Cable Factor
- 3. The highest frequency is 125kHz of the EUT, so upper frequency of measurement range is 30MHz.

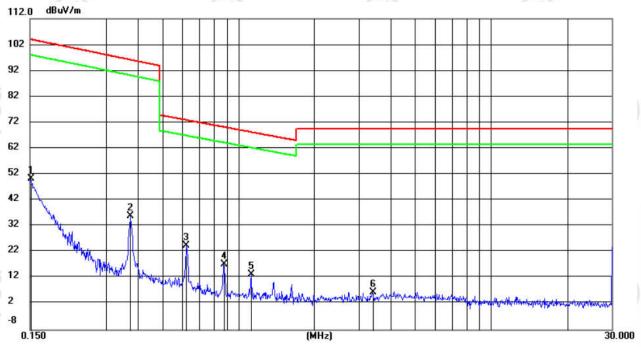








150kHz~30MHz:



No. Mk.	Freq.	Reading Level	Correct Factor	Measure- ment	Limit	Margin	ĺ	Antenna Height	Table Degree	
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1	0.1508	30.16	20.33	50.49	104.03	-53.54	peak			
2	0.3751	15.45	20.40	35.85	96.12	-60.27	peak			
3 *	0.6238	3.88	20.55	24.43	72.90	-48.47	peak			
4	0.8757	-3.19	20.45	17.26	70.22	-52.96	peak			
5	1.1233	-6.99	20.41	13.42	68.26	-54.84	peak			
6	3.3994	-14.13	20.54	6.41	69.54	-63.13	peak			

Remark:

- 1.The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
- 2. The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level =Receiver Reading - Correct Factor

Correct Factor = Preamplifier Factor - Antenna Factor - Cable Factor

3. The highest frequency is 125kHz of the EUT, so upper frequency of measurement range is 30MHz.











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6.4 20dB Bandwidth

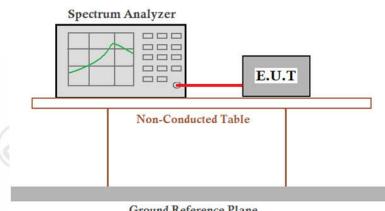
47 CFR Part 15C Section 2.1049 **Test Requirement:**

Test Method: ANSI C63.10 2013

The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating Limit:

above 900 MHz, the emission shall be no wider than 0.5% of the center frequency.

Bandwidth is determined at the points 20 dB down from the modulated carrier.



Ground Reference Plane

Test Mode: Transmitting mode

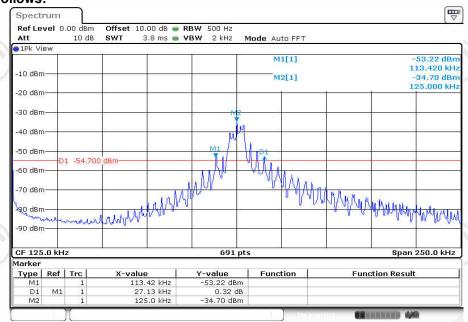
Pass Test Results:

Measurement Data

Test Setup:

20dB bandwidth (kHz)	Results
27.13	Pass

Test plot as follows:



Date: 23.0 CT.2021 09:31:26