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Report No.: SZEM140200045701  
Page: 1 of 29

## 1 Cover Page

# FCC REPORT

**Application No.:** SZEM1402000457RF  
**Applicant:** Bosch Security Systems, Inc.  
**Manufacturer:** Bosch (Zhuhai) Security Systems Co., Ltd  
**Factory:** Bosch (Zhuhai) Security Systems Co., Ltd  
**Product Name:** Allplex track  
**Model No.(EUT):** ATX-COR-MT01  
**Add Model No.:** ATX-RCV-MT01  
**FCC ID:** T3X-ATX-CR-RV  
**Standards:** 47 CFR Part 15, Subpart C (2013)  
**Date of Receipt:** 2014-02-12  
**Date of Test:** 2014-02-19 to 2014-08-25  
**Date of Issue:** 2014-08-29

<b>Test Result:</b>	<b>PASS *</b>
---------------------	---------------

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2014-08-29		Original

Authorized for issue by:				
Tested By		 _____ (Back Huang) /Project Engineer		2014-08-25
				Date
Prepared By		 _____ (Hedy Wen) /Clerk		2014-08-29
				Date
Checked By		 _____ (Emen Li) /Reviewer		2014-09-11
				Date

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### 3 Test Summary

Test Item	Test Requirement	Test method	Result
Antenna Requirement	47 CFR Part 15, Subpart C Section 15.203	ANSI C63.10(2009)	PASS
AC Power Line Conducted Emission	47 CFR Part 15, Subpart C Section 15.207	ANSI C63.10 (2009)	PASS
Spurious Emissions	47 CFR Part 15, Subpart C Section 15.231 (e)/15.209	ANSI C63.10(2009)	PASS
20dB Bandwidth	47 CFR Part 15, Subpart C Section 15.231 (c)	ANSI C63.10(2009)	PASS
Occupancy Time	47 CFR Part 15, Subpart C Section 15.231 (e)	ANSI C63.10(2009)	PASS

Remark:

Model No.: ATX-COR-MT01, ATX-RCV-MT01

Only the model ATX-COR-MT01 was tested, since the electrical circuit design, layout, components used and internal wiring were identical on RF Module.

Only differ in below description.

	ATX-COR-MT01	ATX-RCV-MT01
System		
<ul style="list-style-type: none"> <li>Clock source</li> </ul>	25 MHz oscillator goes to Ethernet PHY and from Ethernet PHY 50Mhz goes to MCU	Single 50MHz oscillator goes to MCU
<ul style="list-style-type: none"> <li>Ethernet and POE</li> </ul>	Available	Not available

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## 5 General Information

### 5.1 Client Information

Applicant:	Bosch Security Systems, Inc.
Address of Applicant:	130 Perinton Parkway, Fairport, NY, 14450, US
Manufacturer:	Bosch (Zhuhai) Security Systems Co., Ltd
Address of Manufacturer:	20 Ji Chang Bei Road, Qingwan Industrial Estate, Sanzao, Jinwan District, Zhuhai, 519040, P.R.China
Factory:	Bosch (Zhuhai) Security Systems Co., Ltd
Address of Factory:	20 Ji Chang Bei Road, Qingwan Industrial Estate, Sanzao, Jinwan District, Zhuhai, 519040, P.R.China

### 5.2 General Description of EUT

Product Name:	Allplex track
Model No.:	ATX-COR-MT01, ATX-RCV-MT01
Sample Type:	Fixed production
EUT Function:	Allplex track
Operation Frequency:	433.420MHz, 303.825MHz, 304.000MHz
Channel Numbers:	3
Modulation Type:	ASK
Antenna Type:	Integral
Antenna Gain:	-4dBi
Power Supply:	DC 12V

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### 5.3 Test Environment and Mode

Operating Environment:	
Temperature:	24.0 °C
Humidity:	52 % RH
Atmospheric Pressure:	1000 mbar
Test mode:	
Transmitting mode:	Keep the EUT in transmitting mode with modulation.

### 5.4 Description of Support Units

The EUT has been tested independent unit.

### 5.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen Branch E&E Lab,  
No. 1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, Guangdong, China.  
518057.

Tel: +86 755 2601 2053 Fax: +86 755 2671 0594

No tests were sub-contracted.



## 5.6 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 3m Semi-anechoic chamber, Full-anechoic Chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197, G-416, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

## 5.7 Deviation from Standards

None.

## 5.8 Abnormalities from Standard Conditions

None.

## 5.9 Other Information Requested by the Customer

None.

### 5.10 Equipment List

RE in Chamber					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	2015-06-10
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	2015-05-16
3	EMI Test software	AUDIX	E3	SEL0050	N/A
4	Coaxial cable	SGS	N/A	SEL0027	2015-05-29
5	Coaxial cable	SGS	N/A	SEL0189	2015-05-29
6	Coaxial cable	SGS	N/A	SEL0121	2015-05-29
7	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
8	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0015	2014-10-24
9	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0006	2014-10-24
10	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	2015-05-16
11	Pre-Amplifier (0.1-26.5GHz)	Compliance Directions Systems Inc.	PAP-0126	SEL0168	2014-10-24
12	Barometer	ChangChun	DYM3	SEL0088	2015-05-16
13	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24
14	Humidity/ Temperature Indicator	Shanghai Qixiang	ZJ1-2B	SEL0103	2014-10-24
15	Signal Generator	Rohde & Schwarz	SMY01	SEL0155	2014-10-24
16	Signal Generator (10M-27GHz)	Rohde & Schwarz	SMR27	SEL0067	2015-05-16
17	Loop Antenna	Beijing Daze	ZN30401	SEL0203	2015-06-04



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## SGS-CSTC Standards Technical Services Ltd.

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RF connected test					
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Due date (yyyy-mm-dd)
1	DC Power Supply	Zhao Xin	RXN-305D	SEL0117	2014-10-24
2	Humidity/ Temperature Indicator	HYGRO	ZJ1-2B	SEL0033	2014-10-24
3	Spectrum Analyzer	Rohde & Schwarz	FSP	SEL0154	2014-10-24
4	Coaxial cable	SGS	N/A	SEL0178	2015-05-29
5	Coaxial cable	SGS	N/A	SEL0179	2015-05-29
6	Barometer	ChangChun	DYM3	SEL0088	2015-05-16
7	Signal Generator	Rohde & Schwarz	SML03	SEL0068	2015-05-16
8	Band filter	amideon	82346	SEL0094	2015-05-16
9	POWER METER	R & S	NRVS	SEL0144	2014-10-24
10	Attenuator	Beijin feihang taida	TST-2-6dB	SEL0205	2015-05-16
11	Power Divider(splitter)	Agilent Technologies	11636B	SEL0130	2014-10-24

Note: The calibration interval is one year, all the instruments are valid.

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## 6 Test results and Measurement Data

### 6.1 Antenna Requirement

<b>Standard requirement:</b>	47 CFR Part 15C Section 15.203
<p>15.203 requirement:</p> <p>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.</p>	
<b>EUT Antenna:</b>	
<p>The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is -4dBi.</p>	

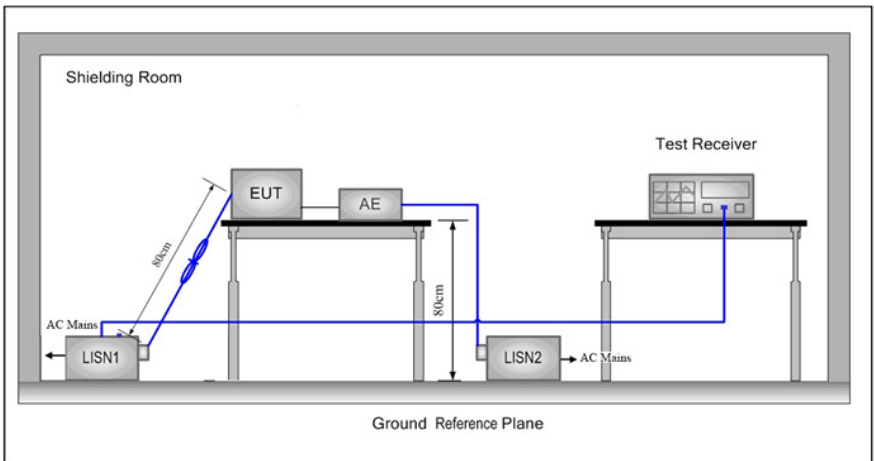
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## 6.2 AC Power Line Conducted Emission

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2009		
Test Frequency Range:	150kHz to 30MHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		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.			
Test Procedure:	<ol style="list-style-type: none"> <li>1) The mains terminal disturbance voltage test was conducted in a shielded room.</li> <li>2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50Ω/50μH + 5Ω linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.</li> <li>3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.</li> <li>4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.</li> <li>5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2009 on conducted measurement.</li> </ol>		

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<p>Test Setup:</p>	
<p>Test Mode:</p>	<p>AC charge + Transmitting mode</p>
<p>Instruments Used:</p>	<p>Refer to section 5.10 for details</p>
<p>Test Results:</p>	<p>Pass</p>

**Measurement Data**

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

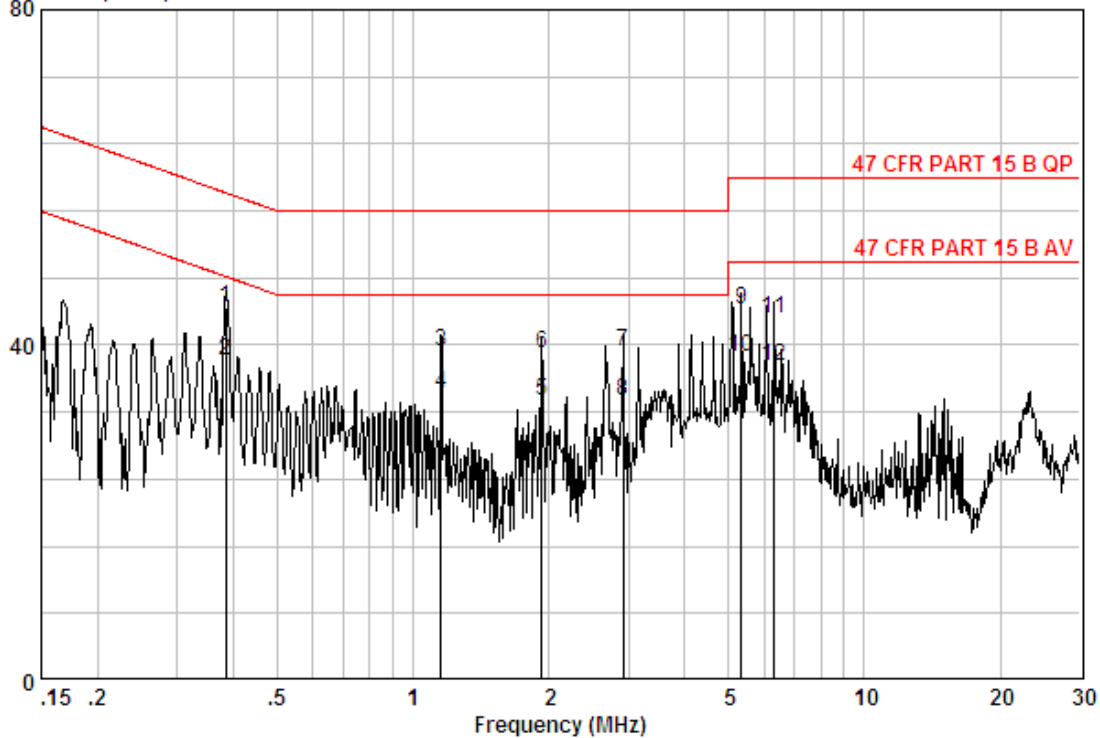
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Live line:

Data: 52

Level (dBuV)



Site : Shielding Room  
 Condition : 47 CFR PART 15 B QP CE LINE  
 Job No. : 0457RF  
 Mode : TX mode

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.38519	0.01	9.79	34.64	44.44	58.17	-13.73	QP
2 @	0.38519	0.01	9.79	28.25	38.05	48.17	-10.12	Average
3	1.153	0.02	9.80	29.34	39.16	56.00	-16.84	QP
4	1.153	0.02	9.80	24.36	34.18	46.00	-11.82	Average
5	1.928	0.02	9.80	23.58	33.40	46.00	-12.60	Average
6	1.928	0.02	9.80	29.27	39.09	56.00	-16.91	QP
7	2.915	0.02	9.84	29.27	39.13	56.00	-16.87	QP
8	2.915	0.02	9.84	23.58	33.44	46.00	-12.56	Average
9	5.333	0.01	9.90	34.32	44.23	60.00	-15.77	QP
10	5.333	0.01	9.90	28.65	38.56	50.00	-11.44	Average
11	6.319	0.01	9.90	33.21	43.12	60.00	-16.88	QP
12	6.319	0.01	9.90	27.65	37.56	50.00	-12.44	Average

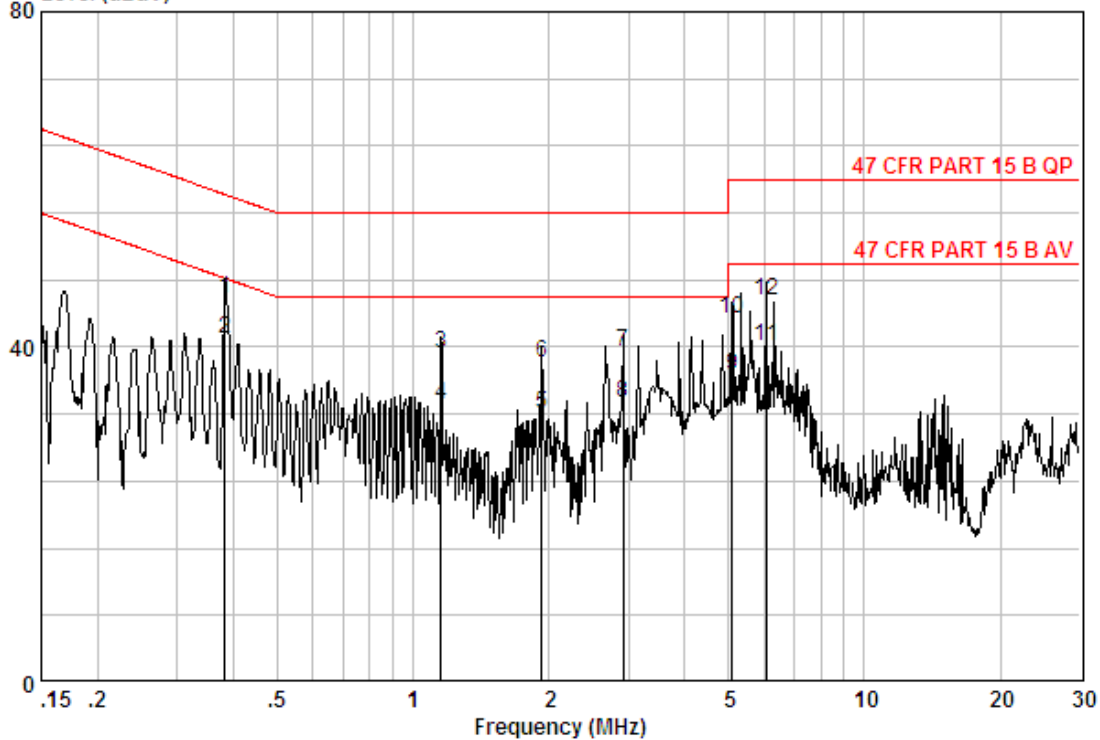
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Neutral line:

Data: 51

Level (dBuV)



Site : Shielding Room  
 Condition : 47 CFR PART 15 B QP CE NEUTRAL  
 Job No. : 0457RF  
 Mode : TX mode

	Freq	Cable Loss	LISN Factor	Read Level	Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.38315	0.01	9.78	36.06	45.85	58.21	-12.36	QP
2 @	0.38315	0.01	9.78	31.24	41.03	48.21	-7.18	Average
3	1.153	0.02	9.80	29.43	39.25	56.00	-16.75	QP
4	1.153	0.02	9.80	23.24	33.06	46.00	-12.94	Average
5	1.928	0.02	9.80	22.14	31.96	46.00	-14.04	Average
6	1.928	0.02	9.80	28.39	38.21	56.00	-17.79	QP
7	2.915	0.02	9.84	29.61	39.48	56.00	-16.52	QP
8	2.915	0.02	9.84	23.56	33.42	46.00	-12.58	Average
9	5.085	0.01	9.90	26.78	36.69	50.00	-13.31	Average
10	5.085	0.01	9.90	33.52	43.44	60.00	-16.56	QP
11 @	6.056	0.01	9.96	30.24	40.21	50.00	-9.79	Average
12	6.056	0.01	9.96	35.69	45.66	60.00	-14.34	QP

Notes:

1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Final Test Level = Receiver Reading + LISN Factor + Cable Loss.

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### 6.3 Spurious Emissions

#### 6.3.1 Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.231(e) and 15.209				
Test Method:	ANSI C63.10: 2009				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Receiver Setup:	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	100 kHz	300kHz	Quasi-peak
	Above 1GHz	Peak	1MHz	3MHz	Peak
Peak		1MHz	10Hz	Average	
Limit: (Spurious Emissions)	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	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
<p>Note:</p> <p>1:15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.</p> <p>2: Radiated Emissions is investigated from the lowest frequency generated within the EUT, not going below 9 kHz, up to the 10th harmonic of the highest fundamental frequency.</p>					

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Limit: (Field strength of the fundamental signal)	Frequency	Limit (dBuV/m @3m)	Remark
	433.420MHz	72.85	Average Value
		92.85	Peak Value
	303.825MHz	66.97	Average Value
		86.97	Peak Value
	304.000MHz	66.98	Average Value
86.98		Peak Value	
Test Procedure:	<p>a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.</p> <p>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.</p> <p>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.</p> <p>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 rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.</p> <p>e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</p> <p>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 re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, Only the test worst case mode is recorded in the report.</p>		
Test Setup:			

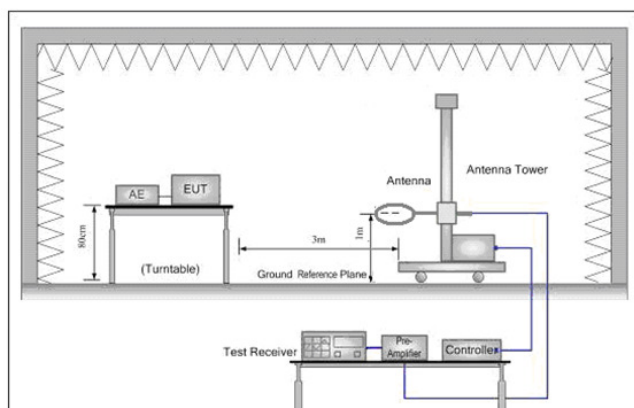


Figure 1. Below 30MHz

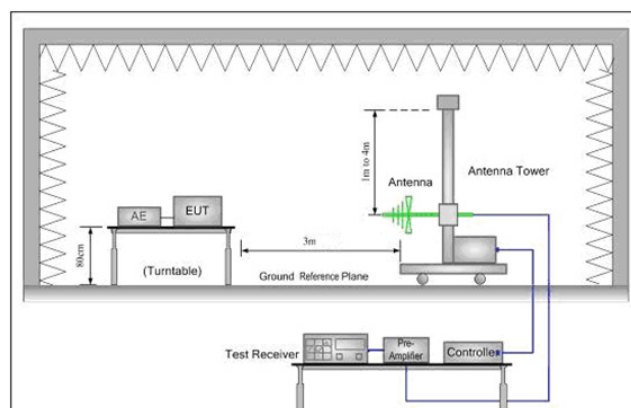


Figure 2. 30MHz to 1GHz

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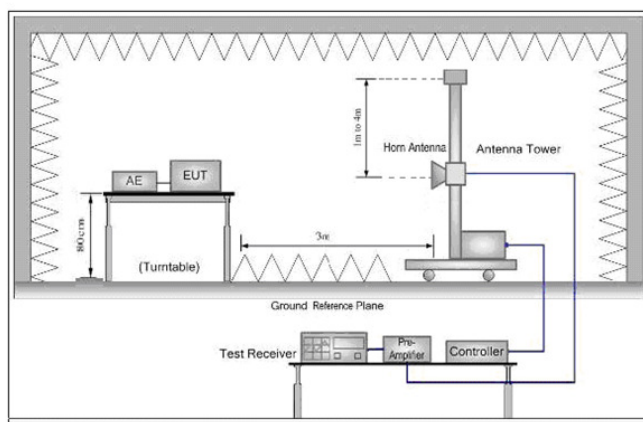


Figure 3. Above 1 GHz

Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

**Measurement Data**

**6.3.1.1 Field Strength Of The Fundamental Signal**

433.420MHz								
Peak value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.420	2.35	11.97	27.33	91.68	78.67	92.85	-14.18	Horizontal
433.420	2.35	11.97	27.33	81.88	68.87	92.85	-23.98	Vertical
Average Value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
433.420	2.35	11.97	27.33	74.39	61.38	72.85	-11.47	Horizontal
433.420	2.35	11.97	27.33	65.42	52.41	72.85	-20.44	Vertical

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303.825MHz								
Peak value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
303.825	1.91	9.77	26.42	95.43	80.69	86.97	-6.28	Horizontal
303.825	1.91	9.77	26.42	84.53	69.79	86.97	-17.18	Vertical
Average Value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
303.825	1.91	9.77	26.42	80.15	65.41	66.97	-1.56	Horizontal
303.825	1.91	9.77	26.42	70.31	55.57	66.97	-11.40	Vertical

304.000MHz								
Peak value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
304.000	1.91	9.77	26.42	93.81	79.07	86.98	-7.91	Horizontal
304.000	1.91	9.77	26.42	83.28	68.54	86.98	-18.44	Vertical
Average Value:								
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
304.000	1.91	9.77	26.42	78.55	63.81	66.98	-3.17	Horizontal
304.000	1.91	9.77	26.42	69.45	54.71	66.98	-12.27	Vertical



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6.3.1.2 Spurious Emissions

**Below 1GHz**

**433.420MHz**

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
33.095	0.60	15.50	27.34	40.36	29.12	40.00	-10.88	Vertical
55.221	0.80	6.58	27.28	44.49	24.59	40.00	-15.41	Vertical
115.726	1.24	7.52	27.10	45.22	26.88	43.50	-16.62	Vertical
250.301	1.68	8.57	26.54	37.03	20.74	46.00	-25.26	Vertical
651.942	2.81	15.80	27.47	34.42	25.56	46.00	-20.44	Vertical
868.840	3.48	19.60	26.92	51.60	47.76	52.85	-5.09	Vertical
60.492	0.80	4.98	27.27	39.11	17.62	40.00	-22.38	Horizontal
98.487	1.19	6.40	27.20	48.28	28.67	43.50	-14.83	Horizontal
117.360	1.25	7.59	27.09	47.04	28.79	43.50	-14.71	Horizontal
250.301	1.68	8.57	26.54	49.59	33.30	46.00	-12.70	Horizontal
373.311	2.13	11.41	26.95	44.50	31.09	46.00	-14.91	Horizontal
868.840	3.48	19.60	26.92	53.46	49.62	52.85	-3.23	Horizontal

**303.825MHz**

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
33.095	0.60	15.50	27.34	46.63	35.39	40.00	-4.61	Vertical
117.360	1.25	7.59	27.09	47.57	29.32	43.50	-14.18	Vertical
550.948	2.65	14.80	27.61	36.50	26.34	46.00	-19.66	Vertical
607.650	2.72	15.43	27.53	52.56	43.18	46.97	-3.79	Vertical
755.387	3.07	17.70	27.35	32.55	25.97	46.00	-20.03	Vertical
911.475	3.61	20.47	26.71	46.11	43.48	46.97	-3.49	Vertical
121.549	1.26	7.77	27.06	45.56	27.53	43.50	-15.97	Horizontal
152.130	1.32	9.43	26.90	43.02	26.87	43.50	-16.63	Horizontal
397.633	2.19	11.44	27.11	40.11	26.63	46.00	-19.37	Horizontal
607.650	2.72	15.43	27.53	53.42	44.04	46.97	-2.93	Horizontal
755.387	3.07	17.70	27.35	38.35	31.77	46.00	-14.23	Horizontal
911.475	3.61	20.47	26.71	47.26	44.63	46.97	-2.34	Horizontal

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### 304.000MHz

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
33.799	0.60	14.90	27.34	44.67	32.83	40.00	-7.17	Vertical
38.616	0.60	11.55	27.32	46.15	30.98	40.00	-9.02	Vertical
113.316	1.24	7.53	27.11	44.92	26.58	43.50	-16.92	Vertical
148.963	1.32	9.23	26.91	39.64	23.28	43.50	-20.22	Vertical
608.000	2.72	15.43	27.53	52.53	43.15	46.98	-3.83	Vertical
912.000	3.61	20.47	26.71	45.75	43.12	46.98	-3.86	Vertical
98.487	1.19	6.40	27.20	49.48	29.87	43.50	-13.63	Horizontal
117.360	1.25	7.59	27.09	47.17	28.92	43.50	-14.58	Horizontal
250.301	1.68	8.57	26.54	50.70	34.41	46.00	-11.59	Horizontal
608.000	2.72	15.43	27.53	53.21	43.83	46.98	-3.15	Horizontal
755.387	3.07	17.70	27.35	37.20	30.62	46.00	-15.38	Horizontal
912.000	3.61	20.47	26.71	47.05	44.42	46.98	-2.56	Horizontal

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### Above 1GHz

#### 433.420MHz

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1296.469	2.38	27.73	39.27	60.78	51.62	74.00	-22.38	Vertical
1728.561	2.66	29.83	39.45	50.10	43.14	74.00	-30.86	Vertical
2162.567	2.90	32.08	39.68	50.44	45.74	74.00	-28.26	Vertical
2597.564	3.09	32.84	40.00	50.36	46.29	74.00	-27.71	Vertical
5191.168	4.84	34.60	41.62	49.98	47.80	74.00	-26.20	Vertical
10560.940	6.11	38.32	37.68	45.52	52.27	74.00	-21.73	Vertical
1296.469	2.38	27.73	39.27	60.66	51.50	74.00	-22.50	Horizontal
2162.567	2.90	32.08	39.68	52.95	48.25	74.00	-25.75	Horizontal
3026.195	3.33	33.39	40.33	54.86	51.25	74.00	-22.75	Horizontal
3893.520	4.07	33.68	40.95	50.14	46.94	74.00	-27.06	Horizontal
4772.910	4.67	34.76	41.61	49.66	47.48	74.00	-26.52	Horizontal
7394.878	6.00	35.96	39.71	47.87	50.12	74.00	-23.88	Horizontal

#### 303.825MHz

Peak value:

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1210.356	2.33	27.57	39.23	52.08	42.75	74.00	-31.25	Vertical
1514.252	2.52	28.22	39.36	62.05	53.43	74.00	-20.57	Vertical
2118.973	2.88	32.02	39.65	51.31	46.56	74.00	-27.44	Vertical
3342.042	3.61	33.26	40.55	52.85	49.17	74.00	-24.83	Vertical
3634.910	3.85	33.37	40.77	50.62	47.07	74.00	-26.93	Vertical
4547.561	4.53	35.12	41.44	53.54	51.75	74.00	-22.25	Vertical
1210.356	2.33	27.57	39.23	55.58	46.25	74.00	-27.75	Horizontal
2810.846	3.21	33.14	40.16	47.62	43.81	74.00	-30.19	Horizontal
3342.042	3.61	33.26	40.55	50.46	46.78	74.00	-27.22	Horizontal
4267.178	4.34	34.55	41.23	49.85	47.51	74.00	-26.49	Horizontal
5865.832	5.08	35.48	41.04	48.19	47.71	74.00	-26.29	Horizontal
7566.249	6.19	36.00	39.56	47.87	50.50	74.00	-23.50	Horizontal

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**304.000MHz**

Peak value:

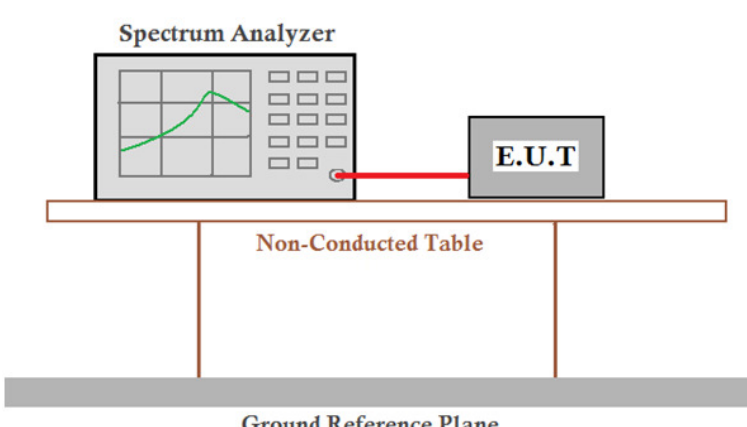
Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2118.973	2.88	32.02	39.65	50.91	46.16	74.00	-27.84	Vertical
3342.042	3.61	33.26	40.55	51.38	47.70	74.00	-26.30	Vertical
4234.716	4.31	34.45	41.21	49.21	46.76	74.00	-27.24	Vertical
4871.103	4.72	34.59	41.68	51.19	48.82	74.00	-25.18	Vertical
5850.919	5.07	35.45	41.06	48.35	47.81	74.00	-26.19	Vertical
7413.726	6.02	35.97	39.69	47.61	49.91	74.00	-24.09	Vertical
1210.356	2.33	27.57	39.23	48.71	39.38	74.00	-34.62	Horizontal
1805.005	2.71	30.32	39.48	46.84	40.39	74.00	-33.61	Horizontal
2726.283	3.16	33.03	40.10	50.65	46.74	74.00	-27.26	Horizontal
3342.042	3.61	33.26	40.55	52.37	48.69	74.00	-25.31	Horizontal
4871.103	4.72	34.59	41.68	50.45	48.08	74.00	-25.92	Horizontal
6747.341	5.32	36.06	40.28	48.97	50.07	74.00	-23.93	Horizontal

Remark:

- 1) 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 + Antenna Factor + Cable Factor – Preamplifier Factor
- 2) As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. So, only the peak measurements were shown in the report.

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### 6.4 20dB Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.231 (c)
Test Method:	ANSI C63.10:2009
Limit:	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 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.
Test Setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to an E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Mode:	Transmitting mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

### Measurement Data

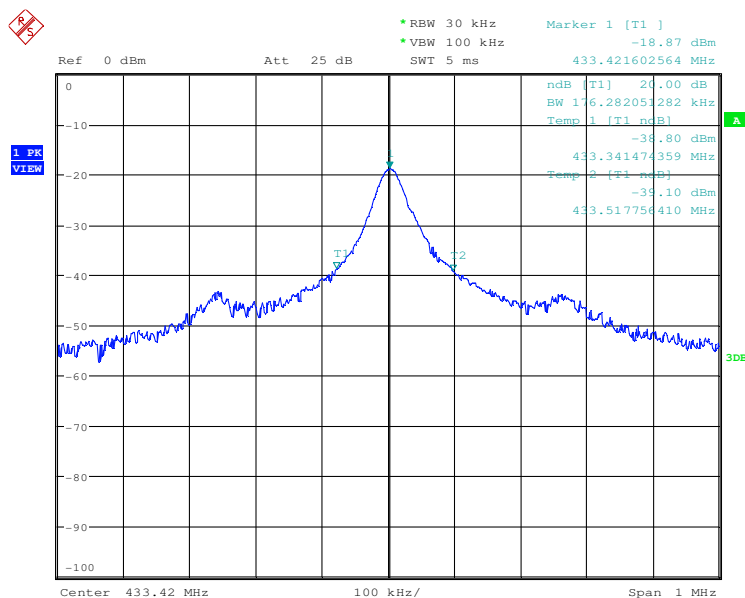
Frequency (MHz)	20dB bandwidth (MHz)	Limit (MHz)	Results
433.420	0.176	1.0836	Pass
303.825	0.163	0.7596	Pass
304.000	0.188	0.7600	Pass

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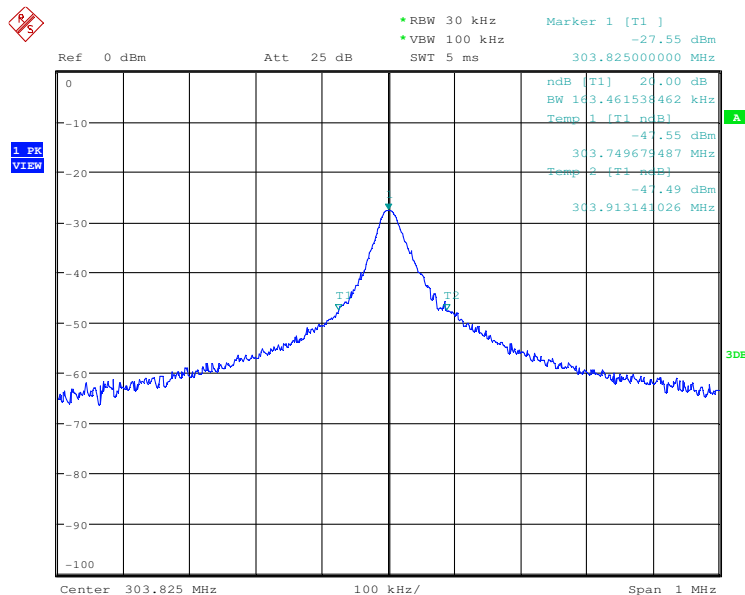


Test plot as follows:

Frequency: 433.420MHz



Frequency: 303.825MHz



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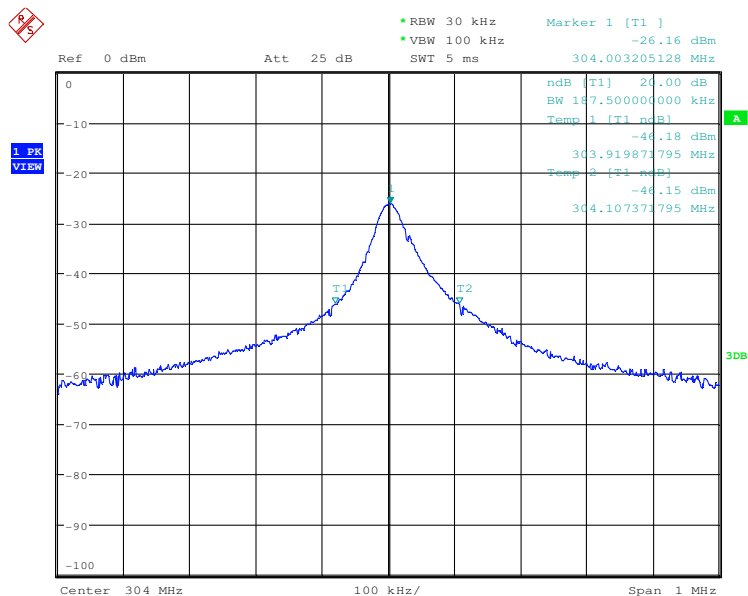


# SGS-CSTC Standards Technical Services Ltd.

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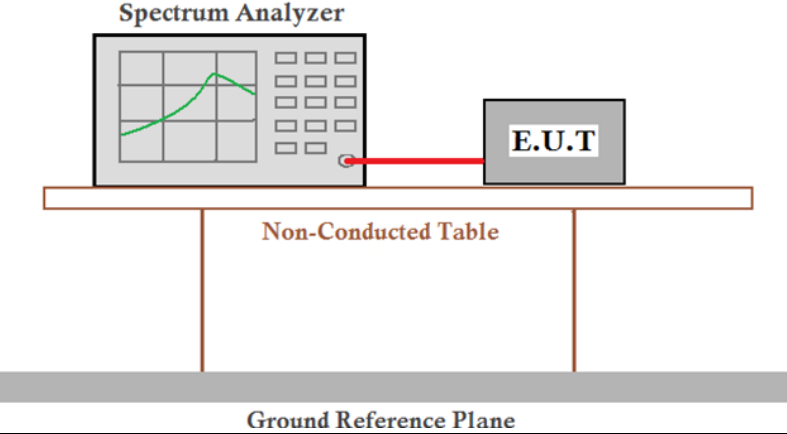
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Frequency: 304.000MHz



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### 6.5 Occupy Time

Test Requirement:	47 CFR Part 15C Section 15.231 (e)
Test Method:	ANSI C63.10:2009
Test Setup:	
Limit:	Transmitting time < 1s, Silent time >30* Transmitting time, Silent time >10s
Test Mode:	Normal mode
Instruments Used:	Refer to section 5.10 for details
Test Results:	Pass

### Measurement Data

Test item	Limit (MHz)	Results
Transmitting time	<1s	Pass
Silent time	>10s	Pass

Remark :

For 433.42MHz

Transmitting time=0.0445s<1s

Silent time >30\* Transmitting time=30\*0.0445=1.335s

For 303.825MHz

Transmitting time=0.0443s<1s

Silent time >30\* Transmitting time=30\*0.0443=1.329s

For 304MHz

Transmitting time=0.0445s<1s

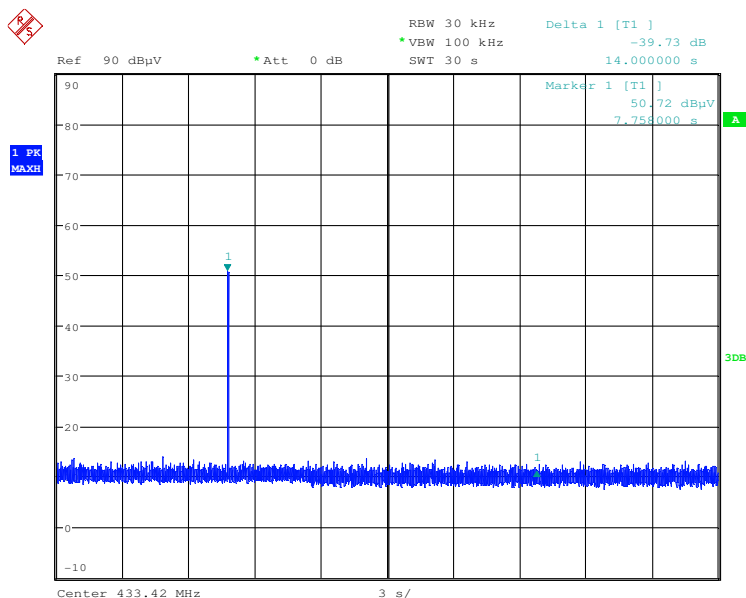
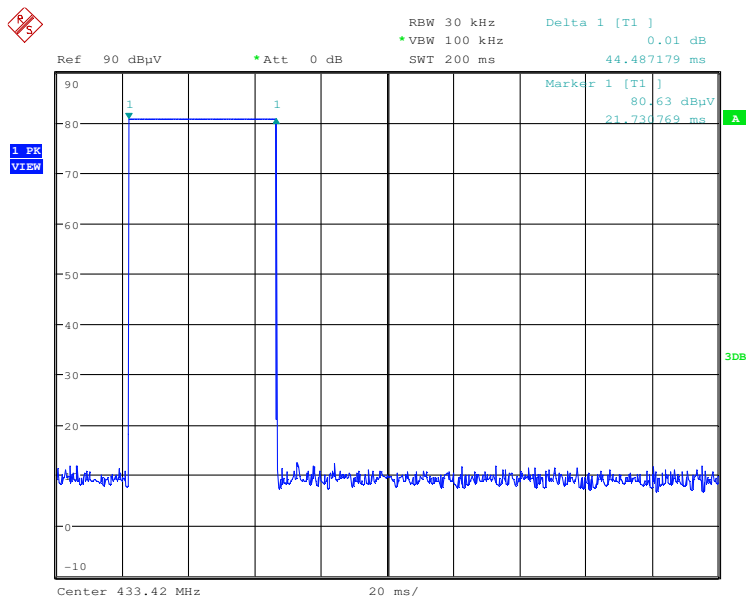
Silent time >30\* Transmitting time=30\*0.0445=1.335s

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Test plot as follows:

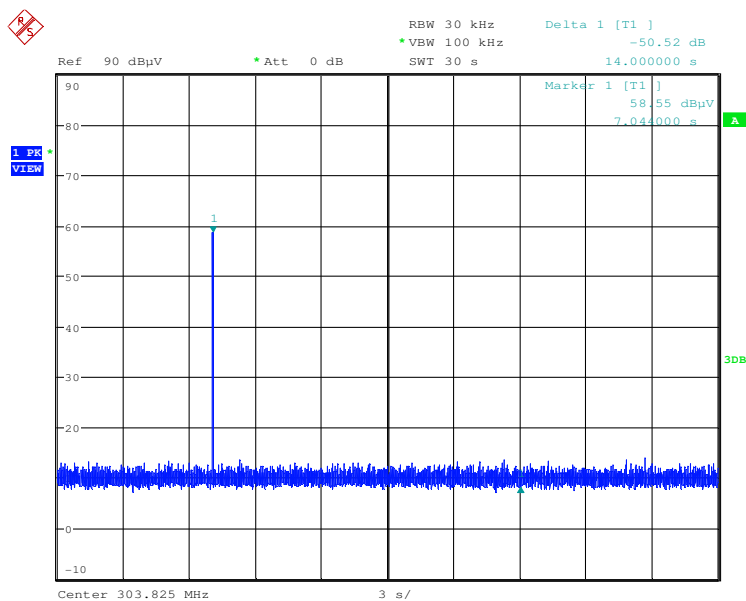
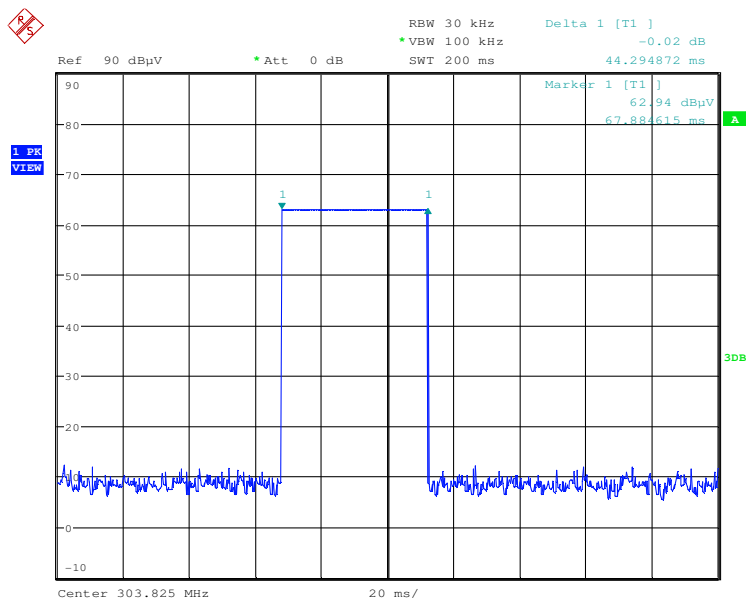
Frequency: 433.420MHz



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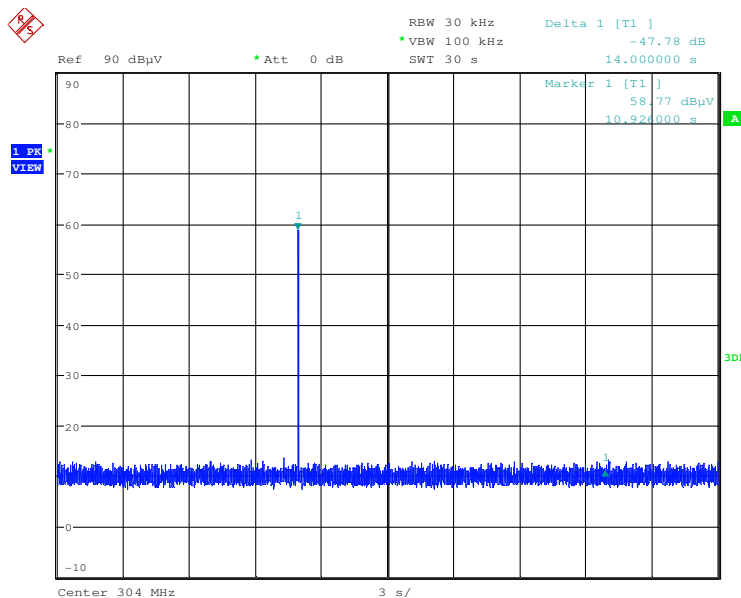
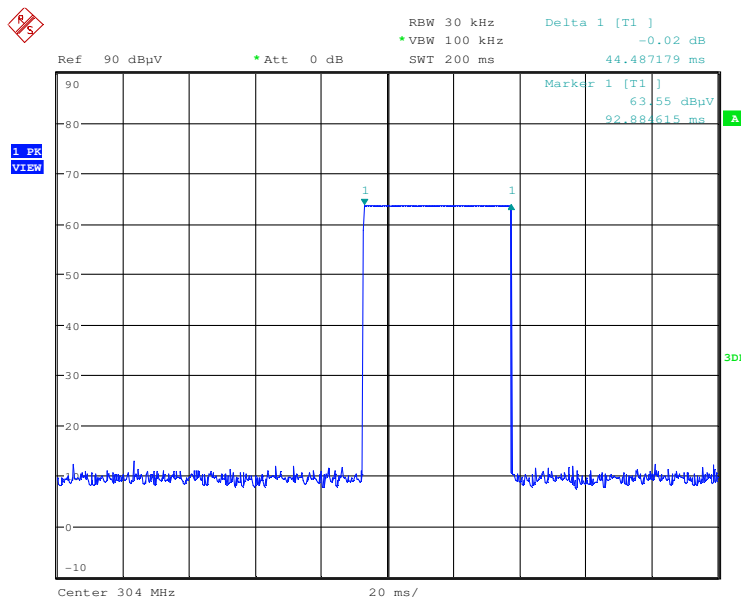
Frequency: 303.825MHz



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Frequency: 304.000MHz



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