Radio Test Report

FCC ID: Z5N-UHF01

This report concerns (check one) : ■ **Original Grant** □ **Class II Change**

Issued Date	:	Nov. 15, 2011
Project No.	:	R1108001
Equipment	:	ON TOUCH RF Remote Controller
Model Name	:	SR06
Applicant	:	LOONG YEE Industry CO., LTD.
Address	:	No. 14, Lane 103, Sec. 2, Chung Hsing Rd., WuKu District, New Taipei City 24847, Taiwan (R.O.C.)

Tested by: Neutron Engineering Inc. EMC Laboratory
Date of Receipt: Aug. 12, 2011
Date of Test: Aug. 12, 2011 ~ Oct. 03, 2011

Testing Engineer : Rush Kao
(Rush Kao)

Technical Manager : Jeff Yang
(Jeff Yang)

Authorized Signatory : Andy Chiu
(Andy Chiu)

Neutron Engineering Inc.
B1, No. 37, Lane 365, YangGuang St.,
NeiHu District 114, Taipei, Taiwan.
TEL: +886-2-2657-3299
FAX: +886-2-2657-3331

NVLAP Lab Code: 200145-0 ilac-MRA TAF Testing Laboratory 0659

Declaration

Neutron represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**) of **R.O.C**., or National Institute of Standards and Technology (**NIST**) of **U.S.A.**

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Limitation

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1. CERTIFICATION

Equipment : ON TOUCH RF Remote Controller
Brand Name : LOONG YEE
Model Name : SR06
Applicant : LOONG YEE Industry CO., LTD.
Date of Test : Aug. 12, 2011 ~ Oct. 03, 2011
Standards : FCC Part15, Subpart C / ANCI C63.4 : 2009

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-R1108001) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of NVLAP and TAF according to the ISO-17025 quality assessment standard and technical standard(s).

2. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards: (Antenna to EUT distance is **3** m)

FCC Part15(15.231), Subpart C		
Standard	Test Item	Judgment
15.207	Conducted Emission	N/A **NOTE(1)**
15.209	Radiated Emission	PASS
15.231(a)(1)	Transmitting Time	PASS
15.231(b)	Radiated Emission	PASS **NOTE(2)**
15.231(c)	20dB Occupied Bandwidth Measurement	PASS

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

(2) The EUT is manually operated transmitter, not periodic transmissions.

2.1 TEST FACILITY

The test facilities used to collect the test data in this report:

CB08: (VCCI RN: G-91; FCC RN: 614388; FCC DN: TW1054;
IC Assigned Code: 4428C-1)
1F., No. 61, Ln. 77, Sing-ai Rd., Neihu Dist., Taipei City 114, Taiwan (R.O.C.)

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement **y** ± **U**，where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**，providing a level of confidence of approximately **95**%.
The measurement instrumentation uncertainty considerations contained in CISPR 16-4-2.

Test Site	Method	Measurement Frequency Range	Ant. H / V	U，(dB)	NOTE
CB08	ANSI	30MHz ~ 200MHz	V	3.22	
		30MHz ~ 200MHz	H	3.35	
		200MHz ~ 1,000MHz	V	3.24	
		200MHz ~ 1,000MHz	H	3.11	
		1000MHz ~ 18000MHz	V	4.05	
		1000MHz ~ 18000MHz	H	3.97	
		18000MHz ~ 40000MHz	V	4.04	
		18000MHz ~ 40000MHz	H	4.01	

Our calculated Measurement Instrumentation Uncertainty is shown in the tables above. These are our U_{lab} values in CISPR 16-4-2 terminology.
Since Table 1 of CISPR 16-4-2 has values of measurement instrumentation uncertainty, called U_{CISPR}, as follows:

Conducted Disturbance (mains port) – 150 kHz – 30 MHz : 3.6 dB
Radiated Disturbance (electric field strength on an open area test site or alternative test site) – 30 MHz – 1000 MHz : 5.2 dB

It can be seen that our U_{lab} values are smaller than U_{CISPR}.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Equipment	ON TOUCH RF Remote Controller
Brand Name	LOONG YEE
Model Name	SR06
OEM Brand/Model Name	N/A
Model Difference	Please refer to Note 2.
Product Description	The EUT is a ON TOUCH RF Remote Controller. Operation Frequency: 433.95 MHz Modulation Type: Pulse Modulation (ASK) Antenna Designation: Printed Antenna Number Of Channel: 1 Transmitting Time: < 5 seconds Associated Receiver: FCC DOC Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.
Power Source	Battery supplied.
Power Rating	I/P: DC 3V
Connecting I/O Port(s)	Please refer to the User's Manual
Products Covered	N/A
EUT Modification(s)	N/A

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

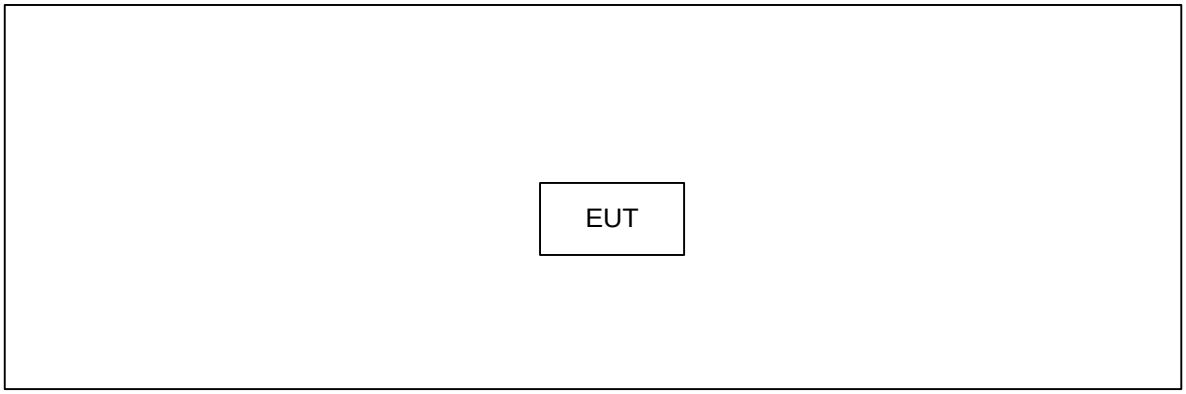
3.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Test Mode	Description
Mode 1	TX 433.95MHz

For Radiated Test	
Final Test Mode	Description
Mode 1	TX 433.95MHz

3.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
E-1	ON TOUCH RF Remote Controller	LOONG YEE	SR06	Z5N-UHF001	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note
N/A	-	-	-	-

Note:

(1) The support equipment was authorized by Declaration of Confirmation.
(2) For detachable type I/O cable should be specified the length in cm in『Length』column.

4. EMC EMISSION TEST

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 RADIATED EMISSION LIMITS (Frequency Range 30MHz-1000MHz)

According to 15.231 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

Fundamental	Field Strength of Fundamental		Field Strength of Spurious	
Frequency (MHz)	uV/meter	dBuV/meter	uV/meter	dBuV/meter
40.66 – 40.70	2250	67.04	225	48.04
70 – 130	1250	61.94	125	41.94
130 – 174	1250 to 3750	61.94 to 71.48	125 to 375	41.94 to 51.48
174 – 260	3750	71.48	75	37.50
260 – 470	3750 to 12500	71.48 to 81.94	375 to 1250	51.48 to 61.94
Above 470	12500	81.94	1250	61.94

Notes:

(1) Emission level in dBuV/m=20 log (uV/m)

(2) Measurement was performed at an antenna to the closed point of EUT distance of meters.

(3) Fundamental frequency shall not be located within the Restricted Bands specified in provision of 15.205.

(4) If spurious frequency which falls within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Notes:

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

4.1.2 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012
2	Horn Antenna	Schwarzbeck	BBHA 9120	D-325	Dec. 08, 2011
3	Microwave Pre_amplifier	Agilent	8449B	3008A01714	Apr. 18, 2012
4	Microflex Cable	N/A	N/A	1m	May. 18, 2012
5	Microflex Cable	AISI	S104-SMAP-1	10m	Aug. 21, 2012
6	Microflex Cable	N/A	N/A	3m	Aug. 21, 2012
7	Test Cable	N/A	LMR-400	966_12m	Jun. 16, 2012
8	Test Cable	N/A	LMR-400	966_3m	Jun. 16, 2012
9	Pre-Amplifier	EMC	EMC-330	980001	Jun. 02, 2012
10	Log-Bicon Antenna	Schwarzbeck	VULB9168-352	9168-352	Jun. 20, 2012

Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

4.1.3 TEST PROCEDURE

a. The measuring distance of at 10 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3m or 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Remark：

(1) Spectrum Setting:
9 KHz – 150 KHz, RBW= 1 KHz, VBW=1 KHz, Sweep time = 200 ms.
150 K Hz – 30 MHz, RBW= 9 KHz, VBW=9 KHz, Sweep time = 200 ms.
30 MHz – 1000 MHz, RBW= 100KHz, VBW=100KHz, Sweep time = 200 ms.
(2) All readings are Peak unless otherwise stated QP in column of『Note』. Peak denotes that the Peak reading compliance with the QP Limits and then QP Mode measure-ment didn‘t perform。

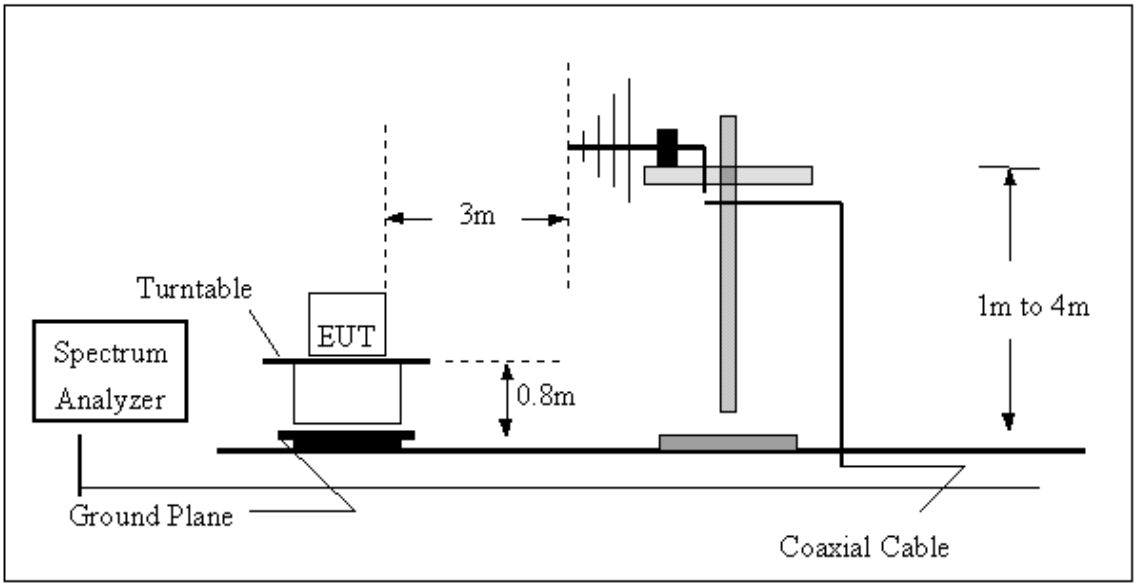
(3) Measuring frequency range from 30MHz to 1000MHz ◦
(4) If the peak scan value lower limit more than 20dB, then this signal data does not how in table ◦
(5) The average value of fundamental frequency is:
Average = Peak value + 20log(Duty cycle)
(6) EUT Orthogonal Axes：
“X” - denotes Laid on Table；”Y” - denotes Vertical Stand；”Z” - denotes Side Stand

4.1.4 DEVIATION FROM TEST STANDARD

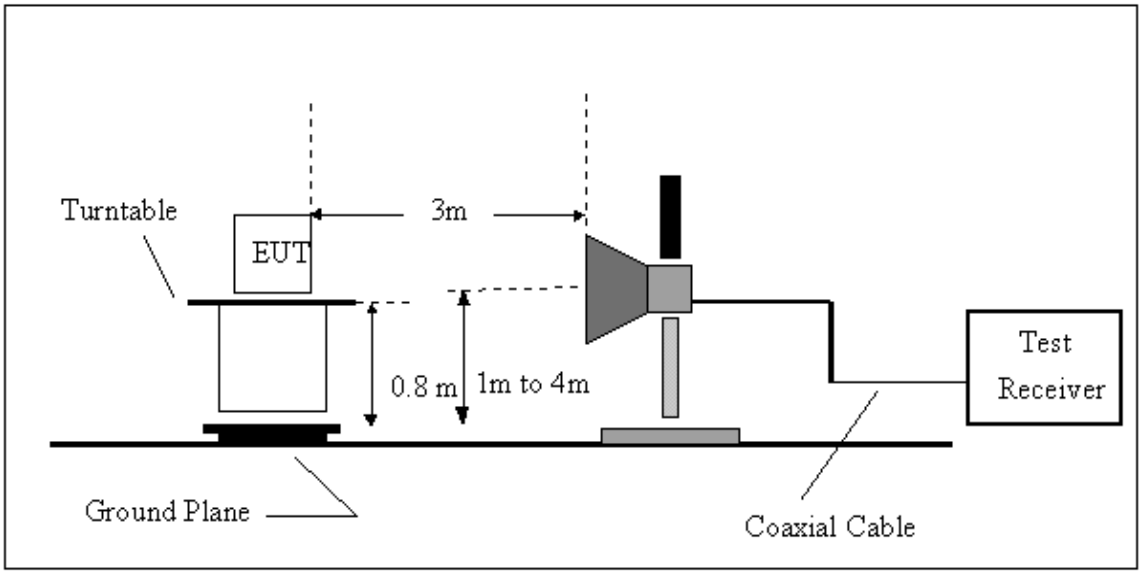
No deviation

4.1.5 TEST SETUP

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



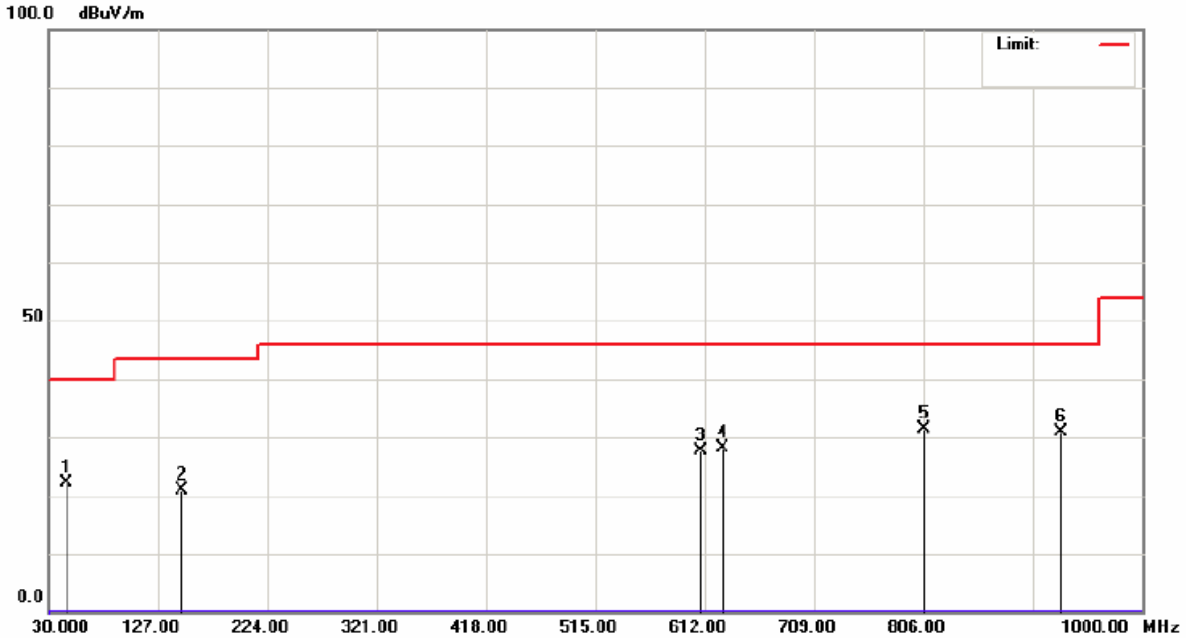
4.1.6 EUT OPERATING CONDITIONS

4.1.7 TEST RESULTS (BETWEEN30 – 1000 MHz)

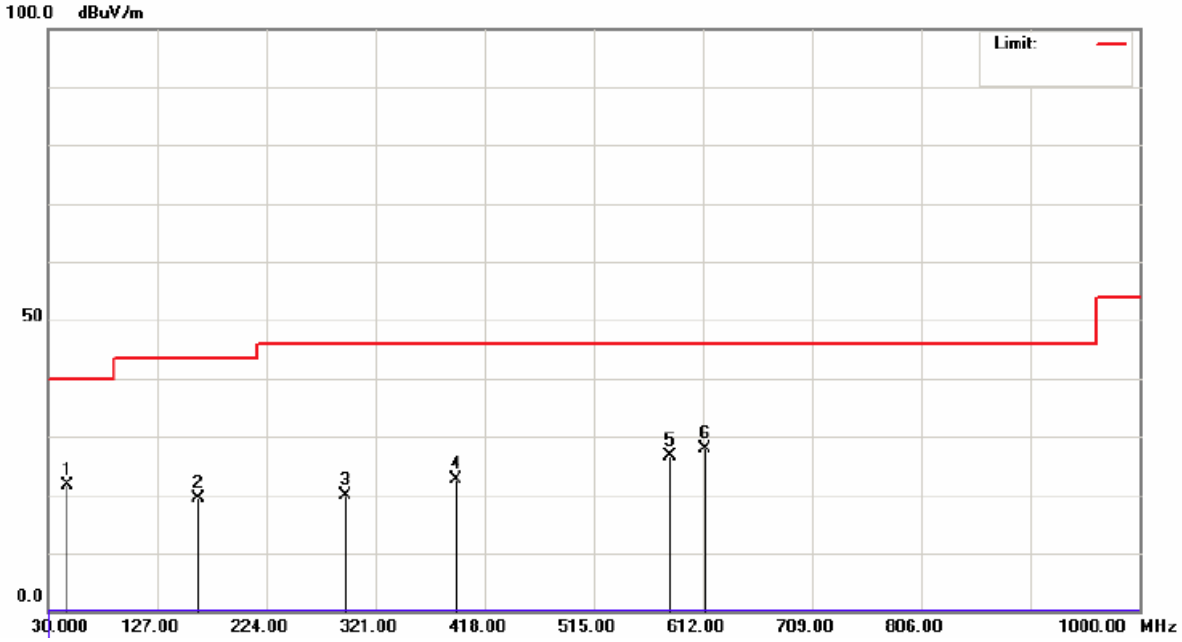
EUT：	ON TOUCH RF Remote Controller	Model Name ：	SR06
Temperature：	26°C	Relative Humidity：	60%
Test Voltage ：	DC 3V	Orthogonal Axis：	Y
Test Mode ：	TX 433.95MHz		
The following table lists worst case data from TX with various orthogonal planes on the EUT antenna.			

Freq. (MHz)	Ant.Pol. H/V	DetectorMode (PK/AV)	Reading (dBuV)	Ant./CL/ Amp. CF(dB)	Actual FS (dBuV/m)	Limit-3m (dBuV/m)	Safe Margins (dBuV/m)	Note
45.52	V	Peak	34.47	- 12.22	22.25	40.00	- 17.75	
148.34	V	Peak	33.93	- 13.10	20.83	43.50	- 22.67	
608.12	V	Peak	33.41	- 5.88	27.53	46.00	- 18.47	
627.52	V	Peak	33.66	- 5.53	28.13	46.00	- 17.87	
806.00	V	Peak	34.27	- 2.83	31.44	46.00	- 14.56	
928.22	V	Peak	33.19	- 2.23	30.96	46.00	- 15.04	
47.46	H	Peak	33.91	- 12.24	21.67	40.00	- 18.33	
163.86	H	Peak	32.84	- 13.37	19.47	43.50	- 24.03	
293.84	H	Peak	32.49	- 12.66	19.83	46.00	- 26.17	
392.78	H	Peak	32.92	- 10.24	22.68	46.00	- 23.32	
582.90	H	Peak	33.02	- 6.46	26.56	46.00	- 19.44	
613.94	H	Peak	33.53	- 5.77	27.76	46.00	- 18.24	

Polarization: Vertical



Polarization: Horizontal



4.1.8 TEST RESULTS (BETWEEN30 – 5000 MHz)

EUT：	ON TOUCH RF Remote Controller	Model Name ：	SR06
Temperature：	24°C	Relative Humidity：	36%
Test Voltage ：	DC 3V	Orthogonal Axis：	Y
Test Mode ：	TX 433.95MHz		
The following table lists worst case data from TX with various orthogonal planes on the EUT antenna.			
About the duty cycle correction factor calculated, please refer to the next page (Table-1).			

Freq. (MHz)	F/S	Ant.Pol. H/V	Reading (dBuV)	Ant./CL CF(dB)	Duty Cycle CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margins (dBuV/m)
433.95	F	V	69.71	- 9.17	- 6.27	60.54	54.27	100.83	80.83	- 26.56
867.92	S	V	47.69	- 2.78	- 6.27	44.91	38.64	80.83	60.83	- 22.19
1301.81	S	V	48.99	- 6.65	- 6.27	42.34	36.07	74.00	54.00	- 17.93
1735.92	S	V	48.76	- 4.93	- 6.27	43.83	37.56	74.00	54.00	- 16.44

EUT：	ON TOUCH RF Remote Controller	Model Name ：	SR06
Temperature：	24°C	Relative Humidity：	36%
Test Voltage ：	DC 3V	Orthogonal Axis：	Y
Test Mode ：	TX 433.95MHz		
The following table lists worst case data from TX with various orthogonal planes on the EUT antenna.			
About the duty cycle correction factor calculated, please refer to the next page (Table-1).			

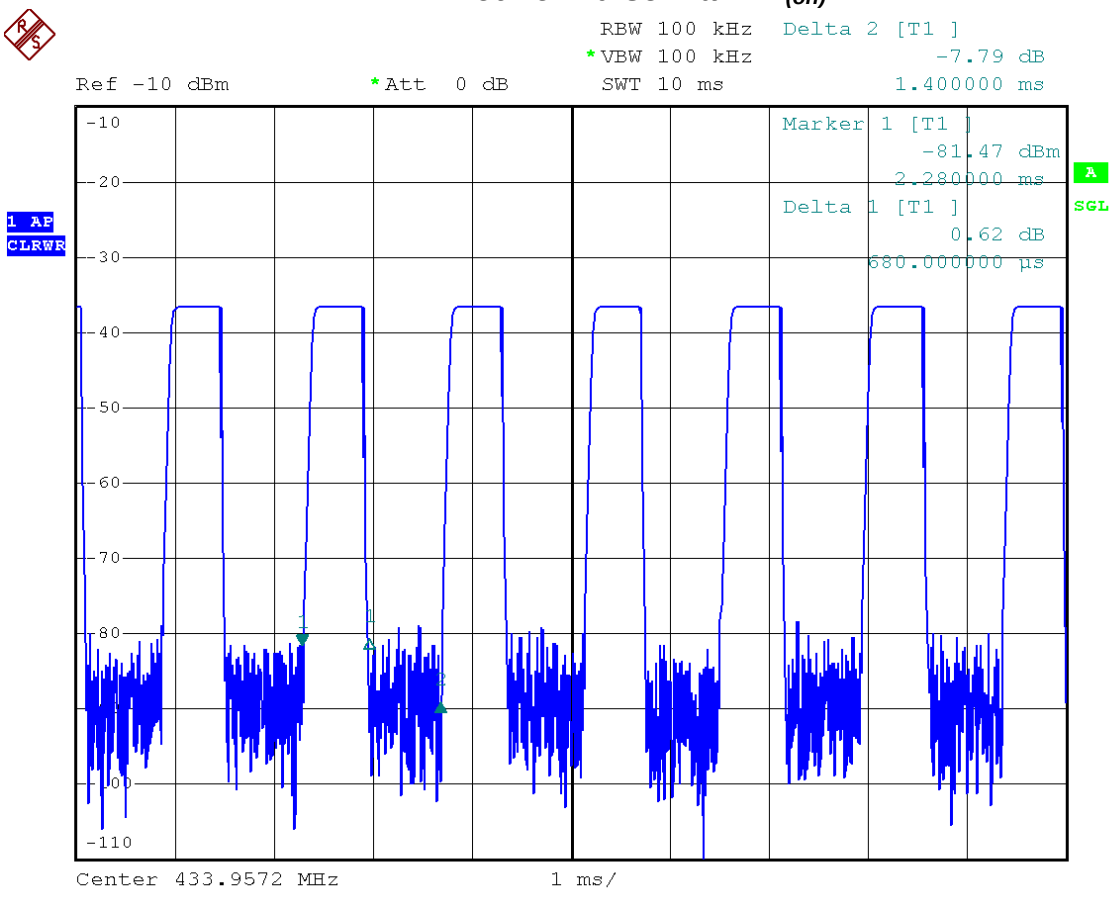
Freq. (MHz)	F/S	Ant.Pol. H/V	Reading (dBuV)	Ant./CL CF(dB)	Duty Cycle CF(dB)	Peak (dBuV/m)	AV (dBuV/m)	Peak Limit (dBuV/m)	AV Limit (dBuV/m)	Safe Margins (dBuV/m)
433.95	F	V	80.91	- 9.17	- 6.27	71.74	65.47	100.83	80.83	- 15.36
867.92	S	V	56.04	- 2.78	- 6.27	53.26	46.99	80.83	60.83	- 13.84
1301.88	S	V	45.43	- 6.65	- 6.27	38.78	32.51	74.00	54.00	- 21.49
1735.79	S	V	44.65	- 4.93	- 6.27	39.72	33.45	74.00	54.00	- 20.55

Table - 1

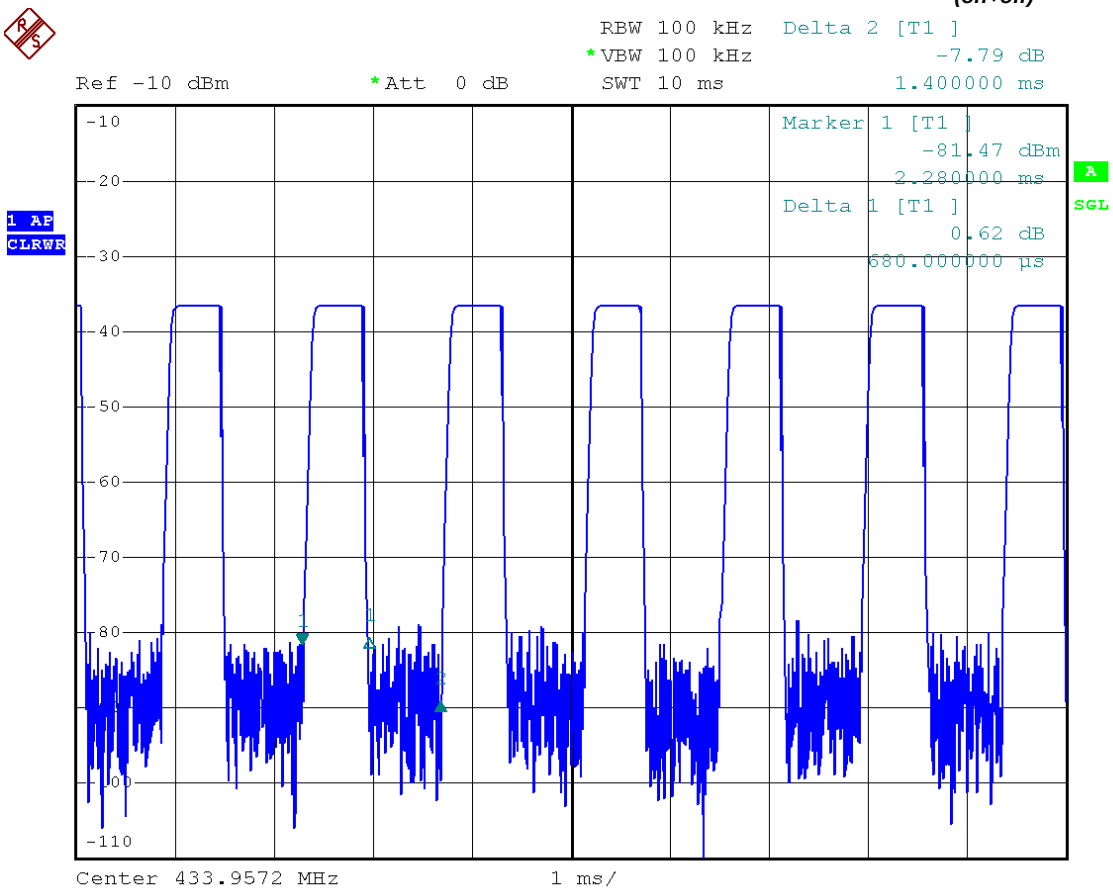
Duty Cycle Correction Factor Calculated			
EUT：	ON TOUCH RF Remote Controller	Model Name ：	SR06
Temperature：	24˚C	Relative Humidity：	58%
Test Voltage：	DC 3V		

Frequency (MHz)	Pulse Train $T_{(on)}$ (ms)	Total Duration of EUT at active state($T_{(on+off)}$) (ms)	Factor = 20 log[$T_{(on)}$/ $T_{(on+off)}$]
433.95	0.68 ms	1.4 ms	-6.27 dB

Plot For Pulse Train: $T_{(on)}$



Plot For Total Duration of EUT at active state: $T_{(on+off)}$



4.2 20dB OCCUPIED BANDWIDTH MEASUREMENT

4.2.1 MEASUREMENT INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012

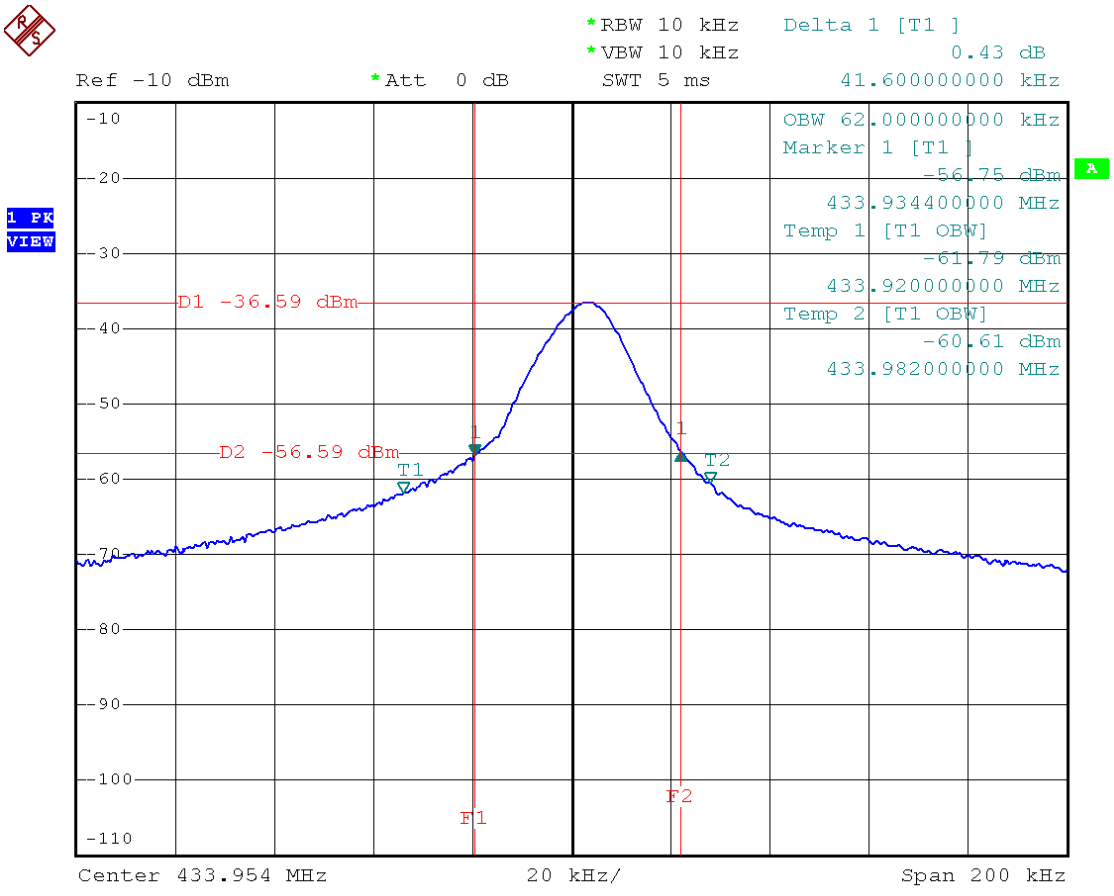
Remark: ” N/A” denotes No Model Name / Serial No. and No Calibration specified.

4.2.2 TEST RESULTS

EUT：	ON TOUCH RF Remote Controller	Model Name ：	SR06
Temperature：	15°C	Relative Humidity :	58%
Test Voltage：	DC 3V		
Test Mode ：	TX 433.95MHz		

Frequency (MHz)	20dB Bandwidth (KHz)	99% Occupied BW (KHz)	Maximum Limit(KHz)	Result
433.95	41.60	62.00	1080.00	PASS

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



5. TIMING TESTING

5.1 RADIATED EMISSION MEASUREMENT

5.1.1 LIMITS

According to 15.231(a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

5.1.2 MEASURING INSTRUMENTS LIST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	Spectrum Analyzer	R&S	FSP-40	100129	Aug. 30, 2012

5.1.3 TEST PROCEDURE

a. The transmitter was used antenna to receive and measure the release time in peak hold mode.
b. Spectrum Setting:
RBW= 100 KHz, VBW=100 KHz, Sweep time = 10 s.

5.1.4 DEVIATION FROM TEST STANDARD

No deviation

5.1.5 EUT OPERATING CONDITIONS

The EUT was programmed to be in normal mode.

5.1.6 TEST RESULTS

EUT：	ON TOUCH RF Remote Controller	Model Name ：	SR06
Temperature：	15°C	Relative Humidity：	58%
Test Voltage：	DC 3V		
Test Mode ：	TX 433.95MHz		

Frequency (MHz)	Pulse Train $T_{(on+off)}$ (ms)	Release Time (Second)	Result
433.95	220	< 5 *Note(1)*	PASS

Note:
(1)The EUT is a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

Release Time