

Test Report

FCC ID:2AKBV-S11

Date of issue: Jul. 03, 2017

Report Number:	MTi170912E032
Sample Description:	Remote Control
Model(s):	S1
Applicant:	POS International Limited
Address:	office 3A,12/F, Kaiser centre, No.18 centre street, Sai ying pun HK
Date of Test:	Jun. 21, 2017 – Jul. 03, 2017

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>

TEST RESULT CERTIFICATION	
Applicant's name	POS International Limited
Address	office 3A,12/F, Kaiser centre, No.18 centre street, Sai ying pun HK
Manufacture's Name	SHENZHEN AIDAXING ELECTRONIC TECHNOLOGY CO., LTD.
Address	2ND FLOOR, BLDG 24, XITIAN 3RD INDUSTRIAL ZONE, GONGMING, GUANGMING DISTRICT, SHENZHEN, CHINA
Product description	
Product name	Remote Control
Model and/or type reference :	S1
Serial Model	N/A
Standards	FCC Part15.249
Test procedure.....	ANSI C63.10-2013

This device described above has been tested by Shenzhen Toby Technology Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:



Demi Mu

Jul. 03, 2017

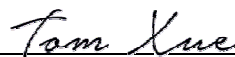
Reviewed by:



Smith Chen

Jul. 03, 2017

Approved by:



Tom Xue

Jul. 03, 2017

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.249) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.203/15.249	Antenna Requirement	PASSED	
15.207	Conducted Emission	PASSED	
15.249(a)/15.205	the field strength of emissions	PASSED	
15.215	20dB Occupied Bandwidth	PASSED	
15.249(d)	Band Edge	PASSED	

NOTE:

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

1.1 TEST FACILITY

Shenzhen Toby Technology Co., Ltd.

Add.: 10/F.,A Block, Jiada R&D Bldg., No.5 Songpingshan, Road, Science&Technology Park,
Shenzhen, 518057

FCC Registration No.:811562

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %** .

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2\%$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Equipment	Remote Control	
Trade Name	N/A	
Model Name	S1	
Serial Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a Remote Control	
	Operation Frequency:	2402-2480MHz
	Modulation Type:	GFSK
	Bit Rate of Transmitter	2Mbps
	Number Of Channel	79CH
	Antenna Designation:	Please see Note 3.
	Antenna Gain (dBi)	0dBi
	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.	
Channel List	Please refer to the Note 2.	
Adapter	N/A	
Battery	DC 3.7V 500mAh	
Connecting I/O Port(s)	Please refer to the User's Manual	

Note:

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

2. Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		
Remark: Channel 0, 39 & 78 selected for GFSK					

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
A	N/A	N/A	Internal antenna	/	0	Antenna

2.2 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 Mode	Description
Mode 1	GFSK CH1/CH40/CH79
Mode 2	TX Mode

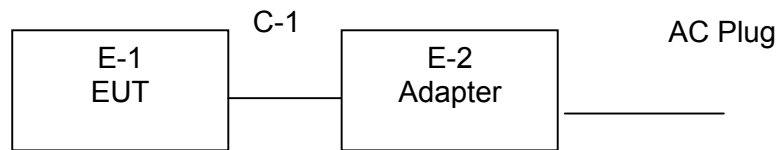
For Conducted Emission	
Final Test Mode	Description
Mode 2	TX Mode

For Radiated Emission	
Final Test Mode	Description
Mode 1	GFSK CH1/CH40/CH79

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) The measurements are performed at all Bit Rate of Transmitter, the worst data was reported

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

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	Brand	Model/Type No.	Series No.	Note
E-1	Remote Control	N/A	S1	N/A	EUT
E-2	Adapter	N/A	SAW12-050-2000UD	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	1.0m	
C-2	NO	NO	0.8m	

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.

2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Class A (dBuV)		Class B (dBuV)		Standard
	Quasi-peak	Average	Quasi-peak	Average	
0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	CISPR
0.50 -5.0	73.00	60.00	56.00	46.00	CISPR
5.0 -30.0	73.00	60.00	60.00	50.00	CISPR

0.15 -0.5	79.00	66.00	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	73.00	60.00	56.00	46.00	FCC
5.0 -30.0	73.00	60.00	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

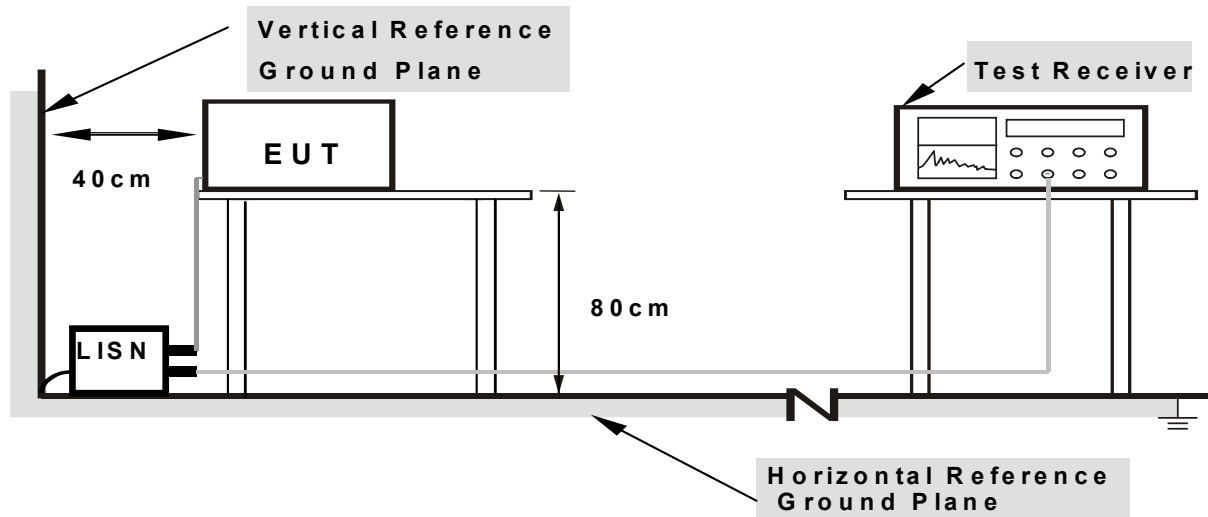
3.2 TEST PROCEDURE

- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.2 DEVIATION FROM TEST STANDARD

No deviation

3.1.3 TEST SETUP



Note: 1.Support units were connected to second LISN .

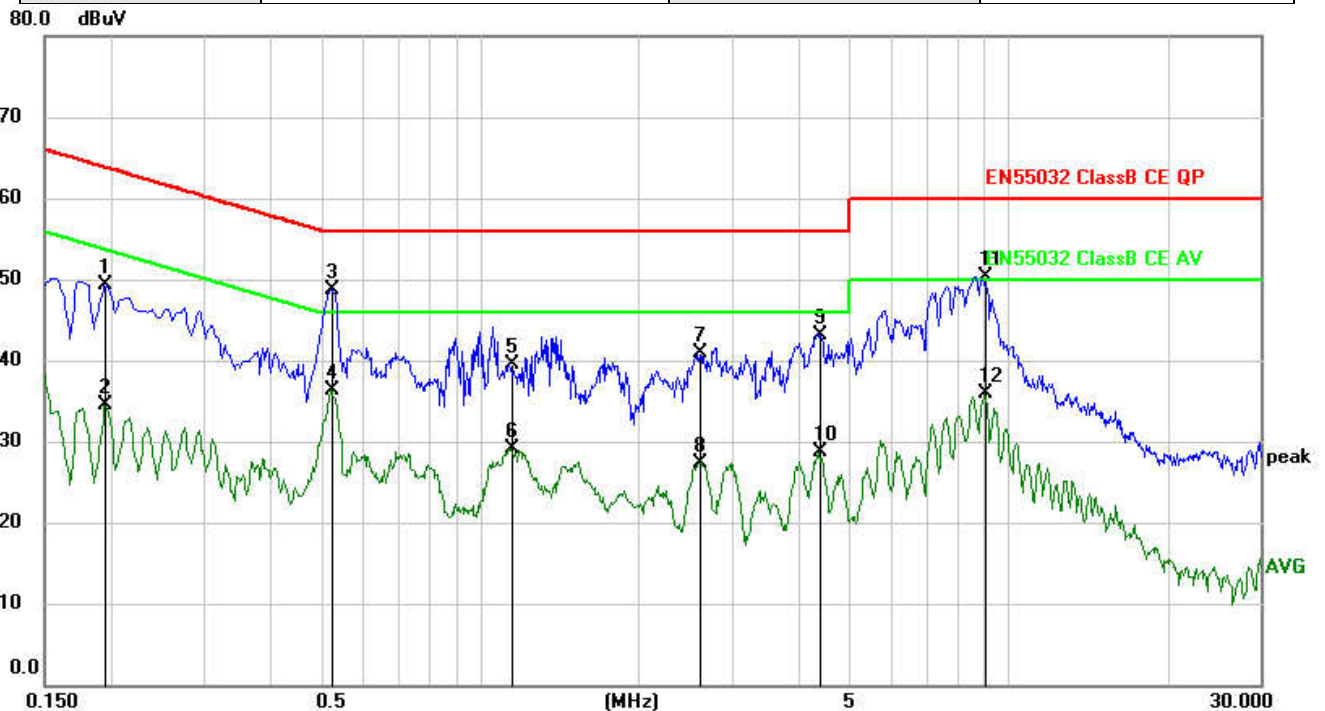
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

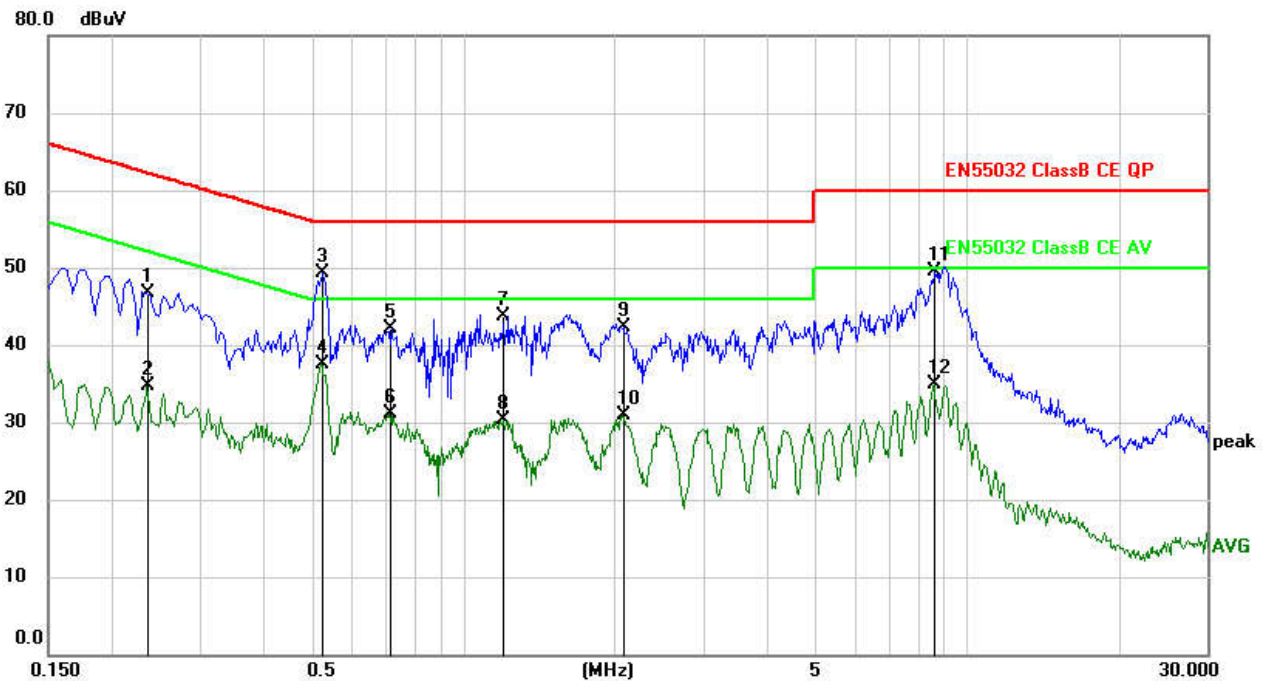
3.1.5 TEST RESULTS

EUT :	Remote Control	Model Name. :	S1
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	L
Test Voltage :	DC 5V from adapter AC 120V/60Hz	Test Mode :	Mode 2



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1949	49.26	-0.05	49.21	63.83	-14.62	QP	
2		0.1949	34.51	-0.05	34.46	53.83	-19.37	AVG	
3	*	0.5235	48.84	-0.05	48.79	56.00	-7.21	QP	
4		0.5235	36.39	-0.05	36.34	46.00	-9.66	AVG	
5		1.1445	39.48	-0.06	39.42	56.00	-16.58	QP	
6		1.1445	29.24	-0.06	29.18	46.00	-16.82	AVG	
7		2.5980	40.95	-0.08	40.87	56.00	-15.13	QP	
8		2.5980	27.44	-0.08	27.36	46.00	-18.64	AVG	
9		4.4025	43.29	-0.09	43.20	56.00	-12.80	QP	
10		4.4025	28.85	-0.09	28.76	46.00	-17.24	AVG	
11		9.0285	50.55	-0.17	50.38	60.00	-9.62	QP	
12		9.0285	36.05	-0.17	35.88	50.00	-14.12	AVG	

EUT :	Remote Control	Model Name. :	S1
Temperature :	26 °C	Relative Humidity :	54%
Pressure :	1010hPa	Phase :	N
Test Voltage :	DC 5V from adapter AC 120V/60Hz	Test Mode :	Mode 2



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.2355	46.79	-0.05	46.74	62.25	-15.51	QP	
2		0.2355	34.71	-0.05	34.66	52.25	-17.59	AVG	
3	*	0.5235	49.30	-0.05	49.25	56.00	-6.75	QP	
4		0.5235	37.49	-0.05	37.44	46.00	-8.56	AVG	
5		0.7125	42.08	-0.05	42.03	56.00	-13.97	QP	
6		0.7125	31.15	-0.05	31.10	46.00	-14.90	AVG	
7		1.1985	43.72	-0.06	43.66	56.00	-12.34	QP	
8		1.1985	30.33	-0.06	30.27	46.00	-15.73	AVG	
9		2.0715	42.33	-0.07	42.26	56.00	-13.74	QP	
10		2.0715	30.97	-0.07	30.90	46.00	-15.10	AVG	
11		8.6235	49.66	-0.16	49.50	60.00	-10.50	QP	
12		8.6235	35.03	-0.16	34.87	50.00	-15.13	AVG	

4. RADIATED EMISSION & BAND EDGE SPURIOUS EMISSION

4.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/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

Frequency	Field Strength(dBuv/m)	Detector
Fundamental	114	PK
Fundamental	94	AV
Harmonic emissions	74	PK
Harmonic emissions	54	AV

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz PK detector for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

4.2 TEST PROCEDURE

- The measuring distance of at 3 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 3 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.

Note:

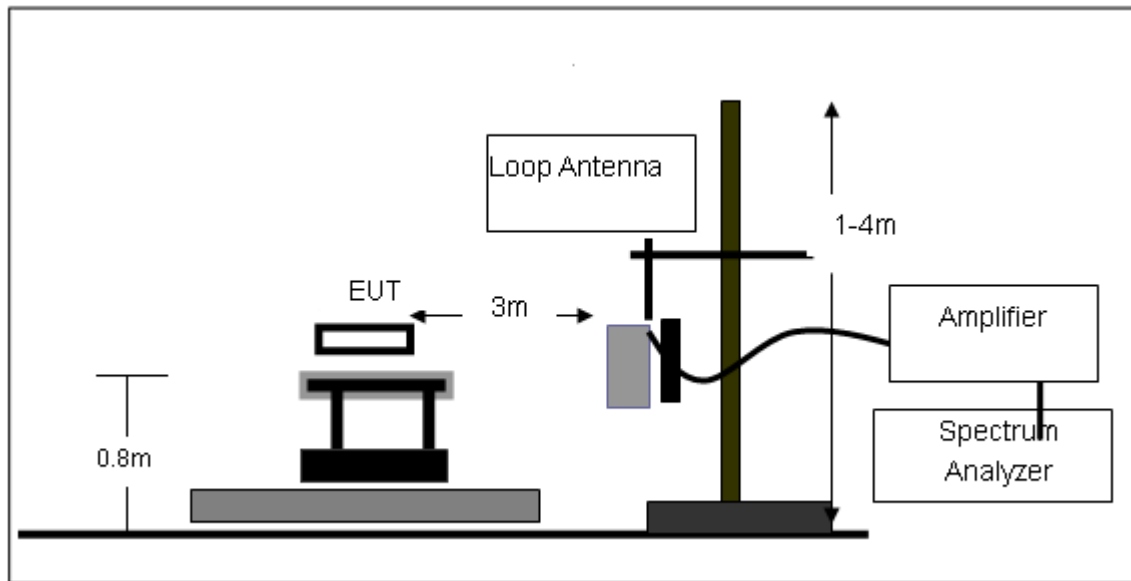
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.3 DEVIATION FROM TEST STANDARD

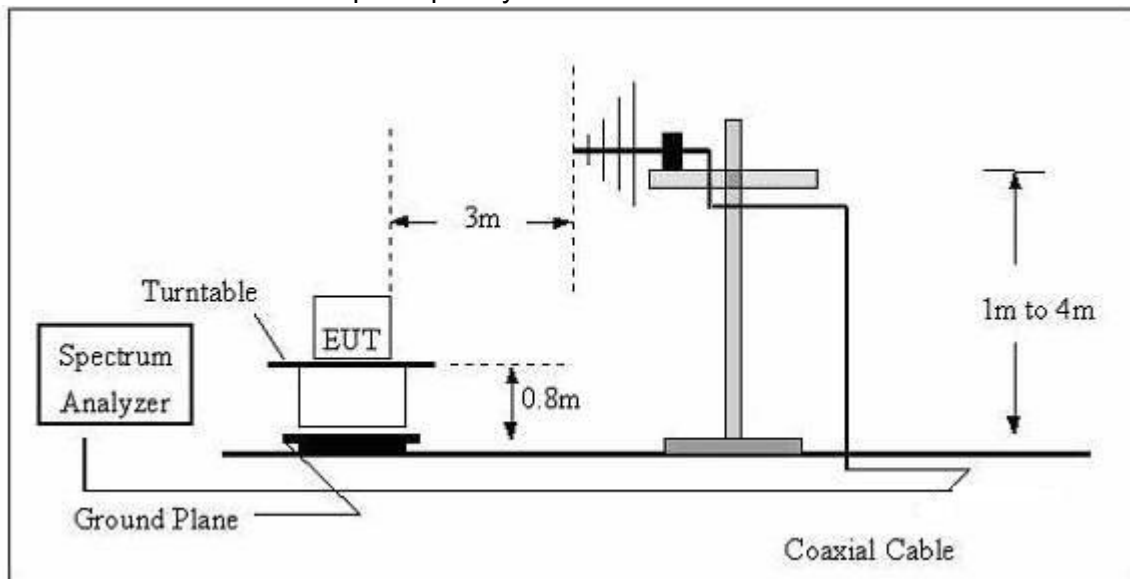
No deviation

4.4 TEST SETUP

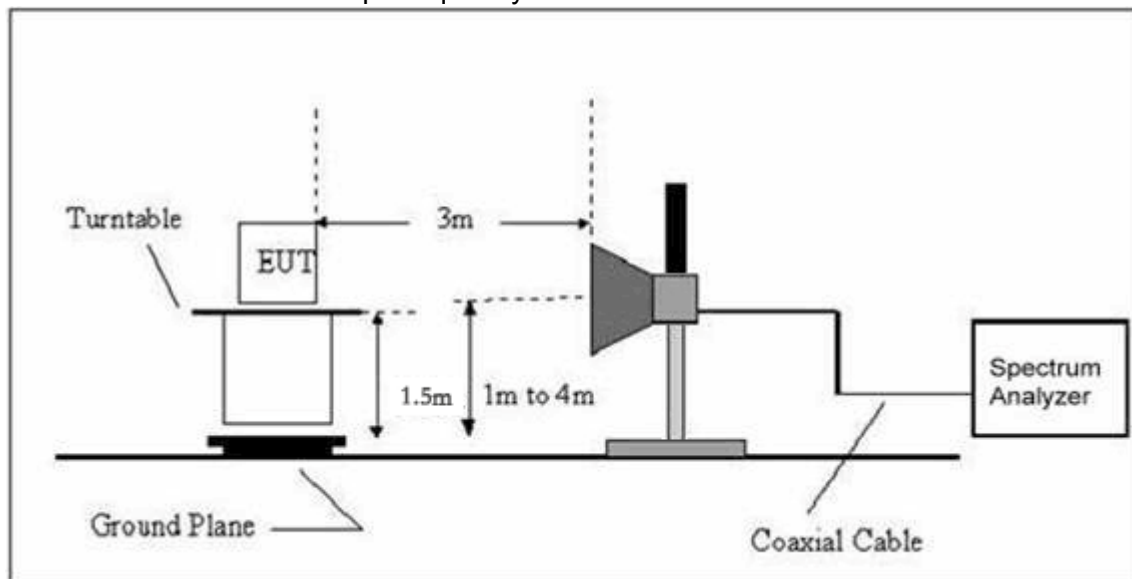
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.6 TEST RESULTS (BETWEEN 9KHZ – 30 MHZ)

EUT:	Remote Control	Model Name. :	S1
Temperature:	20 °C	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7Vfrom battery
Test Mode :	TX	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.

4.7 EST RESULTS (BETWEEN 30MHZ – 1GHZ)

EUT :	Remote Control	Model Name :	S1
Temperature :	20 °C	Relative Humidity :	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7Vfrom battery
Test Mode :	TX		

Polar (H/V)	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
V	119.4360	12.35	12.08	24.43	43.5	19.07	QP
V	128.1129	13.38	12.2	25.58	43.5	17.92	QP
V	170.7926	14.76	10.35	25.11	43.5	18.39	QP
V	341.9786	10.55	16.19	26.74	46	19.26	QP
V	468.8761	12.73	19.69	32.42	46	13.58	QP
V	935.5462	8.29	29.42	37.71	46	8.29	QP
H	170.7923	14.51	10.35	24.86	43.5	18.64	QP
H	341.9786	15.43	16.19	31.62	46	14.38	QP
H	468.8761	12.92	19.69	32.61	46	13.39	QP
H	726.8052	8.62	26	34.62	46	11.38	QP
H	813.1114	6.74	26.35	33.09	46	12.91	QP
H	854.0247	7.27	27.51	34.78	46	11.22	QP

Remark:

Absolute Level= ReadingLevel+ Factor, Margin= Absolute Level- Limit

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Factor added by measurement software automatically

4.8 TEST RESULTS (1G-25GHz)

GFSK

Transmitter channel: 2402MHz

Frequency	Ant. Polarization	Emission level	Limits	Detector	Result
(MHz)	H / V	dBμV/m	dBμV/m		
2402	V	91.54	114	PK	
2402	H	89.57	114	PK	
2402	V	/	94	AV	
2402	H	/	94	AV	
4804	V	49.22	74	PK	
4804	H	43.46	74	PK	

Transmitter channel: 2441MHz

Frequency	Ant. Polarization	Emission level	Limits	Detector	Pass
(MHz)	H / V	dBμV/m	dBμV/m		
2441	V	90.73	114	PK	
2441	H	88.42	114	PK	
2441	V	/	94	AV	
2441	H	/	94	AV	
4882	V	49.14	74	PK	
4882	H	44.07	74	PK	

Transmitter channel: 2480MHz

Frequency	Ant. Polarization	Emission level	Limits	Detector	Pass
(MHz)	H / V	dBμV/m	dBμV/m		
2480	V	89.76	114	PK	
2480	H	87.98	114	PK	
2480	V	/	94	AV	
2480	H	/	94	AV	
4960	V	48.21	74	PK	
4960	H	43.85	74	PK	

Note: The PK value is less than the AV value, AV value is not required
Factor added by measurement software automatically.

For fundamental frequency , RBW 3MHz VBW 3MHz Peak detector is for PK
,RMS detector is for AV

4.9 BAND EDGE(Radiated)

	Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Detector Type	Comment
	(MHz)	(dBμV)	(dB)	(dBμV/m)	(dBμV/m)	(dB)		
	GFSK							
CHL	2390	53.22	-13.06	40.16	74	33.84	peak	Vertical
CHL	2390	52.28	-13.06	39.22	74	34.78	peak	Horizontal
CHL	2400	51.33	-13.06	38.27	74	-35.73	peak	Vertical
CHL	2400	53.14	-12.78	40.36	74	-33.64	peak	Horizontal
CHH	2483.5	59.79	-12.78	47.01	74	26.99	peak	Vertical
CHH	2483.5	55.54	-12.78	42.76	74	31.24	peak	Horizontal

NOTE:The PK value is less than the AV value, AV value is not required.

5. 20 DB OCCUPY BANDWIDTH

5.1 APPLIED PROCEDURES / LIMIT

FCC Part15 (15.249) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.215	20dB bandwidth	/	2400-2483.5	PASS

5.2 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Bandwidth: RBW=30 kHz, VBW=100 kHz, detector= Peak

5.3 DEVIATION FROM STANDARD

No deviation.

5.4 TEST SETUP



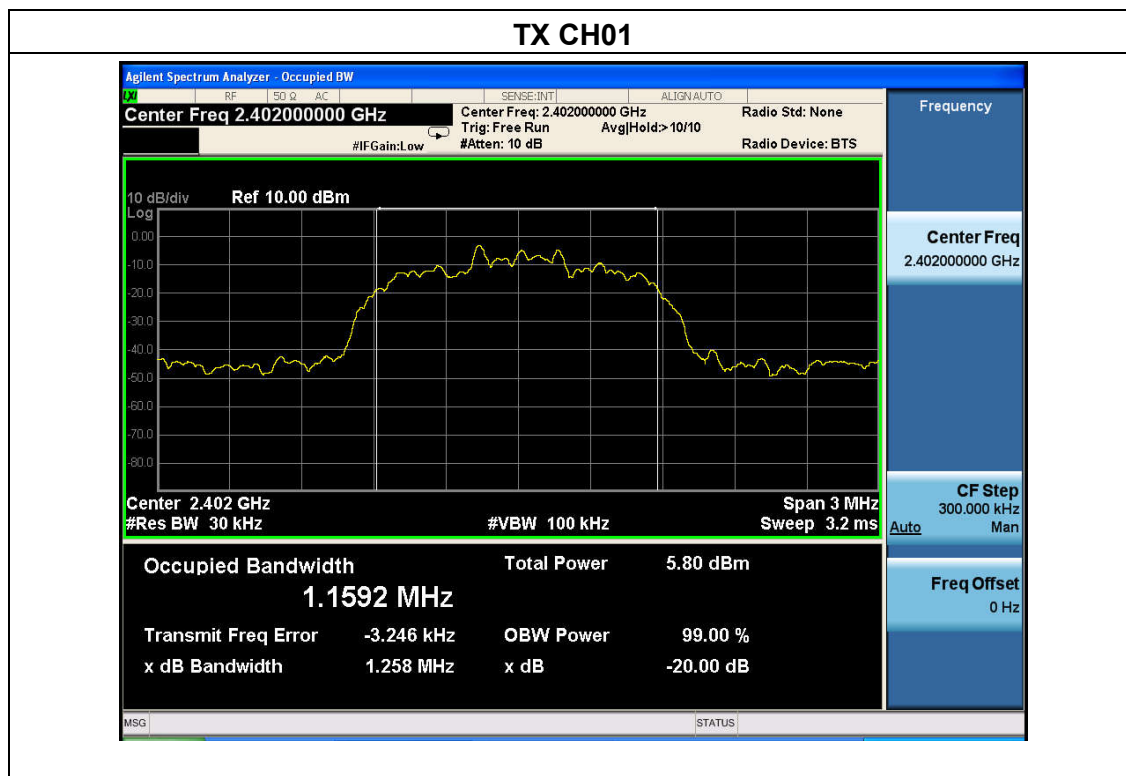
5.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.1 Unless otherwise a special operating condition is specified in the follows during the testing.

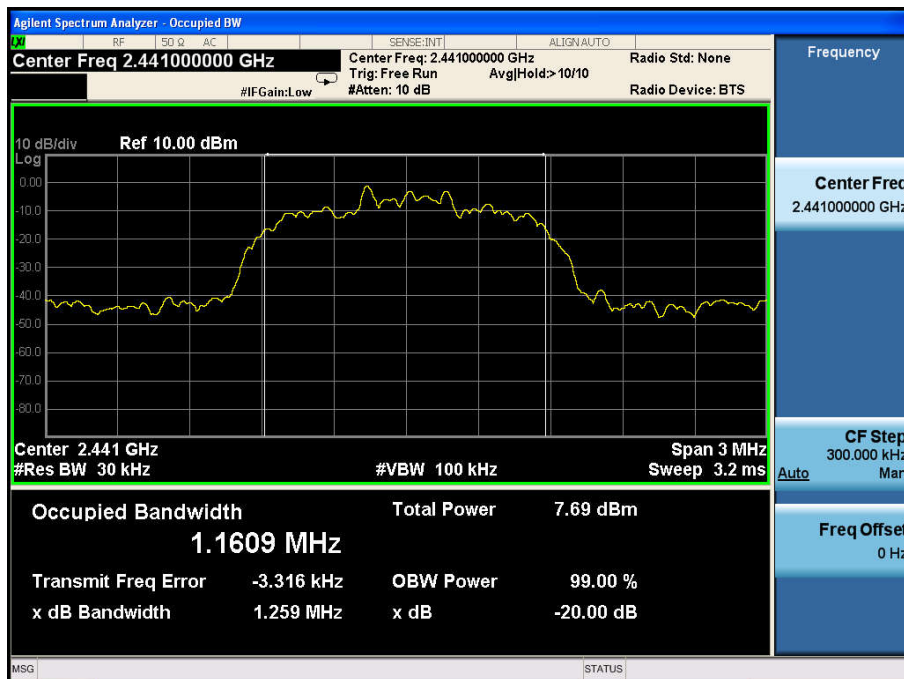
5.6 TEST RESULTS

EUT :	Remote Control	Model Name :	S1
Temperature :	25 °C	Relative Humidity :	60%
Pressure :	1015 hPa	Test Voltage :	DC 3.7Vfrom battery
Test Mode :	GFSK Mode /CH01, CH40, CH79		

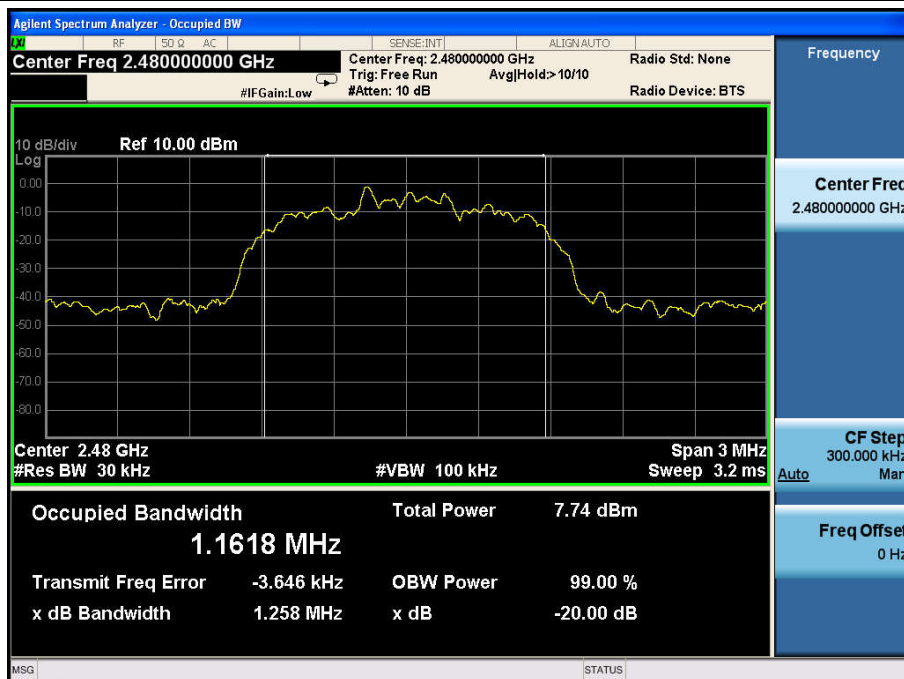
Frequency	20dB Bandwidth (MHz)	Limit	Result
2402 MHz	1.258	/	PASS
2441 MHz	1.259	/	PASS
2480 MHz	1.258	/	PASS



TX CH40



TX CH79



6. ANTENNA REQUIREMENT

6.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: 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.

6.2 EUT ANTENNA

The EUT antenna is Internal antenna 0dbi. It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.

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