



**BUREAU
VERITAS**

TEST REPORT No: (5215)132-1466

TEST REPORT

To:	NEW BRIGHT INDUSTRIAL CO., LTD.	To:	-
Attn:	Eric Kwok	Attn:	-
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Folder No.:	NBT-15MY099MTHS-B-B		

Factory name:	NEW BRIGHT INDUSTRIAL CO., LTD.
Location:	9/F., NEW BRIGHT BUILDING, 11 SHEUNG YUET ROAD, KOWLOON BAY, KOWLOON, HONG KONG.
Product:	TOY Transmitter & Receiver Model No.: GF21H2





Sample No:	HK150507/048
Test date:	May 20, 2015 to June 01, 2015
Test Requested:	FCC Part 15 - 2012
Test Method:	ANSI C63.4 - 2009
FCC ID:	G6DGF21H2

The results given in this report are related to the tested specimen of the described electrical apparatus.

CONCLUSION: The submitted sample was found to COMPLY with requirement of FCC Part 15 Subpart C.

Authorized Signature:

	
Reviewed by: Keith Yeung	Approved by: Steven Tsang
Date: June 09, 2015	Date: June 09, 2015

**BUREAU VERITAS HONG KONG LIMITED –
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This report is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. Our report is limited to the test samples identified herein. The results set forth in this report are not necessarily indicative or representative of the statistical quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof. You shall have thirty days from receipt of this report to request additional testing of the samples or to notify us of any errors or omissions relating to our report, provided, however, such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.



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Test Result Summary

EMISSION TEST			
Test requirement: FCC Part 15 - 2012			
Test Condition	Test Method	Test Result	
		Pass	Failed
Radiated Emission Test, 9kHz to 40GHz	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Frequency range of Fundamental Emission	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
26dB Bandwidth of Fundamental Emission	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Duty Cycle Correction During 100msec	ANSI C63.4	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Report Revision & Sample Re-submit History:

Sample first submission date: May 08, 2015
 Sample second submission date: May 29, 2015



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Location of the test laboratory

Radiated and Conducted emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009. An Open Area Test Site and Full Anechoic Chamber (FCC Listed Site, Registration No. 642151) are set up for investigation and located at :

BUREAU VERITAS HONG KONG LIMITED, EMC CENTRE

No. 2106-2107, 21/F., Westin Centre,
26 Hung To Road,
Kwun Tong, Kowloon,
Hong Kong

List of measuring equipment

Radiated Emission

EQUIPMENT	MANUFACTURER	MODEL NO.	SERIAL NO.	LAST CALIBRATION	CALIBRATION DUE
EMI TEST RECEIVER	R&S	ESCI	100379	21-JAN-2015	20-JAN-2016
SPECTRUM ANALYZER	R&S	R3127	111000909	26-MAR-2015	25-MAR-2016
LOOP ANTENNA	ETS LINDGREN	6502	00102266	28-SEP-2014	27-SEP-2015
BILOG ANTENNA	SCHAFFNER	CBL6112D	25229	02-JAN-2015	02-JAN-2016
HORN ANTENNA	SCHWARZBECK	BBHA9120D	9120D-692	27-DEC-2014	26-DEC-2015
OPEN AREA TEST SITE	BVCPS	N/A	N/A	07-JUL-2014	06-JUL-2015
ANECHOIC CHAMBER	ALBATROSS	M-CDC	80374004499B	05-FEB-2014	03-FEB-2016
COAXIAL CABLE	HUBER + SUHNER	RG223	N/A	23-DEC-2014	22-DEC-2015
COAXIAL CABLE	HUBER + SUHNER	RG214	N/A	23-DEC-2014	22-DEC-2015
Signal Analyzer 40GHz	Rohde & Schwarz	FSV 40	100977	13-MAY-2015	12-MAY-2016
Wideband Horn Antenna 18 to 40GHz	STEATITE	QWH-SL-18-40-K-SG	12688	02-SEP-2014	01-SEP-2015
High frequency RF cable	Rohde & Schwarz	N/A	N/A	15-SEP-2014	14-SEP-2015

Measurement Uncertainty

MEASUREMENT	FREQUENCY	UNCERTAINTY
Radiated emissions	9kHz to 30MHz	4.2dB
	30MHz to 1GHz	5.0dB
	1GHz to 18GHz	4.9dB
	18GHz to 40GHz	4.8dB

Remarks:-

N/A : Not Applicable or Not Available

The measurement instrumentation uncertainty would be taking into consideration on each of the test result

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Equipment Under Test [EUT]

Description of Sample:

Model Name: TOY Transmitter & Receiver
 Model Number: GF21H2
 Additional Model Name: --
 Additional Model Number: --
 Additional Model information: --
 Rating: 3Vd.c. ("AA" size battery x 2)

Description of EUT Operation:

The Equipment Under Test (EUT) is a **NEW BRIGHT INDUSTRIAL CO., LTD.** of Remote Control Transceiver. It is 2 sticks & 2 buttons transceiver and operating at 2410MHz to 2473MHz. The lowest, middle and highest frequencies were tested and the results are shown in the report. The EUT transmit while sticks are being pushed or pulled, Modulation by IC, and type is GFSK.

There are total 64 channels and below is the frequency list (MHz) :

ch.no	freq.	ch.no	freq.	ch.no	freq.	ch.no	freq.	ch.no	freq.	ch.no	freq.	ch.no	freq.
1	2410	11	2420	21	2430	31	2440	41	2450	51	2460	61	2470
2	2411	12	2421	22	2431	32	2441	42	2451	52	2461	62	2471
3	2412	13	2422	23	2432	33	2442	43	2452	53	2462	63	2472
4	2413	14	2423	24	2433	34	2443	44	2453	54	2463	64	2473
5	2414	15	2424	25	2434	35	2444	45	2454	55	2464		
6	2415	16	2425	26	2435	36	2445	46	2455	56	2465		
7	2416	17	2426	27	2436	37	2446	47	2456	57	2466		
8	2417	18	2427	28	2437	38	2447	48	2457	58	2467		
9	2418	19	2428	29	2438	39	2448	49	2458	59	2468		
10	2419	20	2429	30	2439	40	2449	50	2459	60	2469		

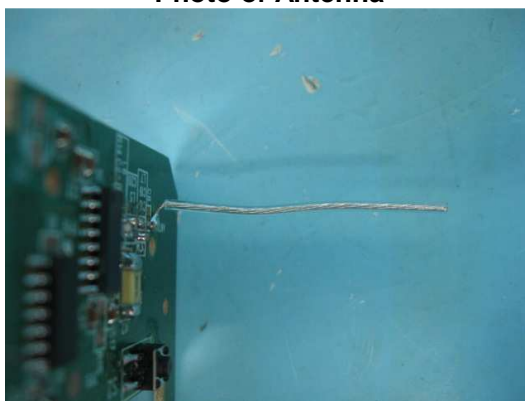
The transmitter has different control:

1. Left stick – control forward and backward
2. Left button – control for Start /Mute sound
3. Right stick – control leftward and rightward
4. Right button – press to issue sound

Antenna Requirement (Section 15.203)

The EUT is use of a permanently antenna. It is soldered on the PCB. The antenna consists of 3.5cm long wire The antenna is not replaceable or user serviceable. The requirements of S15.203 are met. There are no deviations or exceptions to the specifications.

Photo of Antenna



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Test Results

Radiated Emissions (Fundamental)

Test Requirement:	FCC Part 15 Section 15.249
Test Method:	ANSI C63.4
Test Date(s):	2015-06-01
Temperature:	25.0 °C
Humidity:	80.0 %
Atmospheric Pressure:	100.6 kPa
Mode of Operation:	Transmission mode
Tested Voltage:	3Vd.c. ("AA" size battery x 2)

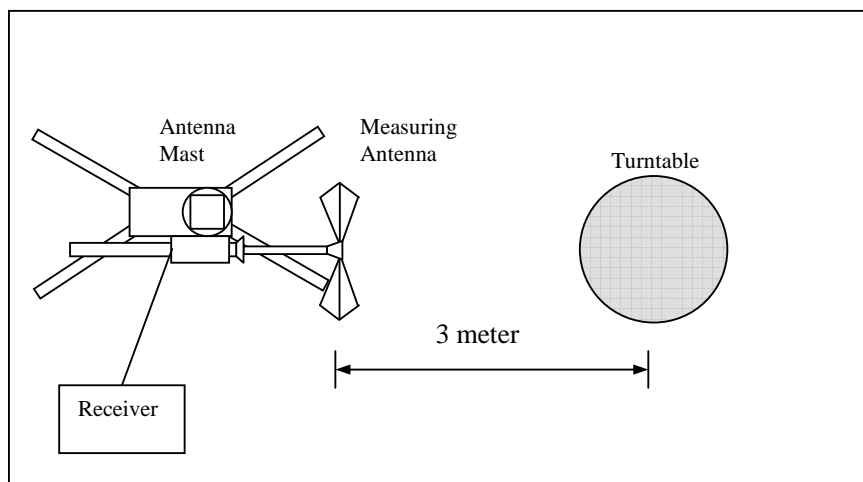
Test Procedure:

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009.

The equipment under test (EUT) was placed on a non-conductive turntable with dimensions of 1.5m x 1m and 0.8m high above the ground. 3m from the EUT, a broadband antenna mounting on the mast received the signal strength. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level. The antenna was then moving along the mast from 1m up to 4m until no more higher value was found. Both horizontal and vertical polarization of the antenna were placed and investigated.

Location: The Roof, Westin Centre, 26 Hung To Road, Kwun Tong, Kowloon, Hong Kong

Test Setup: Open Area Test Site





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Limits for Field Strength of Fundamental Emissions [FCC 47CFR 15.249]:

Frequency Range of Fundamental [MHz]	Field Strength of Fundamental Emission (Average) [mV/m]	Field Strength of Harmonics Emission (Average) [μV/m]
2400-2483.5	50	500

Measurement Data

Test Result of (Transmission mode, Lowest frequency): PASS

Frequency (MHz)	Polarity (H/V)	Antenna Factor & Cable Loss (dB/m)	Duty-cycle correction (dB)	Field Strength at 3m – Peak (dBμV/m)	Limit at 3m – Peak (dBμV/m)	Margin - Peak (dB)	Field Strength at 3m – Average (dBμV/m)	Limit at 3m – Average (dBμV/m)	Margin - Average (dB)
2410.11	H	0.0	-14.1	78.2	114.0	-35.8	**64.1	94.0	-29.9
2410.11	V	0.0	-14.1	80.0	114.0	-34.0	**65.9	94.0	-28.1

Test Result of (Transmission mode, Middle frequency): PASS

Frequency (MHz)	Polarity (H/V)	Antenna Factor & Cable Loss (dB/m)	Duty-cycle correction (dB)	Field Strength at 3m – Peak (dBμV/m)	Limit at 3m – Peak (dBμV/m)	Margin - Peak (dB)	Field Strength at 3m – Average (dBμV/m)	Limit at 3m – Average (dBμV/m)	Margin - Average (dB)
2442.11	H	0.0	-14.1	79.4	114.0	-34.6	**65.3	94.0	-28.7
2442.11	V	0.0	-14.1	79.0	114.0	-35.0	**64.9	94.0	-29.1

Test Result of (Transmission mode, Highest frequency): PASS

Frequency (MHz)	Polarity (H/V)	Antenna Factor & Cable Loss (dB/m)	Duty-cycle correction (dB)	Field Strength at 3m – Peak (dBμV/m)	Limit at 3m – Peak (dBμV/m)	Margin - Peak (dB)	Field Strength at 3m – Average (dBμV/m)	Limit at 3m – Average (dBμV/m)	Margin - Average (dB)
2473.11	H	0.0	-14.1	78.1	114.0	-35.9	**64.0	94.0	-30.0
2473.11	V	0.0	-14.1	79.2	114.0	-34.8	**65.1	94.0	-28.9

For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

**Duty Cycle Correction = $20\log(0.195) = -14.1\text{dB}$.

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz
VBW = 1MHz



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Radiated Emissions (Spurious Emission)

Test Requirement: FCC Part 15 Section 15.249
 Test Method: ANSI C63.4
 Test Date(s): 2015-06-01
 Temperature: 25.0 °C
 Humidity: 80.0 %
 Atmospheric Pressure: 100.6 kPa
 Mode of Operation: Transmission mode
 Tested Voltage: 3Vd.c. ("AA" size battery x 2)

Measurement Data

Test Result of (Transmission mode, Lowest frequency): PASS

Frequency (MHz)	Polarity (H/V)	Antenna Factor & Cable Loss (dB/m)	Duty-cycle correction (dB)	Field Strength at 3m – Peak (dBμV/m)	Limit at 3m – Peak (dBμV/m)	Margin - Peak (dB)	Field Strength at 3m – Average (dBμV/m)	Limit at 3m – Average (dBμV/m)	Margin - Average (dB)
4820.22	H	5.9	-14.1	64.0	74.0	-10.0	**49.9	54.0	-4.1
7230.33	H	12.7	-14.1	49.2	74.0	-24.8	**35.1	54.0	-18.9
9640.44	H	16.4	-14.1	50.3	74.0	-23.7	**36.2	54.0	-17.8
12050.55	H	18.4	-14.1	52.8	74.0	-21.2	**38.7	54.0	-15.3
14460.66	H	23.2	-14.1	60.1	74.0	-13.9	**46.0	54.0	-8.0
16870.77	H	22.0	-14.1	61.5	74.0	-12.5	**47.4	54.0	-6.6
19280.88	H	46.3	-14.1	61.6	74.0	-12.4	**47.5	54.0	-6.5
21690.99	H	47.1	-14.1	62.2	74.0	-11.8	**48.1	54.0	-5.9
24101.10	H	47.5	-14.1	62.4	74.0	-11.6	**48.3	54.0	-5.7
26511.21	H	48.5	-14.1	62.8	74.0	-11.2	**48.7	54.0	-5.3

For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

**Duty Cycle Correction = $20\text{Log}(0.195) = -14.1\text{dB}$.

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz
VBW = 1MHz



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Measurement Data

Test Result of (Transmission mode, Lowest frequency): PASS

Frequency (MHz)	Polarity (H/V)	Antenna Factor & Cable Loss (dB/m)	Duty-cycle correction (dB)	Field Strength at 3m – Peak (dB μ V/m)	Limit at 3m – Peak (dB μ V/m)	Margin - Peak (dB)	Field Strength at 3m – Average (dB μ V/m)	Limit at 3m – Average (dB μ V/m)	Margin - Average (dB)
4820.22	V	5.9	-14.1	58.1	74.0	-15.9	**44.0	54.0	-10.0
7230.33	V	12.7	-14.1	49.4	74.0	-24.6	**35.3	54.0	-18.7
9640.44	V	16.4	-14.1	51.0	74.0	-23.0	**36.9	54.0	-17.1
12050.55	V	18.4	-14.1	53.7	74.0	-20.3	**39.6	54.0	-14.4
14460.66	V	23.2	-14.1	60.7	74.0	-13.3	**46.6	54.0	-7.4
16870.77	V	22.0	-14.1	62.2	74.0	-11.8	**48.1	54.0	-5.9
19280.88	V	46.3	-14.1	62.0	74.0	-12.0	**47.9	54.0	-6.1
21690.99	V	47.1	-14.1	62.1	74.0	-11.9	**48.0	54.0	-6.0
24101.10	V	47.5	-14.1	62.5	74.0	-11.5	**48.4	54.0	-5.6
26511.21	V	48.5	-14.1	62.6	74.0	-11.4	**48.5	54.0	-5.5

For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

**Duty Cycle Correction = $20\text{Log}(0.195) = -14.1\text{dB}$.

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz
VBW = 1MHz



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Measurement Data

Test Result of (Transmission mode, Middle frequency): PASS

Table with 10 columns: Frequency (MHz), Polarity (H/V), Antenna Factor & Cable Loss (dB/m), Duty-cycle correction (dB), Field Strength at 3m - Peak (dBµV/m), Limit at 3m - Peak (dBµV/m), Margin - Peak (dB), Field Strength at 3m - Average (dBµV/m), Limit at 3m - Average (dBµV/m), Margin - Average (dB). Rows include frequencies from 4884.22 to 26863.21 MHz.

Table with 10 columns: Frequency (MHz), Polarity (H/V), Antenna Factor & Cable Loss (dB/m), Duty-cycle correction (dB), Field Strength at 3m - Peak (dBµV/m), Limit at 3m - Peak (dBµV/m), Margin - Peak (dB), Field Strength at 3m - Average (dBµV/m), Limit at 3m - Average (dBµV/m), Margin - Average (dB). Rows include frequencies from 4884.22 to 26863.21 MHz with vertical polarity.

For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

**Duty Cycle Correction = 20Log(0.195) = -14.1dB.

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz, VBW = 1MHz



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Measurement Data

Test Result of (Transmission mode, Highest frequency): PASS

Table with 10 columns: Frequency (MHz), Polarity (H/V), Antenna Factor & Cable Loss (dB/m), Duty-cycle correction (dB), Field Strength at 3m - Peak (dBµV/m), Limit at 3m - Peak (dBµV/m), Margin - Peak (dB), Field Strength at 3m - Average (dBµV/m), Limit at 3m - Average (dBµV/m), Margin - Average (dB). Rows include frequencies from 4946.22 to 27204.21 MHz.

Table with 10 columns: Frequency (MHz), Polarity (H/V), Antenna Factor & Cable Loss (dB/m), Duty-cycle correction (dB), Field Strength at 3m - Peak (dBµV/m), Limit at 3m - Peak (dBµV/m), Margin - Peak (dB), Field Strength at 3m - Average (dBµV/m), Limit at 3m - Average (dBµV/m), Margin - Average (dB). Rows include frequencies from 4946.22 to 27204.21 MHz.

For pulse modulated devices and using measuring equipment employing a peak detection mode, properly adjusted for such factor as pulse desensitisation.

**Duty Cycle Correction = 20Log(0.195) = -14.1dB.

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 1MHz
VBW = 1MHz



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Radiated Emissions (9kHz – 40GHz)

Test Requirement: FCC Part 15 Section 15.209
 Test Method: ANSI C63.4
 Test Date(s): 2015-05-20
 Temperature: 26.0 °C
 Humidity: 81.0 %
 Atmospheric Pressure: 100.7 kPa
 Mode of Operation: On mode
 Tested Voltage: 3Vd.c. ("AA" size battery x 2)

Limits for Radiated Emissions [FCC 47 CFR 15.209]:

Frequency Range [MHz]	Quasi-Peak Limits [$\mu\text{V}/\text{m}$]	Measurement Distance m
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above960	500	3

Measurement Data

Test Result of (On mode): PASS

Detection mode: Quasi-Peak

Frequency	Polarity (H/V)	Field Strength	Limit	Margin (dB)
Emissions detected are more than 20 dB below the limit line(s) in 9kHz to 30MHz				

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 200Hz
 VBW = 200Hz



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Measurement Data

Test Result of (On mode): PASS

Detection mode: Quasi-Peak

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
47.20	H	24.5	40.0	-15.5
76.88	H	20.3	40.0	-19.7
137.48	H	23.6	43.5	-19.9
239.12	H	23.9	46.0	-22.1
387.64	H	27.2	46.0	-18.8
459.96	H	28.1	46.0	-17.9

Frequency (MHz)	Polarity (H/V)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)
47.20	V	24.7	40.0	-15.3
76.88	V	20.1	40.0	-19.9
137.48	V	23.8	43.5	-19.7
239.12	V	24.2	46.0	-21.8
387.64	V	27.0	46.0	-19.0
459.96	V	27.7	46.0	-18.3

Note: Field Strength includes Antenna Factor and Cable Loss.

Receiver setting: RBW = 120KHz
 VBW = 120KHz



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Frequency range of Fundamental Emission

Test Requirement: FCC 47 CFR 15.249
Test Method: ANSI C63.4:2009 (Section 13.1.7)
Test Date(s): 2015-05-20
Temperature: 26.0 °C
Humidity: 81.0 %
Atmospheric Pressure: 100.7 kPa
Mode of Operation: Transmission mode
Tested Voltage: 3Vd.c. ("AA" size battery x 2)

Test Method:

The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency. Once the reference level is established, the equipment is conditioned with typical modulating signal to produce the worst-case (i.e. the widest) bandwidth.

Limits for Frequency range of Fundamental Emission:

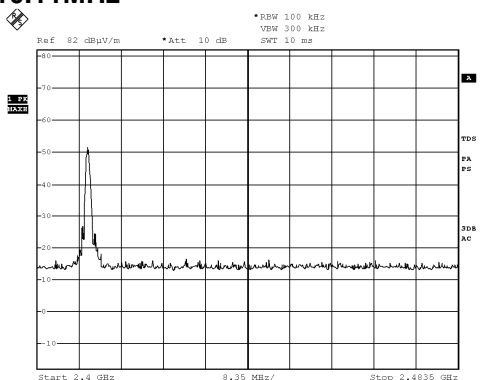
Frequency [MHz]	FCC Limits [MHz]
2409.410 – 2473.810	2400.00 – 2483.50

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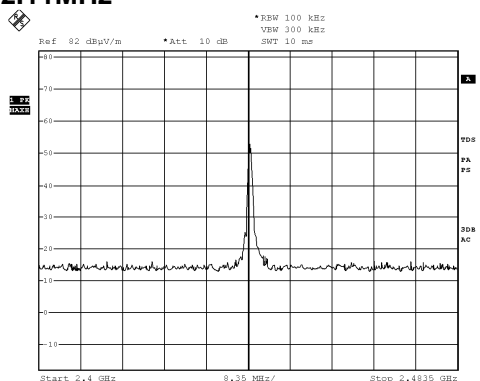
Measurement Data :

Test Result of Frequency Range of Fundamental Emission: PASS

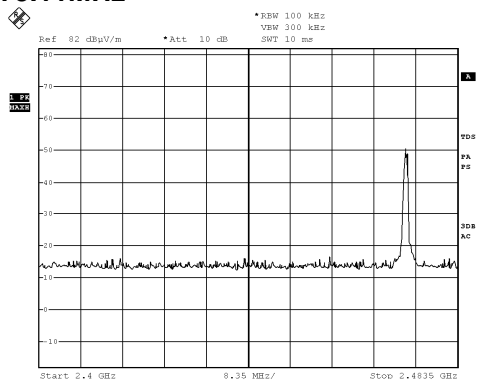
Lowest Frequency – 2410.11MHz



Middle Frequency – 2442.11MHz



Highest Frequency – 2473.11MHz



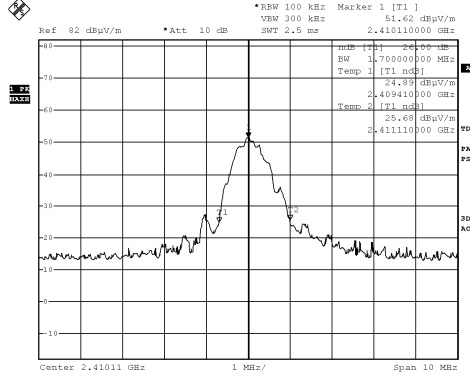


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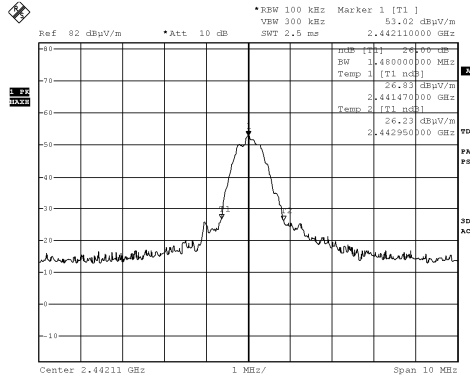
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Measurement Data :

Test Result of 26dB Bandwidth of Fundamental Emission: PASS

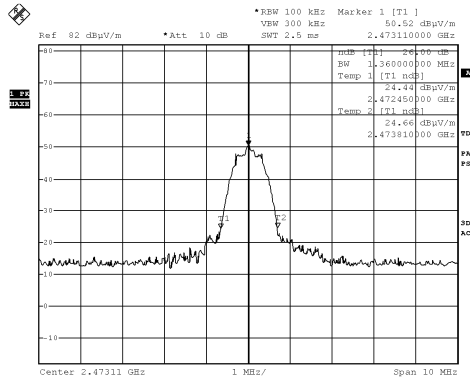
Lowest Frequency – 2410.11MHz



Middle Frequency – 2442.11MHz



Highest Frequency – 2473.11MHz





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Duty Cycle Correction During 100msec:

Each function key sends a different series of characters, but each packet period (100msec) never exceeds a series of 39 pulses (0.5 msec). Assuming any combination of short and long pulses maybe obtained due to encoding the worst case transmit duty cycle would be considered 39×0.5 per 100msec = 19.5% duty cycle.

Remarks:

Duty Cycle Correction = $20\text{Log}(0.195) = -14.1\text{dB}$

The following figures [Figure A] show the characteristics of the pulse train for one of these functions.

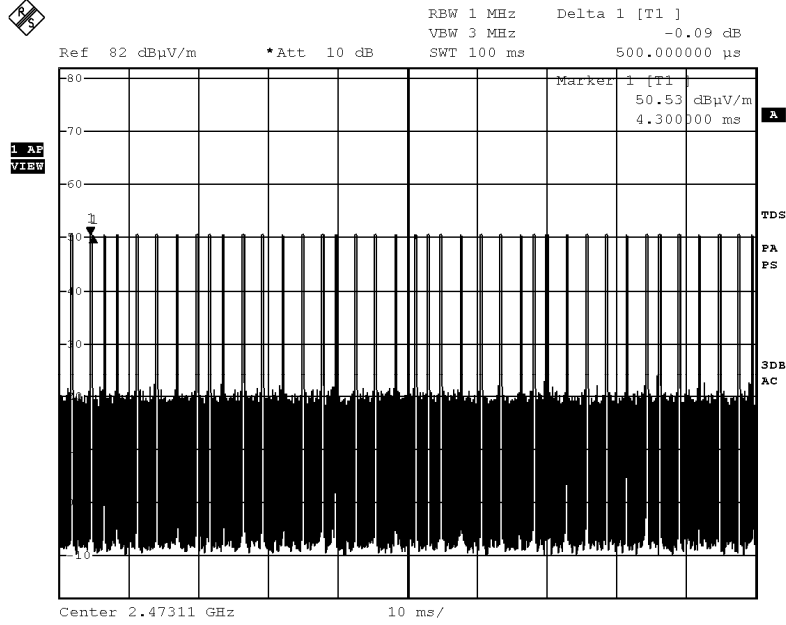


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Measurement Data :

Figure A [Pulse Train]



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Photographs of EUT

Front View of the product



Rear View of the product



Top View of the product



Bottom View of the product



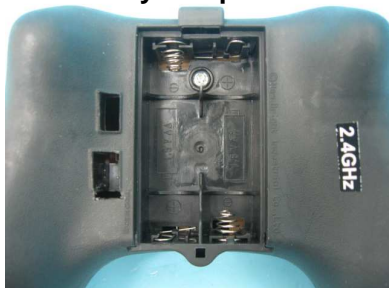
Side View of the product



Side View of the product



Battery compartment



Battery Cover



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Photographs of EUT

Internal View of the product



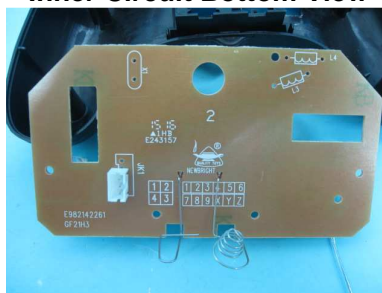
Internal View of the product



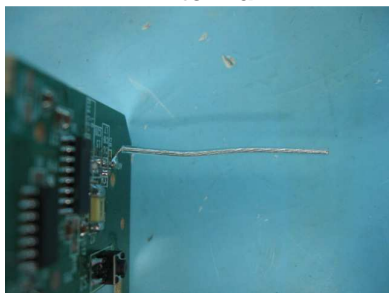
Inner Circuit Top View



Inner Circuit Bottom View



Antenna



TEST REPORT No: (5215)132-1466

Measurement of Radiated Emission Test Set Up



******* End of Report *******