



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0033976(6) Date : 04 Jul 2018

Application No. : LW016703(6)

Client : Kidztech Toys Manufacturing Limited
Room 1201, 12/F., Inter-Continental Plaza,
94 Granville Road, Tsim Sha Tsui East,
Kowloon, Hong Kong

Sample Description : One(1) item of submitted sample stated to be:

Sample Description	Model No.
1/24 R/C Jet Panther	84063, 84521

Radio Frequency : 2410 – 2475MHz

Rating : 2 x 1.5V AA size batteries

No. of submitted sample : Two (2) set (s)

Sample registration No. : RW017909-001, RW017909-002

Date Received : 04 Jun 2018.

Test Period : 06 Jun 2018 to 20 Jun 2018

Test Requested : FCC 47CFR Part 15 Certification

Test Method : 47 CFR Part 15 (10-1-17 Edition)
ANSI C63.10 – 2013
ANSI C63.4 – 2014

Test Result : See attached sheet(s) from page 2 to 18.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C, section 15.249.

Remark : All two models are the same in circuitry and components and construction, and therefore model 84063 was chosen to be the representative of the test sample. The difference(s) between the tested model and the declared model(s) is/are matching different Receiver (Car with non-conductive outer casing).

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

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1 General Information

1.1 General Description

The 12MHz crystal oscillator drives the base of IC final amplifier. The modulation provided by IC u1. The output of U1 has the matching network consisting C1, C2, R1, L1 that limit the harmonic content and effect the proper coupling of the antenna to the output stage.

Antenna, Ground and Power Source

The antenna consists of an Internal wired integral antenna. There is no external ground connection. The ground is only that of the printed circuit board. Electric current is supplied by a 4.5 Volt ("1.5v" AAA size battery x 3) primary battery

Operation Descriptions

The Equipment Under Test (EUT) is a portable 2.4GHz Transmitter (Receiver function is disable), The transmitter is a remote control system. The transmission signal is frequency hopping with channel frequency range 2410.0.-2475.0MHz during normal use. Channel spacing 1MHz, total 66 channels. The EUT was set to fixed frequency test mode by application. The EUT is powered by 2 x 1.5V AAA batteries, After switching on the EUT, the car can be controlled to move forward, backward, turning left/right direction.

Channel Selection:

A. Transmitter (Remote Control): IC will be written serial code when the main ic is programming. After the code is generated, it is permanent, fixed and do not repeated. The code will calculate 3 groups of number. The first group is from 10 to 30. The second group is from 31 to 56. The third code is from 57 to 75. After success the pairing, it will be changed the channel every 10ms.

B. Receiver (Toy car): After success the pairing, it based on the code from transmitter to have next channel. The calculation is same as transmitter. If it does not receive incorrect signal within 50ms, it will change other channel.

Pairing:

A. Transmitter (Remote Control): It will be randomly generated one channel from 31 to 56 for pairing.

B. Receiver (Toy car): it will scan the signal from 31 to 56. While receiving the correct signal, it matches the code to compare with toy car. If the toy car does not have this code, it stores in the toy car memory. After pairing successful, receiver will change normal receiving mode and the transmitter is changed to the normal hopping mode itself within the specified time.

Remarks: The transmitter is Two joystick transmitter. The EUT continues to transmit while Power on. Modulation by IC; and type is GFSK (FHSS - Frequency Hopping Spread Spectrum) modulation.

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1.2 Location of the test site

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2014. A Semi-Anechoic Chamber Testing Site is set up for investigation and located at:

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
Hong Kong.

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.4 – 2014. A shielded room is located at :

Ground Floor, Yan Hing Centre,
9 – 13 Wong Chuk Yeung Street,
Fo Tan, Shatin,
New Territories,
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FCC Accredited Lab (Designation Number: HK0004)



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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	Rohde & Schwarz	ESCS30	100001	01 Feb 2019	1Year
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	07 Dec 2018	1Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100964	08 Feb 2019	1Year
Broadband Antenna	Schaffner	CBL6112B	2692	28 Mar 2020	2Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2020	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	21 Dec 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2018	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2018	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2018	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	17 May 2019	1Year
Coaxial Cable	Suhner	RG 214/U	N/A	17 May 2019	1Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	21 Dec 2018	1Year
LISN	Rohde & Schwarz	ENV216	101323	16 Jan 2019	1Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	24 Oct 2018	1Year



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1.4 Measurement Uncertainty

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor $k=2$, providing a level of confidence of approximately 95%.

Radiated emissions

Frequency	Uncertainty (U_{lab})
30MHz ~ 200MHz (Horizontal)	4.59dB
30MHz ~ 200MHz (Vertical)	4.49dB
200MHz ~ 1000MHz (Horizontal)	4.94dB
200MHz ~ 1000MHz (Vertical)	4.97dB
1GHz ~ 6GHz	4.52dB

1.5 Test Summary

TEST ITEM	FCC REFERENCE	RESULT
Fundamental and harmonic emission	15.249(a)	Comply
Out-band emission	15.249(d)	Comply
Peak Limit	15.249(e)	Comply
Bandwidth	15.215(c)	Comply



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2 Description of the radiated emission test

2.1 Test Procedure

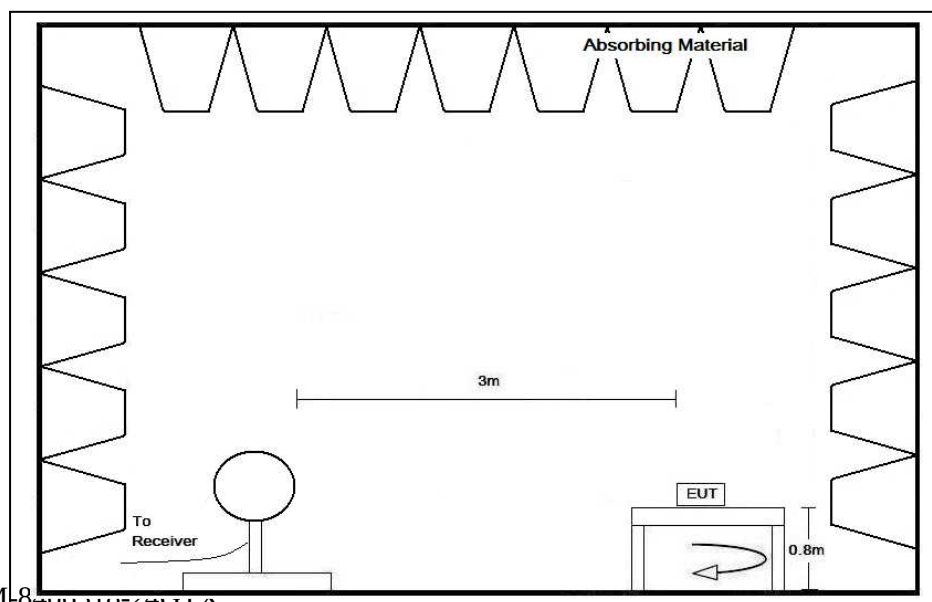
Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.10 – 2013.

A non-conductive turntable with dimensions of 1.5m x 0.4m x 0.8m (L x W x H) placed above the reference ground plane. The equipment under test (EUT) was placed at 0.8m height for below 1GHz measurement and 1.5m height for above 1GHz measurement. The test distance is 3m between EUT and receiving antenna. A broadband antenna mounting on the mast received the signal strength. The turntable was rotated to maximize the emission level. The antenna was 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. Additional absorbing material will be placed between the EUT and receiving antenna for above 1GHz measurement.

For below 30MHz, a loop antenna with its vertical plane is placed 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1 m above the ground.

The device was rotated through three orthogonal axes to determine which attitude and configuration produce the highest emission during measurement.

2.2 Test Setup



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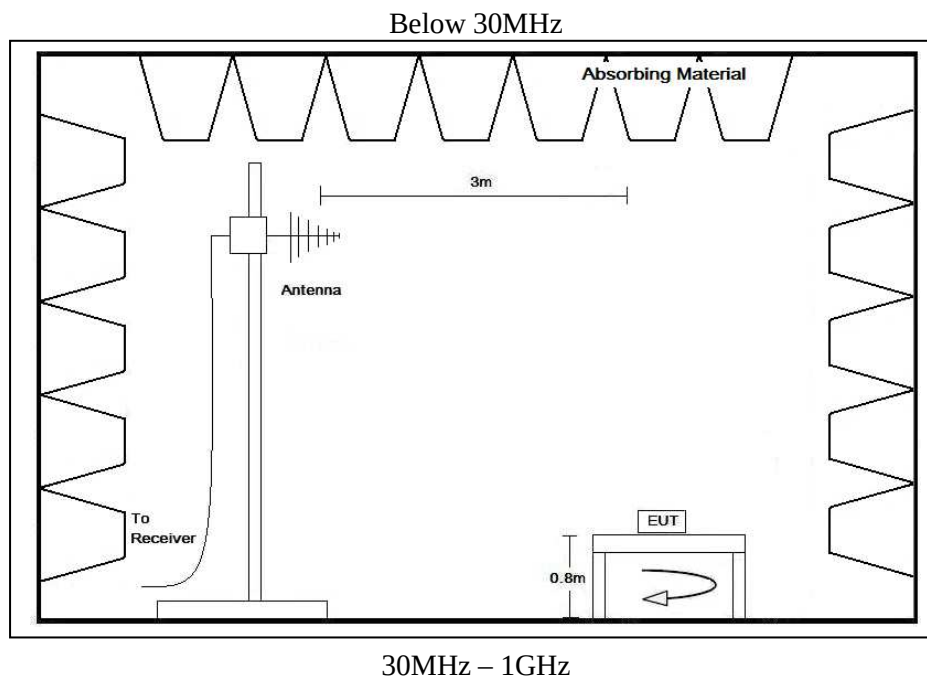
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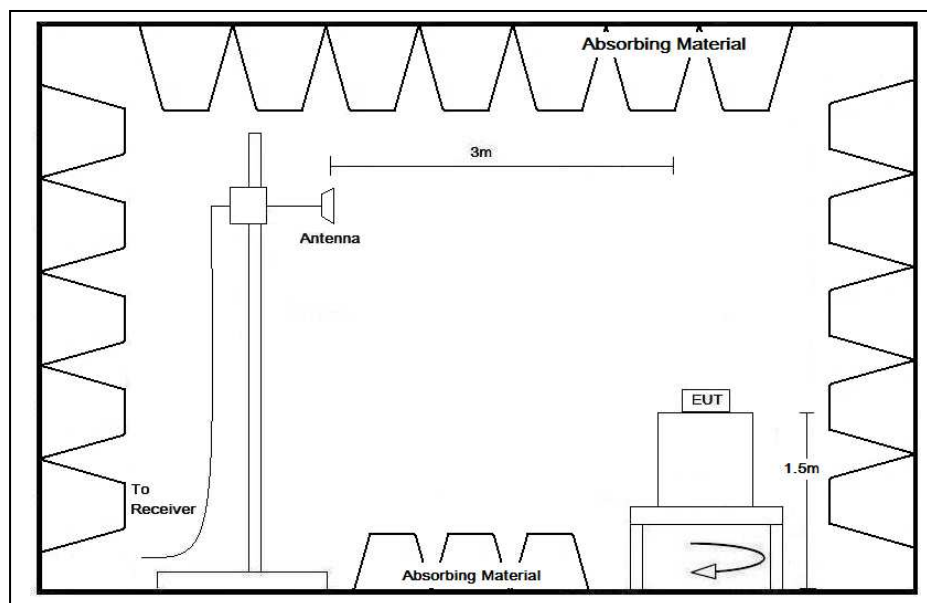
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2.2 Test Setup



Above 1GHz

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2.3 Test Result

Peak Detector data was measured unless otherwise stated.

The radiated emissions are measured from 9kHz to 26GHz (the tenth harmonics)

The worst case configuration is shown on the worst case configuration of test setup photo.

“#” means emissions appearing within the restricted bands of 47 CFR Part 15 section 15.205.

The frequencies from fundamental up to tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next pages.

The EUT has been tested in Transmission mode.

It was found that the EUT meet the FCC requirement.



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2.4 Radiated Emission Measurement Data

Radiated emission

Environmental conditions:

Parameter	Recorded value	
Ambient temperature:	24.5	° C
Relative humidity:	69.2	%

Channel: 2410MHz

Polarization	Frequency (MHz)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Detector Type
V	2410.232	99.1	-4.7	94.4	114.0	-19.6	Peak
V	2409.910	79.8	-4.7	75.1	94.0	-18.9	Average
H	2410.296	101.3	-4.7	96.6	114.0	-17.4	Peak
H	2409.910	82.0	-4.7	77.3	94.0	-16.7	Average
H	2400.000	59.2	-4.7	54.5	74.0	-19.5	Peak
H	2400.000	26.2	-4.7	21.5	54.0	-32.5	Average
V	4819.450	52.6	2.3	54.9	74.0	-19.1	Peak
V	4820.130	26.9	2.3	29.2	54.0	-24.8	Average
H	7230.770	49.7	9.6	59.3	74.0	-14.7	Peak
H	9641.370 ¹	29.6	12.7	42.3	54.0	-11.7	Peak

Remark: 1) The peak value of emission 9641.370MHz is below the average limit, so no average measurement is performed.



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Channel: 2440 MHz

Polarization	Frequency (MHz)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Detector Type
H	2439.702	100.7	-4.7	96.0	114.0	-18.0	Peak
H	2440.020	81.1	-4.7	76.4	94.0	-17.6	Average
V	2440.758	99.5	-4.7	94.8	114.0	-19.2	Peak
V	2440.090	80.0	-4.7	75.3	94.0	-18.7	Average
H	4879.440	52.2	2.3	54.5	74.0	-19.5	Peak
H	4879.840	26.2	2.3	28.5	54.0	-25.5	Average
V	7320.770	51.6	9.6	61.2	74.0	-12.8	Peak
V	7319.310	24.6	9.6	34.2	54.0	-19.8	Average
V	9756.222 ¹	34.1	12.7	46.8	54.0	-27.2	Peak

Remark: 1) The peak value of emission 9756.222MHz is below the average limit, so no average measurement is performed.



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Polarization	Frequency (MHz)	Reading at 3m (dBμV)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dBμV/m)	Limit at 3m (dBμV/m)	Margin (dB)	Detector Type
V	2475.344	100.4	-4.7	95.7	114.0	-18.3	Peak
V	2475.090	80.9	-4.7	76.2	94.0	-17.8	Average
H	2475.278	100.0	-4.7	95.3	114.0	-18.7	Peak
H	2474.760	80.4	-4.7	75.7	94.0	-18.3	Average
V	2483.500	53.2	-4.7	48.5	74.0	-25.5	Peak
H	4950.530	53.4	2.8	56.2	74.0	-17.8	Peak
H	4950.050	26.4	2.8	29.2	54.0	-24.8	Average
V	7425.810	52.5	9.6	62.1	74.0	-11.9	Peak
V	7424.770	25.0	9.6	34.6	54.0	-19.4	Average
V	9899.300 ¹	32.9	12.7	45.6	54.0	-8.4	Peak

Remark: 1) The peak value of emission 9899.300MHz is below the average limit, so no average measurement is performed.



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3 Description of the Line-conducted Test

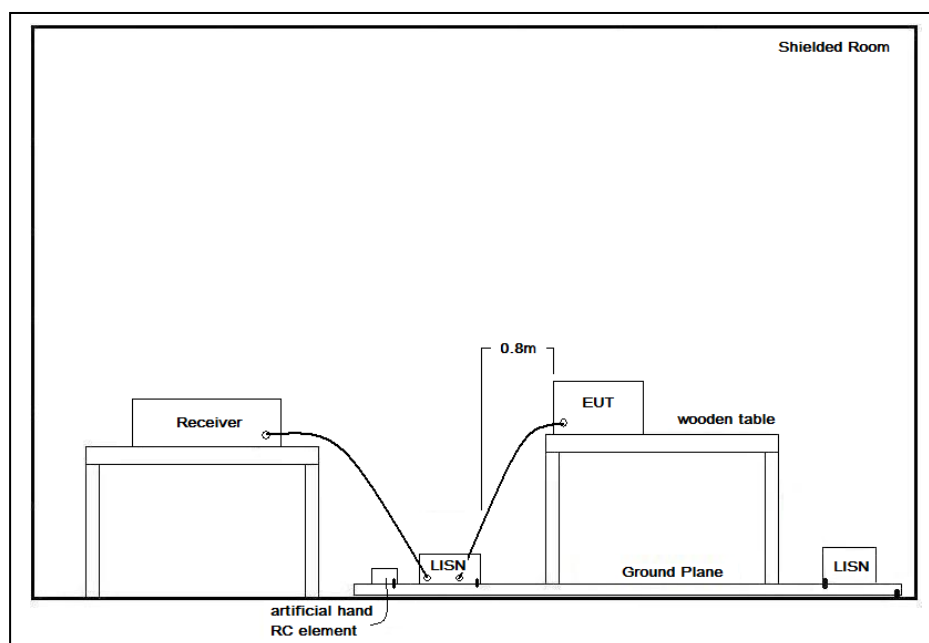
3.1 Test Procedure

Conducted emissions measurements are investigated and also taken pursuant to the procedures of ANSI C63.10 – 2013. The EUT was setup as described in the procedures, and both lines were measured.

3.2 Test Result

No measurement is required as the EUT is a battery-operated product.

3.3 Test Setup



3.4 Graph and Table of Conducted Emission Measurement Data

Not Applicable



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4 Supplementary document

The following document were submitted by applicant, and for electronic filing, the document are saved with the following filenames:

Document	Filename
ID Label/Location	Label Artwork and Location.pdf
Block Diagram	Block Diagram.pdf
Schematic Diagram	Schematic.pdf
Users Manual	User Manual.pdf
Operational Description	Operation Description.pdf

4.1 Bandwidth

Appendices A1 shows the fundamental emission is confined in the specified band. 20dB bandwidth is 2.88MHz which fall in the band of 2400 – 2483.5MHz. It also shows that the EUT met the requirement of FCC Part 15.215(c).



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5 Appendices

A1. 20dB Bandwidth Plot

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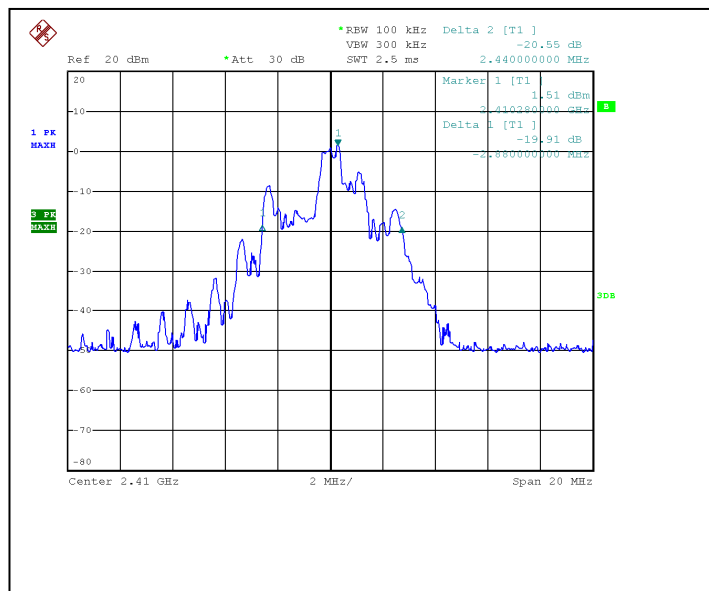
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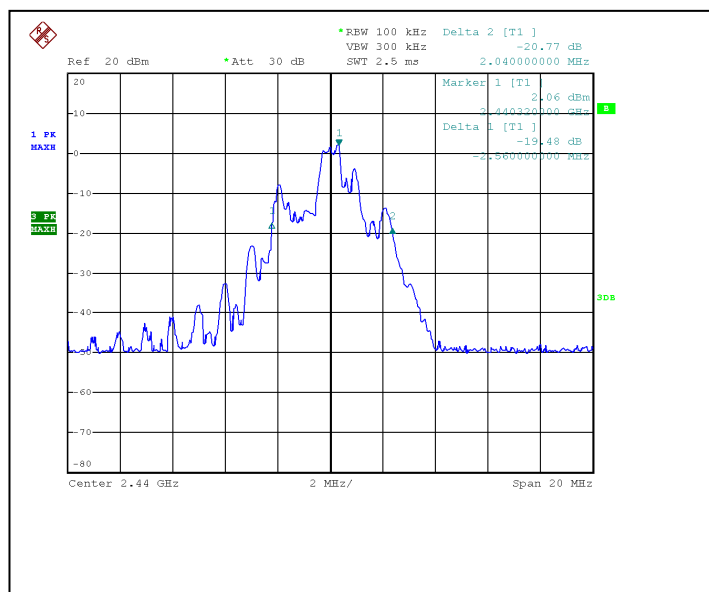
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A1. 20dB Bandwidth Plot



Channel: 2410MHz



Channel: 2440MHz



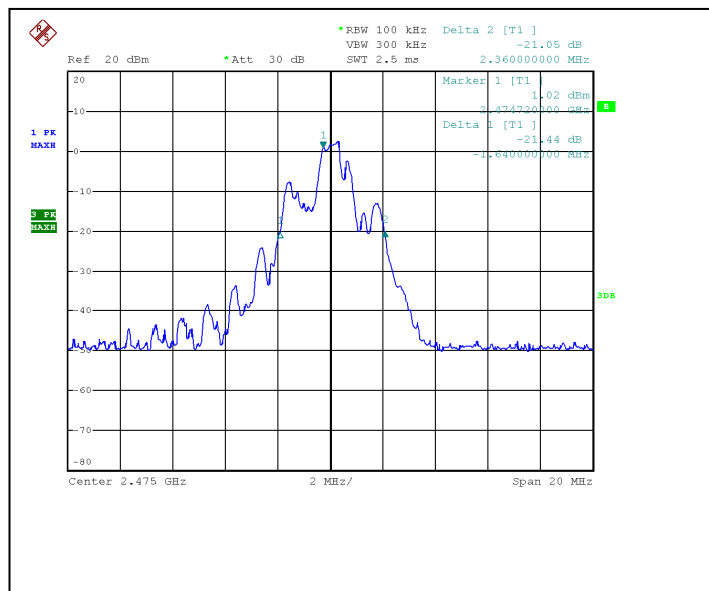
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Channel: 2475MHz

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