



CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No. : AW0024722(6) Date : May 11, 2018

Application No. : LW011807(6)

Applicant : Toy Shock International Limited
Unit 302-303, 3/F, Tower B,
New Mandarin Plaza, 14 Science Museum Road,
Tsim Sha Tsui East, Kowloon,
Hong Kong

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

Sample Description	Model No.
Motocross Bike – Red	500000B and 500000BT
Motocross Bike – Green	500000C and 500000AT

Radio Frequency : 2408 – 2467MHz
Rating : 1 x 9V battery
No. of submitted sample : Two (2) piece (s)
Sample registration No. : RW014162-001

Date Received : April 24, 2018

Test Period : April 24, 2018 – May 10, 2018

Test Requested : FCC 47CFR Part 15 Certification
ISED Certification for License-exempt Device

Test Method : 47 CFR Part 15 (10-1-17 Edition)
ANSI C63.10 – 2013
ANSI C63.4 – 2014
RSS-210 Issue 9
RSS-Gen Issue 4

Test Result : See attached sheet(s) from page 2 to 20.

Conclusion : The submitted sample was found to comply with requirement of FCC 47CFR Part 15 Subpart C, section 15.249 and ISED Canada Radio Standard Specification RSS-210 Issue 9, Annex B.10.

For and on behalf of
CMA Industrial Development Foundation Limited

Authorized Signature : _____

Mr. WONG Lap-pong, Andrew
Manager
Electrical Division

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FCC ID: 2AHUVNQT0002
IC: 22157-NQT0002

CMA Industrial Development Foundation Limited

Room 1302, Yan Hing Centre, 9-13 Wong Chuk Yeung St., Fo Tan, Shatin, N.T., Hong Kong.

Tel: (852) 2698 8198 Fax: (852) 2695 4177 E-mail: info@cmatcl.com Web Site: http://www.cmatcl.com



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1 General Information

1.1 General Description

The equipment under test (EUT) model 500000C is a remote control of the remote controlled motorbike. It operates at frequency band 2408 - 2467MHz for transmitter. The oscillation of radio control is generated by a 12 MHz crystal for RF IC, TXRX2i. The EUT is powered by one 9V battery. The EUT contains two control levers to control moving direction and a ON/OFF switch.

The equipment has four models, two for US market and two for Canada market. The difference is listed in below:

Model:	500000B	500000C	500000BT	500000AT
Import Market	US	US	Canada	Canada
Difference	Only receiver in Red color	Only receiver in Green color	Only receiver in Red color	Only receiver in Green color

Other than above difference mentioned, all electrical aspects are identical for four model.

The wire antenna is used in EUT and the radio output power is unable to adjust.

The brief circuit description is listed as follows:

- U1 and its associated circuit act as RF IC, TXRX2i
- L,R,F,B, SW1 and its associated circuit act as control lever and switch
- L1,C6,C5 and its associated circuit act as matching network



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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,
Hong Kong.

FCC Accredited Lab (Designation Number: HK0004)
ISED Wireless Test Site (ISED Assigned Code: 4093A)



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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	1 Year
EMI Test Receiver	Rohde & Schwarz	ESCI	100152	07 Dec 2018	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV40	100964	08 Feb 2019	1 Year
Broadband Antenna	Schaffner	CBL6112B	2692	28 Mar 2020	2 Years
Loop Antenna	EMCO	6502	00056620	25 Jan 2020	2 Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	21 Dec 2018	2 Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	21 Dec 2018	2 Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	02 Aug 2018	2 Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	02 Aug 2018	2 Years
Coaxial Cable	Schaffner	RG 213/U	N/A	18 May 2018	1 Year
Coaxial Cable	Suhner	RG 214/U	N/A	18 May 2018	1 Year
Coaxial Cable	Suhner	Sucoflex_104	N/A	21 Dec 2018	1 Year
LISN	Rohde & Schwarz	ENV216	101323	16 Jan 2019	1 Year
Coaxial Cable	Tyco Electronics	RG 58C/U	N/A	24 Oct 2018	1 Year



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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 REFERANCE	RSS REFERENCE	RESULT
Fundamental and harmonic emission	15.249(a)	RSS-210, Annex B.10(a)	Comply
Out-band emission	15.249(d)	RSS-210, Annex B.10(6)	Comply
Peak Limit	15.249(e)	RSS-Gen, 8.1	Comply
Bandwidth	15.215(c)	RSS-Gen, 6.7	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.



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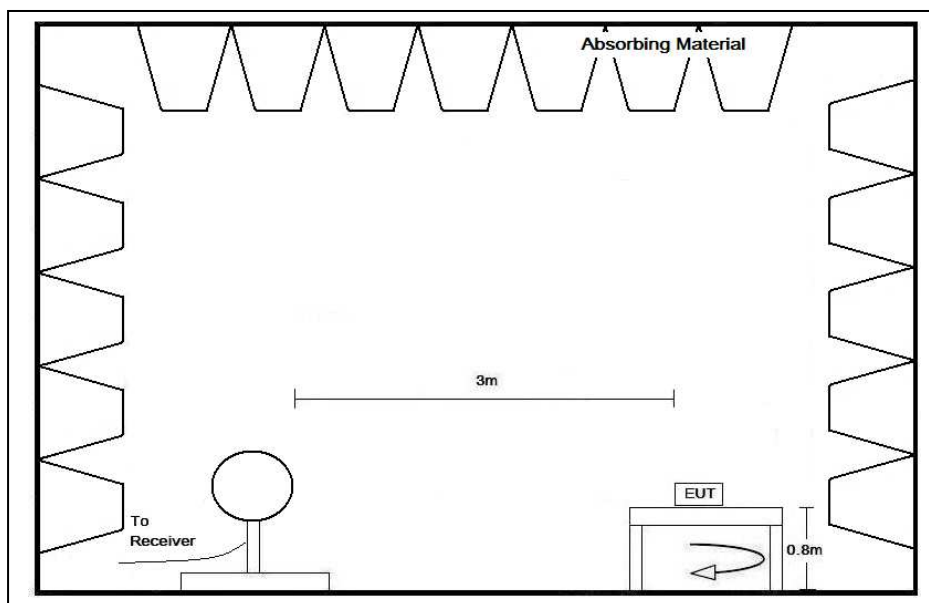
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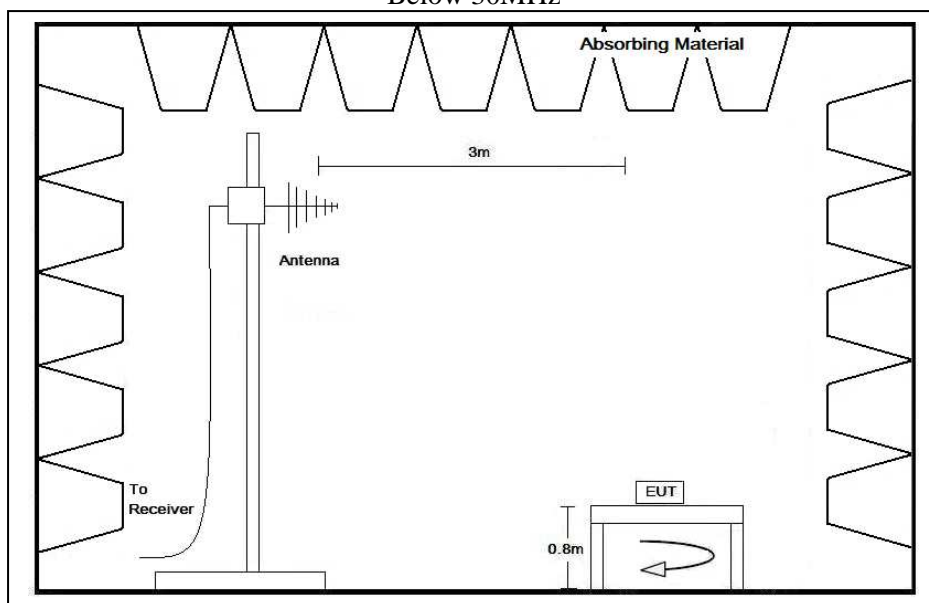
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2.2 Test Setup



Below 30MHz



30MHz – 1GHz



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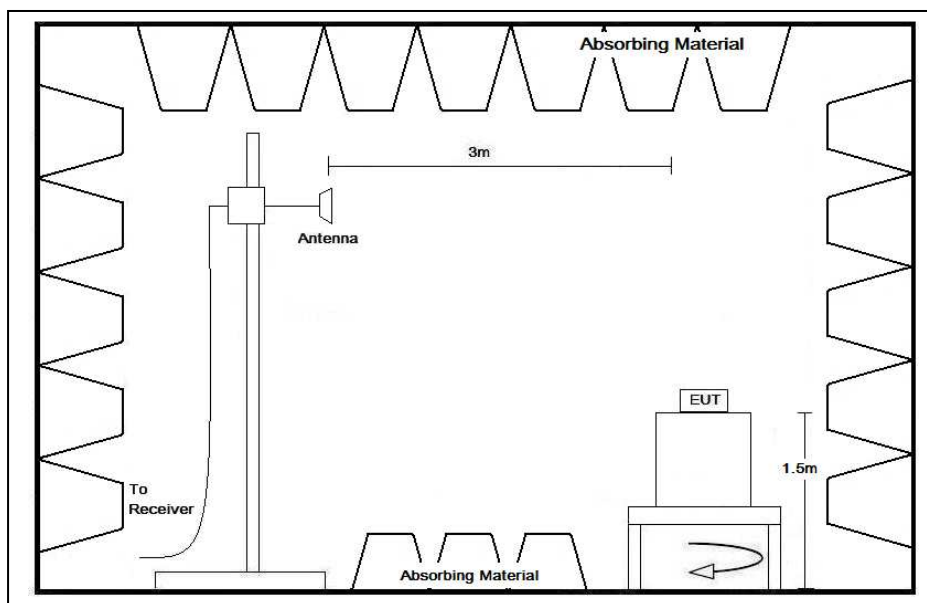
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2.2 Test Setup



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 and “*” means emission appearing within the restricted band of RSS-GEN section 8.10.

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 and RSS 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: 2408MHz

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	2408.592	105.5	-4.7	100.8	114.0	-13.2	Peak
H	2408.284	62.9	-4.7	58.2	94.0	-35.8	Average
V	2408.516	104.8	-4.7	100.1	114.0	-13.9	Peak
V	2408.200	62.8	-4.7	58.1	94.0	-35.9	Average
H	2400.000 ¹	58.4	-4.7	53.7	54.0	-0.3	Peak
H	4815.780	69.5	2.3	71.8	74.0	-2.2	Peak
H	4816.600	38.2	2.3	40.5	54.0	-13.5	Average
H	7225.530	59.7	9.6	69.3	74.0	-4.7	Peak
H	7224.570	24.7	9.6	34.3	54.0	-19.7	Average
V	9631.880	48.3	12.7	61.0	74.0	-13.0	Peak
V	9632.060	22.2	12.7	34.9	54.0	-19.1	Average

Remark: 1) The peak value of emission 2400MHz is below the average limit, so no average measurement is performed.



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Channel: 2434 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	2433.928	106.8	-4.7	102.1	114.0	-11.9	Peak
H	2434.188	63.1	-4.7	58.4	94.0	-35.6	Average
V	2434.057	105.5	-4.7	100.8	114.0	-13.2	Peak
V	2434.449	63.1	-4.7	58.4	94.0	-35.6	Average
H	4868.036	70.9	2.3	73.2	74.0	-0.8	Peak
H	4868.380	38.1	2.3	40.4	54.0	-13.6	Average
V	7303.630	60.9	9.6	70.5	74.0	-3.5	Peak
V	7302.280	25.0	9.6	34.6	54.0	-19.4	Average
V	9736.020	46.8	12.7	59.5	74.0	-14.5	Peak
V	9736.000	22.6	12.7	35.3	54.0	-18.7	Average

Remark:



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Channel: 2467MHz

Polarization	Frequency (MHz)	Reading at 3m (dB μ V)	Antenna Factor and Cable Loss (dB/m)	Field Strength at 3m (dB μ V/m)	Limit at 3m (dB μ V/m)	Margin (dB)	Detector Type
H	2466.948	106.9	-4.7	102.2	114.0	-11.8	Peak
H	2467.400	63.1	-4.7	58.4	94.0	-35.6	Average
V	2466.921	106.0	-4.7	101.3	114.0	-12.7	Peak
V	2467.269	63.1	-4.7	58.4	94.0	-35.6	Average
H	2483.500	57.8	-4.7	53.1	54.0	-0.9	Peak
H	4935.184	70.2	2.8	73.0	74.0	-1.0	Peak
H	4934.560	37.4	2.8	40.2	54.0	-13.8	Average
V	7402.570	62.0	9.6	71.6	74.0	-2.4	Peak
V	7401.510	62.0	9.6	34.8	54.0	-19.2	Average
H	9867.670	22.1	12.7	56.7	74.0	-17.3	Peak
V	9868.060	44.0	12.7	35.5	54.0	-18.5	Average

Remark: 1) The peak value of emission 2483.5MHz is below the average limit, so no average measurement is performed.



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3 Description of the Line-conducted Test

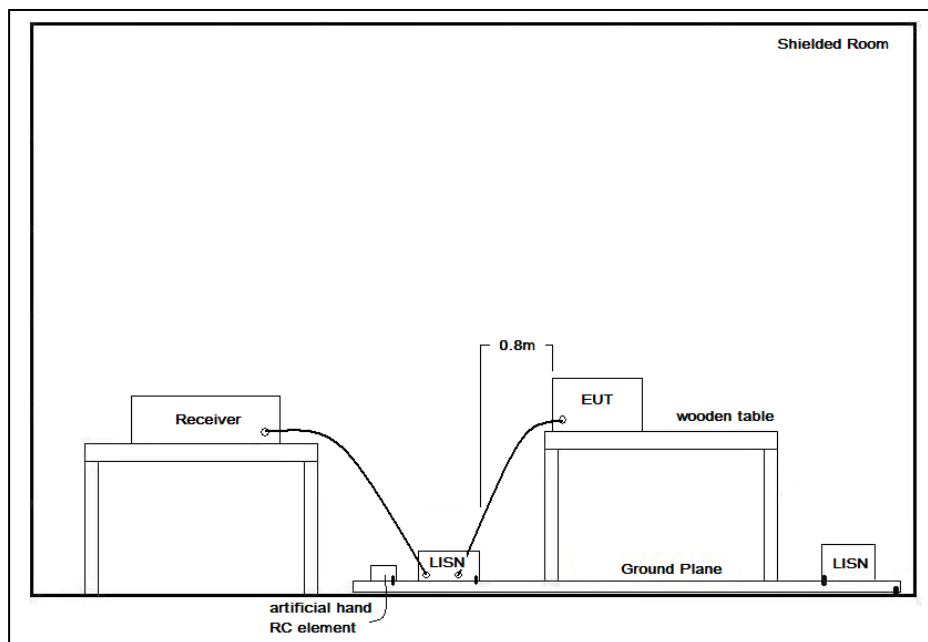
3.1 Test Procedure

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 and A2 are shown the fundamental emission is confined in the specified band. 20dB bandwidth is 910kHz and 99% bandwidth is 1.73MHz. Both bandwidth fall in the band of 2400 – 2483.5MHz It also shows that the EUT met the requirement of FCC Part 15.215(c) and RSS-GEN.



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5 Appendices

A1.	20dB Bandwidth Plot	2	page(s)
A2.	99% Bandwidth	2	page(s)



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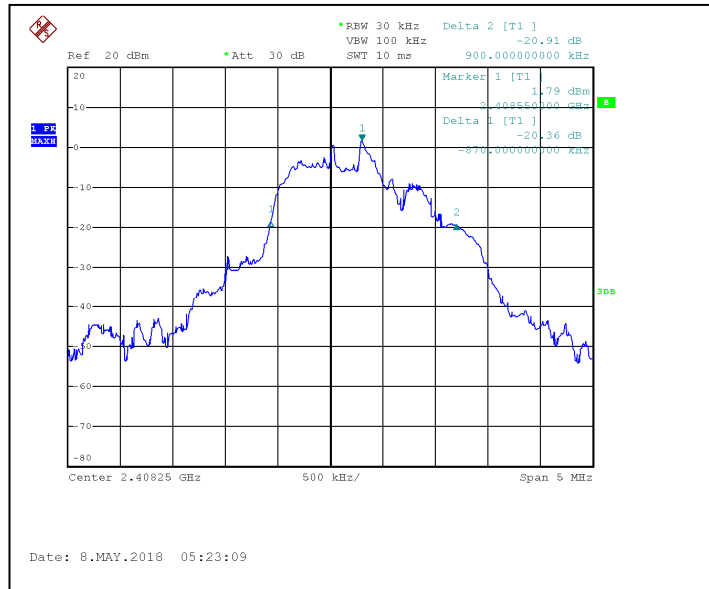
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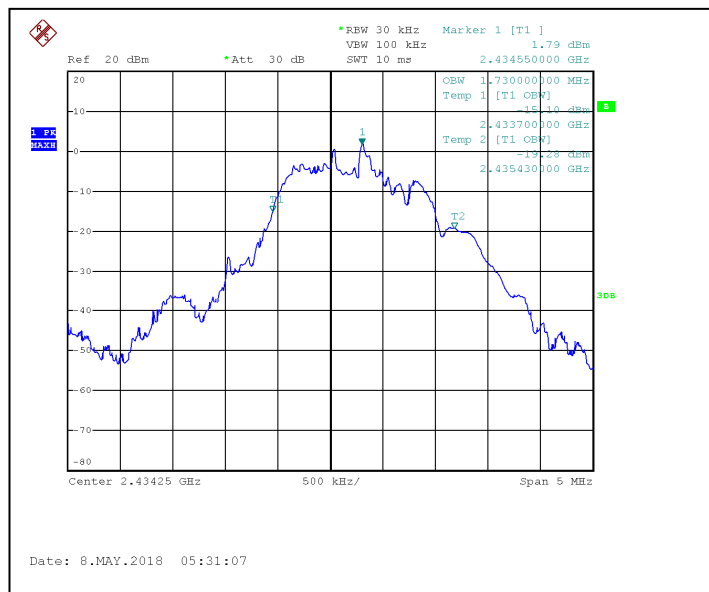
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A1. 20dB Bandwidth Plot



Channel: 2408MHz



Channel: 2434MHz



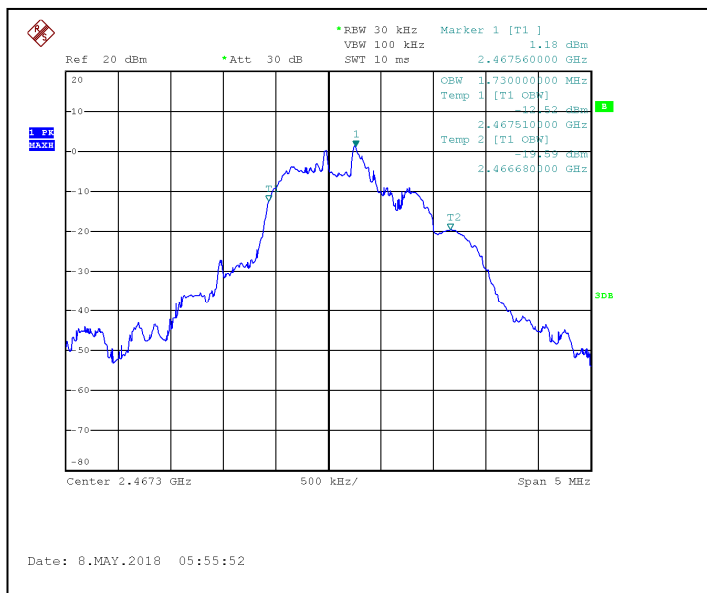
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Channel: 2467MHz



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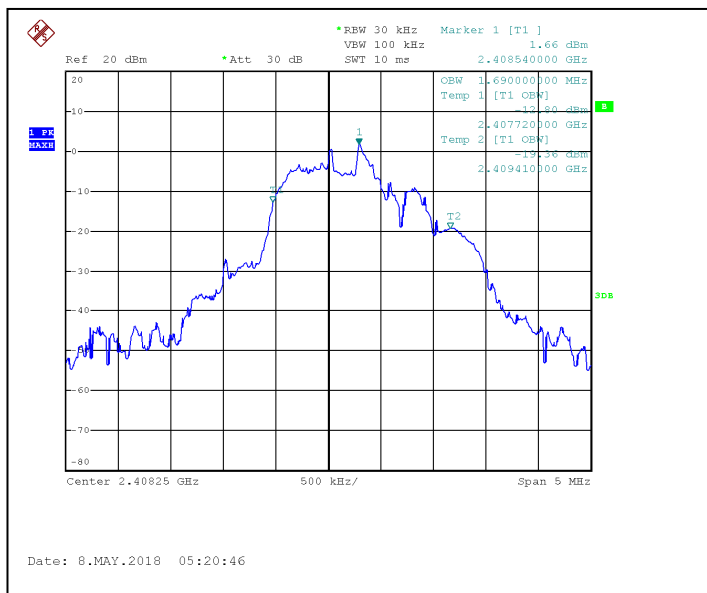
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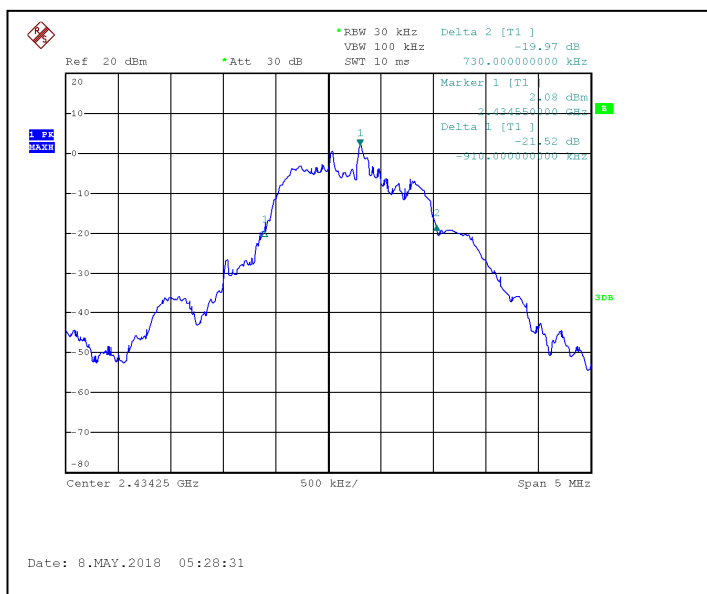
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A2. 99% Bandwidth Plot



Channel: 2408MHz



Channel: 2434MHz



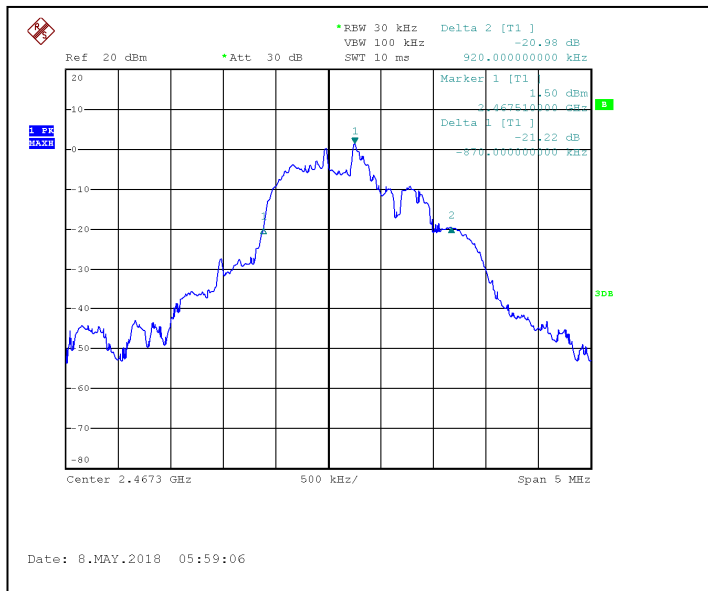
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Channel: 2467MHz

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