

FCC ID: VLE0530-T

CMA Testing and Certification Laboratories

廠商會檢定中心

TEST REPORT

Report No.	:	AT0035784(5)	Ι	Date :	29 May 2015	
Application No.	:	LT024333(4)				
Applicant	:	Asian Express Holdings Limite 4F,-4, No.669 Jingping Rd., Zh Taiwan R.O.C, Taiwan		iPei county	235	
Client	:	Asian Express Holdings Limite Rm804 Sino Centre,582-592 N Mongkok, Kowloon, Hong Ko	lathan Road,			
Sample Description	:	One(1) item of submitted samp	ble stated to be			
		Sample Description	Model No.			
		Small Laser League (3XAAA), Small Laser Force (recharge), Large Laser Force (2XAA), Large Laser Force	0527 / TK-0530		323 / TK-0526 / TK-	
		Sample registration No. : R7				
		1 2	02MHz – 2480 M x 1.5V AAA size		sceiver	
		Rating : 2 x No. of submitted sample :				
Date Received Test Period Test Requested	: : :	23 Apr 2015, 05 May 2015 06 May 2015 to 15 May 2015. FCC Part 15 Certificate,				
Test Method	:	47 CFR Part 15 (10-1-12 Editio	on), ANSI C63.4	4 - 2009		
Test Engineer	:	Mr. LEUNG Shu-kan, Ken				
Test Result	:	See attached sheet(s) from page 2 to 27.				
Conclusion	:	The submitted sample was four Subpart B and C.	nd to comply wi	th requiren	nent of FCC Part 15	

For and on behalf of CMA Industrial Development Foundation Limited

Authorized Signature : Page 1 of 27 Mr. WONG Lap-pong Andrew Manager Electrical Division

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Remark

: All seven models are the same in circuitry and components; and therefore model TK-0530 was chosen to be the representative of the test sample. The difference between the tested model and the declared model(s) is/are the Model no. and Color

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1 General Information

1.1 General Description

The equipment under test (EUT) is a controller for tank. The EUT is power by 2×1.5 V AA size batteries. It operates at 2402MHz – 2480MHz. There are buttons and two joysticks. When the buttons are pressed or joysticks are moved, there are radio signals transmitting to receiver.

The brief circuit description is listed as follows:

- IC1	and its associated circuit act as MCU and RF circuit
- Y1	and its associated circuit act as oscillator
- K1, K2, K3, K4, K5, K6,	and its associated circuit act as tank control
K7, K8, K9, K10	

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1.2 Location of the test site

FCC Registered Test Site Number: 552221

Radiated emissions measurements are investigated and taken pursuant to the procedures of ANSI C63.4 – 2009. 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 - 2009. A shielded room is located at :

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

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1.3 List of measuring equipment

Equipment	Manufacturer	Model No.	Serial No.	Calibration Due Date	Calibration Period
EMI Test Receiver	R&S	ESCI	100152	28 Aug 2015	1Year
Spectrum Analyzer	R&S	FSV40	100628	02 Feb 2016	1Year
Broadband Antenna	Schaffner	CBL6112B	2718	19 Feb 2016	2Years
Loop Antenna	EMCO	6502	00056620	28 Oct 2015	2Years
Horn Antenna	Schwarzbeck	BBHA 9120D	9120D-531	24 Nov 2016	2Years
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170442	24 Nov 2016	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9718	9718-119	18 Jun 2015	2Years
Broadband Pre-Amplifier	Schwarzbeck	BBV 9719	9719-010	17 Jun 2015	2Years
Coaxial Cable	Schaffner	RG 213/U	N/A	19 Feb 2016	1Years
Coaxial Cable	Suhner	RG 214/U	N/A	19 Feb 2016	1Years
Coaxial Cable	Suhner	Sucoflex_104	N/A	24 Nov 2016	2Years

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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)	4.63dB
30MHz ~ 200MHz (Vertical)	4.65dB
200MHz ~1000MHz (Horizontal)	4.45dB
200MHz ~1000MHz (Vertical)	4.41dB

Conducted emissions

Frequency	Uncertainty (U _{lab})
150kHz~30MHz	2.47dB

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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 C63.4 - 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. 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.

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.

For 30MHz to 1GHz, broadband antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. And the reference point of antenna shall be 1 m above the ground.

For above 1GHz, horn antenna with its vertical and horizontal plane is placed 3m from the EUT and rotated about its vertical and horizontal axis for maximum response at each azimuth about the EUT. Preamplifier and High Pass filter was used for measurements. The reference point of antenna shall be 1 m above the ground.

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

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2.2 Test Result

Subpart C

Peak Detector data were measured unless otherwise stated.

"#" means emissions appear within the restricted bands shall follow the requirement of 15.205.

The frequencies from fundamental up to that tenth harmonics were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next page (section 2.3).

It was found that the EUT meet the FCC requirement.

Subpart B

The emissions meet the requirement of section 15.109 are based on measurements employing the CISPR quasi-peak detector below 1000MHz and average detector for frequencies above 1000MHz.

"#" means emissions appear within the restricted bands shall follow the requirement of 15.205.

The frequencies from 30MHz to 1000MHz were investigated, and emissions more 20dB below limit were not reported. Thus, those highest emissions were presented in next page (section 2.3).

It was found that the EUT meet the FCC requirement.

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2.3 Radiated Emission Measurement Data

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:	_	
Parameter	Recorded value	
Ambient temperature:	25	° C
Relative humidity:	70	%

Measurement: Peak RBW: 1MHz VBW: 3MHz Operation Mode: Transmission Testing frequency range: 9kHz to 25GHz

Channel	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBµV)	Transducer Factor (dB/m)	Field Strength at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
	2401.815	V	100.7	- 4.1	96.6	114.0	- 17.4
Larr	#4803.649	V	58.1	3.8	61.9	74.0	- 12.1
Low	#4803.661	Н	58.9	3.8	62.7	74.0	- 11.3
	7205.480	Н	45.3	11.7	57.0	74.0	- 17.0
	2439.833	V	99.3	- 4.1	95.2	114.0	- 18.8
NC 111	#4879.623	V	54.6	3.8	58.4	74.0	- 15.6
Middle	#4879.631	Н	52.3	3.8	56.1	74.0	- 17.9
	#7319.511	Н	45.5	11.7	57.2	74.0	- 16.8
		-					
	2479.876	V	98.6	- 4.3	94.3	114.0	- 19.7
TT: 1	#4959.718	Н	53.7	4.1	57.8	74.0	- 16.2
High	#4959.722	V	52.3	4.1	56.4	74.0	- 17.6
	#7439.415	Н	44.3	11.7	56.0	74.0	- 18.0

Remark: Other emissions more than 20dB below the limit are not reported.

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2.3 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:	_	
Parameter	Recorded value	
Ambient temperature:	25	° C
Relative humidity:	70	%

Measurement: Average RBW: 1MHz VBW: 10Hz Operation Mode: Transmission Testing frequency range: 9kHz to 25GHz

Channel	Frequency (MHz)	Polarity (H/V)	Reading at 3m (dBµV)	Transducer Factor (dB/m)	Field Strength at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
	2401.959	V	66.8	- 4.1	62.7	94.0	- 31.3
Lan	#4803.748	Н	29.6	3.8	33.4	54.0	- 20.6
Low	#4803.768	V	29.0	3.8	32.8	54.0	- 21.2
	7205.608	Н	23.8	11.7	35.5	54.0	- 18.5
	•	•					
	2439.927	V	65.2	- 4.1	61.1	94.0	- 32.9
NC 111	#4879.739	V	27.8	3.8	31.6	54.0	- 22.4
Middle	#4879.797	Н	27.3	3.8	31.1	54.0	- 22.9
	#7319.581	Н	24.2	11.7	35.9	54.0	- 18.1
	2479.888	V	64.2	- 4.3	59.9	94.0	- 34.1
High	#4959.715	V	26.7	4.1	30.8	54.0	- 23.2
	#4959.747	Н	27.3	4.1	31.4	54.0	- 22.6
	#7439.577	Н	24.5	11.7	36.2	54.0	- 17.8

Remark: Other emissions more than 20dB below the limit are not reported.

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2.3 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart C

Environmental conditions:	_	
Parameter	Recorded value	
Ambient temperature:	25	° C
Relative humidity:	70	%

Detector: Quasi-peak RBW: 120kHz VBW: 300kHz

Testing frequency range: 9kHz to 25GHz Operation mode: Transmission

Frequency (MHz)	Polarity (H/V)	Reading at 3m	Antenna Factor and Cable Loss	Field Strength at 3m	Limit at 3m (dBµV/m)	Margin (dB)
		(dBµV)	(dB/m)	(dBµV/m)	• •	
49.184	Н	5.2	12.4	17.6	40.0	- 22.4
93.331	Н	6.0	12.2	18.2	43.5	- 25.3
#133.678	Н	7.1	13.8	20.9	43.5	- 22.6
173.351	Н	6.8	12.1	18.9	43.5	- 24.6
226.515	Н	8.0	11.3	19.3	46.0	- 26.7
#270.672	Н	8.0	15.1	23.1	46.0	- 22.9
311.616	Н	7.9	16.5	24.4	46.0	- 21.6

Remark: Other emissions more than 20dB below the limit are not reported.

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2.3 Radiated Emission Measurement Data (Con't)

Radiated emission

pursuant to

the requirement of FCC Part 15 subpart B

Environmental conditions:	_	
Parameter	Recorded value	
Ambient temperature:	25	° C
Relative humidity:	70	%

Detector: Quasi-peak RBW: 120kHz VBW: 300kHz

Testing frequency range: 9kHz to 25GHz Operation mode: Receiving

Frequency	Polarity	Reading	Antenna Factor	Field Strength	Limit at 3m	Margin
(MHz)	(H/V)	at 3m	and Cable Loss	at 3m	(dBµV/m)	(dB)
		(dBµV)	(dB/m)	(dBµV/m)		
54.289	Н	5.6	10.0	15.6	40.0	- 24.4
88.228	Н	6.4	10.8	17.2	43.5	- 26.3
#124.066	Н	7.4	13.8	21.2	43.5	- 22.3
#164.428	Н	7.3	12.1	19.4	43.5	- 24.1
207.966	Н	6.9	11.6	18.5	43.5	- 27.5
#258.521	Н	7.6	15.1	22.7	46.0	- 23.3
319.292	Н	7.6	16.5	24.1	46.0	- 21.9

Remark: Other emissions more than 20dB below the limit are not reported.

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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 C63.4 - 2009. 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 Graph and Table of Conducted Emission Measurement Data

Not Applicable

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4 Photograph

4.1 Photographs of the Test Setup for Radiated Emission and Conducted Emission

For electronic filing, the photos are saved with filename VLE0530-T TSup.pdf.

4.2 Photographs of the External and Internal Configurations of the EUT

For electronic filing, the photos are saved with filename VLE0530-T ExPho.pdf and VLE0530-T InPho. pdf.

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5 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	LabelSmp.jpg
Block Diagram	BlkDia.pdf
Schematic Diagram	Schem.pdf
Users Manual	UserMan.pdf
Operational Description	OpDes.pdf

5.1 Bandwidth

The plot saved in TestRpt2.pdf shows the fundamental emission is confined in the specified band. It shows the 20dB bandwidth met the 15.215 requirement for frequency band 2400 to 2483.5 MHz.

The plot saved in TestRpt3.pdf shows the band edge is fulfil 15.209 requirement.

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	A1	Photos of the set-up of Radiated Emissions	3	pages	
	A2	Photos of External Configurations	1	page	
	A3	Photos of Internal Configurations	1	page	
	A4	ID Label/Location	1	page	
	A5	Band Edge	2	pages	
	A6	20dB Bandwidth Plot	2	pages	

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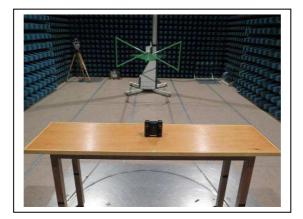
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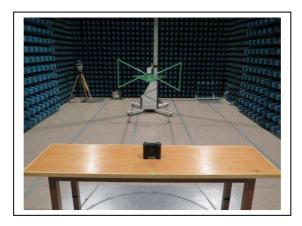
AT0035784(5)

Date : 29 May 2015

A1. Photos of the set-up of Radiated Emissions



(Front view, 30MHz - 1GHz)



(Back view, 30HMz - 1GHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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TEST REPORT

Report No. : ATO

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Date : 29 May 2015

A1. Photos of the set-up of Radiated Emissions



(Front view, 9kHz - 30MHz)



(Back view, 9kHz - 30MHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

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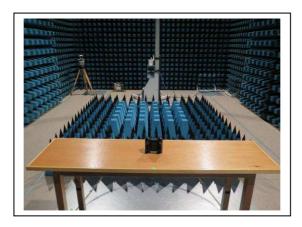
Date :

29 May 2015

A1. Photos of the set-up of Radiated Emissions



(Front view, 1GHz – 25GHz)



(Back view, above 1GHz - 25GHz)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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TEST REPORT

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A2 Photos of External Configurations



(External Configuration 1)



(External Configuration 2)

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Mr. LEUNG Shu-kan, Ken

Reviewed by:

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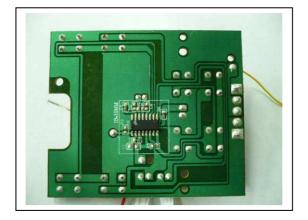


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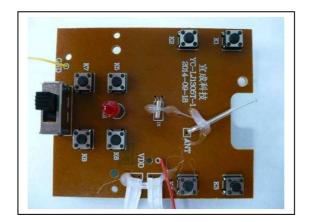
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A3. Photos of Internal Configurations



Internal Configuration 1



Internal Configuration 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

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A4. ID Label / Location



ID Label 1

	. ↑
This device complies with part 15 of the FCC Ru Operation is subject to the following two conditio (1) This device may not cause harmful interferent and (2) this device must accept any interferent received, including interference that may ca	nce, 13.1 mn
undesired operation.	use
·	•

ID Label 2

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by:

Mr. WONG Lap-pong, Andrew

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TEST REPORT

Report No.

AT0035784(5)

:

Date : 29 May 2015

Att	20 dB 😐 SN	VT 100 ms 🖷 VBW	3 MHz Mode S	weep		
●1Pk Max	110					
110 dBµV/m			M2[1]		82.82 dBµV/r 2.400000 GH	
N. 761			M1[1]	96.50 dB 2.40196	μ٧/	
100 dBµV/m				×)	
90 dBµV/m-				Me		
80 dBµV/m		K2 * K			1	
70 dBµV/m					1	
60 dBµV/m					1	
50 dBµV/m				Show and		
40 dBµV/m	when the wards	amber and and the	annound the second	when we		
30 dBµV/m						
20 dBµV/m						

A5. Band Edge

Lower edge (Peak measurement)

 Att TDF 1CA Max 	0	dB 👄 SW	T 100 s 👄	VBW	10 Hz	Mode Swe	ep		
90 dBµV/m-						42[1] 41[1]	5	2.4	75 dBµV/r 100000 GH 12 dBµV/r 102110 GH
70 dBµV/m-			-						
60 dBµV/m-		-	63			-		-	MI
50 dBµV/m-			17			-	7	-	
40 dBµV/m-			G		-				
30 dBµV/m-								A	
20 dBµV/m-									
								_	

Lower edge (Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by: P-R

Mr. WONG Lap-pong, Andrew

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TEST REPORT

Report No.

AT0035784(5)

10 dBu

Start 2.475 GH

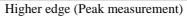
:

Date : 29 May 2015

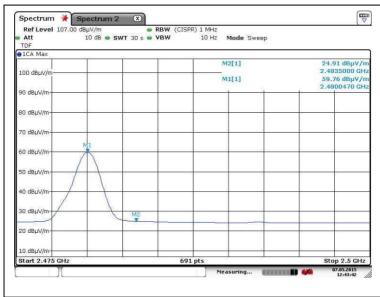
2.5 GHz

Spectrum X Spectru Ref Level 107.0 Mode Sweep TD D1Pk № 94.32 dBµV/n 2.4798660 GH 100 dBL 57.59 dBµV/ M2[1] 90 dBµ\ 30 dBuN '0 d 60 dBµV 50 dBi// 40 dBµ BO dB 20 dBuV/

A5. Band Edge



691 pt



Higher edge (Average measurement)

Tested by:

Mr. LEUNG Shu-kan, Ken

Reviewed by: PR



Mr. WONG Lap-pong, Andrew

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TEST REPORT

Report No.

AT0035784(5)

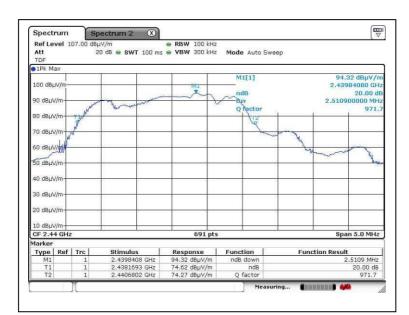
:

Date : 29 May 2015

Spectrum BμV/m 😐 RBW 100 kHz 10 dB 🖷 SWT 100 ms 🖷 VBW 300 kHz Ref Level 107. Att Mode Sweet TD PIPK M M1[1] 96.59 dBpV/n 2.40181940 GH 100 dBµ\ 20.00 90 dBuV/ non O fe an dei 70 dBj ∂ dBµ\ 50 dBµV/ 40 dBuV/i 30 dBuV/ 20 dBuV/ CF 2.40242 GHz 691 pts Span 5.0 MHz Type | Ref | Trc Stimulus Response Function Function Re .4018194 .4009584 .4046848 GHz ndB do 96.59 76.56 76.43 GHz ndE 20.00 df O facto

A6. 20dB Bandwidth Plot

Bandwidth 1 (2402MHz)



Bandwidth 2 (2440MHz)

Tested by:

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Reviewed by:

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TEST REPORT

Report No.

AT0035784(5)

:

Date : 29 May 2015

Spectrum		pectrum 2 🛛 🗶	10 S			T.
Ref Level	107.00 di		e RBW 100 k		- 2010/000	
Att TDF		10 GR 📾 SM1 100	i ms 🖷 VBW 300 k	Hz Mode Auto	Sweep	
1Pk Max						
		T 1		M1[1]		94.28 dBµV/r
100 dBµV/m-			MI			2.47984080 GH
			man the	ndB		20.00 d
90 dBµV/m-	W N	mennonito		WB-		2.764100000 MH
00.10.11	x 4	m an -		Q fector	<u>6</u>	897.
80 dBµV/m #				12		
70 dBµV/m-				7		
NO GOD				N 1	war and	
60 dBuV/m-		<u></u>			1 mg	200
						Mar annual manual
50 dBµV/m-			+ +			N. N.
10xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx						
40 dBµV/m-		Su			10	
30 dBuV/m-						
30 ubµv/m-					27	
20 dBµV/m-						
		T T				
10 dBµV/m-					<u>)</u>	
CF 2.48 GHz	2	and an	691 p	ts	10	Span 5.0 MHz
Marker						
Type Ref		Stimulus	Response	Function	Fu	unction Result
M1	1	2.4798408 GHz		ndB down		2.7641 MHz
T1 T2	1	2.477945 GHz 2.4807091 GHz		Q factor		20.00 dB 897.2
12	1	2.400/091 GHZ	/+.∠8 dBµV/m			
	11			Measuring	SAVE AND AND AND AND AND	07.05.2015

A6. 20dB Bandwidth Plot

Bandwidth 3 (2480MHz)

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

Tested by:

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