

FCC Test Report

Report No.: AGC03335180501FE03

FCC ID	Ċ	2AP2G-LB-DAC
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	The globa	Bluetooth Digital to Analog Converter
BRAND NAME	-	MICCA
MODEL NAME	8	LB-DAC, LB-AMP, LB-TX, LB-RX, A1, A2, A3, A4, A5
CLIENT		SHENZHEN ELEBAO TECHNOLOGY CO., LTD
DATE OF ISSUE	111	June 04, 2018
STANDARD(S) TEST PROCEDURE(S)	:	FCC Part 15 Subpart C Section 15.249
REPORT VERSION		V1.0

Attestation of Global Compliance (Shenzhen) Co., Ltd

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Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0		June 04, 2018	Valid	Initial release

Report Revise Record

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Applicant	SHENZHEN ELEBAO TECHNOLOGY CO., LTD
Address	F/4, TOWER A, HUASHENGHUI ZHIHUICHUANGXIN BLDG XIXIANG TOWN, BAO`AN DISTRCT, SHENZHEN 518126 CHINA
Manufacturer	SHENZHEN ELEBAO TECHNOLOGY CO., LTD
Address	F/4, TOWER A, HUASHENGHUI ZHIHUICHUANGXIN BLDG XIXIANG TOWN, BAO`AN DISTRCT, SHENZHEN 518126 CHINA
Product Designation	Bluetooth Digital to Analog Converter
Brand Name	MICCA
Test Model	LB-DAC
Series Model	LB-AMP, LB-TX, LB-RX, A1, A2, A3, A4, A5
Difference description	All the same except for the model name
Date of test	May 19, 2018 to May 29, 2018
Deviation	None de la companya
Condition of Test Sample	Normal
Report Template	AGCRT-US-BR/RF

1. VERIFICATION OF CONFORMITY

We hereby certify that:

The above equipment was tested by Attestation of Global Compliance (Shenzhen) Co., Ltd. The test data, the energy emitted by the sample tested as described in this report is in compliance with the requirements of FCC Rules Part 15.249. The test results of this report relate only to the tested sample identified in this report.

Tested By

Harry Zhani

Henry Zhang(Zhang Zhuorui) May

May 29, 2018

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Reviewed By

Cool Cheng(Cheng Mengguo) June 04

June 04, 2018

Approved By

Forrest Lei(Lei Yonggang) Authorized Officer

June 04, 2018

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Tel: +86-755 2908 1955 Fax: +86-755 2600 8484 E-mail: agc@agc-cert.com @ 400 089 2118 Add: 2/F., Building 2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Baoan District, Shenzhen, Guangdong China



2. GENERAL INFORMATION 2.1. PRODUCT DESCRIPTION

A major technical description of EUT is described as following

Operation Frequency	2.402 GHz to 2.480GHz
RF Output Power	-9.01dBm(Max EIRP Power=Max radiation field-95.2)
Bluetooth Version	V4.2 • 5 2 • • • • • • • • • • • • • • • •
Modulation	BR ⊠GFSK, EDR ⊠π /4-DQPSK, ⊠8DPSK BLE □GFSK
Number of channels	79
Hardware Version	1.0
Software Version	1.4
Antenna Designation	ROD Antenna
Antenna Gain	0dBi
Power Supply	DC 5V
Note:	

1.

The USB port only used for power supply and can't be used to transfer data with PC. The EUT equipped with PCB and ROD Antenna, but the BT function only apply the ROD Antenna. 2.

2.2. TABLE OF CARRIER FREQUENCYS

BR/EDR Channel List

Frequency Band	Channel Number	Frequency
A B	0	2402MHz
C The stand Contra Contra	GO 1 GO	2403MHz
		at the second second
	38	2440 MHz
2400~2483.5MHz	39	2441 MHz
CC Manual CC	40	2442 MHz
		The state of the s
	77	2479 MHz
E F a Coba Contra	78	2480 MHz

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3. MEASUREMENT UNCERTAINTY

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

- Uncertainty of Conducted Emission, Uc = ±3.2 dB
- Uncertainty of Radiated Emission below 1GHz, Uc = ±3.9 dB
- Uncertainty of Radiated Emission above 1GHz, Uc = ±4.8 dB

4. DESCRIPTION OF TEST MODES

NO.	TEST MODE DESCRIPTION
1 The Semilars	Low channel GFSK
2 0	Middle channel GFSK
3	High channel GFSK
4	Low channel π /4-DQPSK
5 5	Middle channel π /4-DQPSK
6	High channel π /4-DQPSK
G 7	Low channel 8DPSK
8	Middle channel 8DPSK
9 9	High channel 8DPSK
10	BT Link

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		Software Setti	ng 💿	Fallon of Globa	Fin of Global
BlueTest3					
Test Mode		Test Arguments			
PAUSE RADIO STATUS RADIO STATUS FULL	^	LO Freq. (NHz)	2441		lose
TISTARI TIDATAI		Power (Ext, Int)	50 50	11 44.5	ecute
TXDATA2 TXDATA3 TXDATA4 				Cold	Reset
RISTARTI RISTART2 RIDATA1	~			Yarn	Reset
Test Results □ Save to file	Browse f	or file Displ	ay: (• Stand	ard C Bit E	rror
. \logfile. txt					
pening USB SPI (600 ransport active. C7 (Hardware ID 0x3	32) firmware ve				
adio Test TXDATA1 s	uccessful 004, parameters	s: 0004, 0989, 3232, 0000 s: 0004, 0989, 3232, 0000			

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5. SYSTEM TEST CONFIGURATION

5.1. CONFIGURATION OF EUT SYSTEM

Configure 1: (Normal hopping)



Configure 2: (Control continuous TX)

			校.Com		olobal Col
EUT	station o	Control box	D.o.,	PC	

5.2. EQUIPMENT USED IN EUT SYSTEM

ltem	Equipment	Mfr/Brand	Model/Type No.	Remark
10	Bluetooth Digital to Analog Converter	MICCA	LB-DAC	EUT
2	PC	APPLE	A1465	A.E
3	Control box	CSR	USB_SPI_TOOLS	A.E
4	Adapter	KLIPAD	DYEB05015U1EU	A.E
5	USB Cable	N/A	1m unshielded	A.E
6	AUX IN Cable	N/A	1m unshielded	A.E
7	Speaker	My music	B61	A.E
8	IPOD	APPLE	Touch 5	A.E

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5.3. SUMMARY OF TEST RESULTS

FCC RULES	DESCRIPTION OF TEST	RESULT
§15.249(a) §15.209	Radiated Emission	Compliant
§15.249(d)	Band Edges	Compliant
§15.207	Conduction Emission	Compliant
§15.215	Bandwidth	Compliant

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6. TEST FACILITY

Test Site	Attestation of Global Compliance (Shenzhen) Co., Ltd				
Location	1-2F., Bldg.2, No.1-4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang, Bao'an District B112-B113, Bldg.12, Baoan Bldg Materials Center, No.1 of Xixiang Inner Ring Road, Baoan District, Shenzhen 518012				
NVLAP Lab Code	600153-0				
Designation Number	CN5028				
Test Firm Registration Number	682566				
Description	Attestation of Global Compliance(Shenzhen) Co., Ltd is accredited by National Voluntary Laboratory Accreditation program, NVLAP Code 600153-0				

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7. TEST METHOD

All measurements contained in this report were conducted with ANSI C63.10-2013

8. TEST EQUIPMENT LIST

TEST EQUIPMENT OF CONDUCTED EMISSION TEST

Equipment	Equipment Manufacturer		S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESPI	101206	Jun.20, 2017	Jun.19, 2018
LISN	R&S	ESH2-Z5	100086	Aug.21, 2017	Aug.20, 2018

TEST EQUIPMENT OF RADIATED EMISSION TEST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
TEST RECEIVER	R&S	ESCI	10096	Jun.20, 2017	Jun.19, 2018
EXA Signal Analyzer	Aglient	N9010A	MY53470504	Dec.08, 2017	Dec.07, 2018
Horn antenna	SCHWARZBECK	BBHA 9170	#768	Sep.20, 2017	Sep.19, 2018
preamplifier	ChengYi	EMC184045SE	980508	Sep.15, 2017	Sep.14, 2018
Double-Ridged Waveguide Horn	ETS LINDGREN	3117	00034609	May 18, 2017	May 17, 2019
Broadband Preamplifier	SCHWARZBECK	BBV 9718	9718-205	Jun.20, 2017	Jun.19, 2018
ANTENNA	SCHWARZBECK	VULB9168	D69250	Sep.28, 2017	Sep.27, 2018
Radiation Cable 1	MXT	RS1	R005	June 6, 2017	June 5, 2018
Radiation Cable 2	MXT	RS1	R006	June 6, 2017	June 5, 2018
Loop Antenna	A.H.Systems,Inc	SAS-562B		Mar. 01, 2018	Feb. 28, 2019
Filter (2.4-2.483GHz)	Micro-tronics	087	F A Cobal Congliance	Jun.20, 2017	Jun.19, 2018

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9. RADIATED EMISSION

9.1. TEST LIMIT

Standard FCC15.249

Fundamental	Field Strength of Fundamental	Field Strength of Harmonics
Frequency	(millivolts/meter)	(microvolts/meter)
900-928MHz	50	500
2400-2483.5MHz	50 6	500
5725-5875MHz	50	500
24.0-24.25GHz	250	2500

Standard FCC 15.209

Frequency	Distance	Field Strengths Limit					
(MHz)	Meters	μ V/m	dB(µV)/m				
0.009 ~ 0.490	300	2400/F(kHz)					
0.490 ~ 1.705	30	24000/F(kHz)					
1.705 ~ 30	30	30	E England Con Call				
30 ~ 88	3	100	40.0				
88 ~ 216	3	150	43.5				
216 ~ 960	3	200	46.0				
960 ~ 1000	3	500	54.0				
Above 1000	3 South States	Other:74.0 dB(µV)/m (Average)	(Peak) 54.0 dB(µV)/m				

Remark: (1) Emission level dB μ V = 20 log Emission level μ V/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

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9.2. MEASUREMENT PROCEDURE

- The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
- The measuring distance of 3m shall used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
- 3. The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
- 4. The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- 5. All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform(Below 1GHz)
- 6. All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)

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Spectrum Parameter	Setting
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
Start ~Stop Frequency	Fundamental: 2.4~2.483GHz RBW 2MHz/ VBW 6MHz for Peak, RBW 2MHz/ VBW 10Hz for Average Harmonics: 1GHz~25GHz RBW 1MHz/ VBW 3MHz for Peak, RBW 1MHz/ VBW 10Hz for Average
Receiver Parameter	Setting
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

The following table is the setting of spectrum analyzer and receiver.

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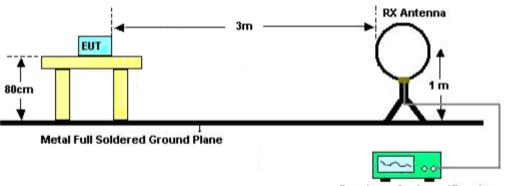


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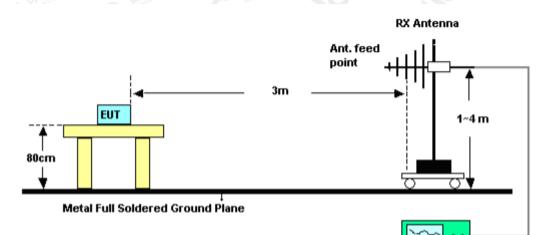
9.3. TEST SETUP

RADIATED EMISSION TEST-SETUP FREQUENCY BELOW 30MHz



Spectrum Analyzer / Receiver

RADIATED EMISSION TEST SETUP 30MHz-1000MHz



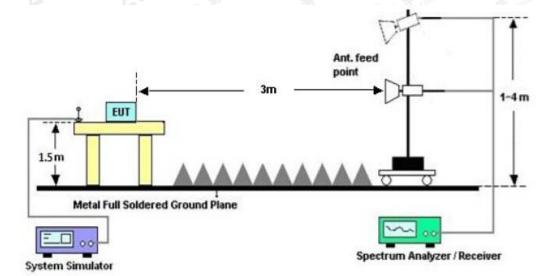
Spectrum Analyzer / Receiver

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RADIATED EMISSION TEST SETUP ABOVE 1000MHz

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9.4. TEST RESULT

(Worst modulation: GFSK)

RADIATED EMISSION BELOW 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz. **RADIATED EMISSION BELOW 1GHz**

26 May, 2018 LB-DAC LOW CHANNEL TX H. dat FCC part15 B_30MHz-1GHz.cnd $\langle \odot \rangle$: FCC Part.15 Class B 3m Mode1 Standard Serial Remark1 Operator AC Power Remark2 Remark3 Temp, Humidity Remark4 [dB(µ V/m)] 100 (FCC B) 90 <LB-DAC LOW CHANNEL TX H> Spectrum(H, PK) 80 Suspected Item(H) 70 60 Level 50 40 30 20 10 0 30 50 100 500 1000 [MHz] Frequency

RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL-HORIZONTAL

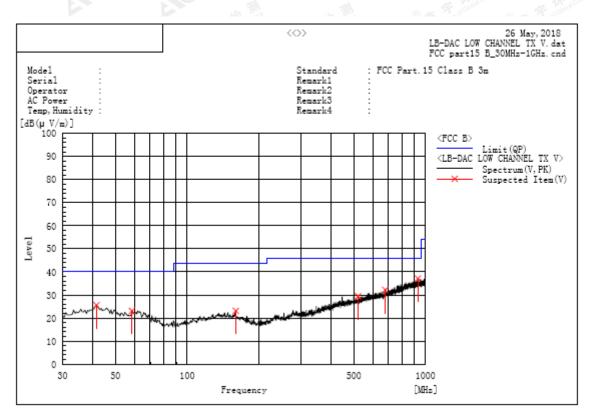
A. Suspected List:

1	Frequency MHz	Polarization Reading dB(uV)		Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Margin dB	Pass/Fail	Height cm	Angle deg
	44.065	Н	6.5	17.3	23.8	40.0	16.2	Pass	100.0	122.8
	121.665	Н	6.5	15.5	22.0	43.5	21.5	Pass	100.0	313.2
8	146.400	Н	5.7	16.6	22.3	43.5	21.2	Pass	100.0	282.4
	342.340	н	6.1	18.6	24.7	46.0	21.3	Pass	200.0	233.1
	731.795	Н	5.6	27.1	32.7	46.0	13.3	Pass	150.0	212.0
	992.240	н	6.1	31.0	37.1	54.0	16.9	Pass	100.0	145.1

RESULT: PASS

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RADIATED EMISSION TEST- (30MHz-1GHz)-LOW CHANNEL -VERTICAL

A. Suspected List:

Frequency MHz	Polarization	Reading dB(uV)			dB(u∨/m)	Margin dB	Pass/Fail	Height cm	Angle deg
41.640	v	8.2	17.4	25.6	40.0	14.4	Pass	100.0	42.2
58.615	v	6.7	16.4	23.1	40.0	16.9	Pass	100.0	10.6
159.980	v	6.5	16.6	23.1	43.5	20.4	Pass	100.0	231.8
521.305	v	6.2	23.3	29.5	46.0	16.5	Pass	200.0	321.2
677.960	v	6.2	26.0	32.2	46.0	13.8	Pass	150.0	126.1
929.190	v	6.6	30.5	37.1	46.0	8.9	Pass	100.0	4.8

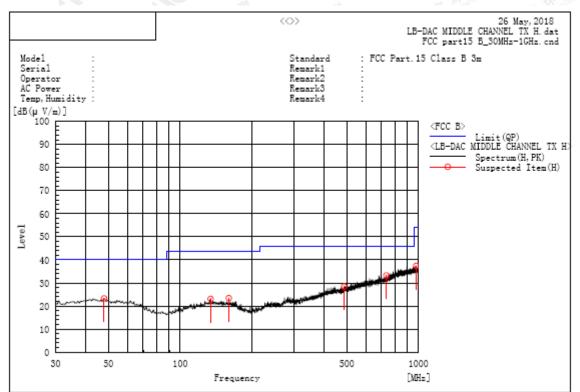
RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

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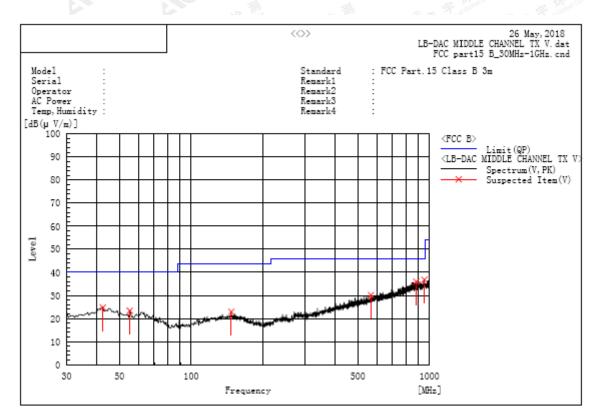
RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL-HORIZONTAL

A. Suspected List:

Frequency MHz	Polarization	Polarization Reading dB		dB(uV/m)	Marqin dB	Pass/Fail	Height cm	Angle deg	
47.945	Н	6.1	17.2	23.3	40.0	16.7	Pass	150.0	256.5
134.275	Н	6.6	16.5	23.1	43.5	20.4	Pass	150.0	260.7
159.980	н	6.8	16.6	23.4	43.5	20.1	Pass	200.0	125.7
487.840	Н	5.7	22.7	28.4	46.0	17.6	Pass	150.0	64.2
733.250	Н	6.1	27.1	33.2	46.0	12.8	Pass	150.0	228.0
978.660	Н	6.5	30.9	37.4	54.0	16.6	Pass	100.0	48.8

RESULT: PASS

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RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL -VERTICAL

A. Suspected List:

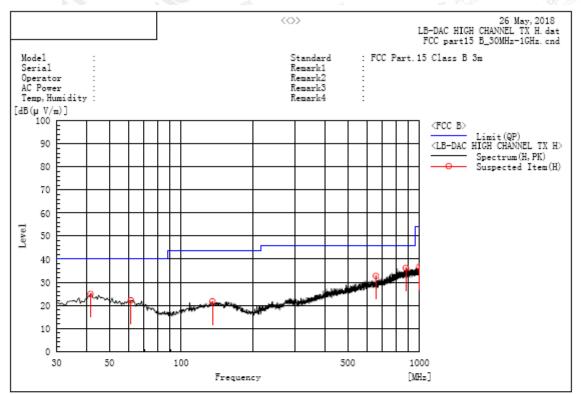
Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(uV/m) QP	Marqin dB	Pass/Fail	Height cm	Angle deg
42.610	v	7.4	17.4	24.8	40.0	15.2	Pass	150.0	142.1
55.220	v	6.7	16.7	23.4	40.0	16.6	Pass	200.0	215.6
147.370	v	6.3	16.6	22.9	43.5	20.6	Pass	150.0	71.4
567.865	v	5.9	24.3	30.2	46.0	15.8	Pass	200.0	323.4
879.720	v	6.0	30.0	36.0	46.0	10.0	Pass	150.0	71.4
951.500	v	6.1	30.7	36.8	46.0	9.2	Pass	200.0	72.1

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

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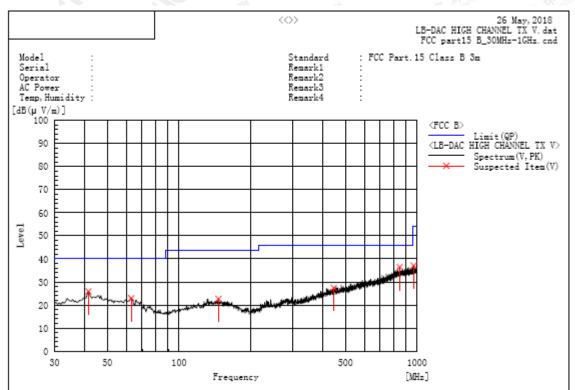
RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL-HORIZONTAL

A. Suspected List:

Frequency MHz	Polarization	Reading dB(uV)			Limit dB(uV/m) QP	Marqin dB	Pass/Fail	Height cm	Angle deg
41.640	Н	7.5	17.4	24.9	40.0	15.1	Pass	150.0	288.6
61.525	Н	6.1	16.0	22.1	40.0	17.9	Pass	200.0	287.9
135.245	Н	5.2	16.5	21.7	43.5	21.8	Pass	150.0	288.6
656.135	Н	7.0	25.7	32.7	46.0	13.3	Pass	150.0	356.5
876.325	Н	6.3	29.9	36.2	46.0	9.8	Pass	150.0	75.1
998.060	Н	5.6	31.1	36.7	54.0	17.3	Pass	150.0	288.6

RESULT: PASS

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RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL -VERTICAL

A. Suspected List:

Frequency MHz	Polarization	Reading dB(uV)	Factor dB (1/m)	Level dB(uV/m) PK	Limit dB(u∨/m) QP	Marqin dB	Pass/Fail	Height cm	Angle deg
41.640	v	8.5	17.4	25.9	40.0	14.1	Pass	200.0	246.4
62.980	v	7.0	15.9	22.9	40.0	17.1	Pass	100.0	287.9
146.400	v	6.1	16.6	22.7	43.5	20.8	Pass	200.0	263.9
446.615	v	5.4	22.0	27.4	46.0	18.6	Pass	200.0	263.9
845.285	v	7.0	29.5	36.5	46.0	9.5	Pass	150.0	287.9
966.535	v	6.3	30.8	37.1	54.0	16.9	Pass	200.0	82.4

RESULT: PASS

Note: 1. Factor=Antenna Factor + Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

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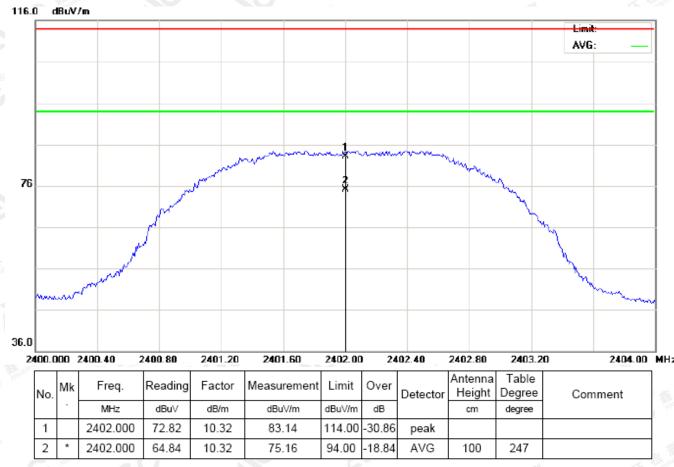
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RADIATED EMISSION ABOVE 1GHz

(Worst modulation: GFSK)

For Fundamental

RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL-HORIZONTAL



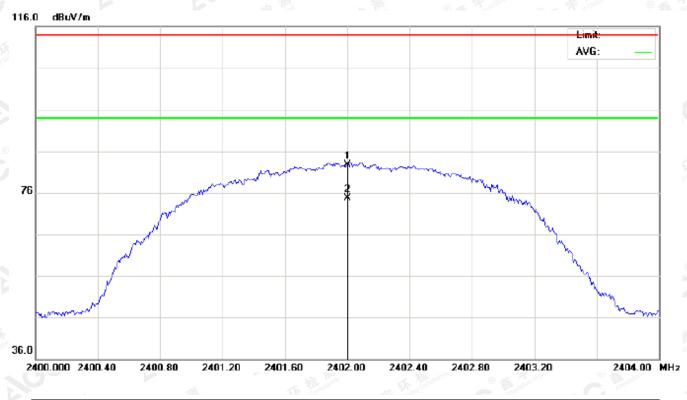
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL- VERTICAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
5	-	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2402.000	72.41	10.32	82.73	114.00	-31.27	peak			
2	*	2402.000	64.37	10.32	74.69	94.00	-19.31	AVG	100	302	

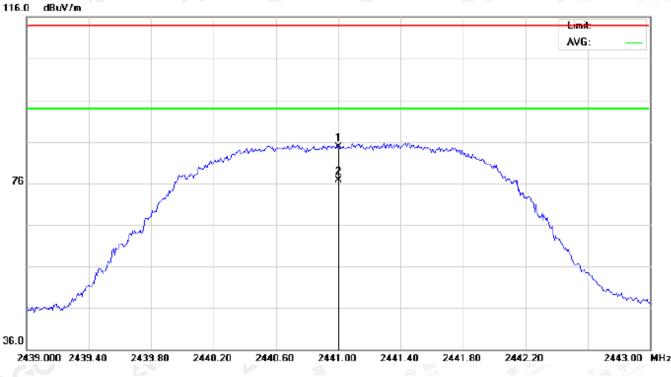
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL-HORIZONTAL

						P	201014		38995.1 AO*		-546 - 1 St.	(C) ABIDE:
	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		•	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
50	1		2441.000	74.28	10.36	84.64	114.00	-29.36	peak			
	2	*	2441.000	66.35	10.36	76.71	94.00	-17.29	AVG	100	214	

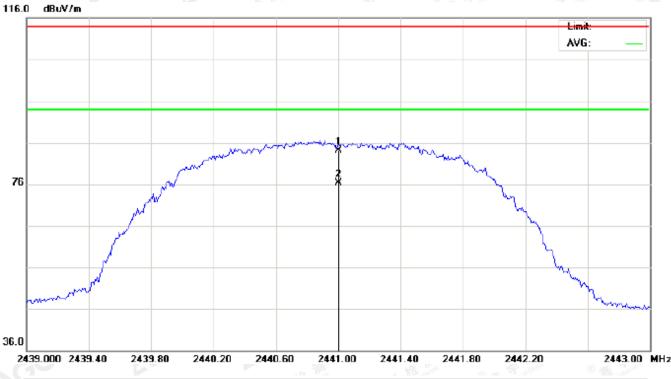
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL- VERTICAL

N	. Mł	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
a		MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2441.000	73.82	10.36	84.18	114.00	-29.82	peak			
2	*	2441.000	65.85	10.36	76.21	94.00	-17.79	AVG	100	121	

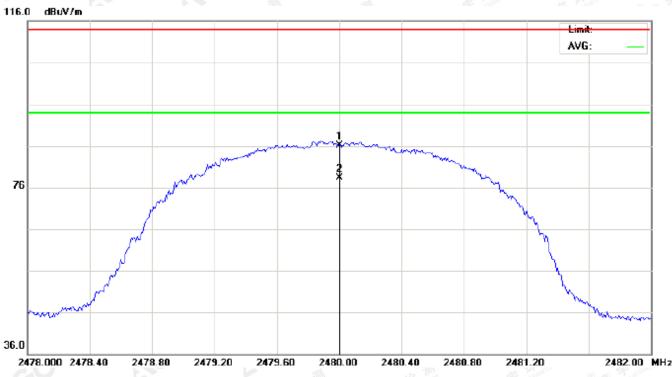
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL-HORIZONTAL

							5010 V		JEPPER ACC		*54E 213V	(C) ANDER TACK
	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
		-	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
510	1		2480.000	75.78	10.41	86.19	114.00	-27.81	peak			
	2	*	2480.000	67.84	10.41	78.25	94.00	-15.75	AVG	100	341	

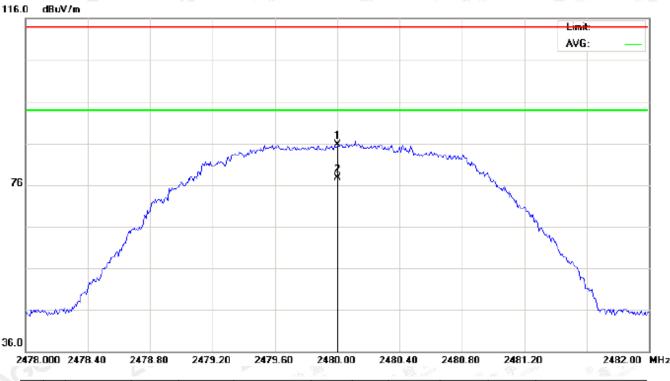
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL- VERTICAL

No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
a	•	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2480.000	75.33	10.41	85.74	114.00	-28.26	peak			
2	*	2480.000	67.29	10.41	77.70	94.00	-16.30	AVG	100		

RESULT: PASS

Note: Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

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Field strength of the fundamental signal

1Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	72.82	10.32	83.14	114	-30.86	Horizontal
2402	72.41	10.32	82.73	114	-31.27	Vertical
2441	74.28	10.36	84.64	114 🐋	-29.36	Horizontal
2441	73.82	10.36	84.18	114	-29.82	Vertical
2480	75.78	10.41	86.19	114	-27.81	Horizontal
2480	75.33	10.41	85.74	114	-28.26	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna	
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization	
2402	64.84	10.32	75.16	94 💿	-18.84	Horizontal	
2402	64.37	10.32	74.69	94	-19.31	Vertical	
2441	66.35	10.36	76.71	94	-17.29	Horizontal	
2441	65.85	10.36	76.21	94	-17.79	Vertical	
2480	67.84	10.41	78.25	94	-15.75	Horizontal	
2480	67.29	10.41	77.70	94	-16.30	Vertical	

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2Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	72.33	10.32	82.65	114	-31.35	Horizontal
2402	71.91	10.32	82.23	114	-31.77	Vertical
2441	73.80	10.36	84.16	114	-29.84	Horizontal
2441	73.35	10.36	83.71	114	-30.29	Vertical
2480	75.31	10.41	85.72	114	-28.28	Horizontal
2480	74.92	10.41	85.33	114	-28.67	Vertical

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization
2402	64.36	10.32	74.68	94	-19.32	Horizontal
2402	63.95	10.32	74.27	94	-19.73	Vertical
2441	65.93	10.36	76.29	94	-17.71	Horizontal
2441	65.42	10.36	75.78	94	-18.22	Vertical
2480	67.37	10.41	77.78	94	-16.22	Horizontal
2480	66.84	10.41	77.25	94	-16.75	Vertical

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3Mbps Result:

Peak value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna	
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization	
2402	71.83	10.32	82.15	114	-31.85	Horizontal	
2402	71.45	10.32	81.77	114	-32.23	Vertical	
2441	73.33	10.36	83.69	114	-30.31	Horizontal	
2441	72.89	10.36	83.25	114	-30.75	Vertical	
2480	74.87	10.41	85.28	114	-28.72	Horizontal	
2480	74.44	10.41	84.85	114	-29.15	Vertical	

Average value

Frequency	Reading Level	Factor	Measurement	Limit	Over	Antenna	
(MHz)	(dBuv)	(dB/m)	(dBuv/m)	(dBuv/m)	(dB)	Polarization	
2402	63.91	10.32	74.23	94	-19.77	Horizontal	
2402	63.51	10.32	73.83	94	-20.17	Vertical	
2441	65.51	10.36	75.87	94	-18.13	Horizontal	
2441	65.00	10.36	75.36	94	-18.64	Vertical	
2480	66.87	10.41	77.28	94	-16.72	Horizontal	
2480	66.42	10.41	76.83	94	-17.17	Vertical	

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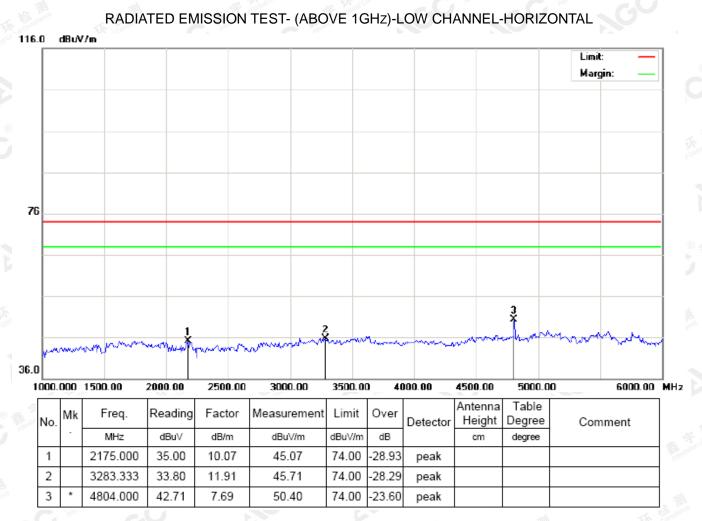




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(Worst modulation: GFSK)

For Harmonics



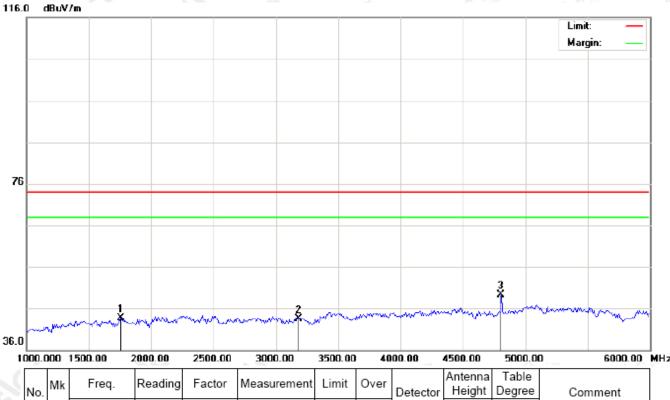
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-LOW CHANNEL- VERTICAL

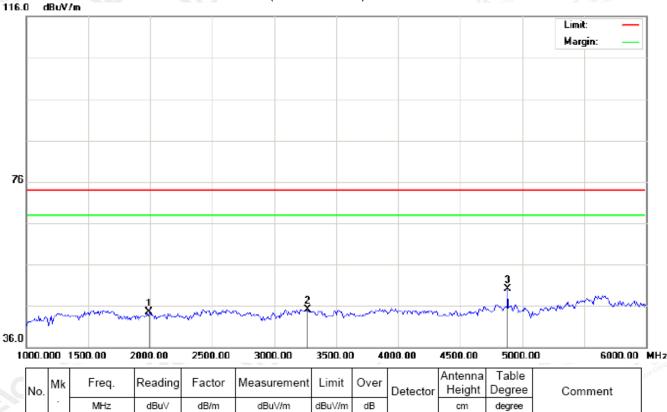
MHz dBu∨ dB/m dBuV/m dBu∀/m dB degree cm 1758.333 36.32 7.34 43.66 74.00 -30.34 1 peak 3183.333 31.71 11.81 43.52 74.00 2 -30.48 peak 3 4804.000 41.55 7.69 49.24 74.00 -24.76 peak

RESULT: PASS

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74.00

74.00

74.00

29.51

28.92

23.9

peak

peak

peak

RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL-HORIZONTAL

RESULT: PASS

1

2

3

34.70

33.19

42.16

1991.667

3266.667

4882.000

9.79

11.89

7.89

44.49

45.08

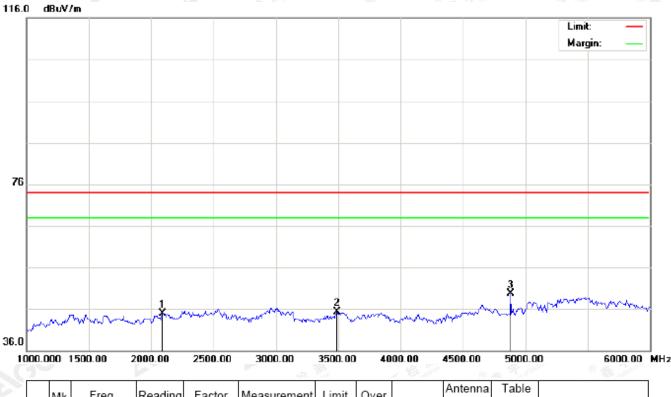
50.05

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RADIATED EMISSION TEST- (ABOVE 1GHz)-MIDDLE CHANNEL- VERTICAL

1	٩o.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
3		-	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
3	1		2091.667	34.91	9.98	44.89	74.00	-29.11	peak			
Γ	2		3491.667	33.15	12.10	45.25	74.00	-28.75	peak			
	3	*	4882.000	41.89	7.89	49.78	74.00	-24.22	peak			

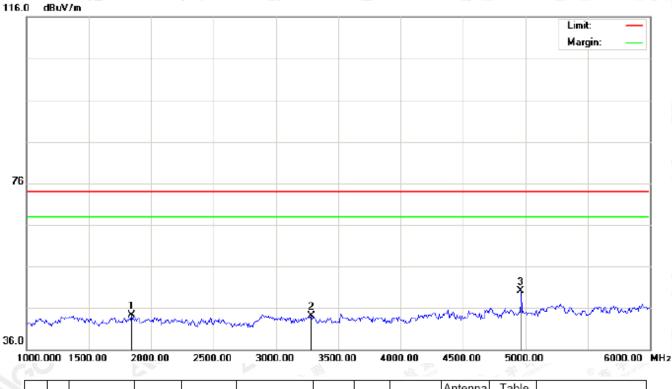
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL-HORIZONTAL

	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
2		-	MHz	dBu∀	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
10	1		1841.667	36.07	8.21	44.28	74.00	-29.72	peak			
	2		3283.333	32.20	11.91	44.11	74.00	-29.89	peak			
	3	*	4960.000	42.10	8.09	50.19	74.00	-23.81	peak			

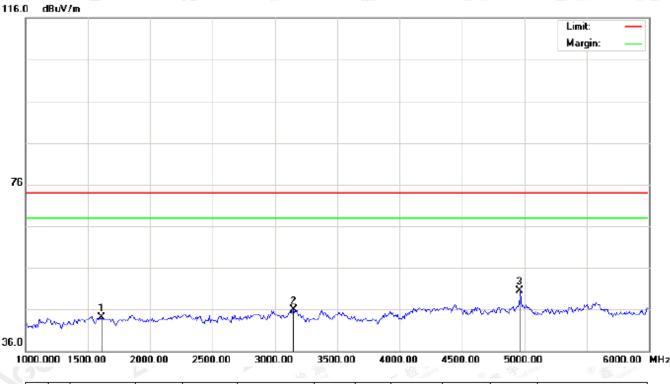
RESULT: PASS

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RADIATED EMISSION TEST- (ABOVE 1GHz)-HIGH CHANNEL- VERTICAL

No	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height		Comment
i i	-	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		1608.333	38.38	5.76	44.14	74.00	-29.86	peak			
2		3150.000	34.14	11.78	45.92	74.00	-28.08	peak			
3	*	4960.000	42.41	8.09	50.50	74.00	-23.50	peak			

RESULT: PASS

Note: 6~25GHz at least have 20dB margin. No recording in the test report.

Factor=Antenna Factor + Cable loss - Amplifier gain, Margin=Measurement-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

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10. BAND EDGE EMISSION

10.1. MEASUREMENT PROCEDURE

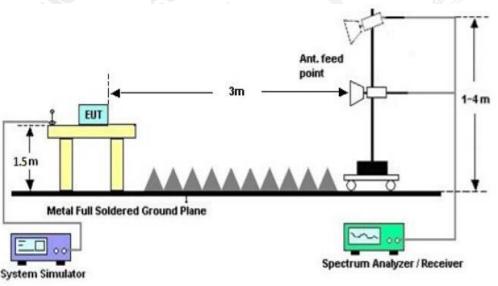
1. The EUT operates at hopping-off test mode. The lowest or highest channels are tested to verify the largest transmission and spurious emissions power at the continuous transmission mode.

2. Max hold the trace of the setup 1, and the EUT operates at hopping-on test mode to verify the largest spurious emissions power.

3. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission.

Start	Start frequency(MHz) 2200 2478			Stop frequency(MHz)				
The second	2200	· · · · · · · · · · · · · · · · · · ·	not C The station	2405	SCC "			
C Treasulton of Circles	2478	C Allestation of Gird	GO	2500				

10.2 TEST SETUP



RADIATED EMISSION TEST SETUP

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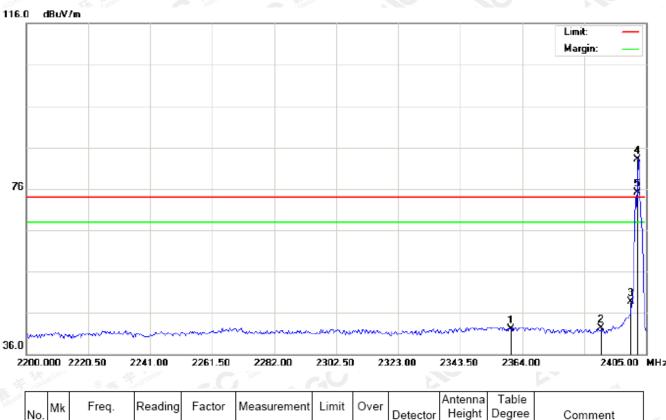


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10.3 RADIATED TEST RESULT

(Worst modulation: GFSK)

TEST PLOT OF BAND EDGE FOR LOW CHANNEL-Horizontal



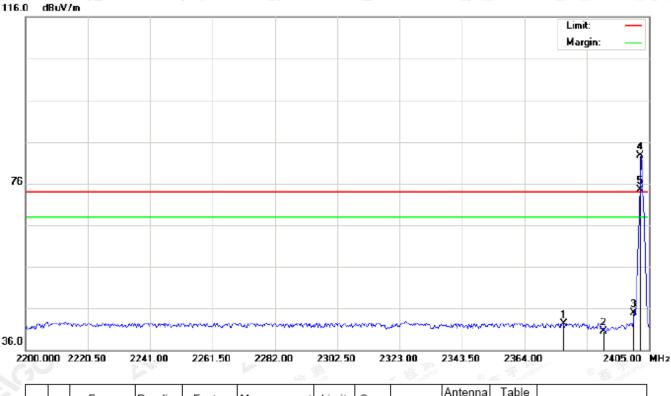
No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Height	Degree	Comment
	-	MHz	dBu∨	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
1		2360.242	31.90	10.28	42.18	74.00	-31.82	peak			
2		2390.000	32.00	10.31	42.31	74.00	-31.69	peak			
3		2400.000	38.47	10.32	48.79	74.00	-25.21	peak			
4	*	2402.000	72.71	10.32	83.03	74.00	9.03	peak			
5	х	2402.000	64.72	10.32	75.04	74.00	1.04	AVG	100	247	

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TEST PLOT OF BAND EDGE FOR LOW CHANNEL -Vertical

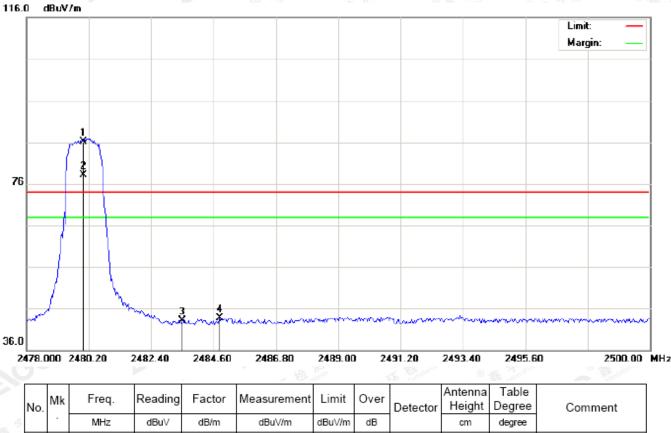
	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Table Height Degree		Comment
ğ		-	MHz	dBu∀	dB/m	dBu\//m	dBuV/m	dB		cm	degree	
101	1		2376.983	31.99	10.29	42.28	74.00	-31.72	peak			
	2		2390.000	30.21	10.31	40.52	74.00	-33.48	peak			
	3		2400.000	34.56	10.32	44.88	74.00	-29.12	peak			
	4	*	2402.000	72.29	10.32	82.61	74.00	8.61	peak			
	5	Х	2402.000	64.26	10.32	74.58	74.00	0.58	AVG	100	157	

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TEST PLOT OF BAND EDGE FOR HIGH CHANNEL -Horizontal

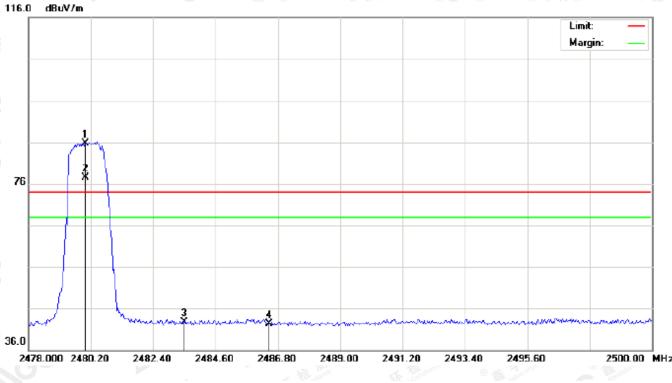
	No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
3		-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
stat	1	*	2480.000	75.67	10.41	86.08	74.00	12.08	peak			
	2	Х	2480.000	67.73	10.41	78.14	74.00	4.14	AVG	100	261	
	3		2483.500	32.69	10.41	43.10	74.00	-30.90	peak			
	4		2484.820	33.36	10.41	43.77	74.00	-30.23	peak			
										P		

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TEST PLOT OF BAND EDGE FOR HIGH CHANNEL-Vertical

No	. N	Иk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
8		-	MHz	dBu∨	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	;	*	2480.000	75.22	10.41	85.63	74.00	11.63	peak			
2)	Х	2480.000	67.18	10.41	77.59	74.00	3.59	AVG	100	134	
3			2483.500	32.26	10.41	42.67	74.00	-31.33	peak			
4			2486.506	31.95	10.41	42.36	74.00	-31.64	peak			

RESULT: PASS

Note: Factor=Antenna Factor + Cable loss - Amplifier gain, Over=Measure-Limit.

The "Factor" value can be calculated automatically by software of measurement system.

Hopping on mode and Hopping off mode have been tested, but only worst case reported.

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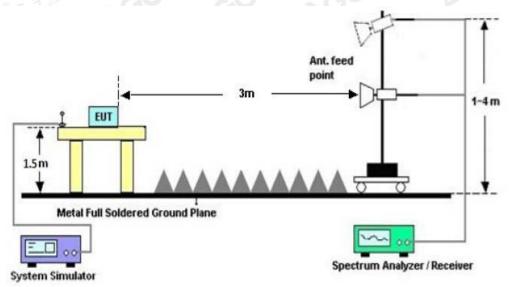
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11. 20DB BANDWIDTH

11.1. MEASUREMENT PROCEDURE

- 1. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 2. Set Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hoping channel
- RBW \geq 1% of the 20 dB bandwidth, VBW \geq 3RBW; Sweep = auto; Detector function = peak
- 3. Set SPA Trace 1 Max hold, then View.

11.2. TEST SET-UP

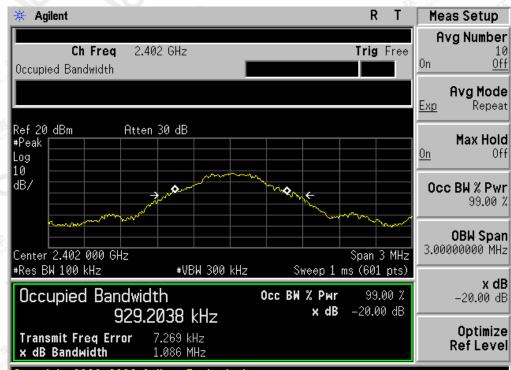


11.3. LIMITS AND MEASUREMENT RESULTS

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT									
	Measurement Result								
Applicable Limits		Desult							
		99%OBW (MHz)	-20dB BW(MHz)	Result					
Har The Standard	Low Channel	0.929	1.086	PASS					
N/A	Middle Channel	0.930	1.069	PASS					
	High Channel	0.910	1.075	PASS					

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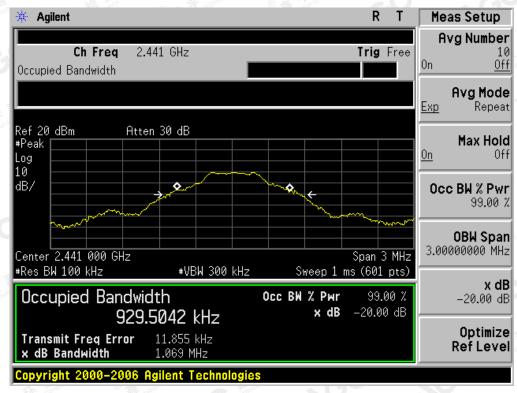


TEST PLOT OF BANDWIDTH FOR LOW CHANNEL

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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



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TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL

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	100						
BLUET	DOTH 2MBPS LIN	ITS AND MEASU	REMENT RESULT				
	Measurement Result						
Applicable Limits		Desalt					
		99%OBW (MHz)	-20dB BW(MHz)	Result			
The standards the standards	Low Channel	1.235	1.409	PASS			
N/A	Middle Channel	1.233	1.368	PASS			
	High Channel	1.263	1.374	PASS			
			M. don	ober Atte			

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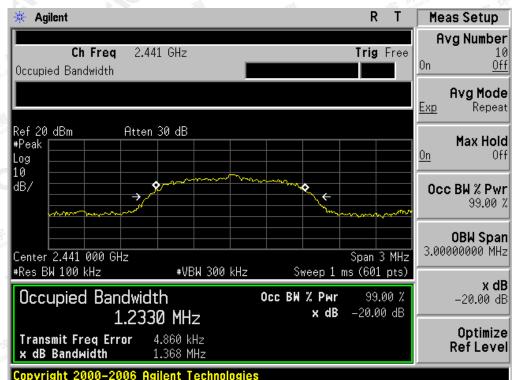
GC

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



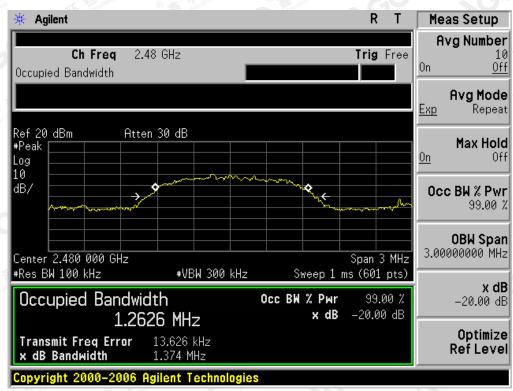
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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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BLUET	BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT								
		Measurement Result							
Applicable Limits		Desult							
		99%OBW (MHz)	-20dB BW(MHz)	Result					
The second second	Low Channel	1.209	1.350	PASS					
N/A	Middle Channel	1.232	1.392	PASS					
GC M	High Channel	1.256	1.397	PASS					
		- iliti	M. M. GO	Alle					

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



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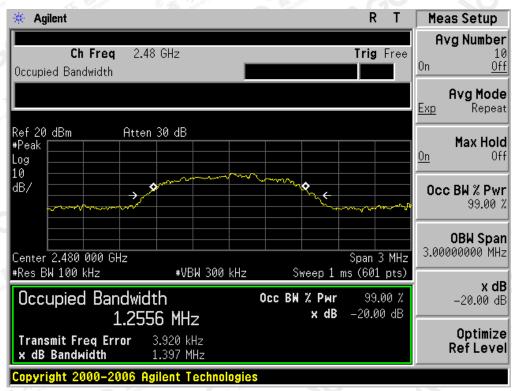
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TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL

TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



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12. FCC LINE CONDUCTED EMISSION TEST

12.1. LIMITS OF LINE CONDUCTED EMISSION TEST

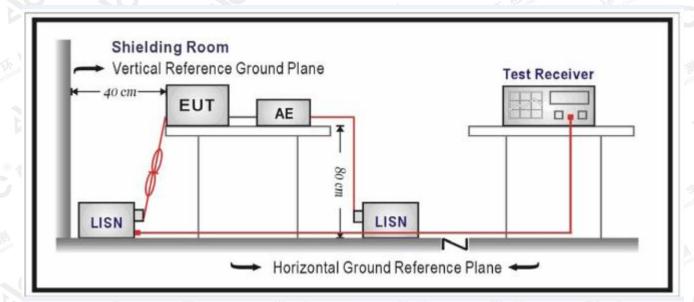
Francisco	Maximum RF Line Voltage						
Frequency	Q.P.(dBuV)	Average(dBuV)					
150kHz~500kHz	66-56	56-46					
500kHz~5MHz	56	46					
5MHz~30MHz	60	50					

Note:

1. The lower limit shall apply at the transition frequency.

2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

12.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST



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12.3. PRELIMINARY PROCEDURE OF LINE CONDUCTED EMISSION TEST

- The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor-standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- 2. Support equipment, if needed, was placed as per ANSI C63.10.
- 3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
- 4. All support equipments received AC120V/60Hz power from a LISN, if any.
- 5. The EUT received DC voltage by adapter or PC which received 120V/60Hzpower by a LISN.
- 6. The test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
- 7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.
- 8. During the above scans, the emissions were maximized by cable manipulation.
- 9. The test mode(s) were scanned during the preliminary test.

Then, the EUT configuration and cable configuration of the above highest emission level were recorded for reference of final testing.

12.4. FINAL PROCEDURE OF LINE CONDUCTED EMISSION TEST

- 1. EUT and support equipment was set up on the test bench as per step 2 of the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit. If EUT emission level was less –2dB to the A.V. limit in Peak mode, then the emission signal was re-checked using Q.P and Average detector.
- 3. The test data of the worst case condition(s) was reported on the Summary Data page.

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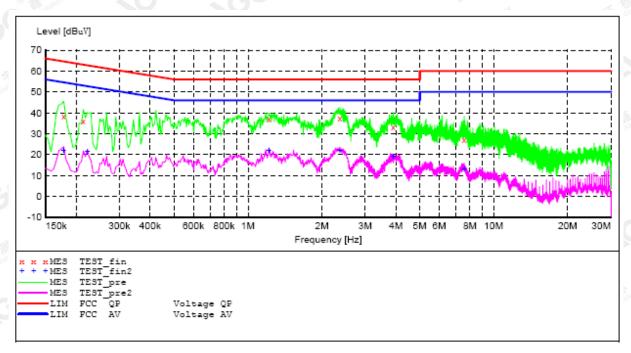
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12.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

By adapter(worst case)

Line Conducted Emission Test Line 1-L



MEASUREMENT RESULT: "TEST fin"

2018/5/26 17: Frequency MHz		Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.178000 0.214000 1.218000 2.366000 3.902000 7.574000	38.50 35.90 36.90 37.20 33.40 27.40	10.0 10.1 10.1 9.9 10.1 9.9	65 63 56 56 56 60	26.1 27.1 19.1 18.8 22.6 32.6	QP QP QP	L1 L1 L1 L1 L1 L1	FLO FLO FLO FLO FLO FLO

MEASUREMENT RESULT: "TEST fin2"

2018/5/26 17:32 Frequency Level Transd Limit Margin Detector Line MHz dBuV dB dBuV dB

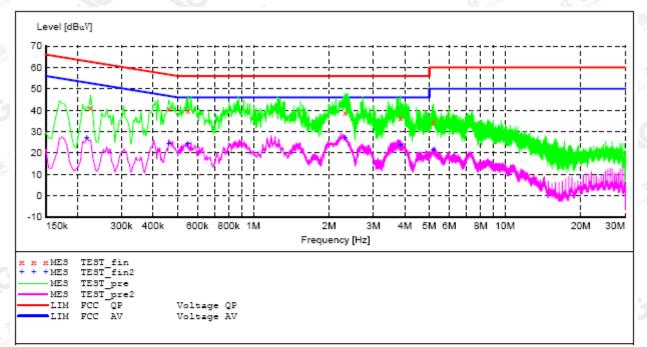
MHz	dBuV	dB	dBuV	dB			
0.178000	21.80	10.0	55	32.8	AV	L1	FLO
0.222000	21.40	10.1	53	31.3	AV	L1	FLO
1.218000	22.10	10.1	46	23.9	AV	L1	FLO
2.366000	21.90	9.9	46	24.1	AV	L1	FLO
3.902000	19.10	10.1	46	26.9	AV	L1	FLO
7.590000	12.90	9.9	50	37.1	AV	L1	FLO

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Line Conducted Emission Test Line 2-N

MEASUREMENT RESULT: "TEST fin"

2018/5/26 17:36 Frequency Level Transd Limit Margin Detector Line ΡE MHz dBuV dB dBuV dB 0.226000 41.00 10.1 63 21.6 Ν FLO QP 0.462000 40.70 10.0 57 16.0 QP Ν FLO 0.550000 40.00 9.9 56 16.0 QP Ν FLO FLO 2.314000 39.00 9.9 56 17.0 QP Ν Ν 3.834000 36.70 10.1 56 19.3 QP FLO 25.6 QP Ν FLO 5.198000 34.40 10.3 60

MEASUREMENT RESULT: "TEST fin2"

MHz dBuV dB dBuV dB 0.218000 27.10 10.1 53 25.8 AV N F 0.462000 24.50 10.0 47 22.2 AV N F 0.550000 24.30 9.9 46 21.7 AV N F 2.318000 27.00 9.9 46 19.0 AV N F 3.834000 23.80 10.1 46 22.2 AV N F	2018/5/26 17	:36						
0.462000 24.50 10.0 47 22.2 AV N F 0.550000 24.30 9.9 46 21.7 AV N F 2.318000 27.00 9.9 46 19.0 AV N F 3.834000 23.80 10.1 46 22.2 AV N F					2	Detector	Line	PE
5.202000 21.70 10.3 50 28.3 AV N F	0.462000 0.550000 2.318000	24.50 24.30 27.00	10.0 9.9 9.9	47 46 46	22.2 21.7 19.0	AV AV AV	N N N	FLO FLO FLO FLO FLO
	5.202000	21.70	10.3	50	28.3	AV	N	FLO

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APPENDIX A: PHOTOGRAPHS OF TEST SETUP FCC LINE CONDUCTED EMISSION TEST SETUP



FCC RADIATED EMISSION TEST SETUP

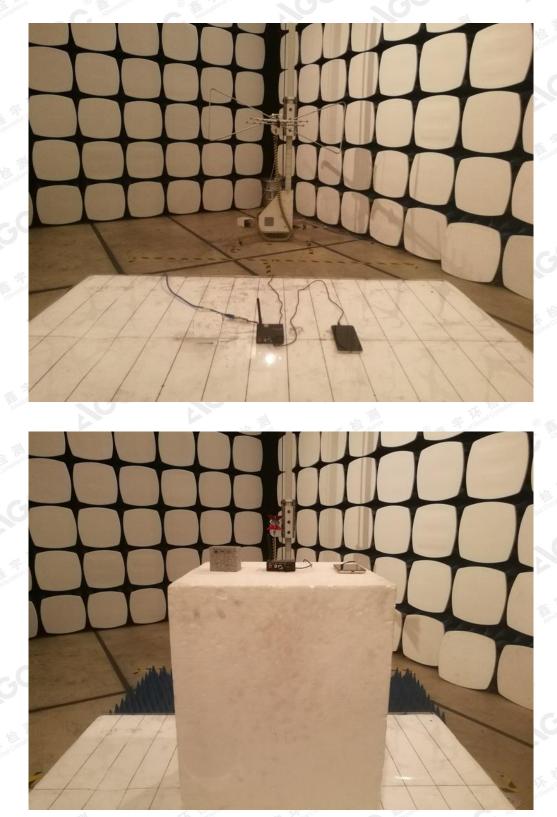


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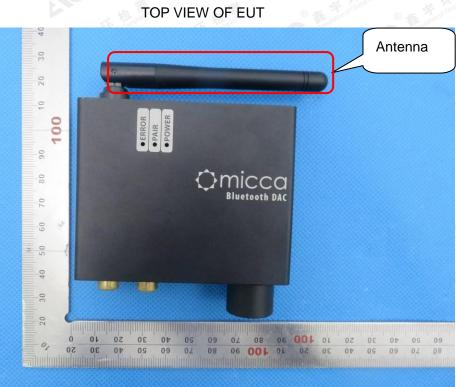


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APPENDIX B: PHOTOGRAPHS OF EUT



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FRONT VIEW OF EUT



BACK VIEW OF EUT



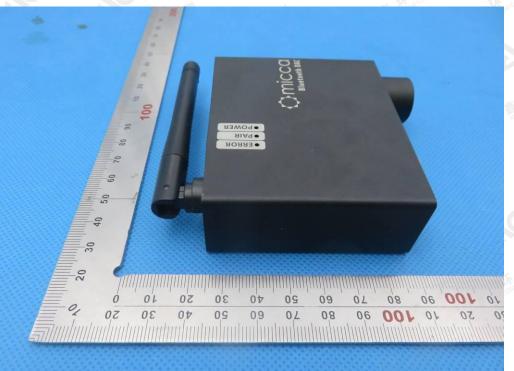
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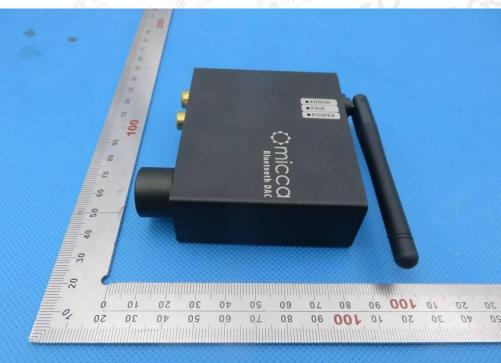


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LEFT VIEW OF EUT



RIGHT VIEW OF EUT



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VIEW OF EUT (PORT)-1



VIEW OF EUT (PORT)-2



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OPEN VIEW OF EUT



INTERNAL VIEW OF EUT-1

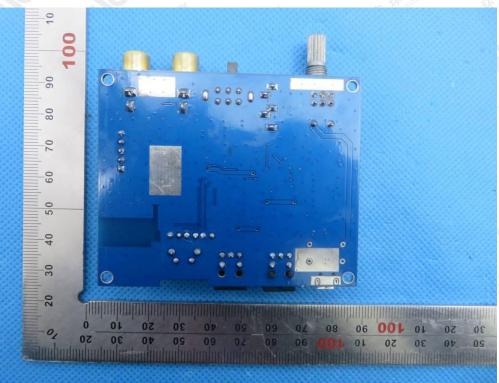


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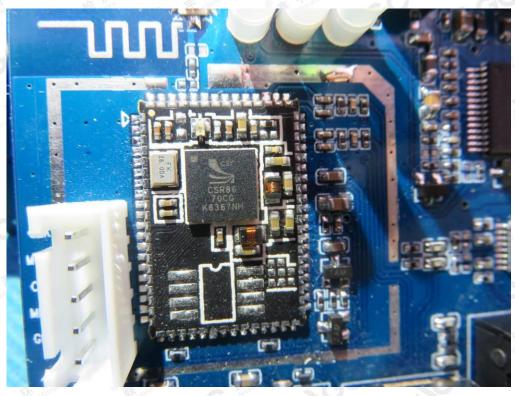


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INTERNAL VIEW OF EUT-2

INTERNAL VIEW OF EUT-3



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VIEW OF ADAPTER (AE)



The adapter was supplied by AGC ----END OF REPORT----

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