

FCC - TEST REPORT

Report Number	68.950.19.2998.01 Date	e of Issue: February 27, 2020
Model	ATH-ANC300TW	
Product Type	WIRELESS HEADPHONES	
Applicant	Audio-Technica Corporation	
Address	2-46-1 Nishi-naruse, Machida T	okyo 194-8666 Japan
Factory	Charter Media (Dongguan) Co.	, Ltd.
Address	Dabandi Industrial Zone, Danin	g District, Humen Town,
	523930 Dongguan City, Guang	dong Province,
	PEOPLE'S REPUBLC OF CHI	NA
Test Result	n Positive O Negative	
Total pages including Appendices	31	

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name:	TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch Building 12 & 13, Zhiheng Wisdomland Business Park, Nantou Checkpoint Road 2, Nanshan District Shenzhen 518052 P.R. China
Telephone: Fax:	86 755 8828 6998 86 755 8288 5299
FCC Registration	514049

No.:



3 Description of the Equipment Under Test

Product:	WIRELESS HEADPHONES
Model no.:	ATH-ANC300TW
FCC ID:	JFZANC300TW-L
Options and accessories:	USB Cable, Charging Case
Rating:	Headphones: 3.8VDC, 75mAh (Supplied by Built Li-ion battery) Charging case: 5VDC (Charged by USB port) 3.7VDC, 700mAh(Supplied by Polymer Li-ion Rechargeable battery)
RF Transmission	2402MHz-2480MHz
Frequency: No. of Operated Channel:	40
Modulation:	GFSK
Antenna Type:	FPC Inverted-F antenna
Antenna Gain:	2.0dBi
Description of the EUT:	The Equipment Under Test (EUT) is WIRELESS HEADPHONES operated at 2.4GHz



4 Summary of Test Standards

Test Standards			
FCC Part 15 Subpart C	PART 15 - RADIO FREQUENCY DEVICES		
10-1-2017 Edition	Subpart C - Intentional Radiators		

All the test methods were according to KDB558074 D01 v05r02 DTS Measurement Guidance and ANSI C63.10 (2013).



5 Summary of Test Results

Technical Requirements						
FCC Part 15 Subp	part C		I			
Test Condition		Page	Test		st Res	
		S	Site	Pass	Fail	N/A
§15.207	Conducted emission AC power port					
§15.247 (b) (1)	Conducted peak output power	10	Site 1			
§15.247(a)(1)	20dB bandwidth					\boxtimes
§15.247(a)(1)	Carrier frequency separation					\boxtimes
§15.247(a)(1)(iii)	Number of hopping frequencies					\square
§15.247(a)(1)(iii)	Dwell Time					\square
§15.247(a)(2)	6dB bandwidth and 99% Occupied Bandwidth	13	Site 1			
§15.247(e)	Power spectral density	16	Site 1			
§15.247(d)	Spurious RF conducted emissions	20	Site 1			
§15.247(d)	Band edge	24	Site 1			
§15.247(d) & §15.209 & §15.205	Spurious radiated emissions for transmitter	26	Site 1			
§15.203	Antenna requirement	See no	ote 1			

Note 1: N/A=Not Applicable.

Note 2: The EUT uses a FPC Inverted-F antenna, which gain is 2.0dBi. In accordance to §15.203, it is considered sufficiently to comply with the provisions of this section.



6 General Remarks

Remarks

This submittal(s) (test report) is intended for FCC ID: JFZANC300TW-L complies with Section 15.205, 15.209, 15.247 of the FCC Part 15, Subpart C.

ATH-ANC300TW is a Bluetooth Headset with Bluetooth 5.0, but it supports 1Mbps only for for Bluetooth Low Energy, but does not support 2Mbps.The TX and RX range is 2402MHz-2480MHz.

Note: The report is for BLE only

SUMMARY:

All tests according to the regulations cited on page 5 were

n - Performed

O - Not Performed

The Equipment under Test

n - Fulfills the general approval requirements.

O - Does not fulfill the general approval requirements.

Sample Received Date:	November 21, 2019
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Testing Start Date: November 21, 2019

Testing End Date: January 3, 2020

- TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch -

Reviewed by:

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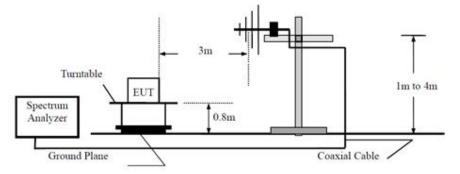
Tree them

Tree Zhan EMC Test Engineer

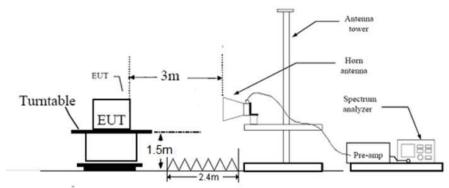


7 Test Setups

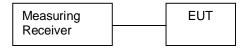
Below 1GHz



Above 1GHz



Conducted RF test setups





8 Systems test configuration

Auxiliary Equipment Used during Test:

DESCRIPTION	MANUFACTURER	MODEL NO.(SHIELD)	S/N(LENGTH)
Notebook	Lenovo	X220	
Adapter			

Test software: Bluetooth 3 Test Tool, which used to control the EUT in continues transmitting mode.

The system was configured to channel 0, 19, and 39 for the test.



9 Technical Requirement

9.1 Conducted peak output power

Test Method

- Use the following spectrum analyzer settings: RBW > the 6dB bandwidth of the emission being measured, VBW≥3RBW, Span≥3RBW Sweep = auto, Detector function = peak, Trace = max hold.
- 2. Add a correction factor to the display.
- 3. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power.

Limits

According to §15.247 (b) (1), conducted peak output power limit as below:

Frequency Range	Limit	Limit
MHz	W	dBm
2400-2483.5	≤1	≤30

Test result as below table

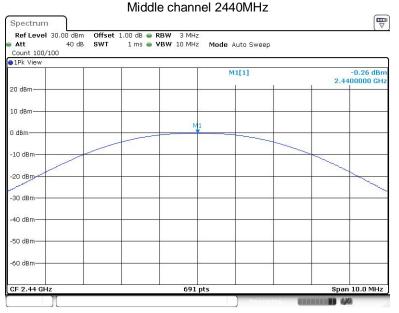
Frequency MHz	Conducted Peak Output Power dBm	Result
Low channel 2402MHz	-0.18	Pass
Middle channel 2440MHz	-0.26	Pass
High channel 2480MHz	-0.48	Pass



Low channel 2402MHz Spectrum
 Offset
 1.00 dB
 ● RBW
 3 MHz

 SWT
 1 ms
 ● VBW
 10 MHz
 Mode
 Auto Sweep
 Ref Level 30.00 dBm Att 40 dB Count 100/100 1Pk View -0.18 dBm 2.4017680 GHz M1[1] 20 dBm 10 dBm M1 0 dBm -10 dBm -20 dBm -30 dBm 40 dBm -50 dBm -60 dBm Span 10.0 MHz CF 2.402 GHz 691 pts

Date: 3.JAN.2020 13:14:17



Date:3JAN.2020 13:16:07

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Count 100/100	1 dBm Offset 40 dB SWT	1.00 dB 👄 RE 1 ms 👄 VE	3W 3 MHz 3W 10 MHz	Mode Auto Swee	эр		
1Pk View				M1[1]			-0.48 dBn 97830 GH:
20 dBm		2					
LO dBm							
) dBm			M1				
10 dBm					/		
						1	
20 dBm							1
30 dBm							
40 dBm							
50 dBm							
60 dBm							

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9.2 Power spectral density

Test Method

This procedure shall be used if maximum peak conducted output power was used to demonstrate compliance:

- Set analyzer center frequency to DTS channel center frequency. RBW=3kHz, VBW≥3RBW, Span=1.5 times DTS bandwidth, Detector=Peak, Sweep=auto, Trace= max hold.
- 2. Allow trace to fully stabilize, use the peak marker function to determine the maximum amplitude level within the RBW.
- 3. Repeat above procedures until other frequencies measured were completed.

Limit

Limit [dBm]

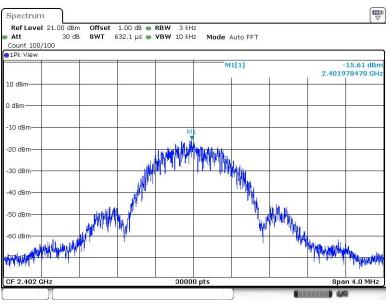
≤8dBm/3KHz

Test result

Power spectral density	Result
dBm/3KHz	
-15.61	Pass
-15.55	Pass
-15.84	Pass
	density dBm/3KHz -15.61 -15.55

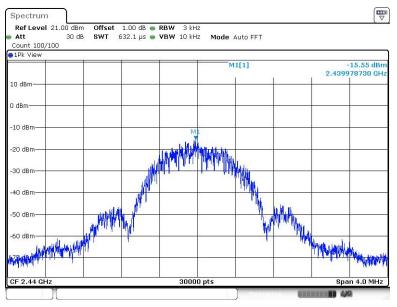


Low channel 2402MHz



Date: 3.JAN 2020 13:14:23



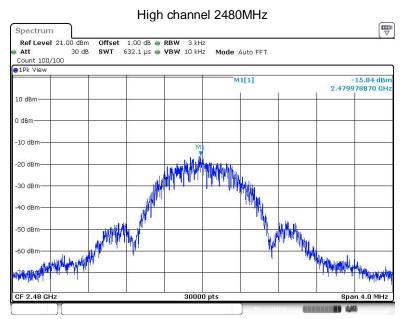


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9.3 6 dB Bandwidth and 99% Occupied Bandwidth

Test Method

1. Use the following spectrum analyzer settings:

RBW=100K, VBW \ge 3RBW, Sweep = auto, Detector function = peak, Trace = max hold 2. Use the automatic bandwidth measurement capability of an instrument, may be employed using the X dB bandwidth mode with X set to 6 dB, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be \ge 6 dB.

3. Allow the trace to stabilize, record the X dB Bandwidth value.

Limit

	Limit [kŀ	lz]	
-	≥500		
Test result Frequency	6dB bandwidth	99 bandwidth	
MHz	kHz	kHz	Result
Bottom channel 2402MHz	728	1039	Pass
Middle channel 2440MHz	732	1039	Pass
Top channel 2480MHz	728	1039	Pass



6 dB Bandwidth

Ref Lo Att Count		30.00 dBi 40 d		RBW 100 kHz VBW 300 kHz	Mode Auto FFT		
1Pk Vi							
					M1[1]		-6.50 dBr
20 dBm·							2.40163600 GH
					M2[1]		-0.48 dBr
10 dBm							2.40200400 GH
				M2			
0 dBm—		Introduction of		MI			
-10 dBm	D	1 -6.484	dBm	1	Å		
-10 000			(
-20 dBm				-	1		
	8		1		1		
-30 dBm				-			
-40 dBm							
-40 UBII		~			75	1	$\sim \sim$
-SU dBm							
	22						
-60 dBm				-	-		
CF 2.40	32 ĠH	Iz	18 V	1001 p	ts		Span 4.0 MHz
1arker							
Туре	Ref		X-value	Y-value	Function	Func	tion Result
M1 M2		1	2.401636 GHz 2.402004 GHz	-6.50 dBm -0.48 dBm			
M2 D3	M1	1	728.0 kHz	-0.48 dBm			

Date: 3 JAN 2020 13:13:59

1Pk View								
				м	1[1]			-1.04 dBn 00400 GH
20 dBm				0	cc Bw			61039 MH
10 dBm								
) dBm			M	L				
10 dBm			m	my				
		Ţ		5	T2			
20 dBm					1			
30 dBm	m	1				m		
40 dBm					می ا			
							mm	m
60 dBm								

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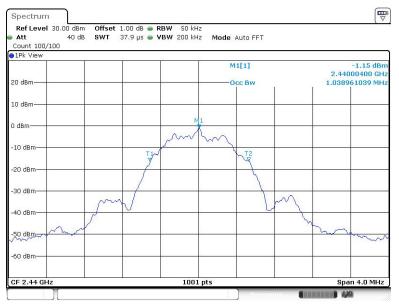
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Middle channel 2440MHz

Att		30.00 dB 40 c NN		 RBW 100 kHz VBW 300 kHz 	Mode Auto FF	Т	
1Pk Vi			201 - MA	10.10 M.2			
20 dBm					M1[1] M2[1]		-6.72 dBr 2.43963200 GH -0.60 dBr
10 dBm							2.44000400 GH
0 dBm—	-	1111111		M2	~		
-10 dBm	1-D	1 -6.602	dBm		A		
-20 dBm	<u>+</u>					×	
-30 dBm	1						
-40 dBm		~ ~					
-50 dBm	1	~	<u></u>				
-60 dBrr	-			0	0.		
CF 2.4	4 GHz	1		1001 pt	ts		Span 4.0 MHz
Marker		-			Function	-	tion Result
Type M1	Ker	1	X-value 2.439632 GHz	Y-value -6.72 dBm	Function	Func	ation Result
M2		1	2.440004 GHz	-0.60 dBm			
D3	M1	1	732.0 kHz	-0.03 dB			

Date:3JAN.2020 13:15:49



Date:3JAN.2020 13:16:00

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High channel 2	480MHz
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Att Count		40 (00	dB SWT 18.9 µs 👄	VBW 300 kHz	Mode Auto FF	Т	
1Pk Vi	ew			r			-6.87 dBn
					M1[1]		2.47963200 GH
20 dBm	8 8			8. D	M2[1]		-0.82 dBr
					matri.		2.48000400 GH
10 dBm	-						
ID				M2			
0 dBm—	_	10000		MI			
-10 dBm	D	1 -6.820) dBm	1	X		
10 000			1		>		
-20 dBm	-				1		
	8				() ()	N	
-30 dBm	1-		m		-	1	
-40 dBm	1				3	1	\sim
	-	\sim					L-M
SO dBr	1						
-60 dBm							
-ou ubii				17	0.		
CF 2.4	B GHz			1001 pt:	5		Span 4.0 MHz
1arker	Def	Trc	X-value	Y-value	Function	- Euro	tion Result
Type M1	кет	1	2.479632 GHz	-6.87 dBm	Function	Func	CIUM RESUL
M2	1	1	2.480004 GHz	-0.87 dBm			
D3	M1	1	728.0 kHz	-0.02 dB			

Date:3JAN.2020 13:17:32

		25.0	M1[1]			-1.34 dBn 00400 GH: 61039 MH:
			OCC DA	1 1	1.0005	
		M1				
	N	m	~			
	TJ~		T2			
			1			
m			1	m		
1					~	
		8			ma	m
			Jun h			2.480 0cc Bw 1.0369

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9.4 Spurious RF conducted emissions

Test Method

- 1. Establish a reference level by using the following procedure:
 - a. Set RBW=100 kHz. VBW≥3RBW. Detector =peak, Sweep time = auto couple, Trace mode = max hold.
 - b. Allow trace to fully stabilize, use the peak marker function to determine the maximum PSD level.
- 2. Use the maximum PSD level to establish the reference level.
 - a. Set the center frequency and span to encompass frequency range to be measured.
 - b. Use the peak marker function to determine the maximum amplitude level. Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements, report the three highest emissions relative to the limit.
- 3. Repeat above procedures until other frequencies measured were completed.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20



Spurious RF conducted emissions

Spectrum	ר	240	2MHz			
		1.00 dB 👄 RBW 100 k 30.1 ms 👄 VBW 300 k	<hz Hz Mode Auto Swee</hz 			(\Box
Count 10/10	Management and an an	and a second		E.		
1Pk Max			M1[1]		12	67.81 dBm
				a a		.8970 MHz
0 dBm						
-10 dBm						
10 0.011						
-20 dBm 1	20.510 dBm			3		
-30 dBm						
-30 UBIII						
-40 dBm				7		
-50 dBm						
-60 dBm						
55	1		M1		Sec. Sec.	
-79.dBm		and on the second s	in participation buildens and an inter-	allowed and the debites	and the state of t	a da angerera da da angerera. Desera da angerera da sera da s
-80 dBm	nu a radamentenditi	and the second	here all the second	a and solution		
Start 30.0 MHz		300	01 pts		Sto	p 1.0 GHz
ate: 3 JAN 2020 1	3:14:49		Mean	ring.4 📲		
ate: 3 JAN 2020 1 Spectrum	314:49		Miser	rino		
Spectrum Ref Level 20.1	D0 dBm Offset :	1.00 dB 🖷 RBW 100 k				
Spectrum Ref Level 20.1 Att	D0 dBm Offset :		Hz Hz Hz Mode Auto Swee			
Spectrum Ref Level 20.1	D0 dBm Offset :		Hz Mode Auto Swee			
Spectrum Ref Level 20.1 Att Count 9/10	D0 dBm Offset :					(₩) 51.92 dBm
Spectrum Ref Level 20.1 Att Count 9/10	D0 dBm Offset :		Hz Mode Auto Swee			
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm	D0 dBm Offset :		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.1 Att Count 9/10 1Pk Max	D0 dBm Offset :		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm	D0 dBm Offset :		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm -10 dBm -10 dBm	0 dBm Offset : 30 dB SWT		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.1 Att Count 9/10 1Pk Max 10 dBm 0 dBm	0 dBm Offset : 30 dB SWT		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm -10 dBm -10 dBm	0 dBm Offset : 30 dB SWT		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.0 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm -30 dBm	0 dBm Offset : 30 dB SWT		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.1 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm 01 -	0 dBm Offset : 30 dB SWT		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -20 dBm -30 dBm -40 dBm	0 dBm Offset : 30 dB SWT		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.6 Att Count 9/10 PIPk Max 10 dBm0 dBm20 dBm30 dBm40 dBm50 dBm5	20.510 dBm		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -20 dBm -30 dBm -40 dBm	20.510 dBm		Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dEm -30 dEm -50 dEm	20.510 dBm	255 ms 👄 VBW 300 k	Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.0 Att Count 9/10 IPk Max 10 dBm -10 dBm -20 dEm -20 dEm -30 dEm -40 dEm -50 dEm	20.510 dBm	255 ms 👄 VBW 300 k	Hz Mode Auto Swee			(₩) 51.92 dBm
Spectrum Ref Level 20.4 Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dEm -30 dEm -50 dEm	20.510 dBm	255 ms VBW 300 k	Hz Mode Auto Swee		7.2	(₩) 51.92 dBm

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2440MHz

	10		-						
					M	1[1]			-67.90 dBr 7.6500 MH
0 dBm			2						
-10 dBm			6		ē		-		
-20 dBm-01	-20.530 d	Bm							
-30 dBm									
-40 dBm									
-50 dBm									
60 dBm									
SS abin									
	and a literation of the	in souther fit	nite and a second	New York Company	and the second	M1	alle ellater (base		ali dana dada
70 dPm	n hin the level of	formen form fra	enter et d'étabanan nerete d'étabanan	वेत्रा विविध्या स्वित्यास्त्र विवेत सन्द्रण्यस्य स्वयं स्वित्यास्य	anan di panganan di pangan Panganan di panganan di pang		in the following of the second	<mark>la delena da la constante de la delena de la constante de la constante de la constante de la constante de la co Tenera de la constante de la cons</mark>	in hi a faraina daala mugama ay mayaraa
70 dBm	Californi (redenanci	in som for sin	and the second	an	and the second			por coll from the balance	Ind the section of th
-80 dBm -80 dBm -81 dBm 	Californi (redenanci	Alternation (Array (M)) and Magnet (Array and	entinen fikkovan ografy kirkatoria	ini finale ina ini na mangané kénép 3000	and the second			por coll from the balance	plate for an
Start 30.0 MH	z 13:16:29			3000:	L pts			por coll from the balance	Ind the section of th
70, dBm, and mo 80 dBm Start 30.0 MH start 3.JAN 2020 Spectrum Ref Level 20 Att Count 9/10	z 13:16:29		1.00 dB @	an	L pts		cino	por coll from the balance	op 1.0 GHz
Start 30.0 MH	z 13:16:29	Offset	1.00 dB @	3000	2 2 2 2 2 3 3 3 3 4 3 4 4 4 4 4 4 4 4 4	анерия и в Илино (учини и Вайна Уранта) Макелана	cino	St	op 1.0 GHz

30001 pts

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20 d

-30 dB -40 dB

-50 dB

-70 dBm Start 1.0 GHz

D1 -20.530 dB

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M1

Stop 26.5 GHz

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2480MHz

Att Count 10/10	20 dB SWT	30.1 ms 👄 VBW 300	kHz Mode Auto	Sweep		
1Pk Max		-	M1[1]		0.	-67.88 dBi
			MILI			-67.88 dBr 3.6820 MH
0 dBm					-	
-10 dBm					-	
-20.dBm-D1	20.910 dBm					
-30 dBm						
-SO UBIII						
-40 dBm						
-50 dBm						-
-60 dBm				M1		
70 10						and a
-78 dBmm thit	स्वय प्रायं प्रायं कि कि स्वयं करने के प्रायं इ.स. स्वयं प्रायं के स्वयं की साम करने का	nen er sen	and the second sec	in an ann air air air an an an an an air	and distributed and dist	and and and a strength of the st
-80 dBm		and the second se				
Start 30.0 MHz		30	001 pts		St	op 1.0 GHz
	318-22			Measuring		_
Spectrum Ref Level 20. Att	1	et 1.00 dB ● RBW 100 255 ms ● VBW 300				_
Spectrum Ref Level 20. Att Count 9/10	00 dBm Offse		kHz Mode Auto	Sweep		
Spectrum Ref Level 20. Att Count 9/10	00 dBm Offse			Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 IPk Max	00 dBm Offse		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 IPk Max	00 dBm Offse		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 1Pk Max 10 dBm	00 dBm Offse		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 PPK Max O dBm O dBm	00 dBm Offse		kHz Mode Auto	Sweep		-52.05 dBr 362250 GH
Spectrum Ref Level 20. Att Count 9/10 PPK Max O dBm O dBm	00 dBm Offse		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 DIPk Max 10 dBm -10 dBm	DO dBm Offs 30 dB SWT		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 DIPk Max 10 dBm -10 dBm	DO dBm Offs 30 dB SWT		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm	DO dBm Offs 30 dB SWT		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm	DO dBm Offs 30 dB SWT		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm	DO dBm Offs 30 dB SWT		kHz Mode Auto	Sweep		-52.05 dBr
Att Count 9/10 DIPk Max DIPk Max D dBm D dBm -10	DO dBm Offs 30 dB SWT		KH2 Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm	DO dBm Offs 30 dB SWT		kHz Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 PIPk Max 10 dBm -10 dBm -20 dBm 01 -30 dBm -40 dBm -50 d	DO dBm Offs 30 dB SWT		KH2 Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20, 0 Att Count 9/10 1PK Max 10 dBm -10 dBm -10 dBm -20 dBm -30 dBm -40 dBm	DO dBm Offs 30 dB SWT		KH2 Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 1Pk Max 10 dBm -10 dBm -20 dBm -30 dBm -50 dBm -60 dBm	DO dBm Offs 30 dB SWT		KH2 Mode Auto	Sweep		-52.05 dBr
Spectrum Ref Level 20. Att Count 9/10 PIPk Max 10 dBm -10 dBm -20 dBm 01 -30 dBm -40 dBm -50 d	DO dBm Offs 30 dB SWT		KH2 Mode Auto	Sweep		-52.05 dBr

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9.5 Band edge

Test Method

- Use the following spectrum analyzer settings: Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 kHz, VBW ≥ RBW, Sweep = auto, Detector function = peak, Trace = max hold.
- 2 Allow the trace to stabilize, use the peak and delta measurement to record the result.
- 3 The level displayed must comply with the limit specified in this Section.

Limit

Frequency Range MHz	Limit (dBc)
30-25000	-20



Band edge testing

					2402	2MHz	-			_
Spectr	um	1								
Ref Le	vel 20.0	0 dBm	Offset	1.00 dB	• RBW 100 kHz					
Att		30 dB	SWT 24	46.5 µs	• VBW 300 kHz	Mode /	Auto FF1	ſ.		
Count 3 1Pk Vie	800/300									
21 10 110		Ĩ			20	M1	[1]			-0.57 dBn
10 dBm-									1	2.402040 GH
						M2	[1]		10	-54.67 dBn
0 dBm—								4	1	2.400000 GH:
-10 dBm	_				-				5	
-20 dBm	D12	0.570	dB m							
		0.370	ubm							
-30 dBm										
-40 dBm										
										14
-50 dBm									23.3	MA
-60,dBm	ndalada D	da Nob	my recorded	alemanda	1 Martin Martin	m. J. Alach	M. ant	A J. IL MILANKA	M3	anton 1
		Current and	and the second	Anti		Boon is a	0 00-10			
-70 dBm					č					
Start 2	.3 GHz				691 pt	s			Sto	p 2.405 GHz
1arker										
	Ref Tr		X-value		Y-value	Functi	ion	F	unction Res	ult
M1		1	2.4020		-0.57 dBm					
M2 M3		1		4 GHz 9 GHz	-54.67 dBm -62.04 dBm					
M4		1	2.39997		-56.27 dBm					
	1					7				4.342

Date: 3.JAN.2020 13:14:33

2480MHz

Ref Level			🖷 RBW 100 kHz			
Att Count 300/	30	dB SWT 1.1 ms	VBW 300 kHz	Mode Auto Sw	eep	
1Pk View	300					
		10 85	100	M1[1]		-0.97 dBn
10 dBm				And the second of		2.480010 GH
				M2[1]		-57.48 dBn
0 dBm	M1					2.483500 GH
	n					
-10 dBm						
202 224	11					
-20 dBm	D1 -20.9	70 dBm				
-30 dBm	11					
-30 UBIII-	14					
-40 dBm						
	11					
-50 dBm	M2	1014				
A what	h		M3	1	4	
ab deh		Marine Marine Marine and a	10 The stand and the state of t	المحمد المرجع	and a star and a second second	
70.10						
-70 dBm			<i>i</i> .			
Start 2.47	CHz		691 pts	-		Stop 2.55 GHz
Aarker			051 pc3	,		0000 2.00 012
	Trc	X-value	Y-value	Function	Fund	ction Result
M1	1	2,48001 GHz	-0.97 dBm	Function	Fund	CION RESUL
M2	1	2.4835 GHz	-57.48 dBm			
M3	1	2.5 GHz	-60.34 dBm			
M4	1	2.487971 GHz	-55.46 dBm			

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9.6 Spurious radiated emissions for transmitter

Test Method

1: The EUT was place on a turn table which is 1.5m above ground plane for above 1GHz and 0.8m above ground for below 1GHz at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

2: The EUT was set 3 meters away from the interference – receiving antenna, which was mounted on the top of a variable – height antenna tower.

3: The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

4: For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

5: Use the following spectrum analyzer settings According to C63.10:

For Below 1GHz

Use the following spectrum analyzer settings:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 100 KHz to 120KHz, VBW≥RBW for peak measurement, Sweep = auto, Detector function = peak, Trace = max hold.

For Peak unwanted emissions Above 1GHz:

Span = wide enough to capture the peak level of the in-band emission and all spurious RBW = 1MHz, VBW≥RBW for peak measurement ,Sweep = auto, Detector function = peak, Trace = max hold.

Procedures for average unwanted emissions measurements above 1000 MHz

a) RBW = 1 MHz.

b) VBW \ [3 × RBW].

c) Detector = RMS (power averaging), if [span / (# of points in sweep)] \ RBW / 2. Satisfying this condition can require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, then the detector mode shall be set to peak.

d) Averaging type = power (i.e., rms) (As an alternative, the detector and averaging type may be set for linear voltage averaging. Some instruments require linear display mode to use linear voltage averaging. Log or dB averaging shall not be used.)

e) Sweep time = auto.

f) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, then the number of traces shall be increased by a factor of 1 / D,where D is the duty cycle. For example, with 50% duty cycle, at least 200 traces shall be averaged. (If a specific emission is demonstrated to be continuous—i.e., 100% duty cycle—then rather than turning ON and OFF with the transmit cycle, at least 100 traces shall be averaged.)

g) If tests are performed with the EUT transmitting at a duty cycle less than 98%, then a correction factor shall be added to the measurement results prior to comparing with the emission limit, to compute the emission level that would have been measured had the test been performed at 100% duty cycle. The correction factor is computed as follows: 1) If power averaging (rms) mode was used in the preceding step e), then the correction factor is [10 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 3 dB shall be added to the measured emission levels.



2) If linear voltage averaging mode was used in the preceding step e), then the correction factor is [20 log (1 / D)], where D is the duty cycle. For example, if the transmit duty cycle was 50%, then 6 dB shall be added to the measured emission levels.
3) If a specific emission is demonstrated to be continuous (100% duty cycle) rather than turning ON and OFF with the transmit cycle, then no duty cycle correction is required for that emission.

Limit

The radio emission outside the operating frequency band shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power. Radiated emissions which fall in the restricted bands, as defined in section15.205, must comply with the radiated emission limits specified in section 15.209.

Frequency MHz	Field Strength uV/m	Field Strength dBµV/m	Detector
30-88	100	40	QP
88-216	150	43.5	QP
216-960	200	46	QP
960-1000	500	54	QP
Above 1000	500	54	AV
Above 1000	5000	74	PK



Spurious radiated emissions for transmitter

According to C63.10, if the peak (or quasi-peak) measured value complies with the average limit, it is unnecessary to perform an average measurement, so AV emission value did not show in below table if the peak value complies with average limit.

Transmitting spurious emission test result as below:

Low channel 2402MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
Danu	MHz	dBuV/m		dBµV/m		dBuV/m	(dB/m)	
30-	856.93	32.82	Н	46	QP	13.18	-16.8	Pass
1000MHz	911.68	32.24	V	46	QP	13.76	-15.8	Pass
	7206*	39.82	Н	74	PK	34.18	4.8	Pass
1000-			Н	54	AV			Pass
25000MHz	4804*	48.24	V	74	PK	25.76	1.3	Pass
			V	54	AV			Pass

Middle channel 2440MHz Test Result

Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
Dallu	MHz	dBuV/m		dBµV/m		dBuV/m	(dB/m)	
30-			Н	43.5	QP		-	Pass
1000MHz			Н	46	QP			Pass
	4882*	40.02	Н	74	PK	33.98	1.8	Pass
1000-			Н	54	AV			Pass
25000MHz	4882*	45.24	V	74	PK	28.76	1.8	Pass
			V	54	AV			Pass



High channel	2480MHz	Test Result
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Frequency Band	Frequency	Emission Level	Polarization	Limit	Detector	Margin	Correct factor	Result
Dallu	MHz	dBuV/m		dBµV/m		dBuV/m	(dB/m)	
30-			Н	43.5	QP			Pass
1000MHz			Н	46	QP			Pass
	7440*	41.38	Н	74	PK	32.62	3.4	Pass
1000-			Н	54	AV			Pass
25000MHz	4960*	41.94	V	74	PK	32.06	1.7	Pass
			V	54	AV			Pass

Remark:

- (1) "*" means the emission(s) appear within the restrict bands shall follow the requirement of section 15.205.
- (2) Data of measurement within this frequency range shown "--" in the table above means the reading of emissions are the noise floor or attenuated more than 10dB below the permissible limits or the field strength is too small to be measured.
- (3) Level=Reading Level + Correction Factor
 Above 1GHz: Corrector factor = Antenna Factor + Cable Loss- Amplifier Gain
 Below 1GHz: Corrector factor = Antenna Factor + Cable Loss
 (The Reading Level is recorded by software which is not shown in the sheet)



10 Test Equipment List

List of Test Instruments

Radiated Spurious Em	ission Test				
Description	Manufacturer	Model no.	Equipment ID	Serial no.	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-003	101031	2020-6-28
Trilog Super Broadband Test Antenna	Schwarzbeck	VULB 9163	68-4-80-14-003	708	2020-7-5
Horn Antenna	Rohde & Schwarz	HF907	68-4-80-14-004	102295	2020-7-5
Wideband Horn Antenna	Q-PAR	QWH-SL-18- 40-K-SG	68-4-80-14-008	12827	2020-7-5
Loop Antenna	Rohde & Schwarz	HFH2-Z2	68-4-80-14-006	100398	2020-7-7
Pre-amplifier	Rohde & Schwarz	SCU 18	68-4-29-14-001	102230	2020-6-28
Pre-amplifier	Rohde & Schwarz	SCU 40A	68-4-29-14-002	100432	2020-7-16
Fully Anechoic Chamber	TDK	8X4X4	68-4-90-14-002		2020-7-7
Test software	Rohde & Schwarz	EMC32	68-4-90-14-002- A10	Version 9.15.00	N/A

RF Conducted

Description	Manufacturer	Model no.	Equipment ID	Serial no.	cal. due date
Signal Analyzer	Rohde & Schwarz	FSV40	68-4-74-14-004	101030	2020-6-28



11 System Measurement Uncertainty

For a 95% confidence level, the measurement expanded uncertainties for defined systems, in accordance with the recommendations of ISO 17025 were:

System Measurement Uncertainty						
Test Items	Extended Uncertainty					
Uncertainty for Radiated Spurious Emission 25MHz-	Horizontal: 4.81dB;					
3000MHz	Vertical: 4.89dB;					
Uncertainty for Radiated Spurious Emission 3000MHz-	Horizontal: 4.69dB;					
18000MHz	Vertical: 4.68dB;					
Uncertainty for Radiated Spurious Emission 18000MHz-	Horizontal: 4.89dB;					
40000MHz	Vertical: 4.87dB;					
Uncertainty for Conducted RF test with TS 8997	RF Power Conducted: 1.16dB Frequency test involved: 0.6×10-7 or 1%					