

FCC TEST REPORT

Test report On Behalf of Zhongshan K-mate General Electronics Co., Ltd. For **True Wireless Bluetooth Stereo Headset** Model No.: BTH109R

FCC ID: WAD-BTH109RTL

Prepared for :	Zhongshan K-mate General Electronics Co., Ltd.
	NO.2, 5th Xinsheng Street, Gangkou Town, Zhongshan City, Guangdong, China
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Date of Test:	Dec. 21, 2018 ~ Dec. 26, 2018
Date of Report:	Jan. 05, 2019

Report Number: HK1812241971E



TEST RESULT CERTIFICATION

Applicant's name:	Zhongshan K-mate General Electronics Co., Ltd.	
Address:	NO.2, 5th Xinsheng Street, Gangkou Town, Zhongshan City, Guangdong, China	
Manufacture's Name:	Zhongshan K-mate General Electronics Co., Ltd.	
Address:	NO.2, 5th Xinsheng Street, Gangkou Town, Zhongshan City, Guangdong, China	
Product description		
Trade Mark:	K-mate	
Product Name:	True Wireless Bluetooth Stereo Headset	
Model and/or type reference:	BTH109R	
Series Model	BTH137R	
Difference Description	All the same except for the battery and appearance structure	
Standards	FCC Rules and Regulations Part 15 Subpart C Section 15.247 ANSI C63.10: 2013	

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Date of Test	
Date (s) of performance of tests:	Dec. 21, 2018 ~ Dec. 26, 2018
Date of Issue	Jan. 05, 2019
Test Result	Pass

Testing Engineer

Gory Qian)

Technical Manager

Edon Hu

(Eden Hu)

Authorized Signatory:

(Jason Zhou)



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1. TEST SUMMARY

1.1. TEST PROCEDURES AND RESULTS

DESCRIPTION OF TEST	RESULT
Peak Output Power	Compliant
20 dB Bandwidth	Compliant
Conducted Spurious Emission	Compliant
Radiated Emission	Compliant
Band Edges	Compliant
Number of hopping frequency	Compliant
Time of Occupancy	Compliant
Frequency Separation	Compliant
Line conduction Emission	N/A

Note: N/A means it's not applicable to this item.

1.2. TEST FACILITY

Test Firm	:	Shenzhen HUAK Testing Technology Co., Ltd.

Address : 1F, B2 Building, Junfeng Zhongcheng Zhizao Innovation Park, Fuhai Street, Bao'an District, Shenzhen City, China Designation Number: : CN1229

Test Firm Registration Number : 616276

1.3. MEASUREMENT UNCERTAINTY

Measurement Uncertainty		
Conducted Emission Expanded Uncertainty	=	2.23dB, k=2
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2



2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

Operation Frequency	2.402 GHz to 2.480GHz				
RF Output Power	8.874dBm(Max)				
Bluetooth Version	V5.0				
Modulation	BR \square GFSK, EDR $\square \pi$ /4-DQPSK, \square 8DPSK BLE \square GFSK				
Number of channels	79 for BR/EDR				
Hardware Version	BTH109RMB-V05				
Software Version	BTH109R-V15				
Antenna Designation	PCB Antenna				
Antenna Gain	0dBi				
Power Supply	DC 3.7V by battery				
Note: 1 The LISB port only used for charging and can't be used to transfer data with PC					

Note: 1.The USB port only used for charging and can't be used to transfer data with PC.

2. The BT function of EUT doesn't work when charging.

3. The EUT doesn't support BLE.

4. The EUT comprises left and right channel headsets, both are the same and have been tested. Only the test data of left headset recorded in this report.



2.2. CARRIER FREQUENCY OF CHANNELS

BR/EDR Channel List

Frequency Band	Channel Number	Frequency		
2400~2483.5MHz	0	2402MHz		
	1	2403MHz		
	:	:		
	38	2440 MHz		
	39	2441 MHz		
	40	2442 MHz		
	:	:		
	77	2479 MHz		
	78	2480 MHz		

2.3. OPERATION OF EUT DURING TESTING

NO.	TEST MODE DESCRIPTION			
1	Low channel GFSK			
2	Middle channel GFSK			
3	High channel GFSK			
4	Low channel π /4-DQPSK			
5	Middle channel π /4-DQPSK			
6	High channel π /4-DQPSK			
7	Low channel 8DPSK			
8	Middle channel 8DPSK			
9	High channel 8DPSK			
10	BT Link(Hopping mode)			
 Note: 1. All the test modes can be supply by battery, only the result of the worst case was recorded in the report, if no other cases. 2. For Radiated Emission, 3axis were chosen for testing for each applicable mode. 3. The EUT used fully-charged battery when tested. 				



2.4. DESCRIPTION OF TEST SETUP

Configure 1: (Normal hopping)

EUT

Configure 2: (Control continuous TX)

EUT	Control box	PC

2.5. EQUIPMENT USED IN EUT SYSTEM

ltem	Equipment	Mfr/Brand	Model/Type No.	Remark
1	True Wireless Bluetooth	K-mate	BTH109R	EUT
2	Battery	SP	68280	Accessory
3	PC	PC APPLE A1465		A.E
4	IPOD	APPLE A1367		A.E
5	Control box	SERIAL	N/A	A.E
6	USB Cable	N/A	0.2m unshielded	Accessory
7	Temporary Antenna Connector	T10	N/A	A.E

Note: The temporary antenna connector is a RF SMA connector with fifty ohm resistor, which is welded to the PCB board or module.



2.6. MEASUREMENT INSTRUMENTS LIST

TEST EQUIPMENT OF RADIATED EMISSION TEST

ltem	Equipment	Manufacturer	Lab Model No. Equipment No.		Last Cal.	Cal. Interval
1.	Spectrum analyzer	Agilent	N9020A	HKE-048	Dec. 28, 2017	1 Year
2.	Preamplifier	Schwarzbeck	BBV 9743	HKE-006	Dec. 28, 2017	1 Year
3.	EMI Test Receiver	Rohde &		HKE-010	Dec. 28, 2017	1 Year
4.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	HKE-012	Dec. 28, 2017	1 Year
5.	Loop Antenna	Schwarzbeck	FMZB 1519 B	HKE-014	Dec. 28, 2017	1 Year
6.	Horn Antenna	Schewarzbeck	9120D	HKE-013	Dec. 28, 2017	1 Year
7.	Broad-band Horn Antenna	A-INFOMW	LB-180400-KF	HKE-031	Dec. 28, 2017	1 Year
8.	Pre-amplifier	EMCI	EMC051845SE	HKE-015	Dec. 28, 2017	1 Year
9.	Pre-amplifier	Agilent	83051A	HKE-016	Dec. 28, 2017	1 Year
10.	Radiation Cable 1	MXT	HK1	R05	N/A	N/A
11.	Radiation Cable 2	MXT	HK1	R06	N/A	N/A



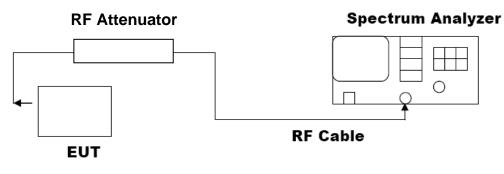
3. PEAK OUTPUT POWER

3.1. MEASUREMENT PROCEDURE

For peak power test:

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, middle and the bottom operation frequency individually.
- 3. RBW > the 20 dB bandwidth of the emission being measured, VBW \ge RBW.
- 4. Record the maximum power from the Spectrum Analyzer.
- 5. The maximum peak power shall be less 21dBm.

3.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)





3.3. LIMITS AND MEASUREMENT RESULT

PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION									
Frequency (GHz)Peak PowerApplicable Limits (dBm)Pass or Fail									
2.402	5.884	21	Pass						
2.441	5.980	21	Pass						
2.480	6.165	21	Pass						

				01						
- đ -								um Analyzer - Sw	Agilent Spect	📕 Ag
Peak Search	ADec 25, 2018 E 1 2 3 4 5 6 E M WWWW T P N N N N N	TRAC	ALIGN AUTO e: Log-Pwr :>100/100	e Run dB		GHz PNO: Fast G		RF 50 S 2.4018200	rker 1	″ Nar
Next Pea	20 GHz 84 dBm	2.401 8 5.8	Mkr1			- Gameen	dBm	Ref 20.00	dB/div	0 d
Next Pk Righ					1 -					10.0
Next Pk Le										
Marker Del										20.0
										30.0 40.0
Mkr→C										+0.0 50.0
Mkr→RefL										
Moi 1 of										70.0
	.000 MHz 1001 pts)	Span 5 .000 ms (Sween 1		(1.5 MHz	#VBW	Z	02000 GHz .5 MHz		
	loo i pis)	_	STATU		1.0 1911 12	<i>"</i> • D • •		19-14112		ISG





📁 Agilent Spectrum Analyzer - Swept SA				
Marker 1 2.440785000000	PNO: Fast 😱 Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold:>100/100	05:01:49 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWWW DET P N N N N N	Peak Search
10 dB/div Ref 20.00 dBm	IFGain:Low Atten: 30 dB	Mkr1	2.440 785 GHz 5.980 dBm	Next Peak
10.0	1			Next Pk Right
-10.0				Next Pk Left
-20.0				Marker Delta
-40.0				Mkr→CF
-60.0				Mkr→RefLvl
-70.0 Center 2.441000 GHz #Res BW 1.5 MHz	#VBW 1.5 MHz	Europ 1	Span 5.000 MHz 000 ms (1001 pts)	More 1 of 2
	#VBW 1.5 WHZ	Sweep 1.		

📕 Agilent Spectrum Analyzer - Swept SA			
Marker 1 2.47983000000	GHz SENSE:INT	ALIGN AUTO 05:02:25 PM Dec 25, 2018 Avg Type: Log-Pwr TRACE 1 2 3 4 5 6 Avg/Hold:>100/100 TYPE M	Peak Search
10 dB/div Ref 20.00 dBm	PNO: Fast 🖵 Trig: Free Run FGain:Low Atten: 30 dB	Avg Hold:>100/100 TYPE MINIMAN DET MINIMA Mkr1 2.479 830 GHz 6.165 dBm	NextPeak
10.0	1		Next Pk Right
-10.0			Next Pk Left
-20.0			Marker Delta
-40.0			Mkr→CF
-60.0			Mkr→RefLv
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW 1.5 MHz	Span 5.000 MHz Sweep 1.000 ms (1001 pts)	More 1 of 2
MSG		STATUS	



PEAK OUTPUT POWER MEASUREMENT RESULT FOR II /4-DQPSK MODULATION									
Frequency (GHz)Peak PowerApplicable Limits (dBm)Pass or Fail									
2.402	8.626	21	Pass						
2.441	8.466	21	Pass						
2.480	8.497	21	Pass						







🎉 Agilent Spectrum Analyzer - Swept S					
Marker 1 2.441080000	0000 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:02:58 PM Dec 25, 2018 TRACE 1 2 3 4 5 6	Peak Search
	PNO: East	g: Free Run ten: 30 dB	Avg Hold:>100/100	DET P NNNN	
			Mkr1	2.441 080 GHz	NextPeak
10 dB/div Ref 20.00 dE	3m			8.466 dBm	
		.1			
10.0		\			Next Pk Right
0.00					
0.00				hand have been a second	Next Pk Left
-10.0					Next FR Left
and the second se				The second second	
-20.0					Marker Delta
-30.0					
-40.0					Mkr→CF
-50.0					
-50.0					
-60.0					Mkr→RefLvl
-70.0					More
					1 of 2
Center 2.441000 GHz #Res BW 1.5 MHz	#VBW 1.5	MHz	Sween_1	Span 5.000 MHz .000 ms (1001 pts)	
MSG			STATUS		

🗾 Agilent Spectrum Analyzer - Swept SA				
Marker 1 2.48011000000	GH7	ALIGN AUTO Avg Type: Log-Pwr	05:03:11 PM Dec 25, 2018 TRACE 1 2 3 4 5 6	Peak Search
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Free Run IFGain:Low Atten: 30 dB	Avg Hold:>100/100	2.480 110 GHz 8.497 dBm	Next Peak
10.0	1			Next Pk Right
-10.0				Next Pk Left
-20.0				Marker Delta
-40.0				Mkr→CF
-60.0				Mkr→RefLvl
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW 1.5 MHz	Sweep 1.	Span 5.000 MHz 000 ms (1001 pts)	More 1 of 2
MSG		STATUS		



PEAK OUTPUT POWER MEASUREMENT RESULT FOR 8DPSK MODULATION									
Frequency (GHz)	Peak Power (dBm)	Applicable Limits (dBm)	Pass or Fail						
2.402	8.083	21	Pass						
2.441	8.874	21	Pass						
2.480	8.843	21	Pass						

				110					
Peak Search	4Dec 25, 2018 E 1 2 3 4 5 6 E M WWWW T P N N N N	TRAC	ALIGN AUTO De: Log-Pwr d:>100/100	Avg T Avg H	SENSE:INT	PNO: East	50000000	RF 5	XI
Next Pea	85 GHz 83 dBm	2.401 9 8.0	Mkr			Gam.Low		Ref 20.0	10 dB/div
Next Pk Rig					1				10.0
Next Pk Lo								and a second	10.00
Marker De									20.0 30.0
Mkr→									40.0
Mkr→Refl									60.0
Мс 1 о	.000 MHz	Span 5					Hz	402000 GF	
	1001 pts)	1.000 ms (s	Sweep		5 MHz	#VBW 1		1.5 MHz	#Res BW





🎉 Agilent Spectrum Analyzer - Swept SA				
Marker 1 2.440990000000	GHz	E:INT ALIGN A Avg Type: Log-	Pwr TRACE 1 2 3 4 5 6	Peak Search
	PNO: Fast Trig: Free I IFGain:Low Atten: 30 of		DET P N N N N	
		М	kr1 2.440 990 GHz	Next Peak
10 dB/div Ref 20.00 dBm			8.874 dBm	
		1		
10.0				Next Pk Right
0.00				
0.00				Next Pk Left
-10.0				Next I K Len
-20.0				Marker Delta
-30.0				
-40.0				Mkr→CF
-50.0				
-60.0				Mkr→RefLvl
-70.0				
				More
Center 2.441000 GHz			Span 5.000 MHz	1 of 2
#Res BW 1.5 MHz	#VBW 1.5 MHz	Swee	ep 1.000 ms (1001 pts)	
MSG			STATUS	

📁 Agilent Spectrum Analyzer - Swept SA			
Marker 1 2.480025000000	GH7	ALIGN AUTO 05:03:49 PM Dec 25, 2018 Avg Type: Log-Pwr TRACE 1 2 3 4 5 6	Peak Search
10 dB/div Ref 20.00 dBm	PNO: Fast Trig: Free Run JFGain:Low Atten: 30 dB	Avg Hold:>100/100 TYPE MUNITYPE MUNITYP	Next Peak
10.0	1		Next Pk Right
-10.0			Next Pk Left
-20.0			Marker Delta
-40.0			Mkr→CF
-60.0			Mkr→RefLvl
Center 2.480000 GHz #Res BW 1.5 MHz	#VBW 1.5 MHz	Span 5.000 MHz Sweep 1.000 ms (1001 pts)	More 1 of 2
MSG		STATUS	

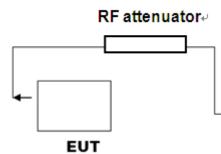


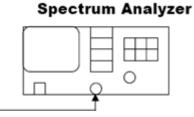
4. BANDWIDTH

4.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
- 3. 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
- 4. Set SPA Trace 1 Max hold, then View.

4.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)





RF Cable

Note: The EUT has been used temporary antenna connector for testing. 4.3. LIMITS AND MEASUREMENT RESULTS

BLUETOOTH 1MBPS LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits	Test Data (MHz)				
	99%OBW (MHz) -20dB BW(MHz) Result				
	Low Channel	0.929	1.089	PASS	
N/A	Middle Channel	0.923	1.077	PASS	
	High Channel	0.924	1.082	PASS	



TEST PLOT OF BANDWIDTH FOR LOW CHANNEL



TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL





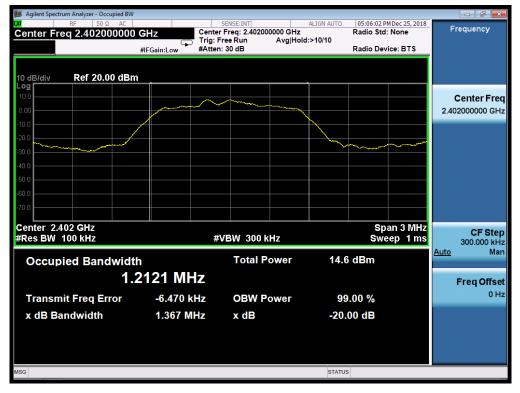
TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





BLUETOOTH 2MBPS LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits	Test Data (MHz)				
	99%OBW (MHz) -20dB BW(MHz) Result				
	Low Channel	1.212	1.367	PASS	
N/A	Middle Channel	1.199	1.366	PASS	
	High Channel	1.204	1.367	PASS	

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL





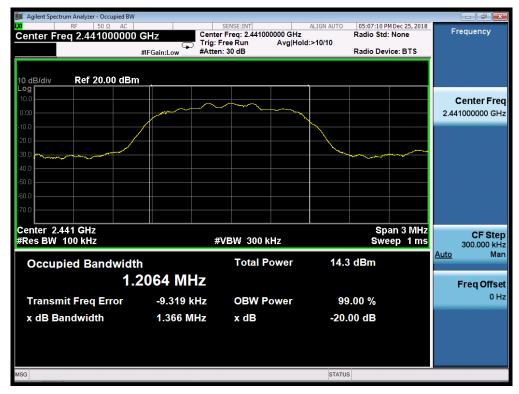
BLUETOOTH 3MBPS LIMITS AND MEASUREMENT RESULT					
	Measurement Result				
Applicable Limits	Test Data (MHz)				
		99%OBW (MHz) -20dB BW(MHz)			
	Low Channel	1.204	1.368	PASS	
N/A	Middle Channel	1.206	1.366	PASS	
	High Channel	1.205	1.368	PASS	

TEST PLOT OF BANDWIDTH FOR LOW CHANNEL





TEST PLOT OF BANDWIDTH FOR MIDDLE CHANNEL



TEST PLOT OF BANDWIDTH FOR HIGH CHANNEL



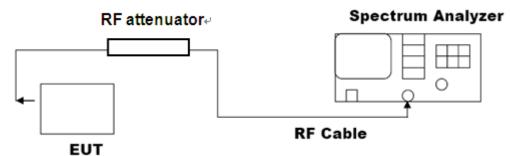


5. CONDUCTED SPURIOUS EMISSION

5.1. MEASUREMENT PROCEDURE

- 1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
- 2. Set the EUT Work on the top, the Middle and the bottom operation frequency individually.
- 3. Set the Span = wide enough to capture the peak level of the in-band emission and all spurious emissions from the lowest frequency generated in the EUT up through the 10th harmonic.
 RBW = 100 kHz; VBW = 300kHz; Sweep = auto; Detector function = peak.
- 4. Set SPA Trace 1 Max hold, then View.

5.2. TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION)



5.3. LIMITS AND MEASUREMENT RESULT

LIMITS AND MEASUREMENT RESULT				
Ampliantia Limita	Measurement Result			
Applicable Limits	Test Data	Result		
In any 100 KHz Bandwidth Outside the	At least -20dBc than the limit			
frequency band in which the spread spectrum	Specified on the BOTTOM	PASS		
intentional radiator is operating, the radio	Channel			
frequency power that is produce by the intentional radiator shall be at least 20 dB below that in 100KHz bandwidth within the band that contains the highest level of the desired power. In addition, radiation emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in§15.209(a))	At least -20dBc than the limit Specified on the TOP Channel	PASS		



TEST PLOT OF OUT OF BAND EMISSIONS WITH THE WORST CASE OF 8DPSK MODULATION IN LOW CHANNEL

📕 Agilent Spectrum Analyzer - Swept SA - dr - X
 ALIGN AUTO
 05:20:00 PM Dec 25, 2018

 Avg Type: Log-Pwr
 TRACE
 2:3:4:5:6

 Avg|Hold:>100/100
 TYPE
 Muthan Mark
 Marker 1 778.549627640 MHz PRO: Fast IFGain:Low Trig: Free Run Atten: 20 dB Peak Search Next Peak Mkr1 778.55 MHz -68.180 dBm 10 dB/div Ref 10.00 dBm og Next Pk Right Next Pk Left 7 Marker Delta Start 30.0 MHz #Res BW 100 kHz Stop 1.0000 GHz Sweep 92.83 ms (8192 pts) #VBW 300 kHz Mkr→CF MKR N FUNCTION FUNCTION WIDTH 778.55 MHz -68.180 dBm N 1 f 2 Mkr→RefLvl 5678 More g 1 of 2 10 Ag 05:21:46 PM Dec 25, 2018 SENSE:INT ALIGN AUTO Avg Type: Log-Pwr Avg|Hold: 29/100 Peak Search Marker 2 4.803198632646 GHz TRACE 1 2 3 4 5 TYPE MWWWW DET P NNNN Trig: Free Run Atten: 20 dB PNO: Fast IFGain:Low Next Peak Mkr2 4.803 20 GHz -33.518 dBm 10 dB/div Log Ref 10.00 dBm $\overline{\nabla}$ Next Pk Right 2 Next Pk Left Marker Delta Start 1.00 GHz #Res BW 100 kHz Stop 25.00 GHz Sweep 2.294 s (8192 pts) #VBW 300 kHz Mkr→CF 5.428 dBm -33.518 dBm 2.400 56 GHz 4.803 20 GHz N 1 f N 1 f 345 Mkr→RefLvl More 1 of 2 10 11 STATUS



TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSK MODULATION IN MIDDLE CHANNEL

Agilent Spectrum Analyzer - Sw		SENSE:INT	ALIGN AUTO	05:19:01 PM Dec 25, 2018	
Marker 1 423.16322	27933 MHz PNO: Fast	Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6 TYPE MWWWW DET P NNNNN	Peak Search
10 dB/div Ref 10.00	IFGain:Low	Atten: 20 dB	MI	kr1 423.16 MHz -68.179 dBm	Next Peal
-10.0					Next Pk Righ
-30.0					Next Pk Lef
-50.0		1			Marker Delta
-80.0					
Start 30.0 MHz #Res BW 100 kHz		W 300 kHz	-	Stop 1.0000 GHz 2.83 ms (8192 pts)	Mkr→Ci
MKR MODE TRC SCL 1 N 1 f 2	× 423.16 MHz	Y -68.179 dBm	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
3 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4				======================================	Mkr→RefLv
7 8					More
9					1 of 2
		III			1 of:
9 10 11 *		III	STATUS	* *	1 of:
9 10 11		III		05:22:29 PM Dec 25, 2018	
9 10 11 Arsg Agilent Spectrum Analyzer - Sw 21 RF 50 0	R AC B52277 GHz PNO: Fast C	" SENSE:INT Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100	05:22:29 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE M WWWWWW	
9 10 11 4 Agilent Spectrum Analyzer - Sw Agilent Spectrum Analyzer - Sw Marker 2 4.8823098 10 dB/diy Ref 10.00	R AC 352277 GHz PNO: Fast C IFGain:Low		ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100	05:22:29 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE IM WARKING	Peak Search
9 10 11 4 4 4 5 5 5 5 5 5 5 5 5 5 5 5 5	R AC 352277 GHz PNO: Fast C IFGain:Low	Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100	05:22:29 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWW DET P NNNNN 2 4.882 31 GHz	Peak Search Next Peal
9 10 11 10 11 4 Asglient Spectrum Analyzer - Sw Aglient Spectrum Analyzer - Sw Marker 2 4.8823098 10 dB/div Ref 10.00 000 10 dB/div Ref 10.00 000 10 dB/div Ref 10.00 000 000 000 000 000 000 000	dBm	Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100	05:22:29 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWW DET P NNNNN 2 4.882 31 GHz	Peak Search Next Peal
9 9 10 11 10 11 Asglent Spectrum Analyzer - Sw Aglient Spectrum Analyzer - Sw Marker 2 4.8823098 10 dB/div Ref 10.00 0.00 10 dB/div Ref 10.00 10 dB/div Ref 10.00	dBm	Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100	05:22:29 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWW DET P NNNNN 2 4.882 31 GHz	
9 10 11 10 11 Asglent Spectrum Analyzer - Sw Aglient Spectrum Analyzer - Sw Marker 2 4.8823098 10 dB/div Ref 10.00 000 10 dB/div Ref 10.00 10	dBm	Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100	05:22:29 PM Dec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MWWW DET P NNNNN 2 4.882 31 GHz	Peak Search Next Peal Next Pk Righ
9 10 11 11 15G 16 17 18 19 10 10 10 10 10 10 10 10 10 10	dBm	Trig: Free Run	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100 MIKT	05:22:29 PMDec 25, 2018 TRACE 1 2 3 4 5 6 TYPE MUNITORN N DET P NNN N 2 4.882 31 GHz -33.188 dBm	Peak Search Next Peal Next Pk Righ Next Pk Lef
9 10 11 11 15G 11 Agilent Spectrum Analyzer - Sw 10 Agilent Spectrum Analyzer - Sw 10 10 10 10 10 10 10 10 10 10	AC S2277 GHz PRO: Fast IFGain:Low dBm dBm #VB	Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100 MIKT	05:22:29 PMDec 25, 2018 TYPE D 23 4 3 6 TYPE P NNN N 2 4.882 31 GHz -33.188 dBm 51 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Peak Search Next Pea Next Pk Righ
9 9 10 11 10 11 10 11 10 10 10 10	dBm	Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100 MKr	05:22:29 PMDec 25, 2018 TRACE 11 23 4 5 6 TYPE 11 23 4 5 6 TYPE 12 14 5 6	Peak Search Next Pea Next Pk Righ Next Pk Let Marker Delt
9 9 10 11 11 4 13 14 15 10 10 10 10 10 10 10 10 10 10	AC S2277 GHz PRO: Fast IFGain:Low dBm dBm #VB1 #VB1 X 2.441 58 GHz	Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100 MIKT	05:22:29 PMDec 25, 2018 TYPE D 23 4 3 6 TYPE P NNN N 2 4.882 31 GHz -33.188 dBm 51 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Peak Search Next Pea Next Pk Righ Next Pk Let Marker Delt
9 9 10 11 10 11 4 4 4 4 4 4 4 4 4 4 4 4 4	AC S2277 GHz PRO: Fast IFGain:Low dBm dBm #VB1 #VB1 X 2.441 58 GHz	Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100 MIKT	05:22:29 PMDec 25, 2018 TYPE D 23 4 3 6 TYPE P NNN N 2 4.882 31 GHz -33.188 dBm 51 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Peak Search Next Pea Next Pk Righ Next Pk Lef
9 9 10 11 11 12 13 14 14 14 14 14 14 15 14 14 15 15 15 15 15 15 15 15 15 15	AC S2277 GHz PRO: Fast IFGain:Low dBm dBm #VB1 #VB1 X 2.441 58 GHz	Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 9/100 MIKT	05:22:29 PMDec 25, 2018 TYPE D 23 4 3 6 TYPE P NNN N 2 4.882 31 GHz -33.188 dBm 51 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Peak Search Next Pea Next Pk Righ Next Pk Let Marker Delt Mkr→Ref Ly



TEST PLOT OF OUT OF BAND EMISSIONS OF 8DPSKMODULATION IN HIGH CHANNEL

Agilent Spectrum Analyzer - Swept RF 50 Ω	AC	SENSE:INT	ALIGN AUTO	05:19:22 PM Dec 25, 2018	
larker 1 995.736784	275 MHz	Trig: Free Run	Avg Type: Log-Pwr Avg Hold:>100/100	TRACE 1 2 3 4 5 6	Peak Search
	PNO: Fast 🖵 IFGain:Low	Atten: 20 dB		TYPE MWWWWW DET PNNNN	NextBeer
			Mk	r1 995.74 MHz	NextPea
0 dB/div Ref 10.00 d	Bm			-69.411 dBm	
0.00					Next Dk Digh
10.0					Next Pk Righ
20.0					
30.0					
40.0					Next Pk Lei
50.0					
60.0					Manda - Date
70.0					Marker Delt
80.0					
start 30.0 MHz	<i>2</i> 2 (3 1)			Stop 1.0000 GHz	
Res BW 100 kHz		300 kHz	-	2.83 ms (8192 pts)	Mkr→Cl
MKR MODE TRC SCL	× 995.74 MHz	-69.411 dBm	ICTION FUNCTION WIDTH	FUNCTION VALUE	
2					
4 5				_	Mkr→RefLv
6					
8					More
9 10					1 of:
11				-	
		m		•	
SG		m	STATUS	•	
SG		m	STATUS	4	
SG Agilent Spectrum Analyzer - Swept				05:23:41 PMDec 25 2018	
Agilent Spectrum Analyzer - Swept	AC 1908 GHz	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr	05:23:41 PMDec 25, 2018 TRACE 12 23 4 5 6 TYPE M	<mark>⊢⊃ ∎⊡ ■×</mark> Peak Search
l Agilent Spectrum Analyzer - Swept RF 50 Ω	AC	SENSE:INT	ALIGN AUTO		Peak Search
l Agilent Spectrum Analyzer - Swept RF 50 Ω	AC 1908 GHz PNO: Fast	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 123456 TYPE MWWWW DET PNNNNN	Peak Search
Agilent Spectrum Analyzer - Swept RF 50 Ω Barker 2 4.96142107	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dl 0 g 1	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal
Agilent Spectrum Analyzer - Swept RF 50 Ω larker 2 4.96142107 0 dB/div Ref 10.00 df 9 1 10 0 20 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal
	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal Next Pk Righ
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dl 0 g 1 0 dD/div 2	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal Next Pk Righ
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dl 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal Next Pk Righ
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 OdB/div Ref 10.00 dl 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal Next Pk Righ Next Pk Lef
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dl 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal Next Pk Righ
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 OdB/div Ref 10.00 dl 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	TRACE 1 2 3 4 5 6 TYPE DET P NNNN 2 4.961 42 GHz	Peak Search Next Peal Next Pk Righ Next Pk Lef
Agilent Spectrum Analyzer - Swept Ref 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dI 0 d 0 d 1 0 d 0 d 1 0 d 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Let Marker Dett
Agilent Spectrum Analyzer - Swept Ref 10.00 df Ref 10.00 df 00 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Let Marker Dett
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 OdB/div Ref 10.00 df 0 00	AC	SENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Lef
Agilent Spectrum Analyzer - Swept RF 50 Ω Ref 10.00 df 9 0 dB/div Ref 10.00 df 9 0	AC 1908 GHz PNO: Fast IFGain:Low	SENSE:INT	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Lef Marker Deft Mkr→Cl
Agilent Spectrum Analyzer - Swept RF 50 Q Iarker 2 4.96142107 0 dB/div Ref 10.00 df 0 0 00 1 0 0 00 2 0 0 00 2 0 0 00 2 0 0 00 2 0 0 00 2 0 0 00 2 0 0 00 2 0 00	AC 1908 GHz PNO: Fast IFGain:Low Bm 	SENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Pea Next Pk Righ Next Pk Lef Marker Deft Mkr→C
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dl 0 g 1 0 dB/div Ref 10.00 dl 0 g 2 0 dB/div Ref 10.00 dl 0 g 2 0 dB/div Ref 10.00 dl 0 g 2 0 dB/div Ref 10.00 dl 0 dB 2 0 dB 3 1 f 3 1 f 3 1 f 3 1 f 3	AC 1908 GHz PNO: Fast IFGain:Low Bm 	SENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Lef Marker Deft Mkr→Cl
Agilent Spectrum Analyzer - Swept RF 50 Ω Iarker 2 4.96142107 0 dB/div Ref 10.00 dl 0 g 1 0 dB/div Ref 10.00 dl 0 g 2 0 dB/div Ref 10.00 dl 0 g 2 0 dB/div Ref 10.00 dl 0 dB 2 0 dB 3 1 dB 3	AC 1908 GHz PNO: Fast IFGain:Low Bm 	SENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Lef Marker Deft Mkr→Cl
Agilent Spectrum Analyzer - Swept Ref 50 Ω Ref 10.00 df G	AC	SENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Pea Next Pk Righ Next Pk Lei Marker Delt Mkr→Cl Mkr→Ref Lv
Agilent Spectrum Analyzer - Swept RE 50 Q Iarker 2 4.96142107 0 dB/div Ref 10.00 df 0 00 0	AC	SENSE:INT Trig: Free Run Atten: 20 dB	ALIGN AUTO Avg Type: Log-Pwr Avg Hold: 6/100 MKC2	2 4.961 42 GHz -34.463 dBm	Peak Search Next Peal Next Pk Righ Next Pk Lef Marker Deft Mkr→Cl



6. RADIATED EMISSION

6.1. TEST LIMIT

u V/m 0/F(kHz)	dB(µV)/m
0/F(kHz)	
0/F(kHz)	
30	
100	40.0
150	43.5
200	46.0
500	54.0
:74.0 dB(µV)/m (P	eak) 54.0 dB(µV)/m
(Averag	ge)
r:	

(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.

6.2. 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)



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

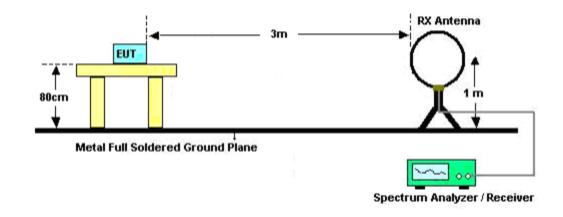
Spectrum Parameter	Setting
Start ~Stop Frequency	9KHz~150KHz/RB 200Hz for QP
Start ~Stop Frequency	150KHz~30MHz/RB 9KHz for QP
Start ~Stop Frequency	30MHz~1000MHz/RB 120KHz for QP
	1GHz~26.5GHz
Start ~Stop Frequency	RBW 1MHz/ VBW 3MHz for Peak,
	RBW 1MHz/ VBW 10Hz for Average

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

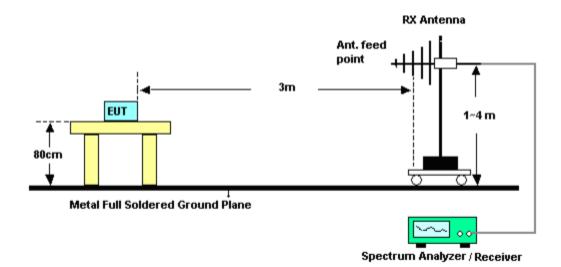


6.3. TEST SETUP

RADIATED EMISSION TEST SETUP BELOW 30MHz

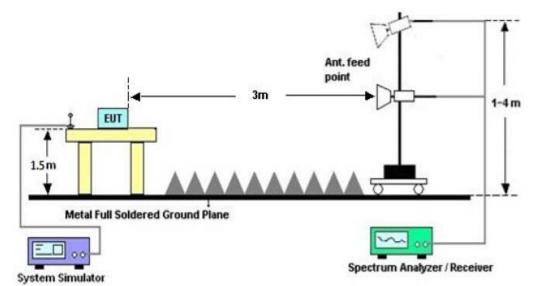


RADIATED EMISSION TEST SETUP 30MHz-1000MHz





RADIATED EMISSION TEST SETUP ABOVE 1000MHz





6.4. TEST RESULT

(Worst Modulation: 8DPSK)

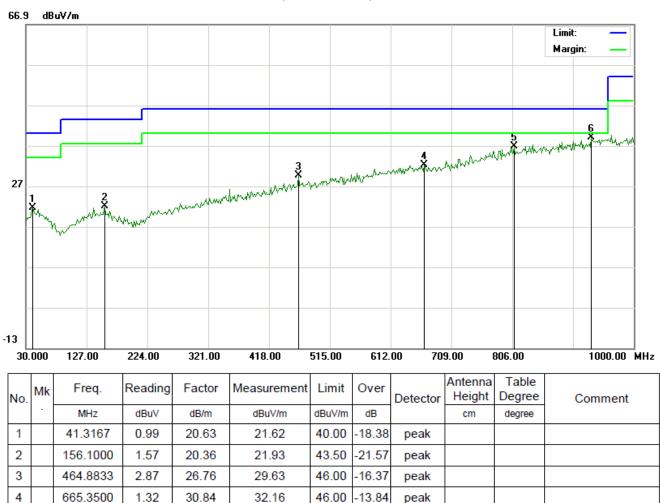
RADIATED EMISSION BELOW 30MHz

No emission found between lowest internal used/generated frequencies to 30MHz.



RADIATED EMISSION BELOW 1GHz

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



46.00

46.00

36.90

38.93

-9.10

-7.07

peak

peak

RESULT: PASS

*

809.2333

932.1000

2.60

2.62

34.30

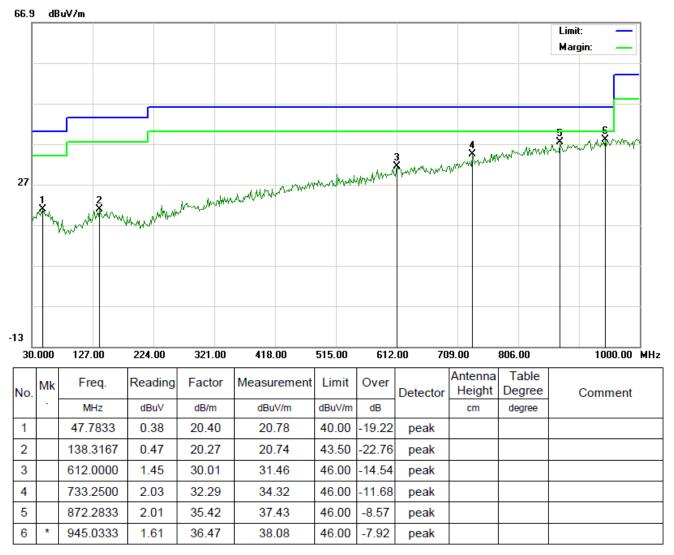
36.31

5

6



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



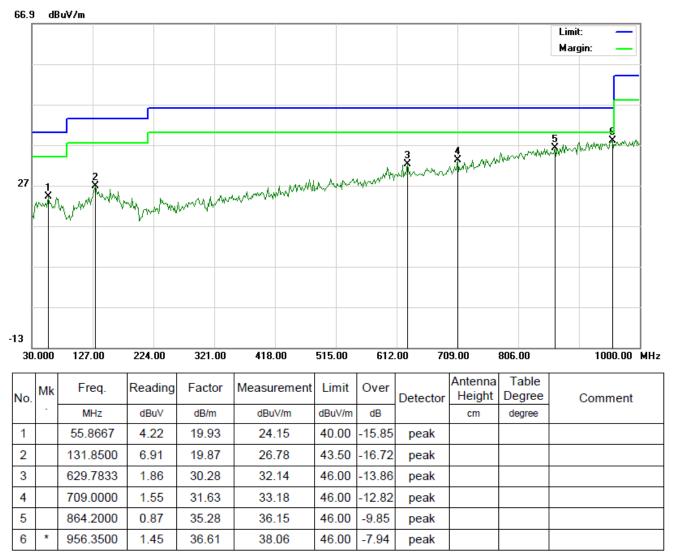
RESULT: PASS

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

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



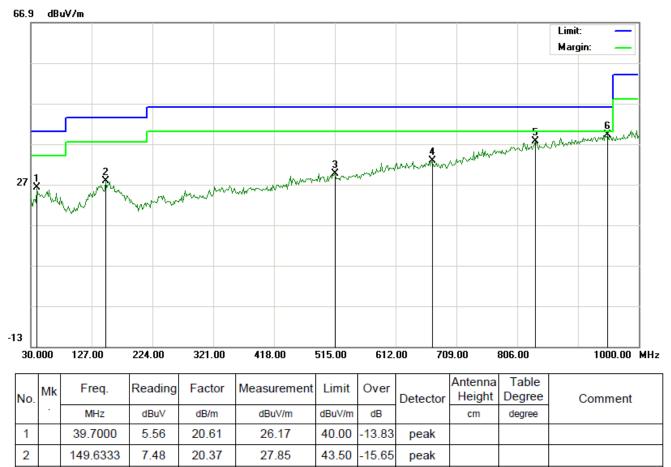
RADIATED EMISSION TEST- (30MHz-1GHz)-MIDDLE CHANNEL-HORIZONTAL



RESULT: PASS



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



RESULT:	PASS

515.0000

670.2000

835.1000

949.8833

1.82

1.79

2.77

2.65

27.84

30.92

34.76

36.53

3

4

5

6

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

29.66

32.71

37.53

39.18

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

46.00

46.00

46.00

46.00

-16.34

-13.29

-8.47

-6.82

peak

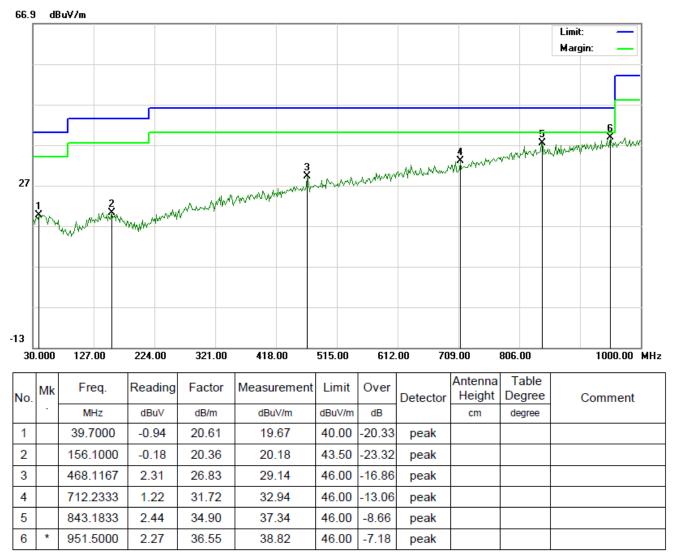
peak

peak

peak



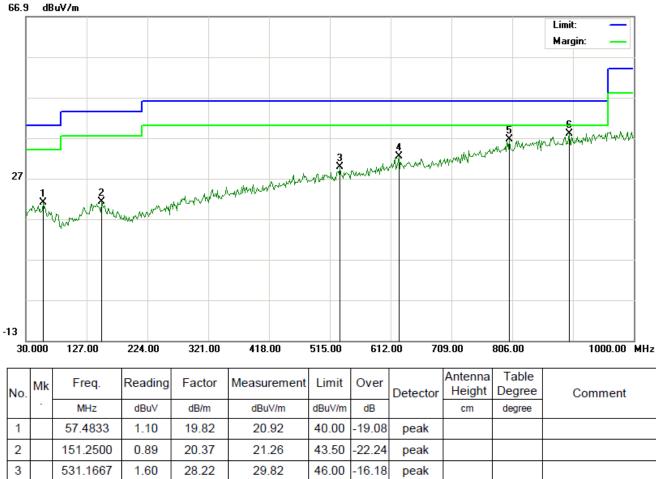
RADIATED EMISSION TEST- (30MHz-1GHz)-HIGH CHANNEL-HORIZONTAL



RESULT: PASS



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



2		151.2500	0.89	20.37	21.26	43.50	-22.24	peak		
3		531.1667	1.60	28.22	29.82	46.00	-16.18	peak		
4		624.9333	2.24	30.21	32.45	46.00	-13.55	peak		
5		801.1500	2.51	34.15	36.66	46.00	-9.34	peak		
6	*	896.5333	2.12	35.86	37.98	46.00	-8.02	peak		

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.



RADIATED EMISSION ABOVE 1GHz

EUT :	True Wireless Bluetooth Stereo Headset	Model Name. :	BTH109R
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 7	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)			
4804.026	41.32	7.12	48.44	74	-25.56	peak		
4804.026	39.54	7.12	46.66	54	-7.34	AVG		
7206.039	37.42	9.84	47.26	74	-26.74	peak		
7206.039	34.19	9.84	44.03	54	-9.97	AVG		
Remark:								
Factor = Ar	Factor = Antenna Factor + Cable Loss – Pre-amplifier.							

EUT :	True Wireless Bluetooth Stereo Headset	Model Name. :	BTH109R
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 7	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)				
4804.026	41.45	7.12	48.57	74	-25.43	peak			
4804.026	38.13	7.12	45.25	54	-8.75	AVG			
7206.039	36.68	9.84	46.52	74	-27.48	peak			
7206.039	33.22	9.84	43.06	54	-10.94	AVG			
Remark:									
Factor = Ar	Factor = Antenna Factor + Cable Loss – Pre-amplifier.								



EUT :	True Wireless Bluetooth Stereo Headset	Model Name. :	BTH109R
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 8	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type		
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)			
4882.032	42.29	7.12	49.41	74	-24.59	peak		
4882.032	39.17	7.12	46.29	54	-7.71	AVG		
7323.048	37.11	9.84	46.95	74	-27.05	peak		
7323.048	33.95	9.84	43.79	54	-10.21	AVG		
Remark:								
Factor = Ar	ntenna Factor +	Cable Loss –	Pre-amplifier.					

EUT :	True Wireless Bluetooth Stereo Headset	Model Name. :	BTH109R
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 8	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)				
4882.032	41.77	7.12	48.89	74	-25.11	peak			
4882.032	38.56	7.12	45.68	54	-8.32	AVG			
7323.048	38.12	9.84	47.96	74	-26.04	peak			
7323.048	34.92	9.84	44.76	54	-9.24	AVG			
Remark:									
Factor = Ar	Factor = Antenna Factor + Cable Loss – Pre-amplifier.								



EUT :	True Wireless Bluetooth Stereo Headset	Model Name. :	BTH109R
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 9	Polarization :	Horizontal

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)				
4960.042	43.17	7.12	50.29	74	-23.71	peak			
4960.042	39.89	7.12	47.01	54	-6.99	AVG			
7440.063	38.45	9.84	48.29	74	-25.71	peak			
7440.063	35.05	9.84	44.89	54	-9.11	AVG			
Remark:									
Factor = Ar	Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

EUT :	True Wireless Bluetooth Stereo Headset	Model Name. :	BTH109R
Temperature :	20 ℃	Relative Humidtity :	48%
Pressure :	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 9	Polarization :	Vertical

Frequency	Meter Reading	Factor	Emission Level	Limits	Margin	Value Type			
(MHz)	(dBµV)	(dB)	(dBµV/m)	(dBµV/m)	(dB)				
4960.042	42.79	7.12	49.91	74	-24.09	peak			
4960.042	38.61	7.12	45.73	54	-8.27	AVG			
7440.063	37.43	9.84	47.27	74	-26.73	peak			
7440.063	34.12	9.84	43.96	54	-10.04	AVG			
Remark:									
Factor = Ar	Factor = Antenna Factor + Cable Loss – Pre-amplifier.								

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.

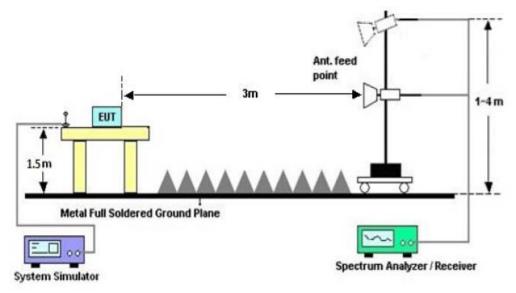


7. BAND EDGE EMISSION

7.1. MEASUREMENT PROCEDURE

- 1. Set the EUT Work on the top, the bottom operation frequency individually.
- Set SPA Start or Stop Frequency=Operation Frequency, For unrestricted band: RBW=100kHz, VBW=300kHz
 For restricted band: RBW=1MHz, VBW=3*RBW
 Center frequency =Operation frequency
- 3. The band edges was measured and recorded.

7.2. TEST SET-UP

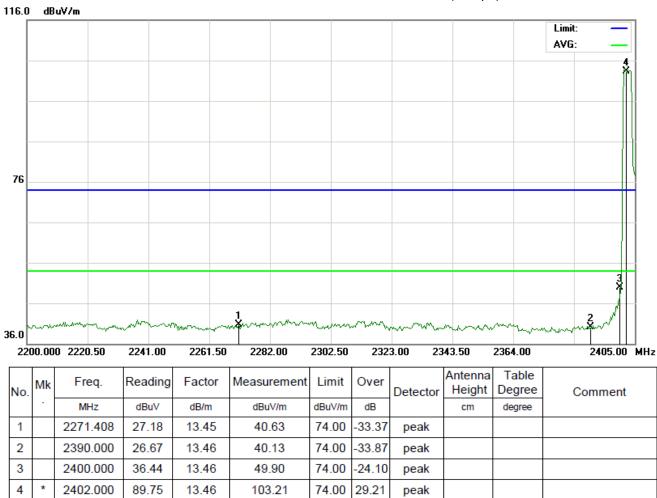




7.3. TEST RESULT

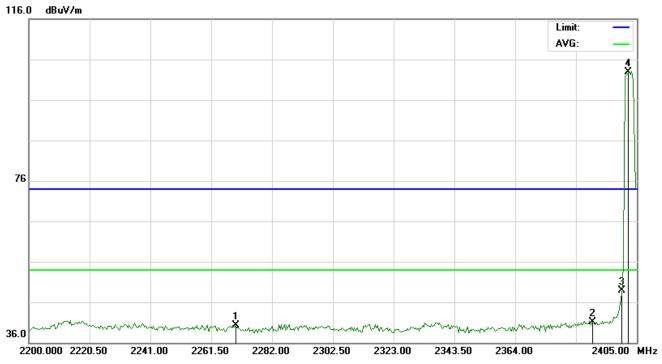
(Worst Modulation: 8DPSK)







TEST PLOT OF BAND EDGE FOR LOW CHANNEL (1Mbps)-Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1		2269.700	26.81	13.45	40.26	74.00	-33.74	peak			
2		2390.000	27.67	13.46	41.13	74.00	-32.87	peak			
3		2400.000	35.44	13.46	48.90	74.00	-25.10	peak			
4	*	2402.000	89.43	13.46	102.89	74.00	28.89	peak			



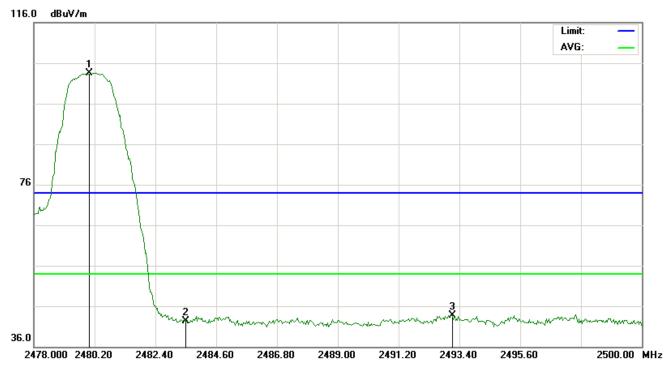
TEST PLOT OF BAND EDGE FOR HIGH CHANNEL (1Mbps)-Horizontal



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	89.87	14.11	103.98	74.00	29.98	peak			
2		2483.500	27.66	14.13	41.79	74.00	-32.21	peak			
3		2493.730	28.28	14.19	42.47	74.00	-31.53	peak			



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL (1Mbps)-Vertical



No.	Mk	Freq.	Reading	Factor	Measurement	Limit	Over	Detector	Antenna Height	Table Degree	Comment
	-	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		cm	degree	
1	*	2480.000	89.37	14.11	103.48	74.00	29.48	peak			
2		2483.500	28.22	14.13	42.35	74.00	-31.65	peak			
3		2493.143	29.56	14.19	43.75	74.00	-30.25	peak			

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.
- 3. Hopping off and Hopping on have been tested and only worst case recorded

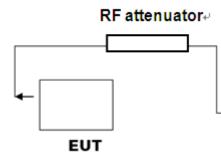


8. NUMBER OF HOPPING FREQUENCY

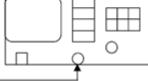
8.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
- 3. Set the spectrum analyzer Start = 2.4GHz Stop = 2.4835GHz
- 4. Set the Spectrum Analyzer as RBW>=1%span, VBW>=3RBW.

8.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)



Spectrum Analyzer



RF Cable

8.3. LIMITS AND MEASUREMENT RESULT

TOTAL NO. OF	LIMIT (NO. OF CH)	MEASUREMENT (NO. OF CH)	RESULT
HOPPING CHANNEL	>=15	79	PASS



TEST PLOT FOR NO. OF TOTAL CHANNELS

🊺 Ag	gilent S	Spectru		nalyzer - Swep									
<mark>w</mark> Mar	ker	1 /	RF		AC	17	SE	NSE:INT	Avg Type	ALIGN AUTO		M Dec 25, 2018	Marker
in lea	Ker			0.00000	PI	NO:Fast Gain:Low	Trig: Free Atten: 30		Avg Hold	:>100/100	TY		Onland Marken
						Jumeow				ΔΜ	kr1 78.0	88 MHz	Select Marker
	B/di	v	Rei	f 20.00 c	lBm						0	.559 dB	
Log 10.0												_1∆2	
0.00	1	Kan	n fi s			n#44480	a a A A white a a		1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.	LANdALAN	ስበሰፈፈትልል	148.64	Normal
-10.0), I I I I I I I I I I I I I I I I I I I	MAANNA (J (ATVENE) A	WWW	NVY I, KVV	VVV) (AVV	MANAA	WWWW	WW.	
-20.0		YYY.	111	YYYVYIY	***11*11	a ra Landa	41111441	i i i a b b a l a		1810.110	Abbliati		
-30.0													Delta
-40.0													
-50.0													
-60.0	1 (\\	Fixed⊳
-70.0												500	
				5 GHz kHz		#VBM	/ 300 kHz	*		Sween 1	Span 8 0 67 ms (6.00 MHz 1001 pts)	Off
		E TRC	_		X	# ¥ D ¥	V 300 KHZ					ON VALUE	
1	Δ2		f	<u>(</u> Δ)	78.08	BMHz (Δ)	0.559	dB			FUNCTI		
23	F	1	f		2.401 933	2 GHz	3.294 dl	Bm					Dreparticab
4													Properties►
6													
7 8													More
9 10													1 of 2
11													
MSG			_							STATUS	3		
	-		_										

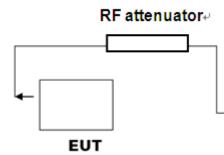


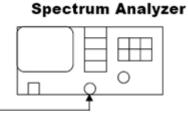
9. TIME OF OCCUPANCY (DWELL TIME)

9.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer.
- 3. Set Span = zero span, centered on a hoping channel
- 4. Set the spectrum analyzer as RBW=1MHz, VBW>=RBW, Span = 0 Hz

9.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)





RF Cable

9.3. LIMITS AND MEASUREMENT RESULT

The Worst Case (1Mbps)	

Channel	Time of Pulse for DH5	Period Time	Sweep Time	Limit
	(ms)	(s)	(ms)	(ms)
Low	2.883	31.6	307.52	400
Middle	2.867	31.6	305.81	400
High	2.883	31.6	307.52	400

Low Channel Time 2.883*(1600/6)/79*31.6=307.52ms Middle Channel Time 2.867*(1600/6)/79*31.6=305.81ms High Channel Time 2.883*(1600/6)/79*31.6=307.52ms

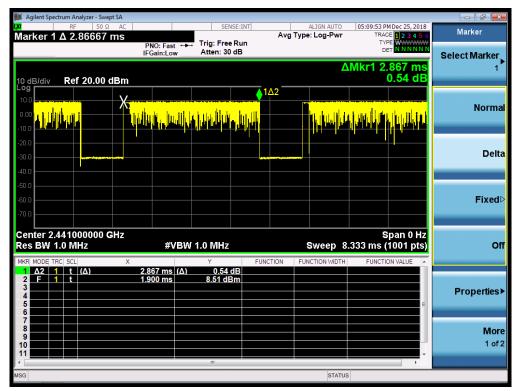


TEST PLOT OF LOW CHANNEL

Page 50 of 68

Agilent Spectrum Analyzer - Swept SA							
		SENSE:INT	Ava.	ALIGN AUTO	05:09:13 PM Dec 25 TRACE 1 2 3		Marker
Marker 1 ∆ 2.88333 ms	PNO: Fast ++ IFGain:Low	 Trig: Free Run Atten: 30 dB 	Avg		DET N N N		Select Marker
10 dB/div Ref 20.00 dBm				Δ	Mkr1 2.883 0.04	ms dB	1
		1	Δ2				Normal
	¹ <mark>m. II. II. II. II. II. II. II. II. II. I</mark>					, IF	
-30.0							Delta
-50.0							Fixed⊳
-70.0							Fixed
Center 2.402000000 GHz Res BW 1.0 MHz	#VBW	1.0 MHz		Sweep 8	Span (333 ms (1001) Hz pts)	Off
MKR MODE TRC SCL X	0.000	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE		
	2.883 ms (∆) 1.600 ms	0.04 dB 6.29 dBm					Properties►
7 8 9 10							More 1 of 2
						Þ.	
MSG				STATUS			

TEST PLOT OF MIDDLE CHANNEL





TEST PLOT OF HIGH CHANNEL

jji 🕺 Agilent Spec											
<mark>w</mark> Marker 1	RF	50 Ω 88333 r	AC		SE	NSE:INT	Avg Typ	ALIGN AUTO	TRACE	Dec 25, 2018	Marker
Marttor		000001		PNO: Fast IFGain:Low				-	TYPE	WWWWWW N N N N N N	
				IFGam:Low	Atten: 0	000		٨	Mkr1 2.8	002 me	Select Marker
10 dB/div	Pof	20.00 d	Bm							0.12 dB	1
Log		20.00 0						▲1∆2			
10.0				<u> </u>	X						Normal
0.00 <mark>1, 1 111</mark> 1	l di li j	li dibi tah	l di Luit (unit	<u>i</u> —	JAN LUT.	. NUTITI	LUMA LUCA	<mark>titalik</mark>	L I	(1. 11.1.1.1 .1	Horma
-10.0		d the	al illi	1	140 141		an ako ka 1a				
-20.0				-							
-30.0				-							Delta
-40.0				•							
-50.0											
-60.0											Fixed⊳
-70.0											
Center 2.4	4200	10000 G	H7						Sr	oan 0 Hz	
Res BW 1			112	#V	BW 1.0 MHz			Sweep 8	.333 ms (1	001 pts)	Off
MKR MODE TF	RC SCL		Х		Y	FUI	NCTION FU	JNCTION WIDTH	FUNCTIO	N VALUE	
1 Δ2 1 2 F 1		(Δ)		2.883 ms (3.300 ms	Δ) -0.12 8.30 d	dB					
3				5.500 ms	0.30 U	5111					Properties►
4 5										=	Tropolaco
6											
8											More
9 10											1 of 2
11											
MSG								STATUS		•	

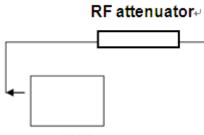


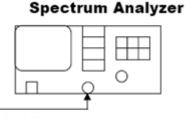
10. FREQUENCY SEPARATION

10.1. MEASUREMENT PROCEDURE

- 1. Place the EUT on the table and set it in transmitting mode
- 2. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer
- Set Span = wide enough to capture the peaks of two adjacent channels Resolution (or IF) Bandwidth (RBW) ≥ 1% of the span Video (or Average) Bandwidth (VBW) ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold

10.2. TEST SETUP (BLOCK DIAGRAM OF CONFIGURATION)





RF Cable

EUT

10.3. LIMITS AND MEASUREMENT RESULT

CHANNEL	CHANNEL SEPARATION	LIMIT	RESULT	
	KHz	KHz		
CH00-CH01	1000	>=25 KHz or 2/3 20 dB BW	Pass	



TEST PLOT FOR FREQUENCY SEPARATION (3Mbps)

📁 Agilent Spectrum Analyzer - Swept SA				
₩ RF 50 Ω AC Marker 2 2.40300000000	0 GH7	ALIGN AUTO	05:13:08 PM Dec 25, 2018 TRACE 1 2 3 4 5 6	Peak Search
	PNO: Wide IFGain:Low Trig: Free Ru Atten: 30 dB	in Avg Hold:>100/100	TYPE MMWWWW DET PPNNNN	NextBack
		Mkr2	2 2.403 000 GHz	Next Peak
10 dB/div Ref 20.00 dBm			7.606 dBm	
10.0		2		
0.00				Next Pk Right
-10.0				
-20.0				
-30.0				Next Pk Left
-40.0				
-50.0			hand	
-60.0				Marker Delta
-70.0				
Start 2.400000 GHz			Stop 2.405000 GHz	
#Res BW 100 kHz	#VBW 300 kHz	Sweep ′	1.000 ms (1001 pts)	Mkr→CF
MKR MODE TRC SCL X	Y 7	FUNCTION FUNCTION WIDTH	FUNCTION VALUE	
2 N 2 f 2.40	02 000 GHz 7.568 dBm 03 000 GHz 7.606 dBm			
3 4				Mkr→RefLvi
5			E	
7				
9				More 1 of 2
10				1012
• [III		• •	
MSG		STATU	JS	



11. LINE CONDUCTED EMISSION TEST 11.1. LIMITS OF LINE CONDUCTED EMISSION TEST

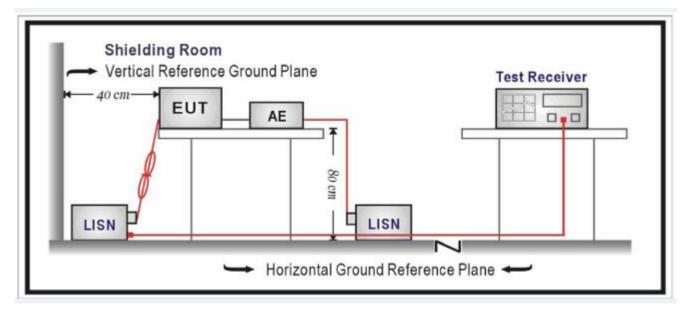
Frequency	Maximum RF Line Voltage	
	Q.P.(dBuV)	Average(dBuV)
150kHz~500kHz	66-56	56-46
500kHz~5MHz	56	46
5MHz~30MHz	60	50

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.

11.2. BLOCK DIAGRAM OF LINE CONDUCTED EMISSION TEST





11.3. 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 charging voltage by adapter 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.

11.4. 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.
- 2. 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.

11.5. TEST RESULT OF LINE CONDUCTED EMISSION TEST

N/A

Note: The BT function of EUT didn't work when charging.

12. ANTENNA REQUIREMENT

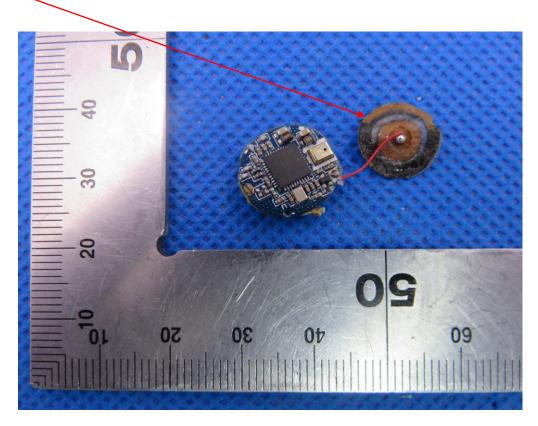
Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Refer to statement below for compliance.

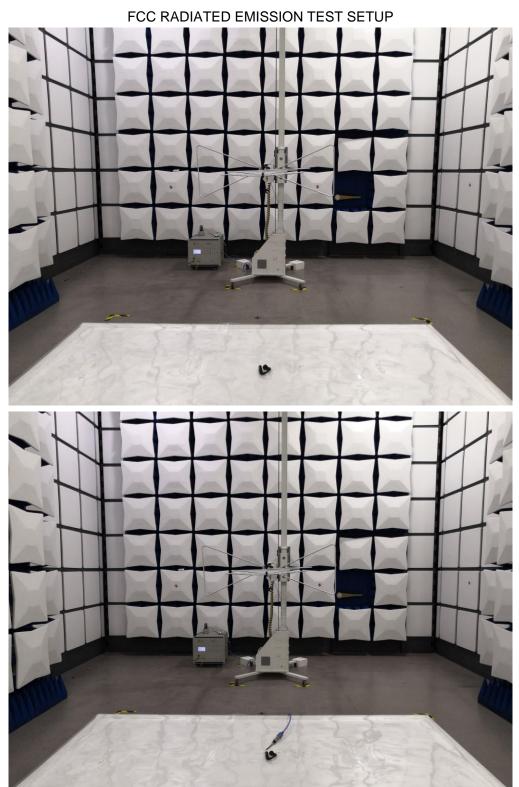
The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

<u>ANTENNA</u>





13. PHOTOGRAPH OF TEST









14. PHOTOGRAPHS OF EUT



TOP VIEW OF EUT





BOTTOM VIEW OF EUT

10 20





BACK VIEW OF EUT



LEFT VIEW OF EUT

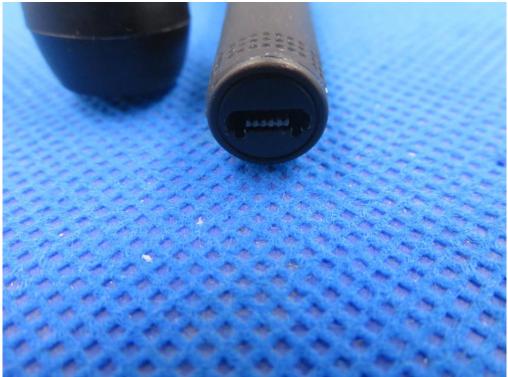




RIGHT VIEW OF EUT



Right VIEW OF EUT (PORT)





OPEN VIEW OF EUT

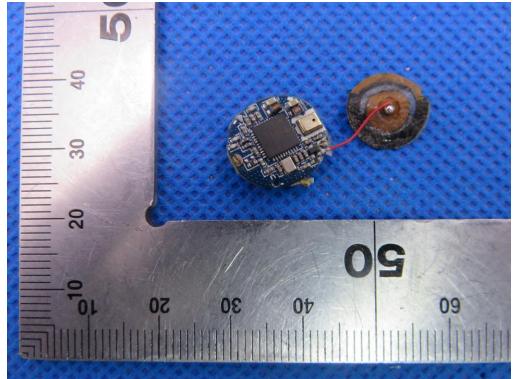


VIEW OF BATTERY

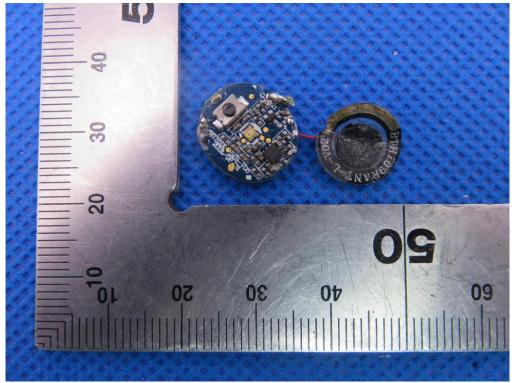




INTERNAL VIEW OF EUT-1

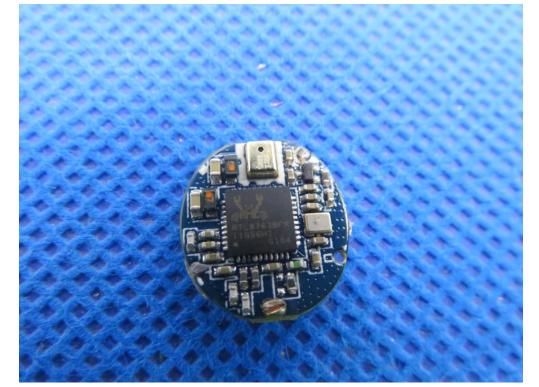


INTERNAL VIEW OF EUT-2





Left VIEW OF EUT (PORT)



INTERNAL VIEW OF EUT-3





OPEN VIEW OF EUT

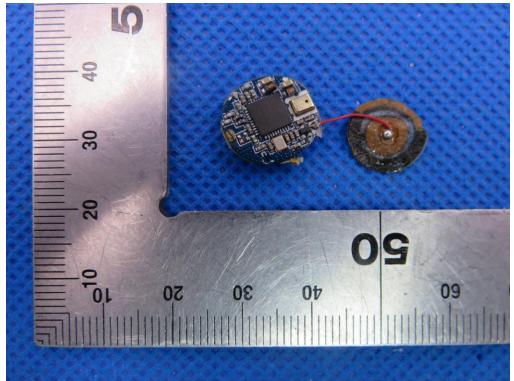


VIEW OF BATTERY

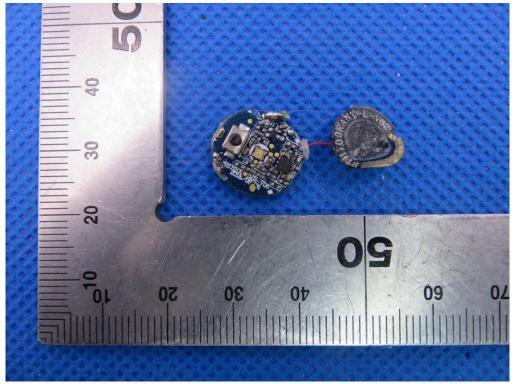




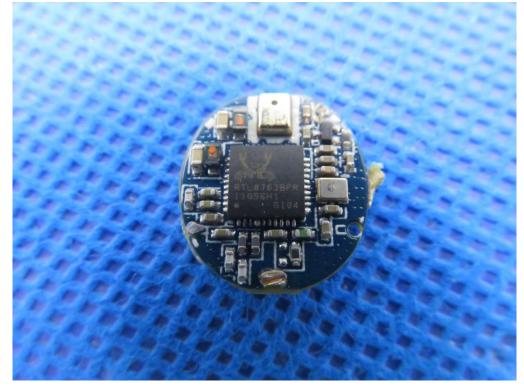
INTERNAL VIEW OF EUT-1



INTERNAL VIEW OF EUT-2



INTERNAL VIEW OF EUT-3



----END OF REPORT----