

TEST REPORT

For
UVU Technology Co., Ltd.

Watch
Model No.: I4

Test Report Number : ESTSZ140601206F/I



Shenzhen Exact Standard Testing Technology Co., Ltd.
No. 403, Building 7, Xinyuan Industrial Park, Xinguang Road,
Xili, Nanshan District, Shenzhen 518055, China
Tel:+86-755-26648640 Fax:+86-755-26648637

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1 - GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

Client Information

Applicant: UVU Technology Co., Ltd.
Address of applicant: 2106B, Building A, TianXia International Centre, TaoYuan Road, NanShan, ShenZhen, P.R.China
Manufacturer: UVU Technology Co., Ltd.
Address of manufacturer: 2106B, Building A, TianXia International Centre, TaoYuan Road, NanShan, ShenZhen, P.R.China

General Description of E.U.T

EUT Description: Watch
Trade Name: UVU
Model No.: I4
Rating: DC 3.7V or DC 5V via Adapter
Test Power Supply: DC 3.7V or AC 120V, 60Hz
Frequency: 2402~2480 MHz (40 channels, See the table 1)

1.2 Test Standards

The following Declaration of Conformity report of EUT is prepared in accordance with
FCC Rules and Regulations Part 15 Subpart C 15.207, 15.209 and 15.247: 2012

IC RSS-210 Issue 8

IC RSS-GEN Issue 3

The objective of the manufacturer is to demonstrate compliance with the described above standards.
Note: This test report is limited to the above client company and the product model only. It may not be duplicated without prior written consent of Shenzhen Exact Standard Testing Technology Co., Ltd.

Date of Test : Jun. 05~25, 2014



Prepared by :

(Testing Engineer: David He)



Reviewer :

(Project Manager: Ronnie Liu)



Approved & Authorized Signer :

(Manager: Alex Chen)

Table1

Channel List					
Channel	Frequency(MHz)	Channel	Frequency(MHz)	Channel	Frequency(MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

1.3 Summary Of Test Result

FCC Part 15 Subpart C	RSS-GEN, RSS-210	Test Items	Result
Section 15.207	RSS-210 GEN 7.2.2	Conduction Emission	Pass
Section 15.247(b)(1)	RSS-210 A8.1 (b)	Peak Output Power	Pass
Section 15.247(a)(2)	RSS-210 A8.2 (a)	6dB Bandwidth	Pass
---	RSS-GEN 4.6.1	99% Bandwidth	Pass
Section 15.247(d)	RSS-210 A8.5	Conducted Band Edges and Spurious Emission	Pass
Section 15.247(e)	RSS-210 A8.2 (b)	Peak Power Spectral Density	Pass
Section 15.209 Section 15.247(d)	RSS-210 A8.5	Radiated Band Edges and Spurious Emission	Pass
Section 15.203 Section 15.247(b)	RSS-210 A8.4	Antenna requirement	Pass
Section 1.1307	RSS-GEN 5.6	Maximum Permissible Exposure	Pass

FCC ID: 2ACKR-I4 / IC: 12142A-I4

1.4 Test Methodology

The tests were performed according to following standards:

FCC Part 15.247: Frequency Hopping, Direct Spread Spectrum and Hybrid Systems that are in operation within the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz.

ANSI C63.4-2009

ANSI C63.10-2009: American National Standard for Testing Unlicensed Wireless Devices.

KDB Publication No. 558074 Guidance on Measurements for Digital Transmission Systems

IC RSS-GEN Issue 3

IC RSS-210 Issue 8

NOTICE 2012-DRS0126

The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

The maximum emission levels emanating from the device are compared to the FCC Part 15 Subpart C limits for radiation emissions and the measurement results contained in this test report show that EUT is to be technically compliant with FCC requirements.

Global United Technology Service Co., Ltd at 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China

1.5 Test Facility

All measurement required was performed at laboratory of Global United Technology Service Co., Ltd at 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, China

The test facility is recognized, certified, or accredited by the following organizations:

FCC – Registration No.: 600491

Global United Technology Service Co., Ltd has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 600491.

The 3m Semi-anechoic chamber of Global United Technology Service Co., Ltd EMC Laboratory has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A.

The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2009.

1.6 Test Equipment List and Details

Equipment	Manufacturer	Model#	Serial #	Data of Cal.	Due Date
3m Semi-Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 30 2014	Mar. 30 2015
Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS202	N/A	N/A
Spectrum Analyzer	Agilent	E4440A	GTS533	Dec. 06, 2014	Dec. 05, 2015
EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Mar. 30 2014	Mar. 30 2015
EMI Test Software	AUDIX	E3	N/A	N/A	N/A
Coaxial Cable	GTS	N/A	GTS400	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS401	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS402	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS407	Apr. 01 2014	Apr. 01 2015
Coaxial Cable	GTS	N/A	GTS408	Apr. 01 2014	Apr. 01 2015
BiConiLog Antenna (26-3000MHz)	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS204	Feb. 26 2014	Feb. 26 2015
Pre-amplifier(0.1-3000MHz)	HP	8347A	GTS210	Aug. 03 2013	Aug. 03 2014
Double-ridged horn (1-18GHz)	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS205	Feb. 26 2014	Feb. 26 2015
Pre-amplifier(1-18GHz)	Rohde & Schwarz	8349B	GTS224	Mar. 30 2014	Mar. 30 2015
Humidity/ Temperature Indicator	Shanghai	ZJ1-2B	GTS250	Oct. 28 2013	Oct. 28 2014
Barometer	ChangChun	DYM3	GTS251	Feb. 26 2014	Feb. 26 2015
Shielding Room	ZhongYu Electron	7.0(L)*3.0(W)*3.0(H)	GTS206	Apr. 10 2014	Apr. 10 2015
EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS208	Sept. 14 2013	Sept. 14 2014
10dB Pulse Limiter	Rohde & Schwarz	N/A	GTS209	Sept. 14 2013	Sept. 14 2014
LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS207	Apr. 14 2014	Apr. 14 2015
Coaxial Cable	GTS	N/A	GTS406	Apr. 01 2014	Apr. 01 2015
Loop Antenna	ETS-Lindgren	6502	00082431	Apr. 14 2014	Apr. 14 2015
Double-ridged horn (15-26.5GHz)	SCHWARZBECK MESS-ELEKTRONIK	BBHA-9170	GTS211	Apr. 01 2014	Apr. 01 2015

2 TEST CONFIGURATION

2.1 Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

2.2 EUT Exercise Software

The EUT exercising program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. The software offered by manufacturer, can let the EUT being normal operation.

2.3 Special Accessories

As shown in section 2.5, interface cable used for compliance testing is shielded as normally supplied by UVU Technology Co., Ltd. and its respective support equipment manufacturers.

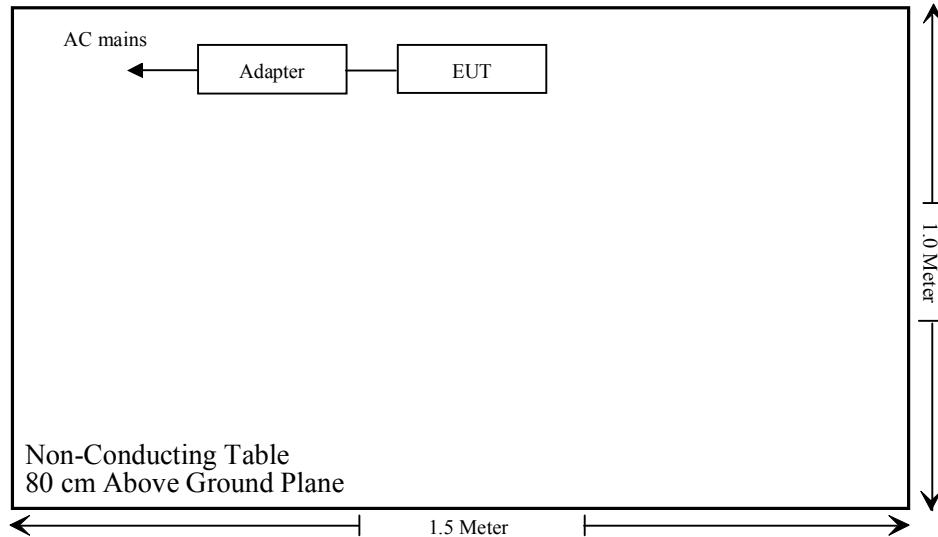
2.4 Equipment Modifications

The EUT tested was not modified by EST.

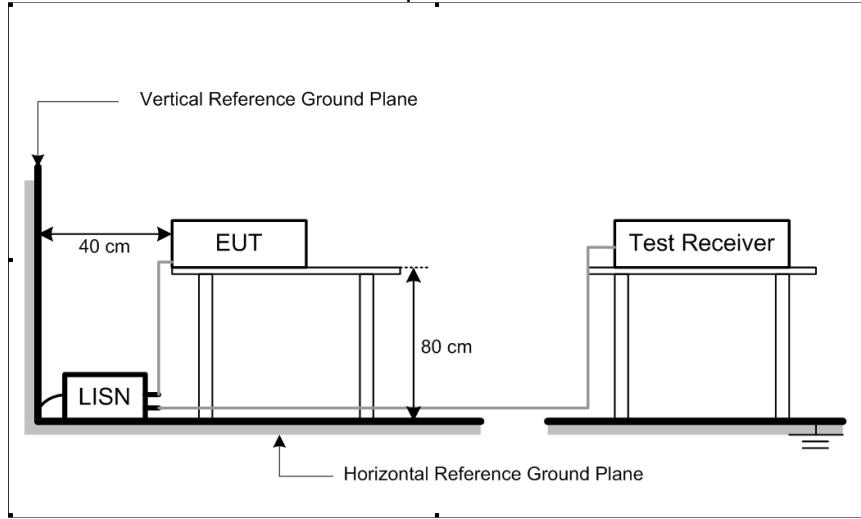
2.5 Basic Test Setup Block Diagram

2.5.1 Setup on the tabletop

Adapter:	Model: NBT-0500500EU Input: AC 100-240V, 50/60Hz
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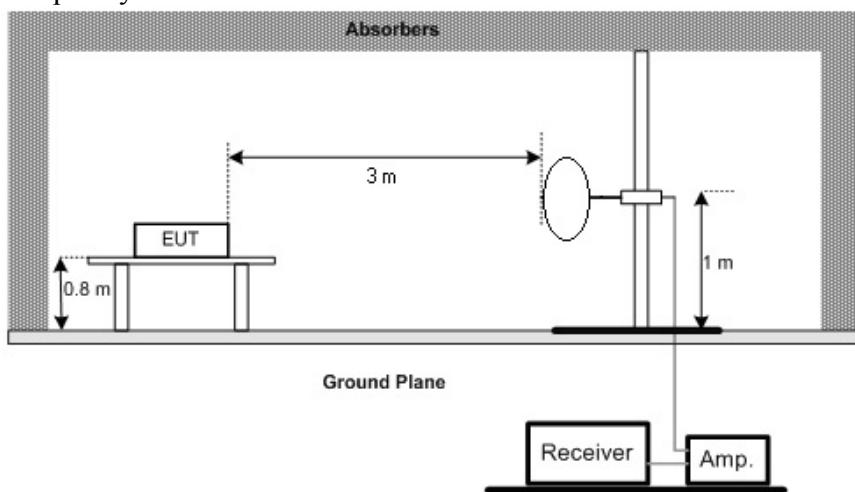


2.5.2 Conducted emission Setup

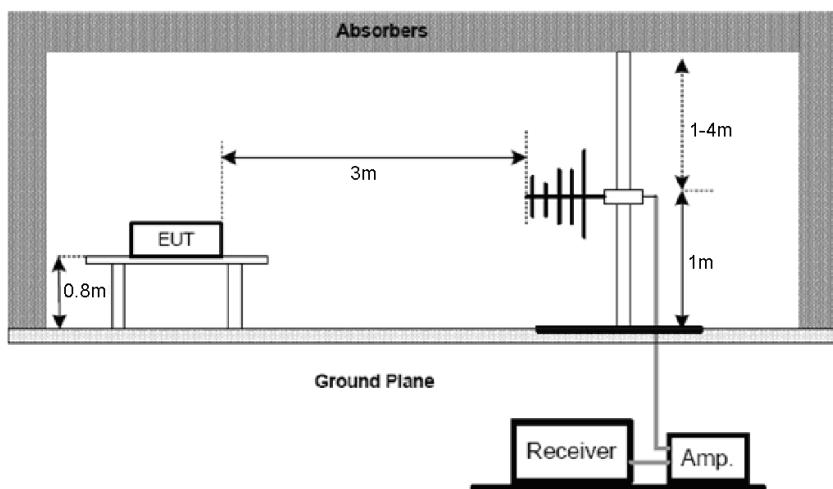


2.5.3 Radiated Emission Setup

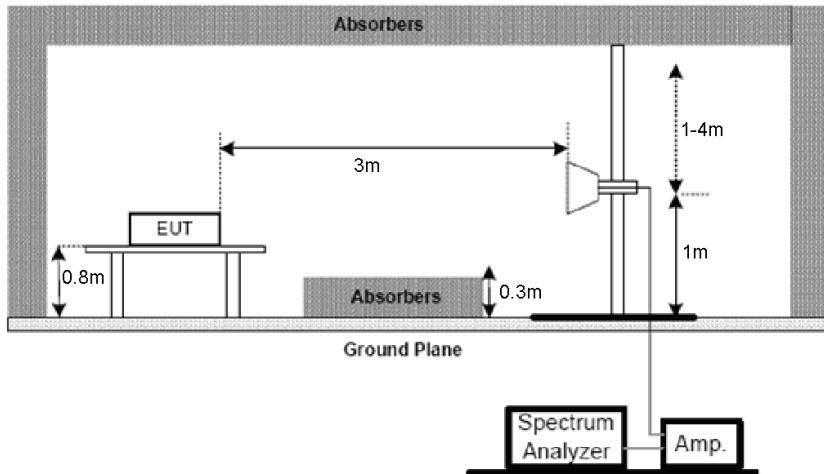
Frequency Below 30MHz



Frequency From 30MHz-1GHz



Frequency Above 1GHz

**2.6 Pre-Scanned RF Power**

Preliminary tests were performed in different data rate as following table and the highest power data rates were chosen for full test in the following tables.

Channel	Frequency	Bluetooth 4.0 – LE RF Output Power
		Data Rate / Modulation
		1 Mbps / GFSK
00	2402 MHz	1.63 dBm
19	2440 MHz	2.37 dBm
39	2480 MHz	-1.01 dBm

Note: The EUT has been associated with peripherals pursuant to ANSI C63.4-2009 and ANSI C63.10-2009 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: Conduction (150 kHz to 30 MHz), Radiation (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). X, Y, Z in three orthogonal panels to determine the final configuration (X plane as worst plane) from all possible combinations.

2.7 Test mode

Summary Table Of Test Cases	
Test Item	Data Rate / Modulation
	1 Mbps / GFSK
AC Conducted Emission	Bluetooth Link + Charging from adapter
Radiated Emission	Bluetooth Link + Charging from adapter
Conducted TCs	Bluetooth Tx C00_2402MHz_1Mbps Bluetooth Tx C19_2440MHz_1Mbps Bluetooth Tx C39_2480MHz_1Mbps
Radiated TCs	Bluetooth Tx C00_2402MHz_1Mbps Bluetooth Tx C19_2440MHz_1Mbps Bluetooth Tx C39_2480MHz_1Mbps

3 - DISTURBANCE VOLTAGE AT THE MAINS TERMINALS

3.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.4 dB.

3.2 Limit of Disturbance Voltage at The Mains Terminals (FCC PART 15.207)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	56~46
0.500~5.000	56	46
5.000~30.00	60	50

Note: (1)The tighter limit shall apply at the edge between two frequency bands.
 (2) Decreases with the logarithm of the frequency.

3.3 EUT Setup

The setup of EUT is according with ANSI C63.4-2009 measurement procedure. The specification used was the FCC Rules and Regulations Part 15.207 limits.

The EUT was placed center and the back edge of the test table.

The spacing between the peripherals was 10 cm.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

3.4 Instrument Setup

The test receiver was set with the following configurations:

Test Receiver Setting:

Frequency Range.....150 KHz to 30 MHz
 Detector.....Peak & Quasi-Peak & Average
 Sweep Speed.....Auto
 IF Band Width.....9 KHz

3.5 Test Procedure

During the conducted emission test, the EUT power cord was connected to the auxiliary outlet of the first Artificial Mains.

Maximizing procedure was performed on the highest emissions to ensure EUT compliance using all installation combination.

All data was recorded in the peak detection mode. Quasi-peak and Average readings were only performed when an emission was found to be marginal (within -10 dB μ V of specification limits). Quasi-peak readings are distinguished with a "QP". Average readings are distinguished with a "AV".

3.6 Test Situation

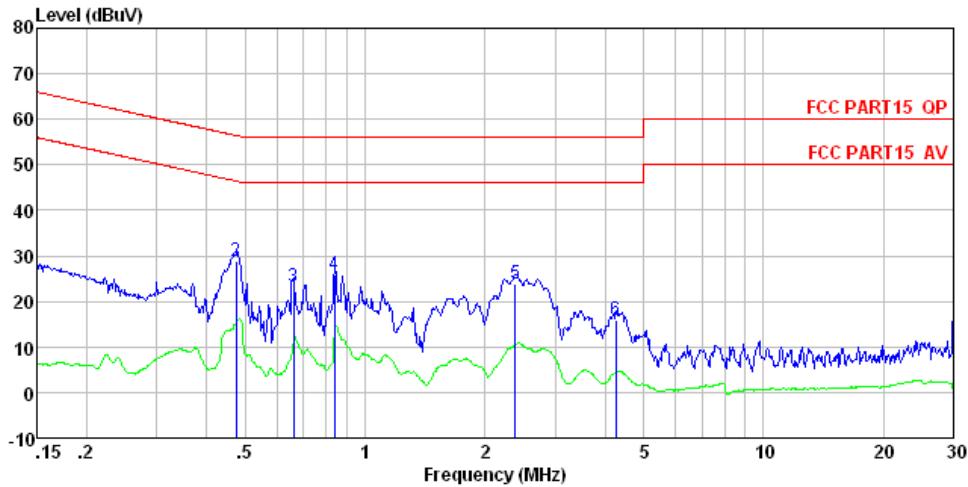
Temperature (°C)	22
Humidity (%RH)	58
Barometric Pressure (mbar)	1001
EUT	Watch
M/N	I4
Operating Mode	Bluetooth Link + Charging mode

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured
(3) When AV reading is less than relevant limit 20dB, the AV reading will not be recorded.

3.7 Test Result

Pass

Details see the following pages.



Condition : FCC PART15 QP LISN-2013 LINE

EUT : Watch

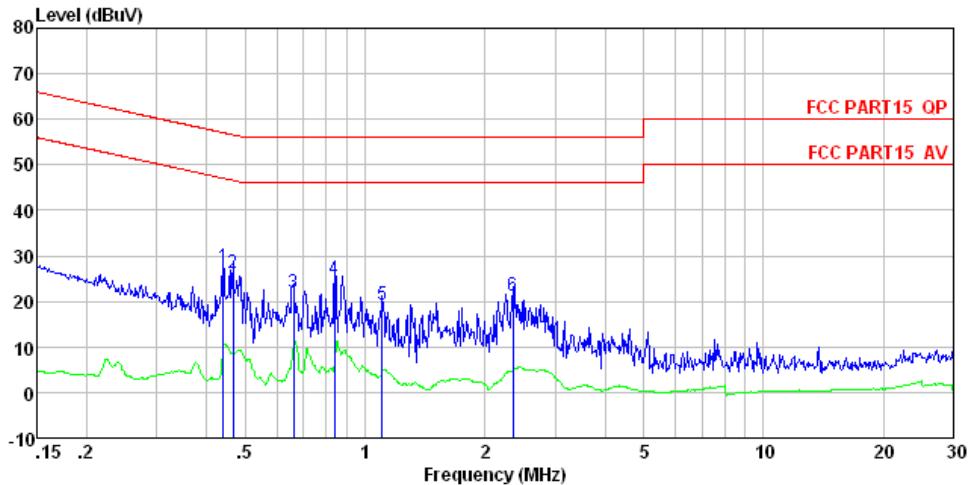
Model : I4

Test Mode : Charging mode

Power Rating : AC 120V/60Hz

Test Engineer: David

Freq	Read	LISN	Cable	Limit	Over	Remark	
	MHz	dBuV	dB	dB	dBuV	dBuV	
1	0.150	26.01	0.15	0.12	26.28	66.00	-39.72 QP
2	0.474	28.76	0.12	0.11	28.99	56.45	-27.46 QP
3	0.661	22.85	0.14	0.13	23.12	56.00	-32.88 QP
4	0.839	25.49	0.14	0.13	25.76	56.00	-30.24 QP
5	2.384	23.61	0.13	0.15	23.89	56.00	-32.11 QP
6	4.269	15.68	0.20	0.15	16.03	56.00	-39.97 QP



Condition : FCC PART15 QP LISN-2013 NEUTRAL

EUT : Watch

Model : I4

Test Mode : Charging mode

Power Rating : AC 120V/60Hz

Test Engineer: David

Freq	Read	LISN	Cable	Limit	Over	Remark
	MHz	dBuV	dB	dBuV	dBuV	
1	0.440	27.45	0.06	0.11	27.62	57.07 -29.45 QP
2	0.466	26.08	0.06	0.11	26.25	56.58 -30.33 QP
3	0.661	21.52	0.07	0.13	21.72	56.00 -34.28 QP
4	0.839	24.74	0.07	0.13	24.94	56.00 -31.06 QP
5	1.106	18.93	0.08	0.13	19.14	56.00 -36.86 QP
6	2.346	21.02	0.10	0.15	21.27	56.00 -34.73 QP

4 RADIATED DISTURBANCES

4.1 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement is ± 4.0 dB.

4.2 Limit of Radiated Disturbances (FCC Part 15.209)

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	40
88 ~216	3	43.5
216 ~ 960	3	46
960~1000	3	54

Note: (1) The tighter limit shall apply at the edge between two frequency bands.
 (2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.3 EUT Setup

The radiated emission tests were performed in the in the 3-meter anechoic chamber, using the setup accordance with the ANSI C63.4-2009. The specification used was the FCC Part 15 limits.

The EUT was placed on the center of the test table.

Maximum emission emitted from EUT was determined by manipulating the EUT, support equipment, interconnecting cables and varying the mode of operation and the levels in the final result of the test were recorded with the EUT running in the operating mode that maximum emission was emitted.

4.4 Test Receiver Setup

According to FCC Part 15 rule, the frequency was investigated from 30 to 1000 MHz. During the radiated emission test, the test receiver was set with the following configurations:

Test Receiver Setting:

Detector.....Peak & Quasi-Peak
 IF Band Width.....120KHz
 Frequency Range.....30MHz to 1000MHz
 Turntable Rotated.....0 to 360 degrees

Antenna Position:

Height.....1m to 4m
 Polarity.....Horizontal and Vertical

4.5 Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the peak detection mode. Quasi-peak readings performed only when an emission was found to be marginal (within $-10 \text{ dB}\mu\text{V}$ of specification limits), and are distinguished with a "QP" in the data table.

4.6 Radiated Emissions Test Result

Temperature (°C)	26
Humidity (%RH)	56
Barometric Pressure (mbar)	1001.1
EUT	Watch
M/N	I4
Operating Mode	Bluetooth Link + Charging mode

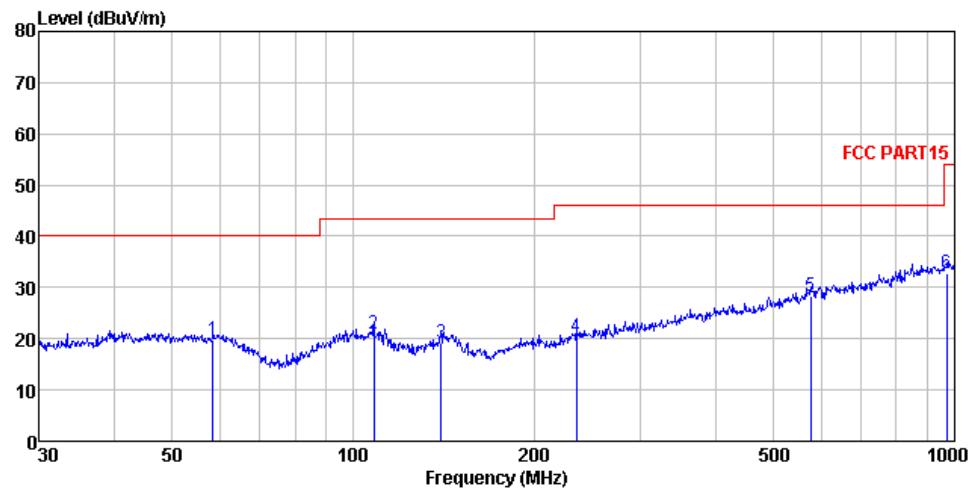
Test data see following pages.

Remark: (1) When PK reading is less than relevant limit 20dB, the QP reading and AV reading will not be recorded.
(2) Where QP reading is less than relevant AV limit, the AV reading will not be measured

4.7 Test Result

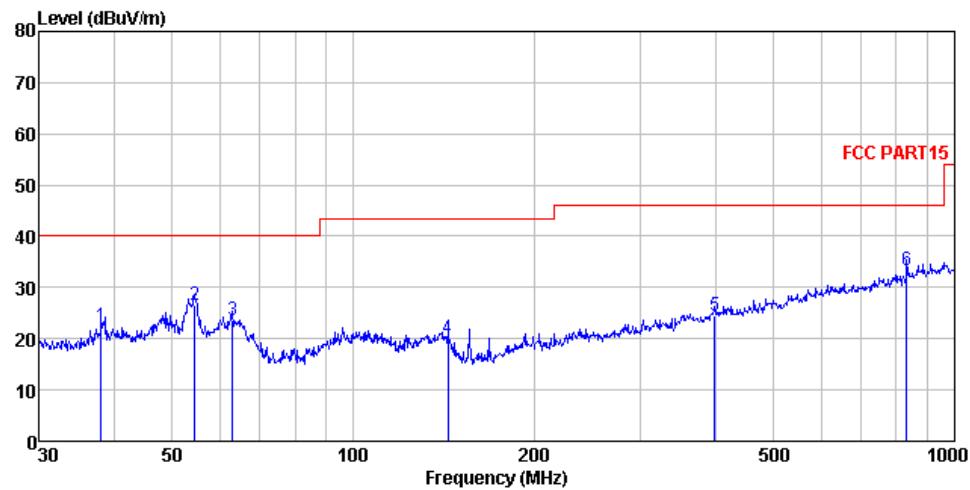
Pass.

Details see the following pages.

Radiated Emission Test Data

Site : 3m chamber
 Condition : FCC PART15 3m VULB9163-2013M HORIZONTAL
 EUT : Watch
 Model : I4
 Test Mode : Charging
 Power Rating : AC 120W/60Hz
 Test Engineer: David

	Read	Antenna	Cable	Preamp	Limit	Over		
	Freq	Level	Factor	Loss	Level	Line	Limit	Remark
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB
1	58.407	36.00	14.80	0.85	31.94	19.71	40.00	-20.29 QP
2	108.287	37.07	14.39	1.26	31.80	20.92	43.50	-22.58 QP
3	139.851	39.45	10.19	1.50	31.94	19.20	43.50	-24.30 QP
4	234.991	36.59	13.83	2.05	32.16	20.31	46.00	-25.69 QP
5	576.644	35.70	20.03	3.63	31.15	28.21	46.00	-17.79 QP
6	968.934	35.38	23.55	5.11	31.22	32.82	54.00	-21.18 QP

Radiated Emission Test Data

Site : 3m chamber
 Condition : FCC PART15 3m VULB9163-2013M VERTICAL
 EUT : Watch
 Model : I4
 Test Mode : Charging
 Power Rating : AC 120W/60Hz
 Test Engineer: David

	Read	Antenna	Cable	Preamp	Limit	Over		
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
1	38.078	38.74	15.11	0.64	32.06	22.43	40.00	-17.57 QP
2	54.452	42.75	15.05	0.81	31.95	26.66	40.00	-13.34 QP
3	63.092	41.06	13.50	0.89	31.92	23.53	40.00	-16.47 QP
4	143.830	40.17	10.22	1.53	31.96	19.96	43.50	-23.54 QP
5	399.030	36.37	17.06	2.85	31.90	24.38	46.00	-21.62 QP
6	833.317	37.64	22.42	4.58	31.27	33.37	46.00	-12.63 QP

5 - FCC Part 15.247 Requirements

Testing was performed in accordance with CFR 47 Part 15.247 and FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01.

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

5.1 Output Power Requirements

The maximum output power requirement is the maximum equivalent isotropic radiated power delivering at the transmitting antenna under specified conditions of measurements in the presence of modulation.

The maximum output power and harmonics shall not exceed CFR47 Part 15.247 (b1).

The maximum transmitted power is + 21 dBm or 0.125 Watt.

5.1.1 Test Method

The conducted method was used to measure the channel power output according to ANSI C63.4:2009 and FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01. The measurement was performed with modulation per CFR47 Part 15.247 (b1).

This test was conducted on 3 channels of Sample. The worst mode result indicated below.

Test Setup



5.1.2 Test Results

Please refer the following pages.

Barometric Pressure (mbar)	1000.8
Temperature	23° C
Relative Humidity	54 %
EUT	Watch
M/N	I4
Operation Condition	GFSK_1Mbps Mode CH00 / CH19 / CH39
Testing Engineer	David

Output Power			
Operating Channel (MHz)	Limit (dBm)	Output Level (dBm)	Result
2402	21	1.63	Pass
2440	21	2.37	Pass
2480	21	-1.01	Pass

5.2 6dB & 99% Bandwidth Requirements

The occupied bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at the fundamental frequency.

The 99% bandwidth is the bandwidth in which 99% of the transmitted power occupied.

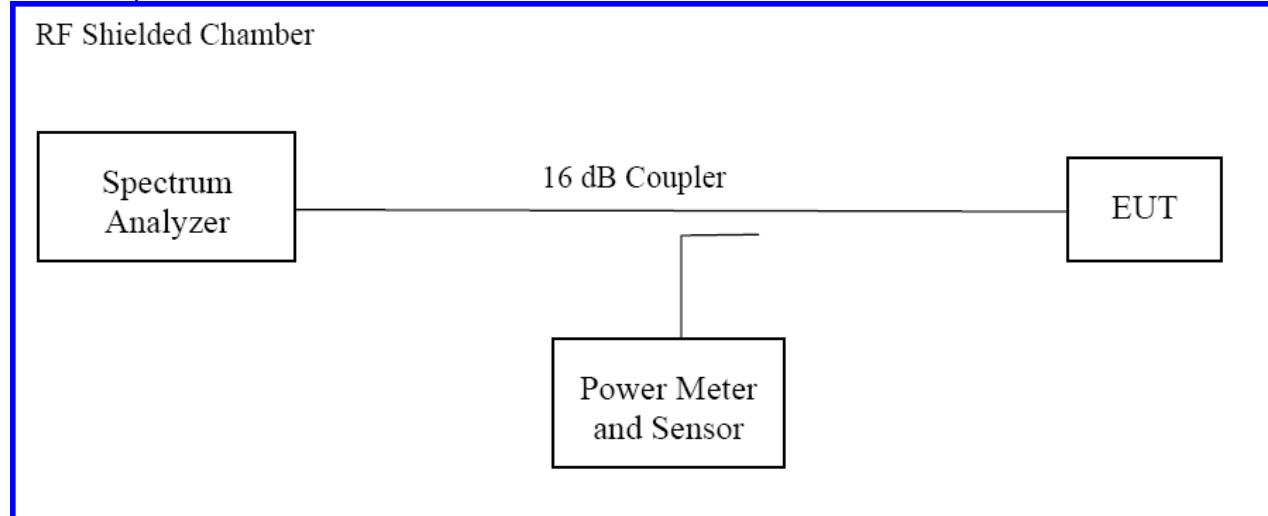
The 6 dB bandwidth is defined the bandwidth of 6 dBr from highest transmitted level of the fundamental frequency.

The bandwidth shall be at least 500 kHz via Section CFR47 15.247(a2).

5.2.1 Test Method

The conducted method was used to measure the channel power output according to ANSI C63.4:2009 and FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01(Section 8.1, Option 1 method). The measurement was performed with modulation per CFR47 Part 15.247 (a2). This test was conducted on 3 channels of Sample. The worst mode result indicated below.

Test Setup

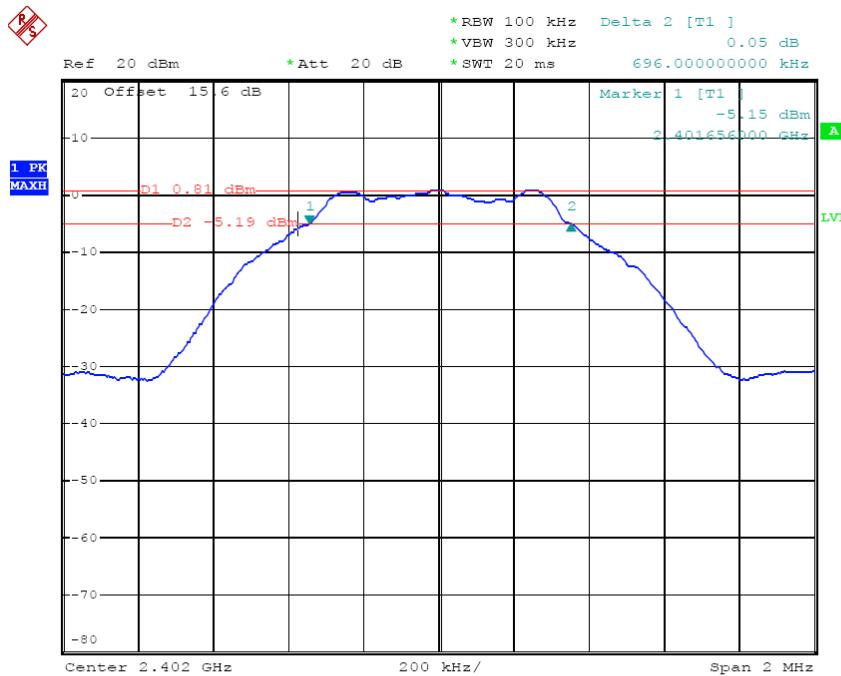


5.2.2 Test Results

Barometric Pressure (mbar)	1000.8
Temperature	23° C
Relative Humidity	54 %
EUT	Watch
M/N	I4
Operation Condition	GFSK_1Mbps Mode CH00 / CH19 / CH39
Testing Engineer	David

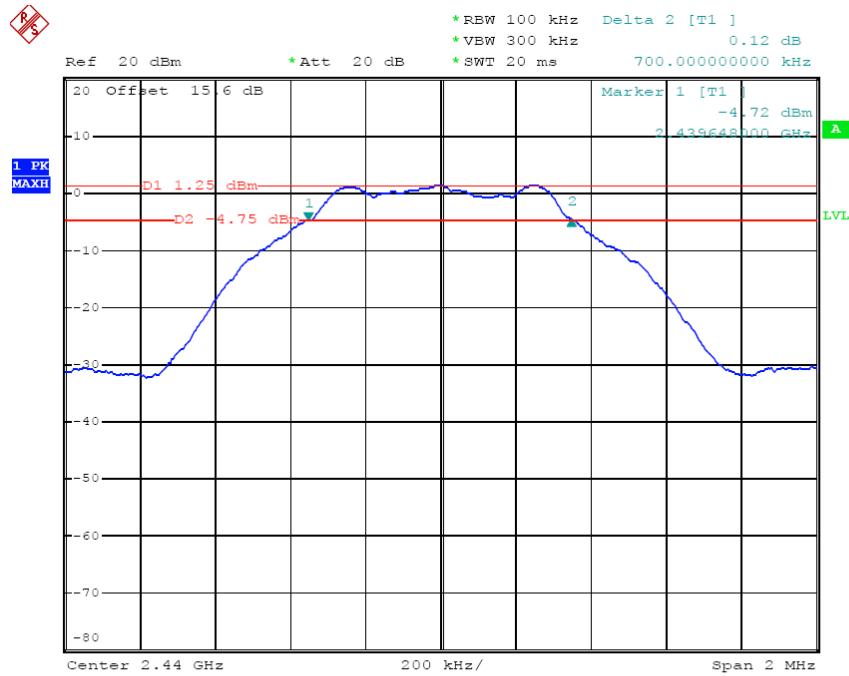
6dB Bandwidth(MHz)			
Operating Channel (MHz)	Limit	Bandwidth (MHz)	Result
2402	> 500kHz	0.696	PASS
2440	> 500kHz	0.700	PASS
2480	> 500kHz	0.684	PASS

Mode: CH00

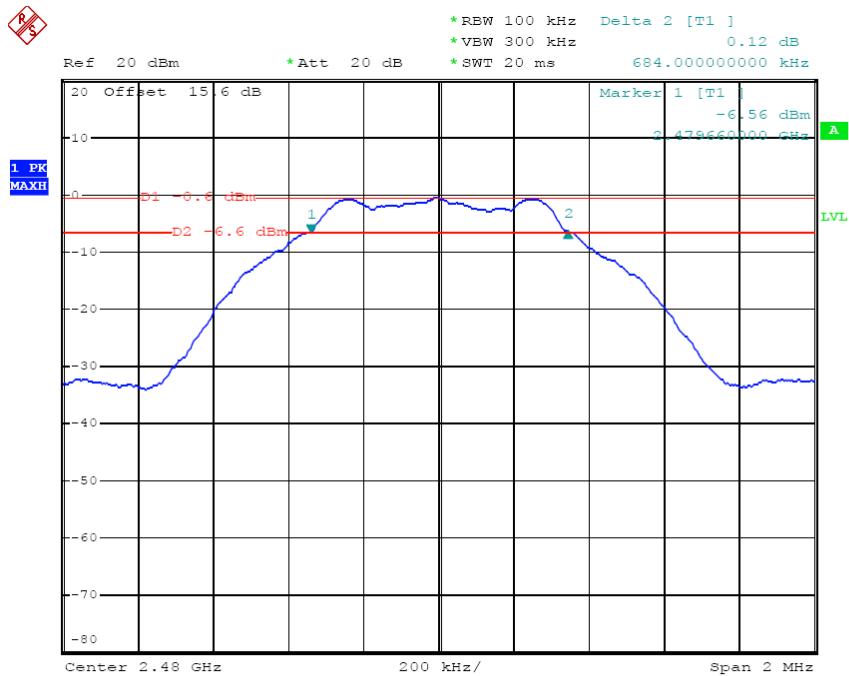


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Mode: CH19



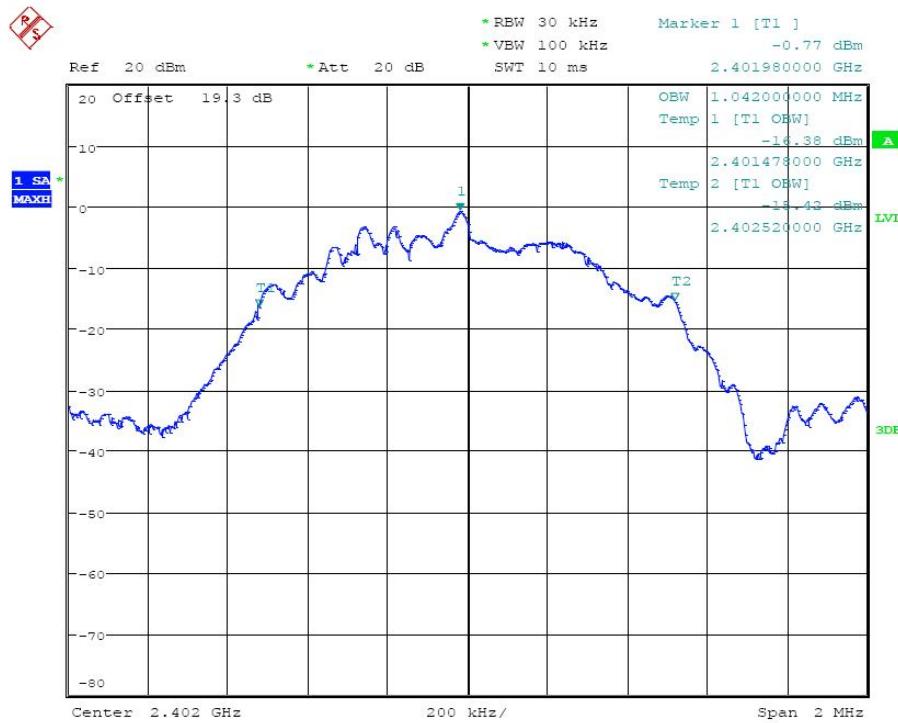
Mode: CH39



Barometric Pressure (mbar)	1000.8
Temperature	23° C
Relative Humidity	54 %
EUT	Watch
M/N	I4
Operation Condition	GFSK_1Mbps Mode CH00 / CH19 / CH39
Testing Engineer	David

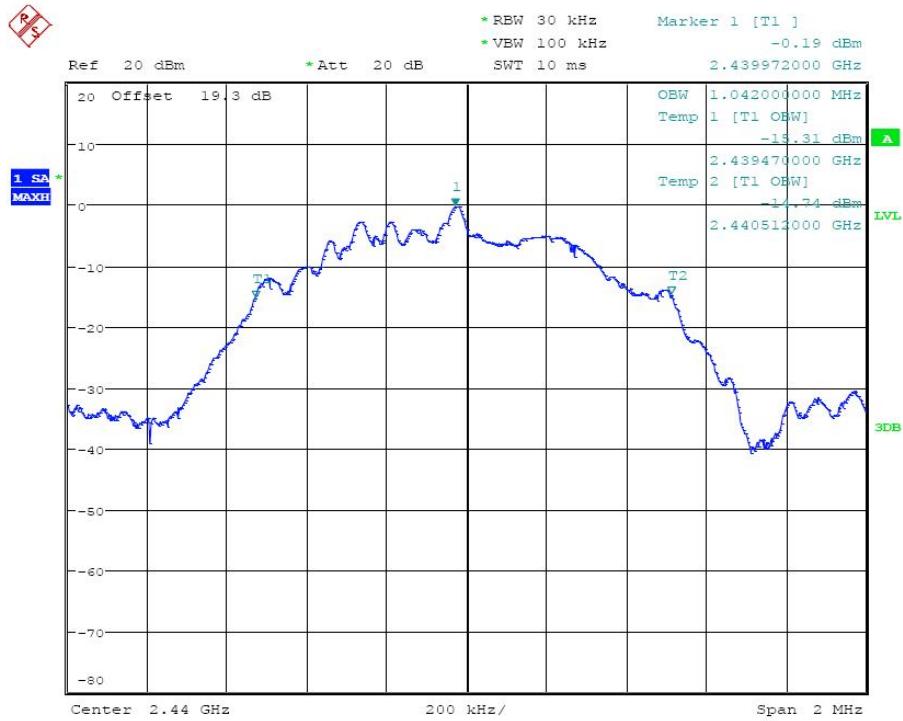
99% Bandwidth(MHz)			
Operating Channel (MHz)	Limit	Bandwidth (MHz)	Result
2402	N/A	1.042	PASS
2440	N/A	1.042	PASS
2480	N/A	1.044	PASS

Mode: CH00

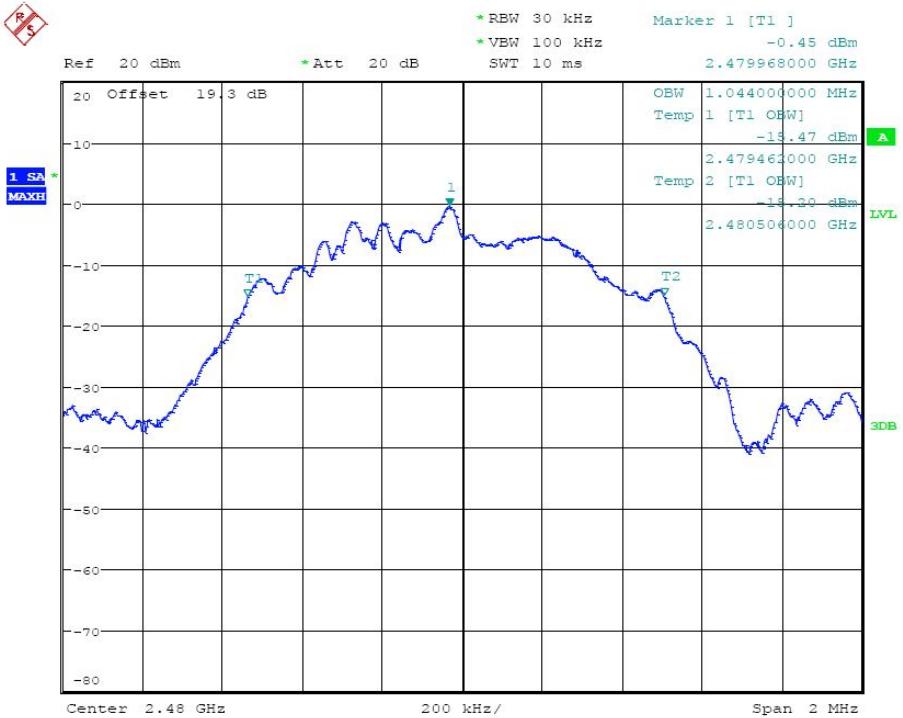


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Mode: CH19



Mode: CH39



5.3 Conducted Band Edges and Spurious Emission Requirements

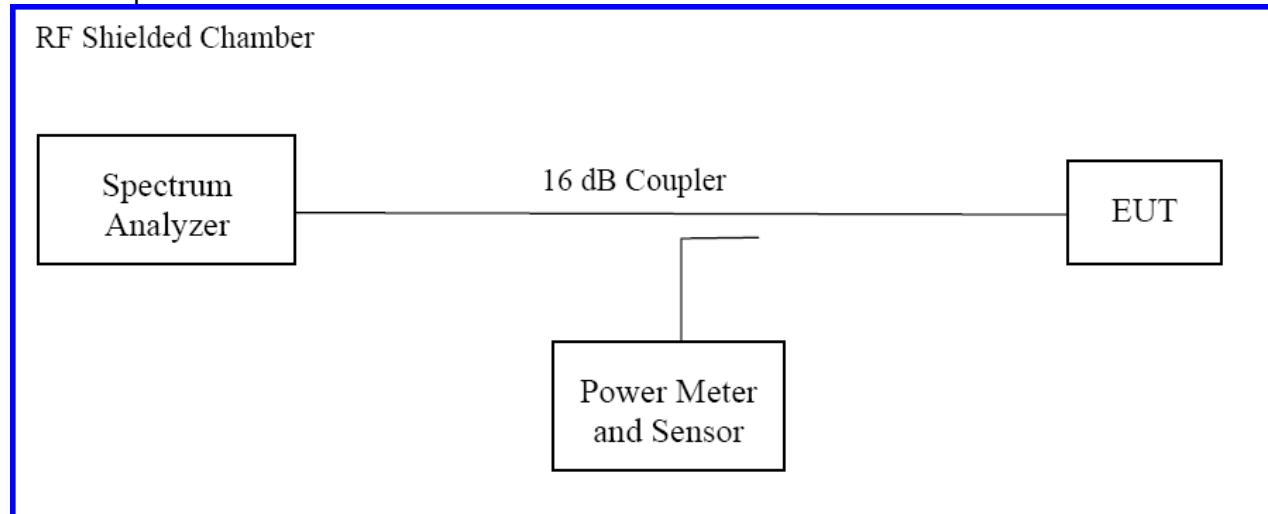
The setup was identical to RF output power measurement. Intentional radiators operating under the alternative provisions to the general emission limits, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If the frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Any frequency outside the band of 2400 MHz to 2483.5 MHz, the power output level must be below 20 dB from the in-band transmitting signal: CFR 47 Part 15.215, 15.247(d).

5.3.1 Test Method

The conducted method was used to measure the channel power output according to ANSI C63.4:2009 and FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01(Section 13.2, Marker-delta method). The measurement was performed with modulation per CFR47 Part 15.215, 15.247 (d). This test was conducted on 2 channels of Sample. The worst mode result indicated below.

Test Setup



5.3.2 Test Results

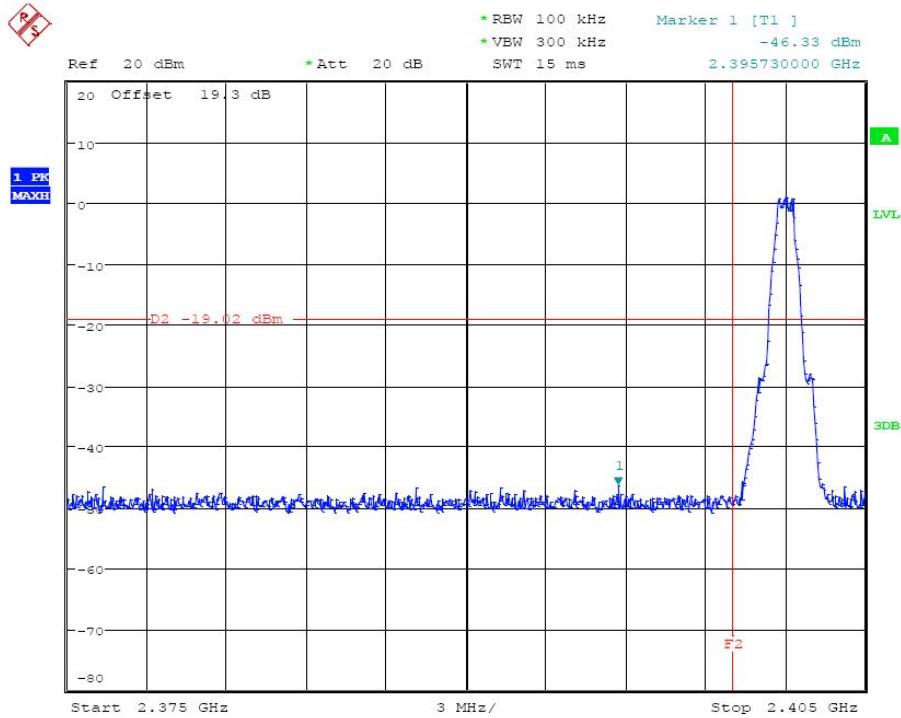
Barometric Pressure (mbar)	1000.8
Temperature	23° C
Relative Humidity	54 %
EUT	Watch
M/N	I4
Operation Condition	GFSK_1Mbps Mode CH00 / CH19 / CH39
Testing Engineer	David

Result: Pass

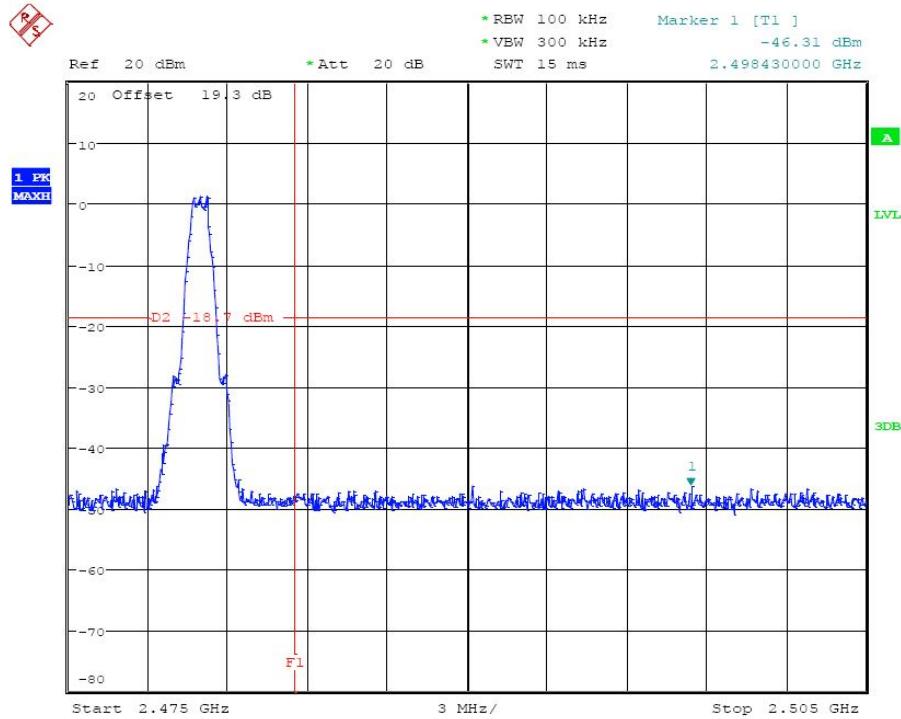
Please refer the following pages.

FCC ID: 2ACKR-I4 / IC: 12142A-I4

Band Edge: CH00

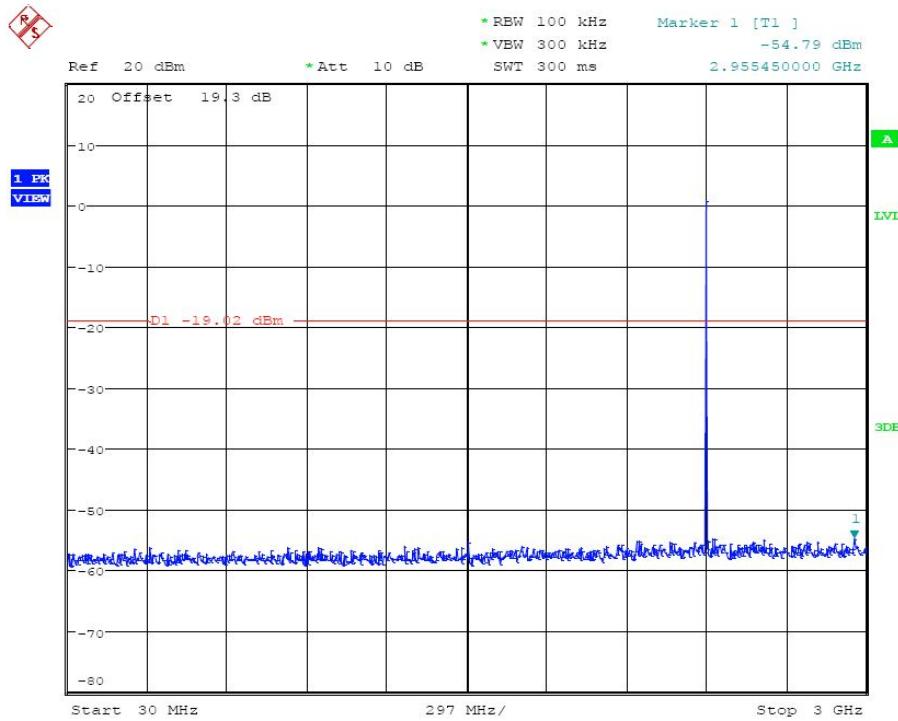


Band Edge: CH39

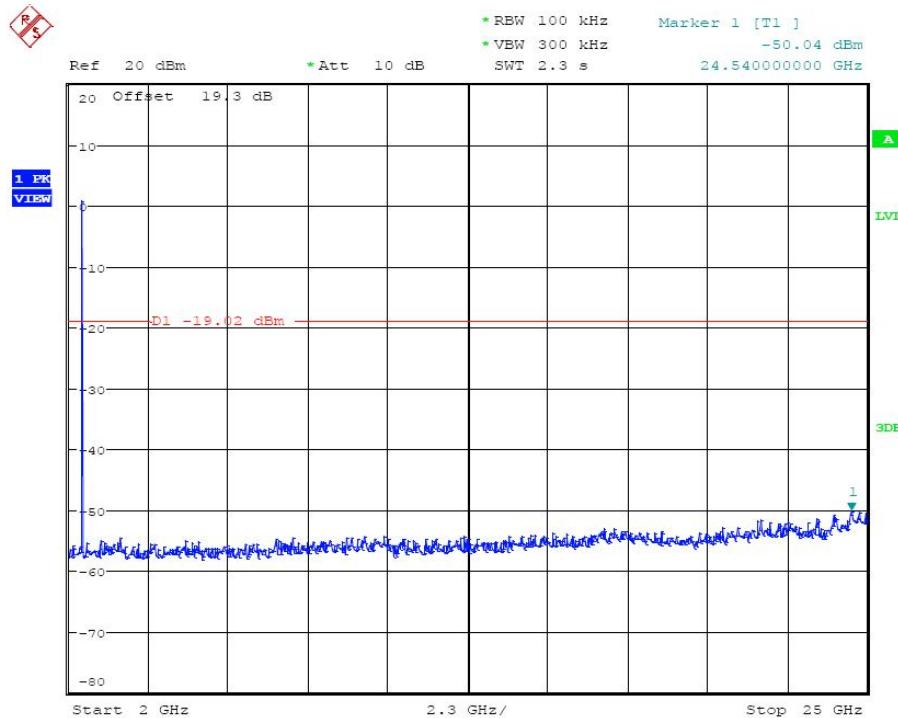


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Spurious Emission: CH00

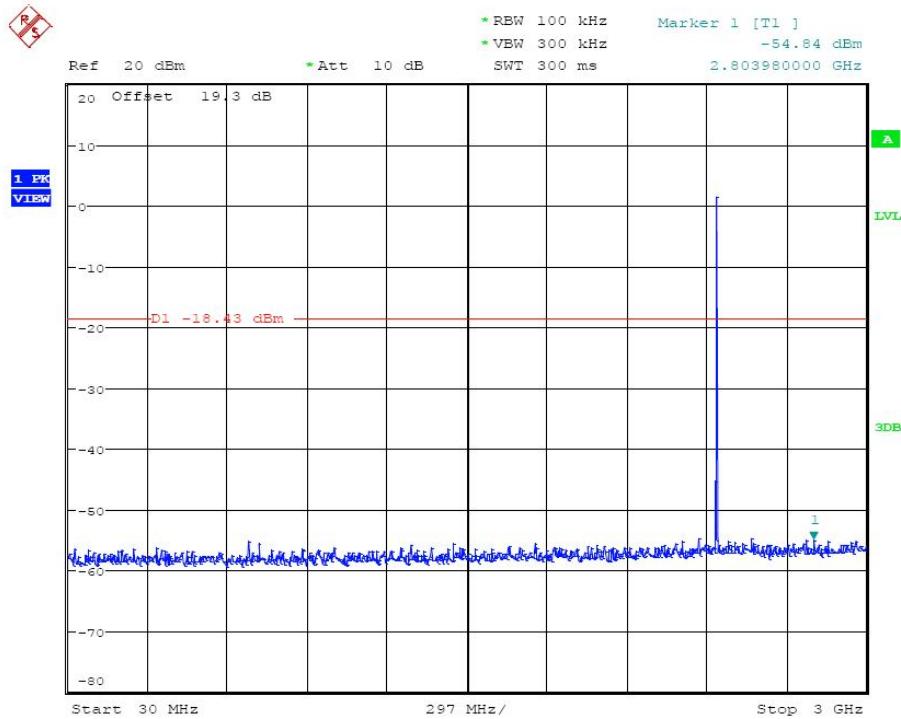


Spurious Emission: CH00

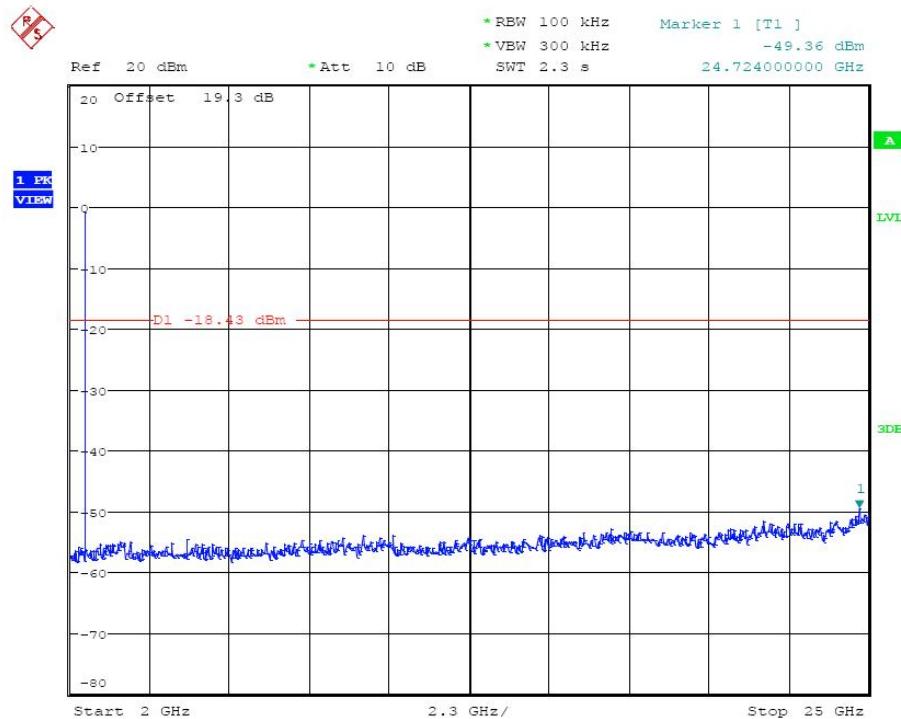


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Spurious Emission: CH19

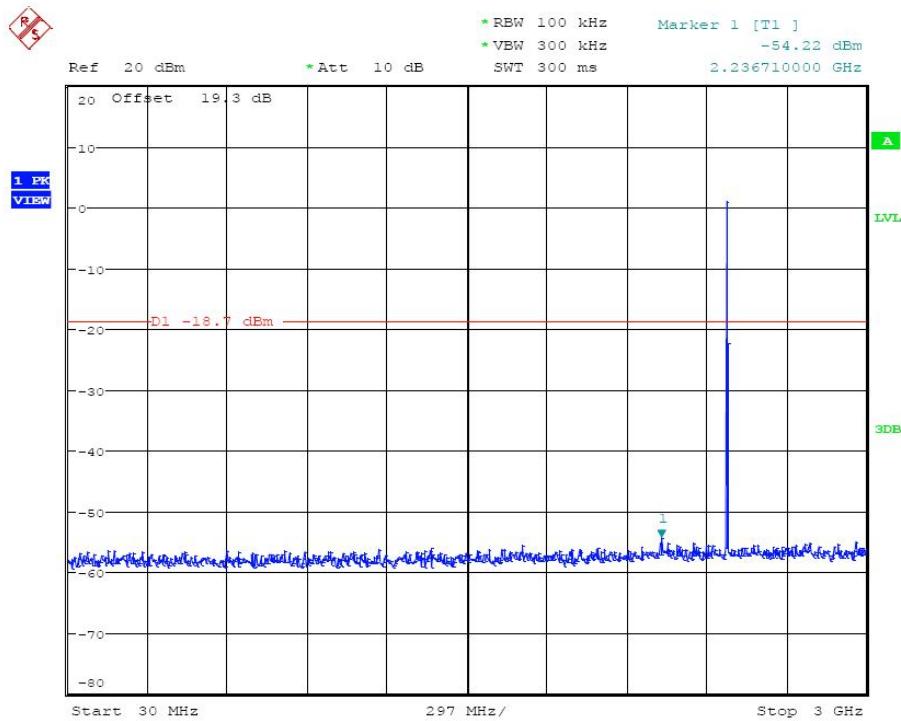


Spurious Emission: CH19

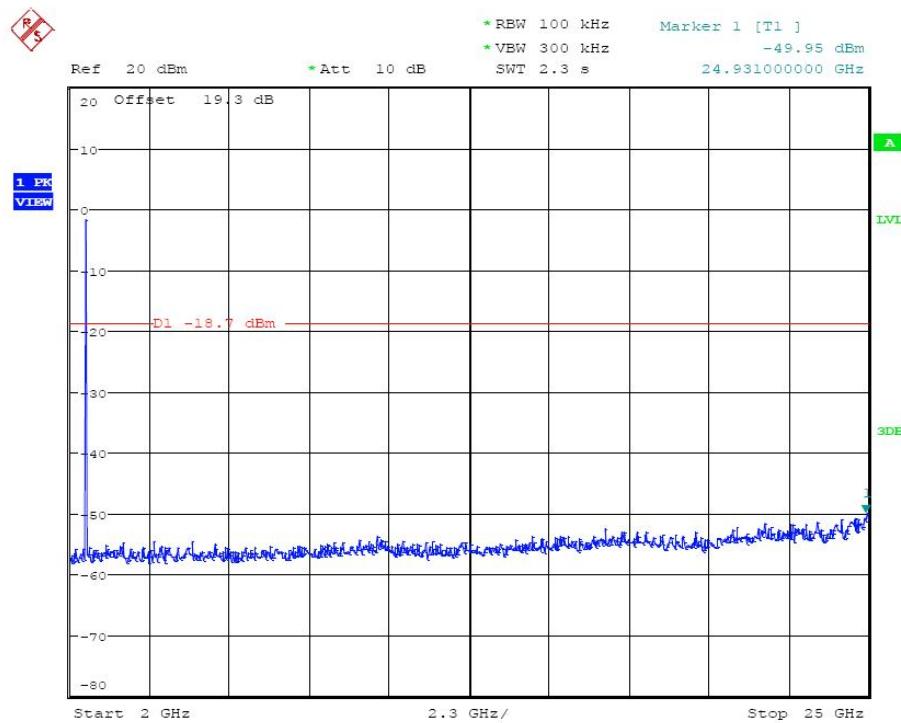


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Spurious Emission: CH39



Spurious Emission: CH39



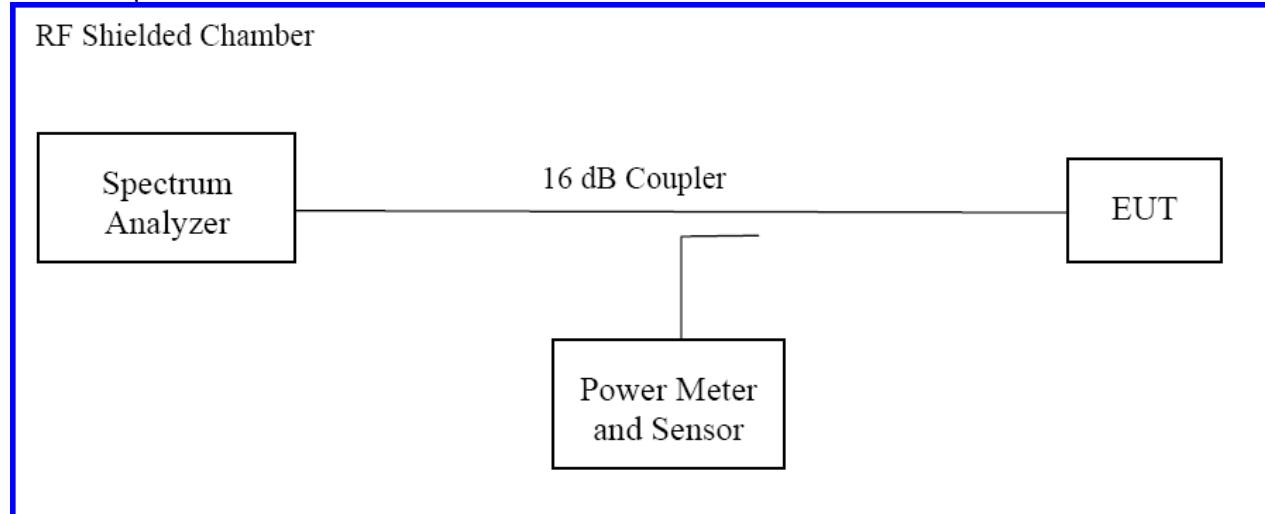
5.4 Peak Power Spectral Density Requirements

According to the CFR47 Part 15.247 (e), the spectral power density output of the antenna port shall be less than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

5.4.1 Test Method

The conducted method was used to measure the channel power output according to ANSI C63.4:2009 and FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01(Section 10.2, PKPSD method). The measurement was performed with modulation per CFR47 Part 15.247 (e). This test was conducted on 3 channels of Sample. The worst mode result indicated below.

Test Setup

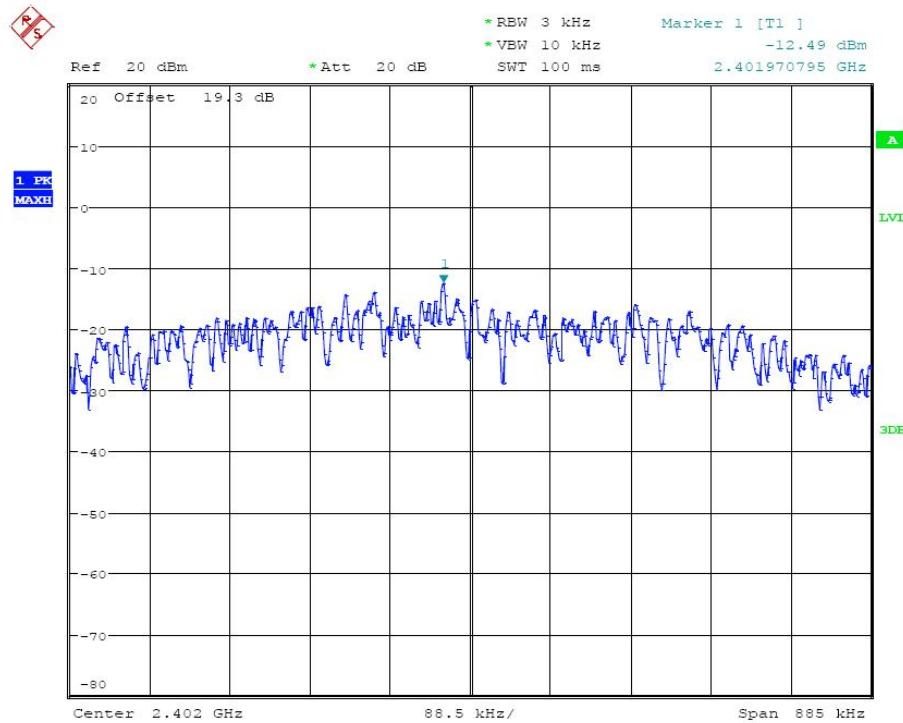


5.4.2 Test Results

Barometric Pressure (mbar)	1000.8
Temperature	23° C
Relative Humidity	54 %
EUT	Watch
M/N	I4
Operation Condition	GFSK_1Mbps Mode CH00 / CH19 / CH39
Testing Engineer	David

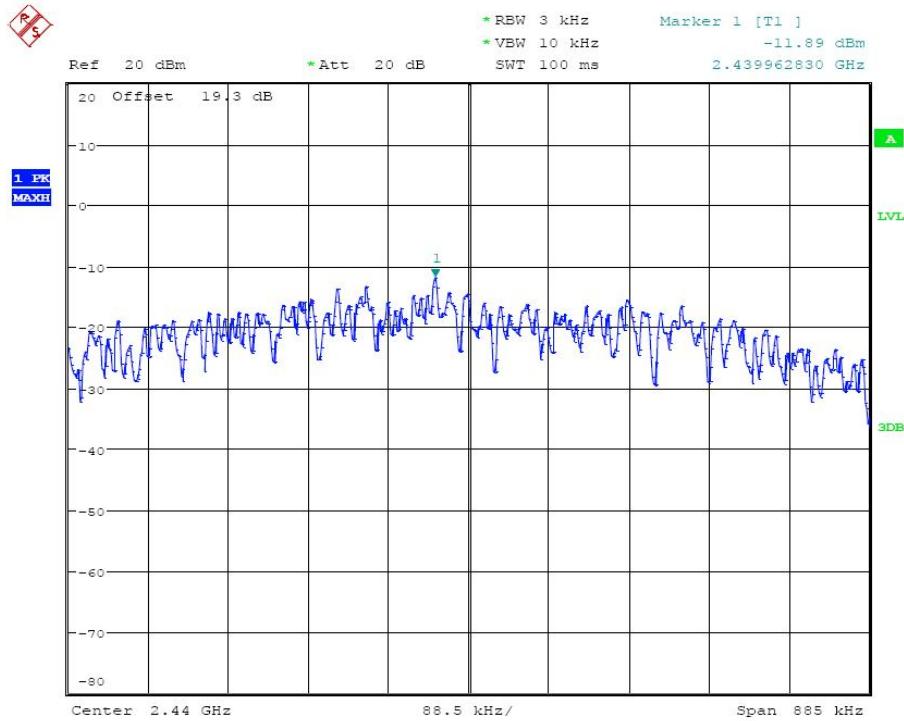
PPSD (3kHz)			
Operating Channel (MHz)	Limit (dBm)	PPSD (dBm)	Result
2402	8	-12.49	Pass
2440	8	-11.89	Pass
2480	8	-12.20	Pass

Mode: CH00

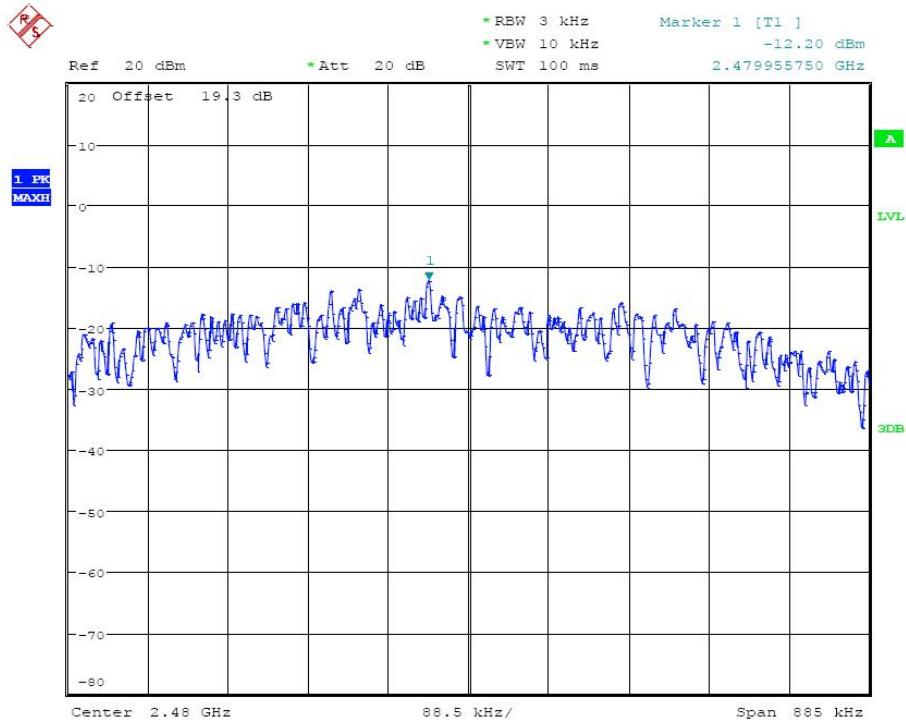


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Mode: CH19



Mode: CH39



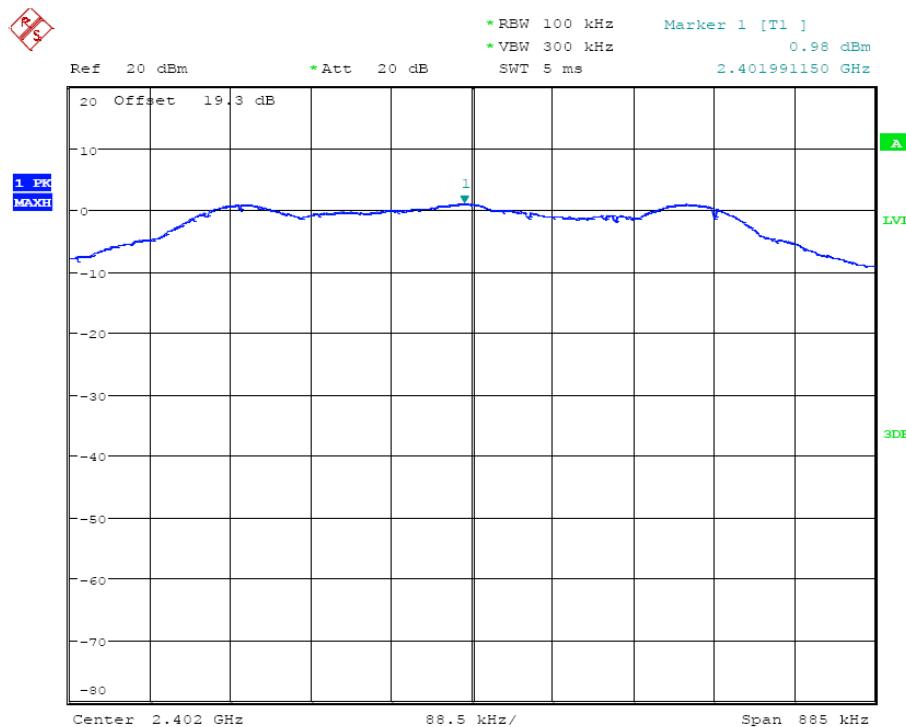
Barometric Pressure (mbar)	1000.8
Temperature	23° C
Relative Humidity	54 %
EUT	Watch
M/N	I4
Operation Condition	GFSK_1Mbps Mode CH00 / CH19 / CH39
Testing Engineer	David

PPSD (100kHz)			
Operating Channel (MHz)	Limit (dBm)	PPSD (dBm)	20dBc
2402	N/A	0.98	-19.02
2440	N/A	1.57	-18.43
2480	N/A	1.30	-18.70

Note:

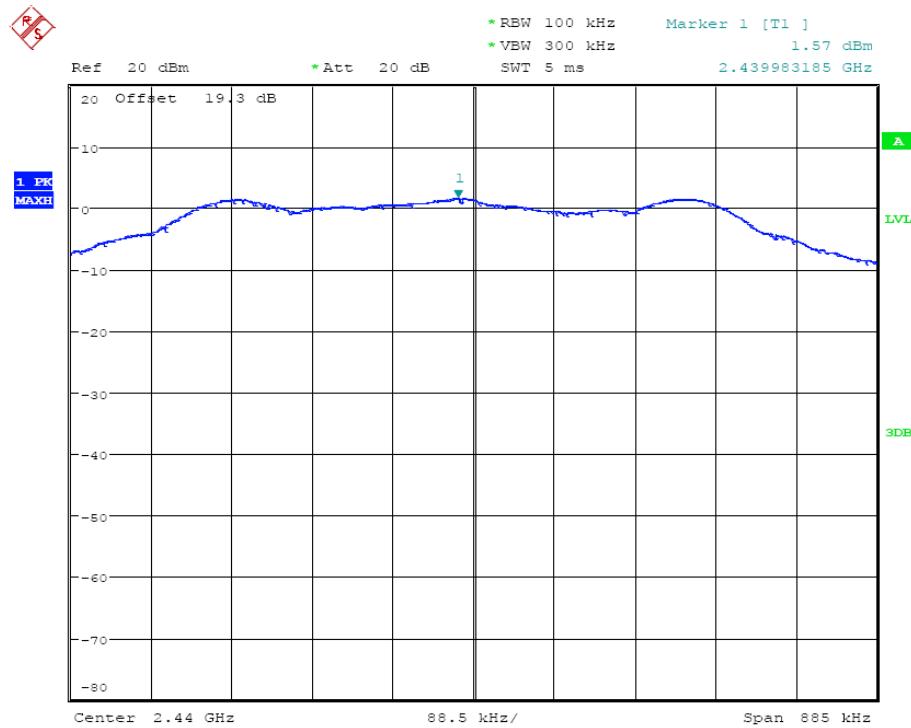
The Measured PPSD(dBm)/100kHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.

Mode: CH00

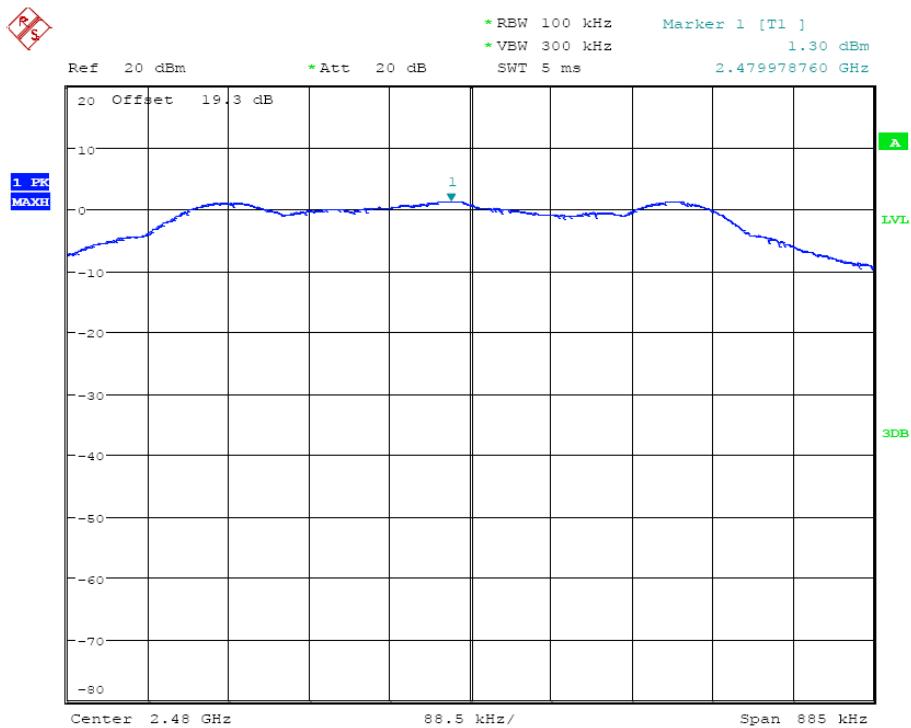


FCC ID: 2ACKR-I4 / IC: 12142A-I4

Mode: CH19



Mode: CH39



5.5 Radiated Band Edges and Spurious Emission Requirements

Transmitter spurious emissions are emissions outside the frequency range of the equipment when the equipment is in transmit mode; per requirement of CFR47 15.205, 15.209, 15.247(d) and FCC KDB No. 558074 DTS D01 Meas. Guidance v03r01(Section 12.2.7).

5.5.1 Test Methodology

5.5.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 120 kHz and provide a reading at each frequency for no more than 12° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's. Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1m. Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

5.5.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on an NSA compliant test site. The EUT was placed on a 1.0m x 1.5m nonconductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

The final scans performed on the worst axis for three operating channels; 2402 MHz, 2440 MHz, and 2480 MHz for GFSK_1Mbps mode.

The worst axis for each antennas type was scanned.

5.5.2 Transmitter Spurious Emission Limit

The spurious emissions of the transmitter shall not exceed the values in CFR47 Part 15.205, 15.209:

Measurement	Field strength (microvolts/meter)	distance (meters)
Frequency (MHz)		
0.009-0.490.....	2400/F (kHz)	300
0.490-1.705.....	24000/F (kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

All harmonics and spurious emission which are outside of the restricted band shall be 20 dB below the in-band emission.

5.5.3 Test Results

The final measurement data was taken under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.4 and 1.5.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Radiated Band Edge:**Mode: GFSK_1Mbps**

CH Low(2402MHz)

Frequency (MHz)	Read Peak (dBuV)	Read AV (dBuV)	Total Factor (dB)	Level (dBuV/m)		Limit(dBuV/m)		Direction (H/V)	Remark
				Peak	AV	Peak	AV		
2362.36	36.25	34.28	5.82	42.07	40.10	74	54	H	PASS
2395.24	35.82	33.76	5.50	41.32	39.26	74	54	V	PASS

CH High(2480MHz)

Frequency (MHz)	Read Peak (dBuV)	Read AV (dBuV)	Total Factor (dB)	Level (dBuV/m)		Limit(dBuV/m)		Direction (H/V)	Remark
				Peak	AV	Peak	AV		
2486.21	37.15	36.34	5.49	42.64	41.83	74	54	H	PASS
2512.54	36.76	36.27	5.68	42.44	41.95	74	54	V	PASS

Radiated Spurious Emission Data (From 9KHz ~ 30MHz):**Mode: GFSK_1Mbps CH 39**

Frequency (MHz)	Read Level (dBuV)	Total Factor (dB/m)	Level (dBuV/m)	Limit Line (dBuV/m)	Remark	Over Limit (dB)	Direction (H/V)	Result
23.96	48.59	-15.39	33.20	49.5	QP	-16.30	-	PASS

Radiated Spurious Emission Data (From 30MHz ~ 1GHz):**Mode: GFSK_1Mbps CH 39**

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark	Direction (H/V)
58.41	36.00	14.80	0.85	31.94	19.71	40.00	-20.29	QP	H
108.27	37.07	14.39	1.26	31.80	20.92	43.50	-22.58	QP	H
139.85	39.45	10.19	1.50	31.94	19.20	43.50	-24.30	QP	H
234.99	36.59	13.83	2.05	32.16	20.31	46.00	-25.69	QP	H
576.64	35.70	20.03	3.63	31.15	28.21	46.00	-17.79	QP	H
968.93	35.38	23.55	5.11	31.22	32.82	54.00	-21.18	QP	H
38.08	38.74	15.11	0.64	32.06	22.43	40.00	-17.57	QP	V
54.45	42.75	15.05	0.81	31.95	26.66	40.00	-13.34	QP	V
63.09	41.06	13.50	0.89	31.92	23.53	40.00	-16.47	QP	V
143.83	40.17	10.22	1.53	31.96	19.96	43.50	-23.54	QP	V
399.03	36.37	17.06	2.85	31.90	24.38	46.00	-21.62	QP	V
833.32	37.64	22.42	4.58	31.27	33.37	46.00	-12.63	QP	V

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Result: PASS.

Radiated Spurious Emission Data (Above 1GHz to the tenth Harmonic):
Mode: GFSK_1Mbps

CH Low(2402MHz)

Frequency (MHz)	Read Peak (dBuV)	Read AV (dBuV)	Total Factor (dB)	Level (dBuV/m)		Limit(dBuV/m)		Direction (H/V)	Result
				Peak	AV	Peak	AV		
4804	44.92	42.47	6.44	51.36	48.91	74	54	H	PASS
7206	43.43	41.99	6.00	49.43	47.99	74	54	H	PASS
9608	43.68	42.12	7.20	50.88	49.32	74	54	H	PASS
4804	45.06	43.60	6.44	51.50	50.04	74	54	V	PASS
7206	42.29	40.85	6.00	48.29	46.85	74	54	V	PASS
9608	43.20	41.74	7.20	50.40	48.94	74	54	V	PASS

CH Middle(2440MHz)

Frequency (MHz)	Read Peak (dBuV)	Read AV (dBuV)	Total Factor (dB)	Level (dBuV/m)		Limit(dBuV/m)		Direction (H/V)	Result
				Peak	AV	Peak	AV		
4880	42.35	40.21	6.48	48.83	46.69	74	54	H	PASS
7320	42.01	38.42	5.89	47.90	44.31	74	54	H	PASS
9760	41.63	38.16	7.78	49.41	45.94	74	54	H	PASS
4880	41.96	38.51	6.48	48.44	44.99	74	54	V	PASS
7320	40.68	37.12	5.89	46.57	43.01	74	54	V	PASS
9760	41.06	38.05	7.78	48.84	45.83	74	54	V	PASS

CH High(2480MHz)

Frequency (MHz)	Read Peak (dBuV)	Read AV (dBuV)	Total Factor (dB)	Level (dBuV/m)		Limit(dBuV/m)		Direction (H/V)	Remark
				Peak	AV	Peak	AV		
4960	43.29	42.15	6.59	49.88	48.74	74	54	H	PASS
7440	41.52	40.02	5.90	47.42	45.92	74	54	H	PASS
9920	41.27	39.55	7.99	49.26	47.54	74	54	H	PASS
4960	44.15	42.89	6.59	50.74	49.48	74	54	V	PASS
7440	42.33	40.45	5.90	48.23	46.35	74	54	V	PASS
9920	41.89	40.04	7.99	49.88	48.03	74	54	V	PASS

Note: Emissions attenuated more than 20 dB below the permissible value are not reported.

Result: PASS.

FCC ID: 2ACKR-I4 / IC: 12142A-I4

5.6 Antenna Requirements

FCC section 15.203 & 15.247(b), 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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of Part 15C. 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.

5.6.1 Antenna Connected Construction

Product uses a chip antenna.

5.6.2 Antenna Gain

Antenna gain is 0dBi (<6dBi).

5.6.3 Result

The antenna is compliance with the FCC rules.

5.7 Maximum Permissible Exposure Requirements

5.7.1 Requirements:

According to FCC §1.1307(b)(1) and RSS-102 §2.5.1, systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

This is a portable device and for general use.

We test the max power output via conducted method. Please refer test data as below.

5.7.2 Test Data

Channel No.	Frequency	Max power output to antenna	
	(MHz)	(dBm)	(mW)
CH00	2402	1.63	1.455
CH19	2440	2.37	1.726
CH39	2480	-1.01	0.792

The EUT works on the 2.4G ISM band, according to KDB 447498 D01 General RF Exposure Guidance v05, the SAR Test Exclusion Power Thresholds is 10mW.

According to RSS-102 §2.5.1, the SAR Test Exclusion Power Thresholds is 20mW.

The max power of this device is 1.726mW < 10mW, so the SAR evaluation is not required.