

# ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

# INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT **CLASS II PC REPORT**

	OF
Product Name:	Frey
Brand Name:	Bitatek
Model No.:	Frey M1-0000, Frey M1-0010
Model Difference:	N/A
FCC ID:	SPYIM0002
Report No.:	ER/2017/70090
Issue Date:	Aug. 04, 2017
FCC Rule Part:	§15.247, Cat: DTS
Prepared for:	Bitatek Co.,Ltd. 6F.,No.115,Wugong 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan
Prepared by:	SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803



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# VERIFICATION OF COMPLIANCE

Applicant:	Bitatek Co.,Ltd. 6F.,No.115,Wugong 3rd Rd., Wugu Dist., New Taipei City 248, Taiwan
Product Name:	Frey
Brand Name:	Bitatek
Model No.:	Frey M1-0000, Frey M1-0010
Model Difference:	N/A
FCC ID:	SPYIM0002
Report Number:	ER/2017/70090
Date of test:	Jul. 18, 2017 ~ Jul. 28, 2017
Date of EUT Received:	Jul. 18, 2017

# We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Electronics & Communication Laboratory The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10:2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits.

The test results of this report relate only to the tested sample identified in this report.

Test By:	Curry Chen	Date:	Aug. 04, 2016
– Prepared By:	Curry Chen / Engineer	Date:	Aug. 04, 2016
Approved By:	Yuri Tsai / Clerk Jim Chang / Asst. Manager	Date:	Aug. 04, 2016

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# **Revision History**

Report Number	Revision	Description	Issue Date
ER/2017/70090	Rev.00	Initial creation of document	Aug. 04, 2016

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#### **GENERAL INFORMATION** 1

# **1.1 Product Description**

General:

Product Name of Host:	Rugged Handheld Computer		
Brand Name:	unitech		
Model No. of Host:	PA730		
Model Difference:	N/A		
Hardware Version:	N/A		
Software Version:	N/A		
Model No. of BT/WLAN Module:	Frey M1-0000, Frey M1-0010		
Scope:	The test report covers the radiated emissions requirements of the standards referenced in the report to allow system level ap- proval of the module in this specific host.		
Class II Permissive change:	Frey INSTALLED IN Rugged Handheld Computer		
USB Cable:	Model No.: 3C10-00000790, Supplier: Bitatek		
	3.7Vdc from Rechargeable Li-polymer Battery or 5V from AC/DC Adapter		
Power Supply:	1. Model No.: BTBAT2, Supplier: Leung's Commu- nication & Electric Products (Guangzhou) LTD.		
Power Suppry.	Battery: 2. Model No.: BTBAT1, Supplier: Leung's Commu-		
	nication & Electric Products (Guangzhou) LTD.		
	Adapter: Model No.: S018BDU0900200, Supplier: Ten Pao Industrial Co., Ltd.		

### Bluetooth Low Energy:

Frequency Range:	2402 – 2480MHz
Bluetooth Version:	V4.1 dual mode
Channel number:	40 channels
Modulation type:	GFSK
Antenna Designation:	IFA Antenna, Gain: 2dBi

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# 1.2 Test Methodology of Applied Standards

FCC Part 15, Subpart C §15.247

FCC KDB 558074 D01 DTS Meas. Guidance

ANSI C63.10:2013

Note:

- 1. All test items have been performed and record as per the above standards.
- 2. The composite system is compliance with FCC Subpart B is authorized under a DoC procedure.

#### **Test Facility** 1.3

SGS Taiwan Ltd. Electronics & Communication Laboratory No.134, Wu Kung Road, New Taipei Industrial Park, Wuku District, New Taipei City, Taiwan 24803 (TAF code 0513)

FCC Registration Numbers are: 509634

### 1.4 Special Accessories

There are no special accessories used while test was conducted.

#### 1.5 **Equipment Modifications**

There was no modification incorporated into the EUT.

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#### SYSTEM TEST CONFIGURATION 2

#### **EUT Configuration** 2.1

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

#### **EUT Exercise** 2.2

An engineering test mode (software/firmware) that applicant provided was utilized to manipulate the EUT into transmit, selection of the test channel, and modulation scheme.

#### **Test Procedure** 2.3

## 2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plan. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz.. The CISPR Quasi-Peak and Average detector mode is employed according to §15.207. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

## 2.3.2 Radiated Emissions

The EUT is a placed on as turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plan. For emission measurements above 1 GHz, the table height shall be 1.5 m. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.

### 2.4 Measurement Results Explanation Example

### For all conducted test items:

The offset level is set in the spectrum analyzer to compensate the RF cable loss and attenuation factor between EUT conducted port and spectrum analyzer. With the offset compensation, the spectrum analyzer reading level is exactly EUT RF output level.

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# 2.5 Configuration of Tested System

# Fig. 2-1 Radiated Emission Configuration



### Table 2-1 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Data Cable	Power Cord
1.	BT Test Software	N/A	N/A	N/A	N/A	N/A

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#### SUMMARY OF TEST RESULTS 3

FCC Rules	Description Of Test	Result
§15.247(d)	Radiated Band Edge and Spurious Emission	Compliant
§15.203 §15.247(b)	Antenna Requirement	Compliant

#### **DESCRIPTION OF TEST MODES** 4

#### 4.1 Operated in 2400 ~ 2483.5MHz Band

40 channels are provided for Bluetooth LE

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
0	2402 MHz	14	2430 MHz	28	2458 MHz
1	2404 MHz	15	2432 MHz	29	2460 MHz
2	2406 MHz	16	2434 MHz	30	2462 MHz
3	2408 MHz	17	2436 MHz	31	2464 MHz
4	2410 MHz	18	2438 MHz	32	2466 MHz
5	2412 MHz	19	2440 MHz	33	2468 MHz
6	2414 MHz	20	2442 MHz	34	2470 MHz
7	2416MHz	21	2444 MHz	35	2472 MHz
8	2418 MHz	22	2446 MHz	36	2474 MHz
9	2420 MHz	23	2448 MHz	37	2476 MHz
10	2422 MHz	24	2450 MHz	38	2478 MHz
11	2424 MHz	25	2452 MHz	39	2480 MHz
12	2426 MHz	26	2454 MHz		
13	2428 MHz	27	2456 MHz		

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# 4.2 The Worst Test Modes and Channel Details

- 1. The EUT has been tested under operating condition.
- 2. Test program used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

# **RADIATED EMISSION TEST:**

RADIATED EMISSION TEST (ABOVE 1 GHz)					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
Bluetooth LE	0 to 39	0,20,39	GFSK	1	Aux

RADIATED BAND EDGE EMISSION TEST					
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)	ANTENNA PORT
Bluetooth LE	0 to 39	0,39	GFSK	1	Aux

### Note:

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1, E2 mode) for Bluetooth LE Transmitter for channel Low, Mid and High, the worst case H position was reported.

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#### **MEASUREMENT UNCERTAINTY** 5

Test Items	Uncertainty
AC Power Line Conducted Emission	+/- 2.586 dB
Peak Output Power	+/- 0.84 dB
6dB Bandwidth	+/- 51.33 Hz
100 KHz Bandwidth Of Frequency Band Edges	+/- 0.84 dB
Peak Power Density	+/- 1.3 dB
Temperature	+/- 0.65 °C
Humidity	+/- 4.6 %
DC / AC Power Source	DC= +/- 0.13%, AC= +/- 0.2%

Radiated Spurious Emission:

_	9kHz-30MHz: +/-2.87dB
	30MHz - 180MHz: +/- 3.37dB
Measurement uncertainty	180MHz -417MHz: +/- 3.19dB
(Polarization : <b>Vertical</b> )	0.417GHz-1GHz: +/- 3.19dB
	1GHz - 18GHz: +/- 4.04dB
	18GHz - 40GHz: +/- 4.04dB

Magguramantungartaintu	9kHz-30MHz: +/-2.87dB
	30MHz - 167MHz: +/- 4.22dB
Measurement uncertainty (Polarization : <b>Horizontal</b> )	167MHz -500MHz: +/- 3.44dB
	0.5GHz-1GHz: +/- 3.39dB
	1GHz - 18GHz: +/- 4.08dB
	18GHz - 40GHz: +/- 4.08dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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#### RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT 6 6.1 Standard Applicable

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands must also comply with the §15.209 limit as below.

And according to §15.33(a) (1), for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

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

### Note:

- 1. The lower limit shall apply at the transition frequencies.
- 2. Emission level ( $dB\mu V/m$ ) = 20 log Emission level ( $dB\mu V/m$ )

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# 6.2 Measurement Equipment Used

966 Chamber							
EQUIPMENT	MFR	MODEL	SERIAL	LAST	CAL DUE.		
ТҮРЕ		NUMBER	NUMBER	CAL.			
EMI Test Receiver	R&S	ESCI7	100760	05/11/2017	05/10/2018		
Spectrum Analyzer	Agilent	E4446A	MY51100003	04/25/2017	04/24/2018		
Loop Antenna	ETS.LINDGREN	6502	148045	09/20/2016	09/19/2017		
Bilog Antenna	SCHWAZBECK	VULB9168	378	12/19/2016	12/18/2017		
Horn Antenna	Schwarzbeck	BBHA9120D	1441	08/01/2016	07/31/2017		
Pre-Amplifier	Agilent	8447D	2944A07676	01/05/2017	01/04/2018		
Pre-Amplifier	EMC Instru- ments Corp.	EMC0126530	980038	01/05/2017	01/04/2018		
Turn Table	HD	DT420	N/A	N.C.R	N.C.R		
Antenna Tower	ChamPro	AM-BS-4500-B	060776-ABS	N.C.R	N.C.R		
Controller	ChamPro	EM1000	60776	N.C.R	N.C.R		
Low Loss Cable	Huber Suhner	966_RX	9	01/05/2017	01/04/2018		
3m Site NSA	SGS	966 chamber	N/A	07/01/2017	06/30/2018		
Low Loss Cable	Huber Suhner	966 TX	1	01/05/2017	01/04/2018		
Horn Antenna	Schwarzbeck	BBHA9170	184	12/12/2016	12/11/2017		
Pre-Amplifier	EMC Instru- ments Corp.	EMC184045	980135	01/05/2017	01/04/2018		

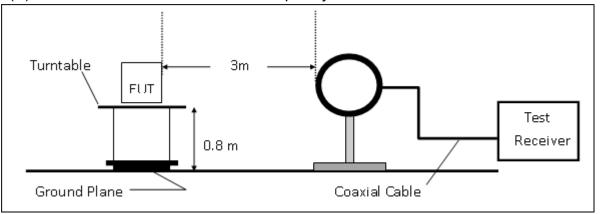
NOTE: N.C.R refers to Not Calibrated Required.

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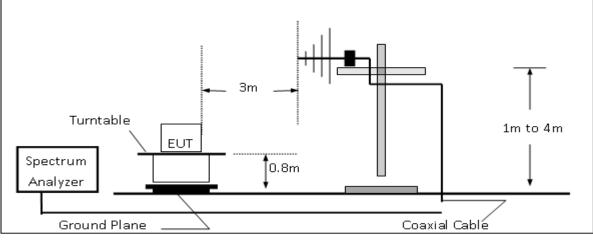


#### 6.3 Test SET-UP

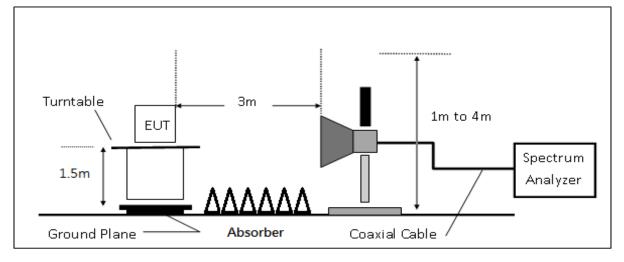
(A) Radiated Emission Test Set-UP Frequency Below 30MHz.



# (B) Radiated Emission Test Set-Up, Frequency form 30MHz to 1000MHz



(C) Radiated Emission Test Set-UP Frequency Over 1 GHz



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#### 6.4 **Measurement Procedure**

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequen-2. cy> 1GHz above ground plan.
- The turn table shall rotate 360 degrees to determine the position of maximum emission level. 3.
- EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the 4. highest emissions.
- 5. Set the spectrum analyzer as RBW=120 kHz and VBW=300 kHz for Peak Detector (PK) and Quasi-peak (QP) at frequency below 1 GHz.
- 6. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Peak Detector at frequency above 1 GHz.
- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Detector at frequency above 1 GHz.
- 8. When measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made "while keeping the antenna in the 'cone of radiation' from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response." is still within the 3dB illumination BW of the measurement antenna.
- 9. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 10. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. On spectrum, change spectrum mode in linear display mode, and reduce VBW = 10Hz if average reading is measured.
- 11. Repeat above procedures until all default test channel measured were complete.

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# 6.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

# FS = RA + AF + CL - AG

Where	0	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

Actual FS(dB $\mu$ V/m) = SPA. Reading level(dB $\mu$ V) + Factor(dB)

Factor(dB) = Antenna Factor(dBµV/m) + Cable Loss(dB) – Pre Amplifier Gain(dB)

# Note :

"F" : denotes Fundamental Frequency. ; "H" : denotes Harmonic Frequency.

"E" : denotes Band Edge Frequency. ; "S" : denotes Spurious Frequency.

# 6.6 Test Results of Radiated Spurious Emissions form 9 kHz to 30 MHz

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit per 15.31(o) was not reported.

# 6.7 Measurement Result:

Note: Refer to next page spectrum analyzer data chart and tabular data sheets.

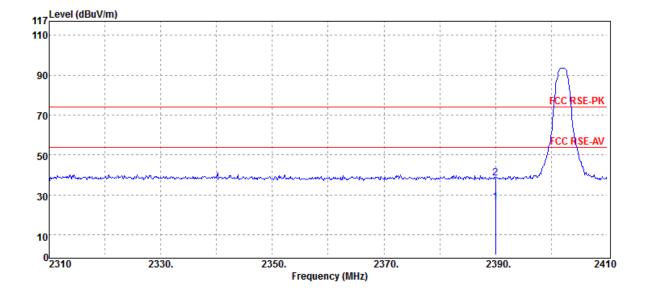
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# Radiated Band Edge Measurement Result (BLE mode)

Operation Band	:BLE	Test Date	:2017-07-20
Fundamental Frequency	:2402 MHz	Temp./Humi.	:21 deg_C / 61 RH
Operation Mode	:Bandedge CH LOW	Engineer	:Mike
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	27.98	-1.74	26.24	54.00	-27.76
2390.00	Е	Peak	40.37	-1.74	38.63	74.00	-35.37

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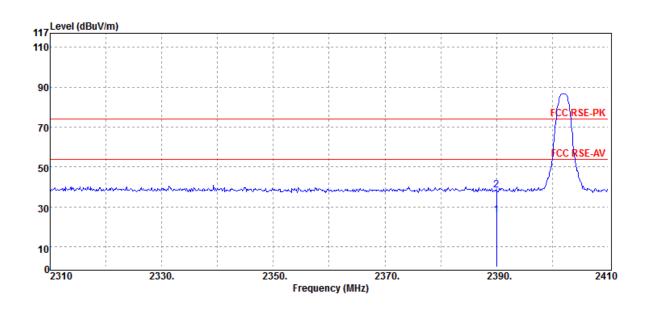
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:BLE **Operation Band** Fundamental Frequency :2402 MHz **Operation Mode** :Bandedge CH LOW EUT Pol. :H Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-20 :21 deg\_C / 61 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2390.00	Е	Average	27.78	-1.74	26.04	54.00	-27.96
2390.00	Е	Peak	40.23	-1.74	38.49	74.00	-35.51

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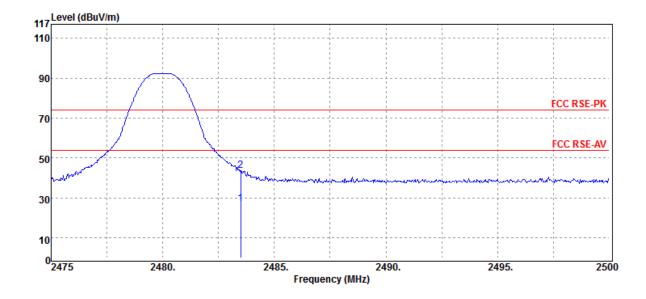
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:BLE **Operation Band** Fundamental Frequency :2480 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :H Plane

Test Date :2017-07-20 Temp./Humi. :21 deg\_C / 61 RH Engineer :Mike :VERTICAL Measurement Antenna Pol.



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	28.86	-1.62	27.24	54.00	-26.76
2483.50	Е	Peak	45.51	-1.62	43.89	74.00	-30.11

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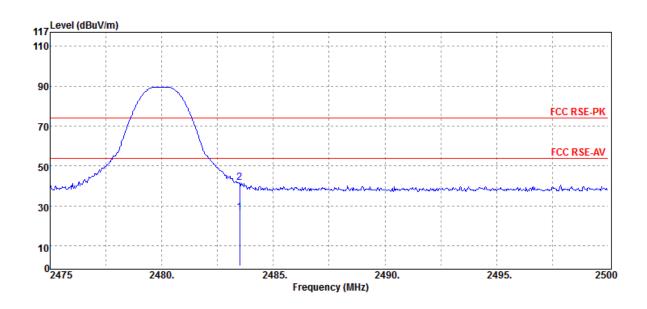
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:BLE **Operation Band** Fundamental Frequency :2480 MHz **Operation Mode** :Bandedge CH HIGH EUT Pol. :H Plane

Test Date Temp./Humi. Engineer Measurement Antenna Pol.

:2017-07-20 :21 deg\_C / 61 RH :Mike :HORIZONTAL



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Margin
		Mode	Reading Level		FS	@3m	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2483.50	Е	Average	28.30	-1.62	26.68	54.00	-27.32
2483.50	Е	Peak	43.37	-1.62	41.75	74.00	-32.25

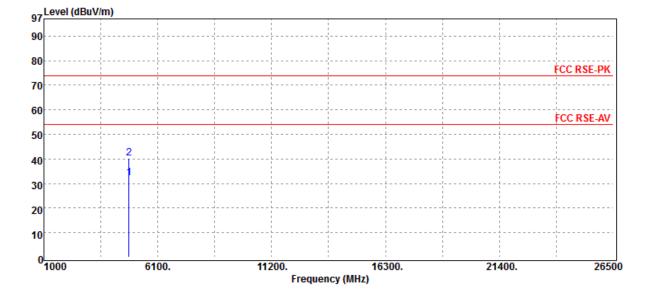
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# **Radiated Spurious Emission Measurement Result (BLE mode)**

For Frequency above 1GHz						
Operation Band	:BLE	Test Date	:2017-07-20			
Fundamental Frequency	:2402 MHz	Temp./Humi.	:21 deg_C / 61 RH			
Operation Mode	:Tx CH LOW	Engineer	:Mike			
EUT Pol.	:H Plane	Measurement Antenna Pol.	:VERTICAL			



Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
 MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4804.00	Н	Average	27.32	4.92	32.24	54.00	-21.76	
4804.00	Н	Peak	35.24	4.92	40.16	74.00	-33.84	

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.



Operation Ba Fundamental Operation Mo	I Frequency	:BLE :2402 MHz :Tx CH LOV	V	Test Date Temp./Hu Engineer	umi.	:Mike	g_C / 61 RH
EUT Pol.		:H Plane		Measure	ment Antenna F	ol. :HORI	ZONTAL
97 Level (d	BuV/m)						_
90							
80	· · · · · · · · · · · · · · · · · · ·					500 505 54	
70			1 1 1 1 	         		FCC RSE-PK	
60	· · · · · · · · · · · · · · · · · · ·						
50	· · · · · · · · · · · · · · · · · · ·					FCC RSE-AV	
40	2						
30							
20							
10							
0 <mark>1000</mark>	610	0.	11200. Frequency (MH	16300.	21400.	265	00
			Trequency (min	2)			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
	11010	Mode	Reading Level	i dotoi	FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
			P.	<u>40</u>			
4804.00	Н	Average	27.31	4.92	32.23	54.00	-21.77
4804.00	н	Peak	35.96	4.92	40.88	74.00	-33.12



Operation Band Fundamental Frequency Operation Mode EUT Pol.		:BLE :2442 MHz :Tx CH MID :H Plane		Test Date Temp./Hu Engineer Measurer		:Mike	_C / 61 RH
97 Level (dE	BuV/m)						l
90							
80	· · · · · · · · · · · · · · · · · · ·			·		FCC RSE-PK	
70			             	       			
60			· · · · · · · · · · · · · · · · · · ·			FCC RSE-AV	
50							
40	2		· · · · · · · · · · · · · · · · · · ·				
30			· · · · · · · · · · · · · · · · · · ·				
20							
10							
01000	610	0.	11200. Frequency (MH	16300. z)	21400.	2650	0
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4884.00	Н	Average	26.48	5.20	31.68	54.00	-22.32
4884.00	Н	Peak	34.11	5.20	39.31	74.00	-34.69



Operation Ba Fundamental Operation Mo	Frequency	:BLE :2442 MHz :Tx CH MID	)	Test Date Temp./Hu Engineer		:21 deg :Mike	:2017-07-20 :21 deg_C / 61 RH :Mike	
EUT Pol.		:H Plane		Measurer	nent Antenna F	ol. :HORIZ	ZONTAL	
97 Level (d	BuV/m)						1	
90								
80						FCC RSE-PK		
70	· · · · · · · · · · · · · · · · · · ·					FUL NJE-PN		
60	·							
50	· · · · · · · · · · · · · · · · · · ·					FCC RSE-AV		
40	2							
30	1							
20								
10								
0 <mark></mark>	610	0.	11200. Frequency (MH	16300.	21400.	2650	0	
			riequency (write	2)				
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
·		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
			ż		·	-		
4884.00	Н	Average	26.56	5.20	31.76	54.00	-22.24	
4884.00	Н	Peak	33.57	5.20	38.77	74.00	-35.23	



Operation Ba Fundamental Operation Mo	Frequency	:BLE :2480 MHz :Tx CH HIG	Н	Test Date Temp./Hu Engineer	ımi.		:2017-07-20 :21 deg_C / 61 RH :Mike	
EUT Pol.		:H Plane		Measurer	ment Antenna	Pol. :VERT	ICAL	
97 Level (dE	BuV/m)						7	
90								
80						FCC RSE-PK		
70								
60				1  1 1		FCC RSE-AV		
50					· · · · · · · · · · · · · · · · · · ·			
40	2							
30								
20					· · · · · · · · · · · · · · · · · · ·			
10								
0 <mark></mark>		0	11200.	16300.	24.400	200		
1000	610	υ.	Frequency (MH		21400.	265	UU	
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe	
		Mode	Reading Level		FS	@3m	Margin	
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB	
4960.00	Н	Average	27.09	5.29	32.38	54.00	-21.62	
4960.00	Н	Peak	34.91	5.29	40.20	74.00	-33.80	



Operation Band Fundamental Frequency Operation Mode EUT Pol.		:BLE :2480 MHz :Tx CH HIG :H Plane	Н	Test Date Temp./Hu Engineer Measurer		:Mike	_C / 61 RH
97	BuV/m)						
90	· · · · · · · · · · · · · · · · · · ·	       					
80						FCC RSE-PK	
70							
60	·					FCC RSE-AV	
50							
40	2						
30							
20		· · · · · · · · · · · · · · · · · · ·					
10						        	
0 <mark>0</mark>	610 E	<b>0.</b>	11200.	16300.	21400.	2650	)
			Frequency (MHz	L)			
Freq.	Note	Detector	Spectrum	Factor	Actual	Limit	Safe
		Mode	Reading Level		FS	@3m	Margin
MHz	F/H/E/S	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4960.00	Н	Average	27.61	5.29	32.90	54.00	-21.10
4960.00	Н	Peak	35.33	5.29	40.62	74.00	-33.38



# 7 ANTENNA REQUIREMENT

# 7.1 Standard Applicable:

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

If the transmitting antenna is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi.

In case of point-to-point operation, the power shall be reduced by the one dB for every 3 dB that the directional gain of antenna exceeds 6dBi.

# According to RSS-GEN 8.3

The applicant for equipment certification, as per RSP-100, must provide a list of all antenna types that may be used with the licence-exempt transmitter, indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna.

Licence-exempt transmitters that have received equipment certification may operate with different types of antennas. However, it is not permissible to exceed the maximum equivalent isotropically radiated power (e.i.r.p.) limits specified in the applicable standard (RSS) for the licence-exempt apparatus.

Testing shall be performed using the highest gain antenna of each combination of licence-exempt transmitter and antenna type, with the transmitter output power set at the maximum level.9 When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna manufacturer.

# 7.2 Antenna Connected Construction:

An embedded-in antenna design is used.

Please see EUT photo and antenna spec. for details.

The antenna gain is less than 6dBi. Therefore, it is not necessary to reduce maximum output power limit.

# ~ End of Report ~

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