

# ELECTROMAGNETIC EMISSIONS **COMPLIANCE REPORT**



Applicant:	Honeywell International Inc.
Manufacturer:	9680 Old Bailes Rd, Fort Mill, SC 29707, USA Honeywell International Inc. 9680 Old Bailes Rd, Fort Mill, SC 29707, USA
Product Name:	Vehicle Mount Computer
Brand Name:	Honeywell
Model No.:	VM1A-L0N
Model Difference:	N/A
Report Number:	TERF2212002704ER
FCC ID	HD5-VM1AL0N
IC:	1693B-VM1AL0N
Date of EUT Received:	December 14, 2022
Date of Test:	December 23, 2022 ~ March 03, 2023
Issue Date:	March 30, 2023
	TT Chain

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Approved By

JJ Chen

## We hereby certify that:

The above equipment was tested by SGS Taiwan Ltd. Central RF Lab 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 comply with FCC rule part §15.247, ISED RSS-247.

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

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.

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Revision History							
Report Number	Revision	Description	Issue Date	<b>Revised By</b>	Remark		
TERF2212002704ER	00	Original.	March 15, 2023	Tiffany Kao			
TERF2212002704ER	01	Updated antenna model no.	March 30, 2023	Tiffany Kao	*		

## Note:

1 . The remark "\*" indicates modification of the report upon requests from certification body.

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#### **GENERAL INFORMATION** 1

#### 1.1 **Product Description**

Product Name:	Vehicle Mount Computer	
Brand Name:	Honeywell	
Model No.:	VM1A-L0N	
Model Difference:	N/A	
Hardware Version:	VM1A-REF MAIN BOARD Rev:2.2	
Firmware Version:	85.00.00-1171	
EUT Series No.:	2231461110	
Power Supply:	15V	
Test Software (Name/Version)	QRCT/4.0.00197.0	

#### 1.2 **RF Specification**

Radio Technology:	BLE
Frequency Range:	2402 – 2480MHz
Channel number:	40 channels
Modulation type:	GFSK
Transmit Power:	BLE 1M: 0.10dBm BLE 2M: 0.34dBm

#### 1.3 **Antenna Designation**

Antenna Type	Supplier	Antenna Model No.	Freq. (MHz)	Transmitter Chain	Peak Antenna Gain (dBi)
External Di pala	LARSEN	R380500314	2.4GHz	Ch 0 & Ch 1	1.6
Di-pole antenna	LAIRD	WTS 2450	2.4GHz	Ch 0 & Ch 1	2.1
Internal Printed Antenna	Honeywell	VM1A_Int_Ant	2.4GHz	Ch0	1.1

## Note:

- 1. Pre-scanned was done on the above antennas, measurements were demonstrated by using the antenna with the highest gain as the worst case scenarios.
- Antenna information is provided by the applicant. 2.

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#### 1.4 **Test Methodology of Applied Standards**

FCC Part 15, Subpart C §15.247 FCC KDB 558074 D01 15.247 Meas Guidance v05r02 RSS-247 issue 2 Feb. 2017 RSS-Gen, Issue 5 April 2018 ANSI C63.10:2013

#### **Test Facility** 1.5

Laboratory	Test Site Address	Test Site Name	FCC Designa- tion number	IC CAB identifier	
		SAC 1			
		SAC 2	]		
		SAC 3			
	No.134, Wu Kung Road, New Taipei	Conduction 1			
	Industrial Park, Wuku District, New	Conducted 1	TW0027		
	Taipei City, Taiwan.	Conducted 2	100027		
	Taiper Oity, Taiwan.	Conducted 3		TW3702	
		Conducted 4			
		Conducted 5			
SGS Taiwan Ltd.		Conducted 6			
Central RF Lab.	No.2, Keji 1st Rd., Guishan District, Taoyuan City, Taiwan 333	Conduction C	TW0028		
(TAF code 3702)		SAC C			
		SAC D			
		SAC G			
		Conducted A			
		Conducted B			
		Conducted C			
		Conducted D			
		Conducted E			
		Conducted F	1		
		Conducted G			
<b>Note:</b> Test site name is remarked on the equipment list in each section of this report as an indica- tion where measurements occurred in specific test site and address.					

#### 1.6 **Special Accessories**

There are no special accessories used while test was conducted.

#### 1.7 **Equipment Modifications**

There was no modification incorporated into the EUT.

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#### SYSTEM TEST CONFIGURATION 2

#### 2.1 **EUT Configuration**

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.

#### 2.2 **EUT Exercise**

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.

#### 2.3 **Test Procedure**

#### 2.3.1 **Conducted Emissions**

The EUT is a placed on a table which is 0.8 m above ground plane. 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. The two LISNs provide 50uH/50 ohm 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 Conducted Test (RF)

The active antenna port of the unlicensed wireless device is connected to the spectrum analyzer with attenuator to protect the instrumentation. If a second antenna port is available, it is tested at one operating frequency, with other port(s) appropriately terminated, to verify it has similar output characteristics as the fully tested port.

#### 2.3.3 **Radiated Emissions**

The EUT is a placed on a turn table. For emissions testing at or below 1 GHz, the table height shall be 0.8 m above the reference ground plane. 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 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.

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#### 2.4 Measurement Results Explanation Example

## 2.4.1 Radiated Emission Test Sites For Measurements From 9 kHz To 30 MHz

Radiated emission below 30MHz is measured in a 9m\*6m\*6m semi-anechoic chamber, the measurements correspond to those obtained at an open-field test site.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

## 2.4.2 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.

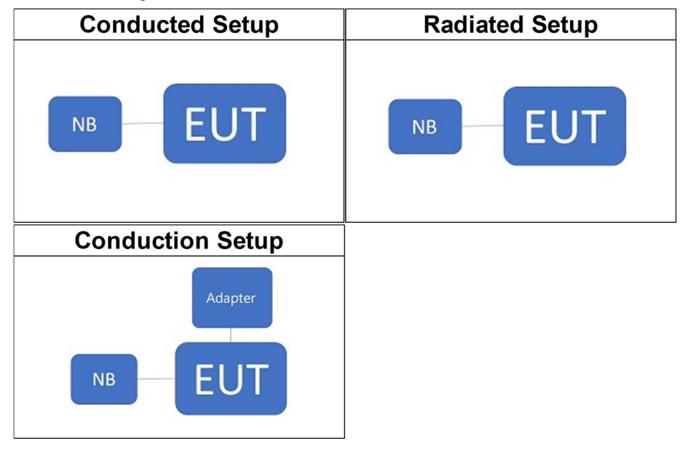
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#### 2.5 **Test Configuration**



#### 2.6 Control Unit(s)

AC Power-Line Conducted Emission Test Site: Conduction 1							
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
Notebook	Lenovo	L480	PF-1S9NT5	N/A	N/A		
Adapter	GlobTek, Inc	GT-46600-6015-T3	N/A	N/A	N/A		
	Со	nducted Emission Test	Site: Conducted 1				
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
Notebook	Lenovo	L480	PF-1S9NT5	N/A	N/A		
	Radiated Emission Test Site: SAC 1						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.		
Notebook	Lenovo	L480	PF-1S9NT5	N/A	N/A		

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#### SUMMARY OF TEST RESULTS 3

FCC Rules	ISED Rules	Description Of Test	Result
§15.207(a)	RSS-Gen §8.8	AC Power Line Conducted Emission	Compliant
§15.247(b) (3)	RSS-247 §5.4 d	Peak Output Power	Compliant
§15.247(a)(2)	RSS-247 §5.2 a RSS-Gen §6.7	Emission Bandwidth	Compliant
§15.247(d) §15.205 §15.209	RSS-247 §5.5 RSS-Gen §8.9 RSS-Gen §8.10	Radiated & Conducted Band Edge and Spurious Emission	Compliant
§15.247(e)	RSS-247 §5.2 b	Peak Power Density	Compliant
§15.203	N/A	Antenna Requirement	Compliant

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

#### 4.1 **Operating Frequencies**

ITEM	FREQUENCY	ITEM	FREQUENCY	ITEM	FREQUENCY
1	2402 MHz	15	2430 MHz	29	2458 MHz
2	2404 MHz	16	2432 MHz	30	2460 MHz
3	2406 MHz	17	2434 MHz	31	2462 MHz
4	2408 MHz	18	2436 MHz	32	2464 MHz
5	2410 MHz	19	2438 MHz	33	2466 MHz
6	2412 MHz	20	2440 MHz	34	2468 MHz
7	2414 MHz	21	2442 MHz	35	2470 MHz
8	2416MHz	22	2444 MHz	36	2472 MHz
9	2418 MHz	23	2446 MHz	37	2474 MHz
10	2420 MHz	24	2448 MHz	38	2476 MHz
11	2422 MHz	25	2450 MHz	39	2478 MHz
12	2424 MHz	26	2452 MHz	40	2480 MHz
13	2426 MHz	27	2454 MHz		
14	2428 MHz	28	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.
- 3. The field strength of radiation emission was measured as the EUT positioned in different orthogonal planes (E1/E2/H) based on actual usage of the EUT to pre-scan the emissions for determining the worst case scenario.
- 4. Investigation has been done on all the possible configurations for searching the worst case.

CONDUCTED TEST							
MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)			
Bluetooth LE	0 to 39	0,20,39	GFSK	1			
Bluetooth LE	0 to 39	0,20,39	GFSK	2			

RADIATED EMISSION TEST (BELOW 1 GHz)					
MODE	AVAILABLE CHANNEL	TERF2212002728E R	MODULATION	DATA RATE (Mbps)	
Bluetooth LE	0 to 39	20	GFSK	1	
Bluetooth LE	0 to 39	20	GFSK	2	
	RADIATE	D EMISSION TEST (A	ABOVE 1 GHz)		
MODE AVAILABLE TESTED MODULATION DATA RATE (Mbps)					
Bluetooth LE	0 to 39	0,20,39	GFSK	1	
Bluetooth LE	0 to 39	0,20,39	GFSK	2	

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#### **MEASUREMENT UNCERTAINTY** 5

Test Items	Uı	ncertaint	ÿ
AC Power Line Conducted Emission	+/-	2.32	dB
Output Power measurement	+/-	1	dB
Emission Bandwidth		1.53	Hz
Undesignable radiated emission measurement	+/-	1.68	dB
Peak Power Density	+/-	2.16	dB
Temperature	+/-	0.7	°C
Humidity	+/-	3	%
DC / AC Power Source	+/-	1	%

Radiated Spurious Emission Measurement Uncertainty				
Polarization: Vertical	+/-	2.8	dB	9kHz~30MHz
	+/-	4.82	dB	30MHz - 1000MHz
	+/-	4.37	dB	1GHz - 18GHz
	+/-	4.21	dB	18GHz - 40GHz
Polarization: Horizontal	+/-	2.8	dB	9kHz~30MHz
	+/-	4.54	dB	30MHz - 1000MHz
	+/-	4.37	dB	1GHz - 18GHz
	+/-	4.21	dB	18GHz - 40GHz

## Note:

- 1. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2. The conformity assessment statement in this report is based solely on the test results, measurement uncertainty is excluded.

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#### MEASUREMENT EQUIPMENT USED 6

#### 6.1 Emission from AC power line

	AC Power-Line Conducted Emission Test Site: Conduction 1				
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMI Test Receiver	R&S	ESCI 7	100759	08/22/2022	08/21/2023
LISN	SCHWARZBECK	NSLK 8127	01040	08/23/2022	08/22/2023
Coaxial Cables	EMC Instruments Corp.	EMCCFD300-BM-BM- 3000	161207	06/22/2022	06/21/2023
Test Software	audix	e3	Ver. 9 210322	N.C.R	N.C.R

#### 6.2 **Conducted Measurement**

	Conducted Emission Test Site: Conducted 1				
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EXA Spectrum Analyzer	KEYSIGHT	N9010B	MY59071571	05/19/2022	05/18/2023
Test Software	SGS	Radio Test Software	Ver. 21	N.C.R	N.C.R
Power Meter	Anritsu	ML2496A	1242004	10/26/2022	10/25/2023
Power Sensor	Anritsu	MA2411B	1207365	10/26/2022	10/25/2023
Power Sensor	Anritsu	MA2411B	1207368	10/26/2022	10/25/2023
DC Block	Mini-Circuits	BLK-18-S+	1	12/13/2022	12/12/2023

#### 6.3 **Radiated Measurement**

Radiated Emission Test Site: SAC 1					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Horn Antenna	SCHWARZBECK	BBHA9120D	1441	09/27/2022	09/26/2023
Bi-log Antenna	SCHWARZBECK	VULB9168	378	08/15/2022	08/14/2023
Horn Antenna	SCHWARZBECK	BBHA9170	184	12/30/2022	12/29/2023
Site Cal	SGS	SAC 1	N/A	01/01/2023	12/31/2023
Loop Antenna	ETS.LINDGREN	6502	148045	10/05/2022	10/04/2023
Spectrum Analyzer	Agilent	E4446A	MY51100003	10/28/2022	10/27/2023
EMI Test Receiver	R&S	ESCI 7	100759	08/22/2022	08/21/2023
Pre-Amplifier	<b>EMC</b> Instruments	EMC184045B	980135	10/27/2022	10/26/2023
Pre-Amplifier	HP	8449B	3008A01973	12/13/2022	12/12/2023
Pre-Amplifier	HP	8447D	2944A09469	12/13/2022	12/12/2023
Bandreject Filter 2400-2483.5	EWT	EWT-14-0166	M1	12/13/2022	12/12/2023
3.2GHz High Pass Filter	WI	WHKX10-2624-80SS	3	12/13/2022	12/12/2023
Coaxial Cable	Huber Suhner	succoflex 102	MY2622/2	12/13/2022	12/12/2023
Coaxial Cable	Huber Suhner	succoflex 104A	800086/4a	12/13/2022	12/12/2023
Coaxial Cable	Huber Suhner	EMC 104-SM-SM-2000	160123	12/13/2022	12/12/2023
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY2630/2	12/13/2022	12/12/2023
Coaxial Cable	Huber Suhner	SUCOFLEX 102	MY22962/2	12/13/2022	12/12/2023
Test Software	Audix	e3	Ver. 9.210322	N.C.R	N.C.R

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

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#### CONDUCTED EMISSION TEST 7

#### 7.1 **Standard Applicable:**

Frequency range within 150kHz to 30MHz shall not exceed the Limit table as below.

Frequency range	Limits (dBµV)		
MHz	Quasi-peak	Average	
0.15 to 0.50	66 to 56	56 to 46	
0.50 to 5	56	46	
5 to 30	60	50	

Note

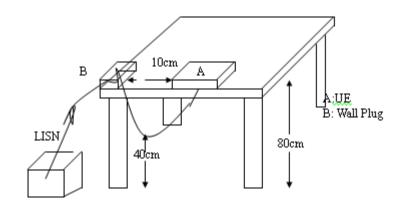
1. The lower limit shall apply at the transition frequencies

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

#### 7.2 **EUT Setup:**

- 1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.10:2013.
- 2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
- 3. The LISN was connected with 120Vac/60Hz power source.

#### 7.3 **Test Setup**



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#### 7.4 **Measurement Procedure:**

- 1. The EUT was placed on a table which is 0.8m above ground plane.
- 2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 3. Repeat above procedures until all phases of power being supplied by given UE are completed

#### 7.5 **Measurement Result:**

Note: Refer to next page for measurement data and plots. Note2: The \* reveals the worst-case results that closest to the limit.

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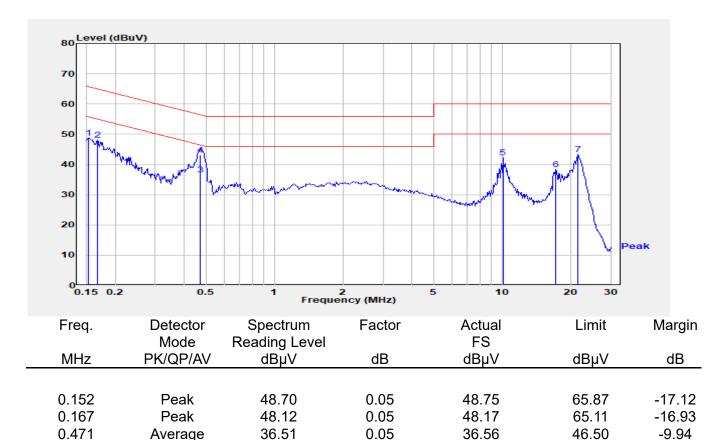
# SGS

## AC POWER LINE CONDUCTED EMISSION TEST DATA

## Cradle (S/N: VM1DG223800172)

:TERF2212002704ER
:BLE
:120V/60Hz
:L

Test Site	:Conduction 1
Test Date	:2023-03-03
Temp./Humi.	:23.8/52
Engineer	:GN Lin



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.

42.99

41.87

37.87

42.71

QP

Peak

Peak

Peak

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0.05

0.34

0.57

0.66

43.04

42.22

38.43

43.37

56.50

60.00

60.00

60.00

-13.46

-17.78

-21.57

-16.63

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0.471

10.083

17.127

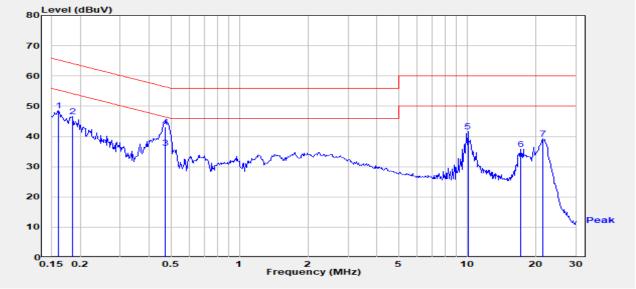
21.564

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Report Number	:TERF2212002704ER
Test Mode	:BLE
Power	:120V/60Hz
Probe	:N

Test Site	:Conduction 1
Test Date	:2023-03-03
Temp./Humi.	:23.8/52
Engineer	:GN Lin



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.161	Peak	48.48	0.05	48.53	65.43	-16.89
0.185	Peak	46.46	0.05	46.51	64.28	-17.77
0.475	Average	36.08	0.05	36.13	46.43	-10.30
0.475	QP	43.06	0.05	43.11	56.43	-13.32
10.083	Peak	41.29	0.33	41.62	60.00	-18.38
17.127	Peak	35.27	0.49	35.76	60.00	-24.24
21.564	Peak	38.63	0.54	39.18	60.00	-20.82

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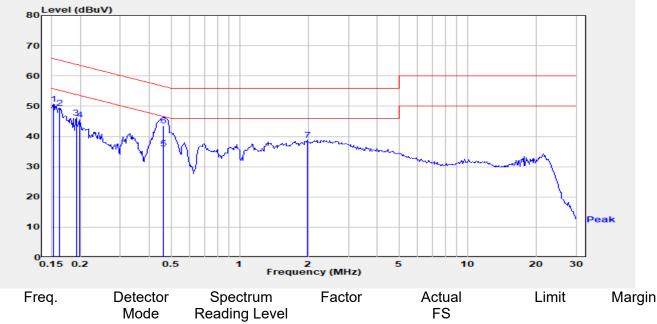
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## Cradle (S/N: VM3AC2235G00006)

Report Number	:TERF2212002704ER
Test Mode	:BLE
Power	:120V/60Hz
Probe	:L

Test Site	:Conduction 1
Test Date	:2023-03-03
Temp./Humi.	:23.8/52
Engineer	:GN Lin



MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.152	Peak	50.60	0.05	50.65	65.87	-15.22
0.162	Peak	49.40	0.05	49.45	65.36	-15.91
0.192	Peak	46.06	0.05	46.11	63.96	-17.84
0.198	Peak	45.56	0.05	45.61	63.70	-18.10
0.464	Average	35.84	0.05	35.89	46.62	-10.73
0.464	QP	43.59	0.05	43.64	56.62	-12.98
1.980	Peak	38.79	0.08	38.87	56.00	-17.13

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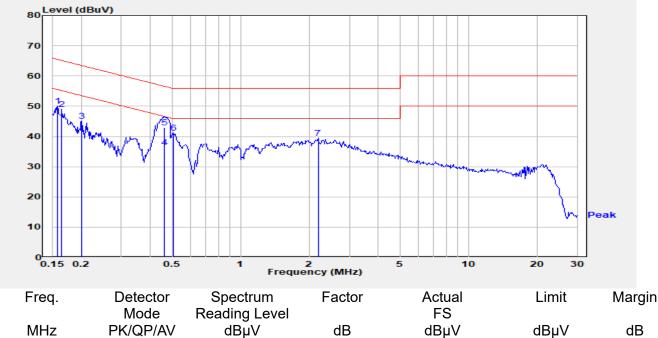
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Report Number	:TERF2212002704ER
Test Mode	:BLE
Power	:120V/60Hz
Probe	:N

Test Site	:Conduction 1
Test Date	:2023-03-03
Temp./Humi.	:23.8/52
Engineer	:GN Lin



0.157	Peak	50.13	0.05	50.18	65.62	-15.43
0.164	Peak	48.94	0.05	48.99	65.23	-16.25
0.201	Peak	44.99	0.05	45.04	63.58	-18.54
0.464	Average	36.42	0.05	36.47	46.62	-10.15
0.464	QP	42.96	0.05	43.01	56.62	-13.61
0.509	Peak	41.10	0.05	41.15	56.00	-14.85
2.187	Peak	39.26	0.10	39.36	56.00	-16.64

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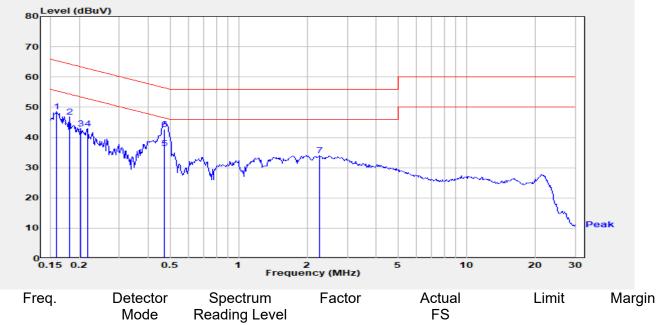
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## Cradle (S/N: VW3AC2304G00015)

:TERF2212002704ER
:BLE
:120V/60Hz
:L

Test Site	:Conduction 1
Test Date	:2023-03-03
Temp./Humi.	:23.8/52
Engineer	:GN Lin



	wode	Reading Level		гэ		
 MHz	PK/QP/AV	dBµV	dB	dBµV	dBµV	dB
0.158	Peak	48.60	0.05	48.65	65.55	-16.91
0.182	Peak	46.81	0.05	46.86	64.41	-17.55
0.202	Peak	42.86	0.05	42.91	63.51	-20.61
0.217	Peak	42.85	0.05	42.90	62.94	-20.04
0.475	Average	36.39	0.05	36.44	46.43	-9.99
0.475	QP	42.73	0.05	42.78	56.43	-13.65
2.273	Peak	34.04	0.10	34.14	56.00	-21.86

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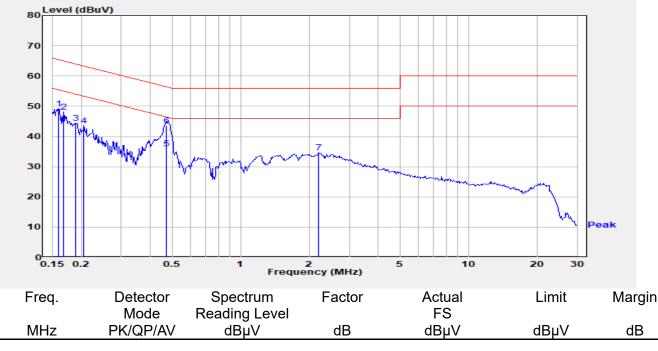
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Report Number	:TERF2212002704ER
Test Mode	:BLE
Power	:120V/60Hz
Probe	:N

Test Site	:Conduction 1
Test Date	:2023-03-03
Temp./Humi.	:23.8/52
Engineer	:GN Lin



0.160	Peak	49.25	0.05	49.30	65.49	-16.19
0.167	Peak	48.15	0.05	48.20	65.11	-16.91
0.189	Peak	44.42	0.05	44.47	64.09	-19.62
0.206	Peak	43.50	0.05	43.55	63.39	-19.84
0.475	Average	36.03	0.05	36.08	46.43	-10.35
0.475	QP	43.59	0.05	43.64	56.43	-12.79
2.204	Peak	34.51	0.10	34.60	56.00	-21.40

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# 8 PEAK OUTPUT POWER MEASUREMENT

## 8.1 Standard Applicable:

For systems using digital modulation in the 2400-2483.5 MHz bands, the limit for peak output power is 1Watt and the e.i.r.p. shall not exceed 4 W.

If the transmitting antenna of directional gain greater than 6dBi are used the peak output power form the intentional radiator shall be reduced below the above stated value by the amount in dB that the directional gain of the Antenna exceeds 6dBi.

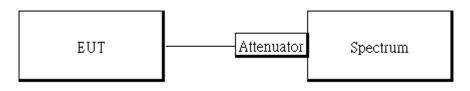
In case of point-to-point operation, the limit has to be reduced by 1dB for every 3dB that the directional gain of Antenna exceeds 6dBi.

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

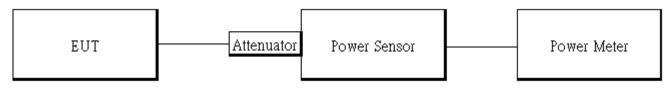
All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

## 8.2 Test Setup

## 8.2.1 Duty Cycle



## 8.2.2 Output Power



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#### 8.3 **Measurement Procedure:**

#### 8.3.1 **Duty Cycle**

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. Set span = Zero
- 3. RBW = 8MHz, VBW = 8MHz,
- 4. Detector = Peak

#### 8.3.2 **Output Power**

- 1. Place the EUT on the table and set it in transmitting mode.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter.
- 4. Record the max. Reading as observed from Power Meter.
- 5. Repeat above procedures until all test default channel measured was complete.

#### 8.4 **Duty Factor:**

	Duty Cycle (%) = Ton / (Ton+Toff)	Duty Factor (dB) =10*log ( 1/Duty Cycle )	1/T (kHz)	VBW setting (kHz)
BLE 1M	63.20	1.99	2.53	3.00
BLE 2M	33.60	4.74	4.76	5.00

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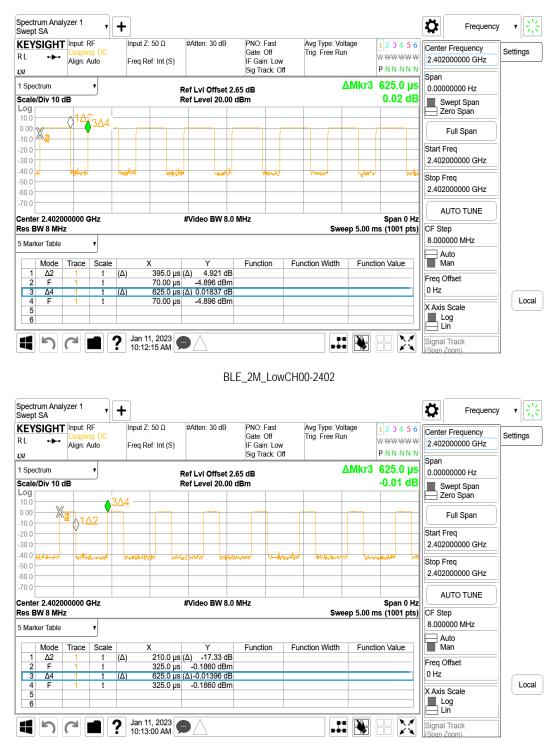
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BLE\_1M\_LowCH00-2402



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#### 8.5 **Output Power:**

#### 8.5.1 Peak & Avg

## BLE 1M mode:

СН	Frequency (MHz)	Power set	Peak Power Output (dBm)	Required Limit (dBm)
Low	2402	-1	0.07	30
Mid	2442	-1	0.10	30
High	2480	-2	-0.79	30
СН	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Required Limit (dBm)
Low	2402	-1	-0.16	30
Mid	2442	-1	-0.15	30
High	2480	-2	-0.99	30

\*Note: Measured by power meter, cable loss 0.88 dB + Duty cycle factor has been offseted to the power meter for Avg. power and cable loss has been offseted for Peak power measurement.

## BLE 2M mode:

СН	Frequency (MHz)	Power set	Peak Power Output (dBm)	Required Limit (dBm)
Low	2402	-1	0.26	30
Mid	2442	-1	0.34	30
High	2480	-2	-0.62	30
СН	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Required Limit (dBm)
Low	2402	-1	-0.19	30
Mid	2442	-1	-0.21	30
High	2480	-2	-1.15	30

\*Note: Measured by power meter, cable loss 0.88 dB + Duty cycle factor has been offseted to the power meter for Avg. power and cable loss has been offseted for Peak power measurement.

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#### 8.5.2 EIRP

## **EIRP BLE 1M mode**

СН	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit		
Low	2402	-1	-0.16	2.10	1.94	4W=	36	dBm
Mid	2442	-1	-0.15	2.10	1.95	4W=	36	dBm
High	2480	-2	-0.99	2.10	1.11	4W=	36	dBm

\* Note: EIRP = Average Power + Gain

## **EIRP BLE 2M mode**

СН	Frequency (MHz)	Power set	Max. Avg. Output include tune up tolerance Power (dBm)	Antenna Gain (dBi)	EIRP (dBm)	Limit		
Low	2402	-1	-0.19	2.10	1.91	4W=	36	dBm
Mid	2442	-1	-0.21	2.10	1.89	4W=	36	dBm
High	2480	-2	-1.15	2.10	0.95	4W=	36	dBm

\* Note: EIRP = Average Power + Gain

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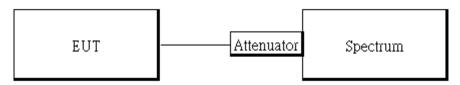


#### 9 EMISSION BANDWIDTH MEASUREMENT

#### 9.1 **Standard Applicable**

The minimum 6 dB bandwidth shall be at least 500 kHz.

#### 9.2 **Test Setup**



#### 9.3 **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 loss RF cable from the antenna port to the spectrum analyzer.

#### 9.3.1 FCC measurements

- 1. The testing follows the Measurement Procedure of the KDB 558074 D01.
- 2. Set the spectrum analyzer as

RBW= 100 kHz, VBW = 3 X RBW. Span= 2 to 5 times of the OBW, Sweep=auto, Detector = Peak, and Max hold.

- 3. Mark the upper and lower frequencies of -6dB.
- 4. Repeat above procedures until all test default channel is completed.

#### 9.3.2 **ISED** measurements

- 1. The testing follows the Measurement Procedure of the RSS-Gen section 6.7.
- 2. Set the spectrum analyzer as RBW= 1 % to 5% of 99% and -6dB Bandwidth, VBW  $\geq$  3 X RBW. Span= large enough to capture all products of the modulation process Sweep=auto, Detector = Peak, and Max hold.
- 3. Mark the upper and lower frequencies of 99% and -6dB.
- 4. Repeat above procedures until all test default channel is completed.

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#### 9.4 **Measurement Result:**

## BLE 1M mode

Frequency (MHz)	6dB BW (MHz)	Required BW (MHz)	Result
2402	0.6838	$\ge$ 0.5	PASS
2442	0.6864	$\ge$ 0.5	PASS
2480	0.6846	$\geq 0.5$	PASS

## **BLE 2M mode**

Frequency (MHz)	6dB BW (MHz)	Required BW (MHz)	Result	
2402	1.156	$\ge$ 0.5	PASS	
2442	1.159	$\ge$ 0.5	PASS	
2480	1.159	≧ 0.5	PASS	

## **BLE 1M mode**

Frequency (MHz)	99%Bandwidth (MHz)
2402	1.0283
2442	1.0273
2480	1.0283

## BLE 2M mode

Frequency (MHz)	99%Bandwidth (MHz)
2402	2.0336
2442	2.0324
2480	2.0321

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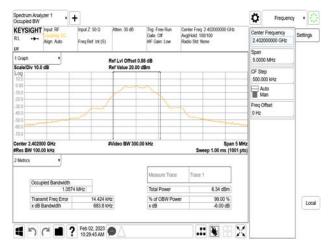
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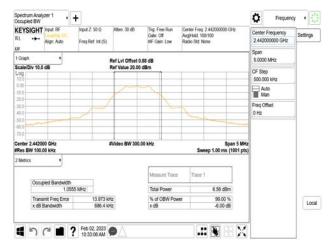
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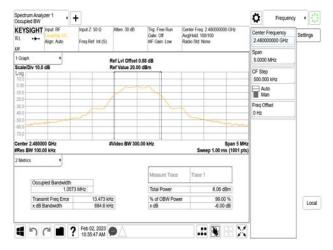
#### OBW\_BLE 1M\_LowCH00-2402MHz



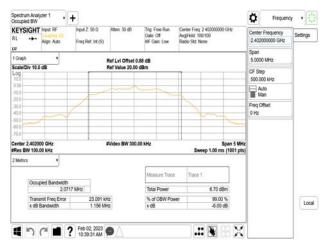
#### OBW\_BLE 1M\_MidCH20-2442MHz



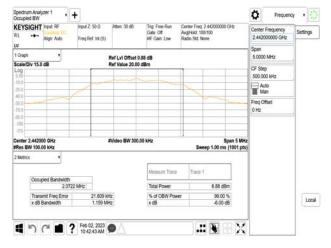
#### OBW\_BLE 1M\_HighCH39-2480MHz



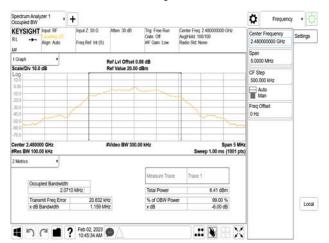
#### OBW\_BLE 2M\_LowCH00-2402MHz



#### OBW\_BLE 2M\_MidCH20-2442MHz



#### OBW\_BLE 2M\_HighCH39-2480MHz



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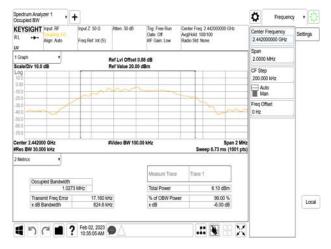
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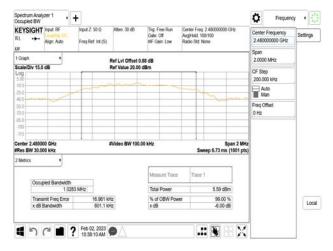
#### IC OBW\_BLE 1M\_LowCH00-2402MHz



## IC OBW\_BLE 1M\_MidCH20-2442MHz



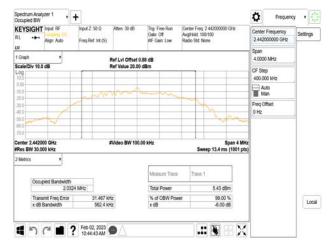
#### IC OBW\_BLE 1M\_HighCH39-2480MHz



#### IC OBW\_BLE 2M\_LowCH00-2402MHz



## IC OBW\_BLE 2M\_MidCH20-2442MHz



#### IC OBW\_BLE 2M\_HighCH39-2480MHz



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# 10 CONDUCTED BAND EDGES AND SPURIOUS EMISSION MEASUREMENT

#### 10.1 **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, as defined in §15.205(a) & RSS-Gen §8.10, must also comply with the radiated emission limits specified in §15.209(a) & RSS-Gen §8.9.

#### 10.2 **Test Setup**



#### 10.3 **Measurement Procedure**

#### 10.3.1 **Reference Level of Emission Limit:**

- 1. Set analyzer center frequency to DTS channel center frequency.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- Set the RBW = 100kHz & VBW = 300 kHz.
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

#### 10.3.2 **Conducted Band Edge:**

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

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- 4. Set start to edge frequency, and stop frequency of spectrum analyzer so as to encompass the spectrum to be examined.
- 5. Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Detector = Peak, Sweep = auto
- 6. Set DL as the limit = reading on marker of reference level measurement 20dBm
- 7. Mark the highest readings of the emissions outside of 2400MHz~2483.5MHz.
- 8. Repeat above procedures until all default test channel (low and high) was complete.

#### 10.3.3 **Conducted Spurious Emission:**

- 1. To connect Antenna Port of EUT to Spectrum.
- 2. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set RBW = 100 kHz & VBW=300 kHz, Detector = Peak, Sweep = Auto
- 4. Allow trace to fully stabilize.
- 5. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- 6. Repeat above procedures until all default test channel measured were complete.

#### **Measurement Result** 10.4

## **BLE 1M Reference Level of Limit**

RF Power Density (dBm)	Reference Level of Limit = PSD - 20dB (dBm)			
-0.49	-20.49			
-0.32	-20.32			
-0.80	-20.80			
	Density (dBm) -0.49 -0.32			

NOTE: cable loss as 0.88dB that offsets in the spectrum NOTE: Refer to next page for plots.

**BLE 2M Reference Level of Limit** 

Frequency (MHz)	RF Power Density (dBm)	Reference Level of Limit = PSD - 20dB (dBm)				
2402	-0.55	-20.55				
2442	-0.39	-20.39				
2480	-0.84	-20.84				

NOTE: cable loss as 0.88dB that offsets in the spectrum

NOTE: Refer to next page for plots.

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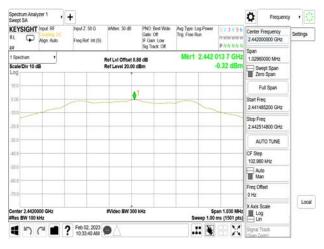
## Report No.: TERF2212002704ER Page: 33 of 90



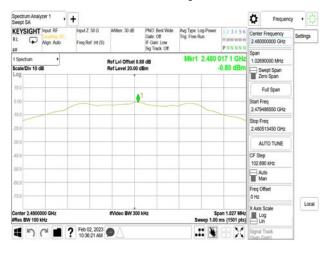
#### Reference Level\_BLE 1M\_LowCH00-2402MHz



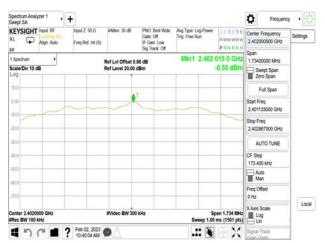
Reference Level\_BLE 1M\_MidCH20-2442MHz



Reference Level\_BLE 1M\_HighCH39-2480MHz

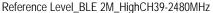


#### Reference Level\_BLE 2M\_LowCH00-2402MHz



Reference Level\_BLE 2M\_MidCH20-2442MHz







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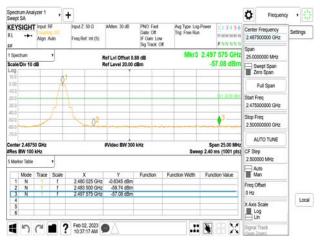
## Report No.: TERF2212002704ER Page: 34 of 90



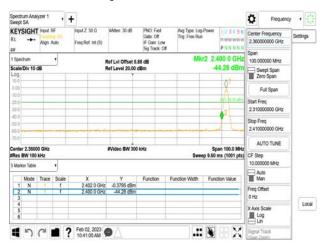
#### Band Edge\_BLE 1M\_LowCH00-2402MHz



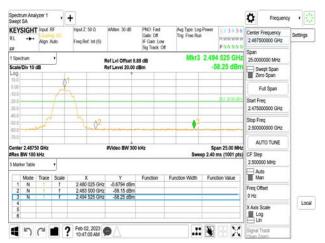
Band Edge\_BLE 1M\_HighCH39-2480MHz



#### Band Edge\_BLE 2M\_LowCH00-2402MHz



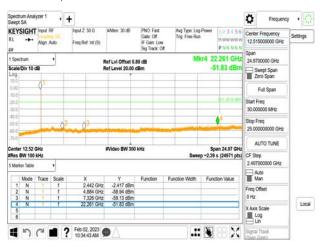
## Band Edge\_BLE 2M\_HighCH39-2480MHz



Spurious Emission\_BLE 1M\_LowCH00-2402MHz



#### Spurious Emission\_BLE 1M\_MidCH20-2442MHz



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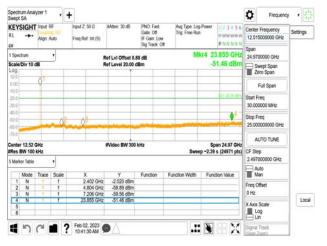
## Report No.: TERF2212002704ER Page: 35 of 90



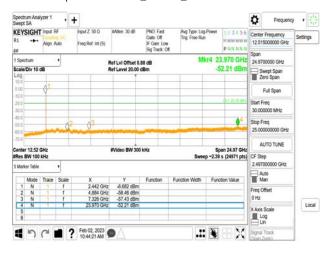
## Spurious Emission\_BLE 1M\_HighCH39-2480MHz

Spectrum Swept SJ		zer 1		+							ø	Frequenc	y • 3
		Input R Align: A			nput Z. 50 D Treg Ref. Int (S)	#Atten: 30 dB	PNO Fast Gate Off IF Gain Low Sig Track O			1 7 3 4 5 6 MWWWWW P NN NN N		Frequency 000000 GHz	Settings
N Spectru	m	1	•			Ref Lvi Offset 0.				3.804 GHz		0000 GHz	
icale/Di	v 10 d	8	-			Ref Level 20.00			4	52.35 dBm		rept Span	1
10.0		Q1	_	-				_				Full Span	
0 0 30 0 30 0	_	-	_				_			0.1 21 2 - 20-	Start Fr 30.000	eq 000 MHz	
40.0 50.0				2	03	_		سنبلي		•	Stop Fr 25.000	eq 000000 GHz	
ro.o	2620					#Video BW 300				pan 24.97 GHz		ITO TUNE	
Res BV	V 100 P			_			NOL.	Sw		s (24971 pts)	CF Ste	p 00000 GHz	
		Trace	Scale		x	Ŷ	Function	Function Width		ction Value		to	1
1	N	Trace	scale	-	2.480 GHz	-3.781 dBm	Function	Function width	Fun	coon value			
2	N	1	÷	-	4.960 GHz	-58.54 dBm		-			Freq Of	fset	
3	N	1	1	-	7.440 GHz	-61.00 dBm			-		0 Hz		- C-
4 5 6	N	4	1		23.804 GHz	-52 35 dBm					X Axis 3	g	Loc
	0	2		•	Feb 02, 2023	A .		10		00.10	Signal 1	6	-

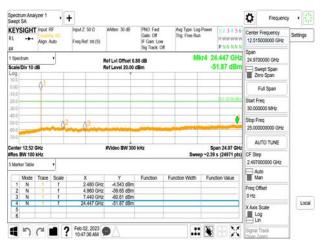
Spurious Emission\_BLE 2M\_LowCH00-2402MHz



Spurious Emission\_BLE 2M\_MidCH20-2442MHz



Spurious Emission\_BLE 2M\_HighCH39-2480MHz



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# **11 RADIATED BANDEDGE AND SPURIOUS EMISSION MEASUREMENT**

## 11.1 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 and RSS-Gen §8.9 Table 5 and 6 limit as below.

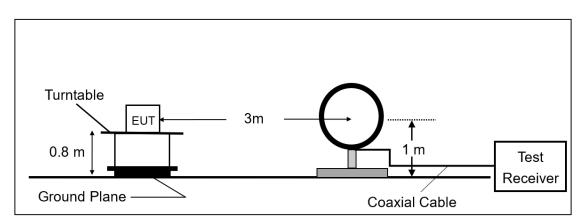
And according to §15.33(a) (1) & RSS-Gen §6.13.2.a for an intentional radiator operates below 10GHz, the frequency range of measurements: to the tenth harmonic of the highest fundamental frequency or to 40GHz, whichever is lower.

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: The lower limit shall apply at the transition frequencies.

## 11.2 Test Setup

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



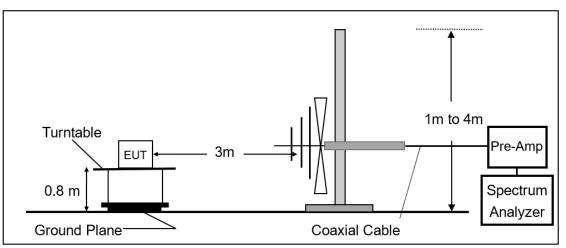
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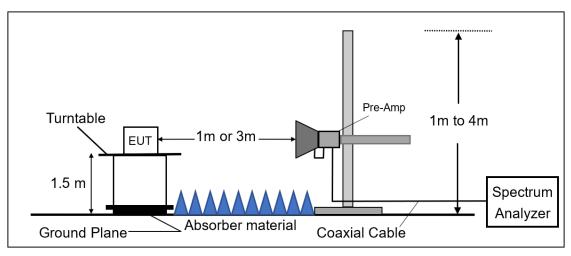
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(B) Radiated Emission Test Set-Up, Frequency From 30MHz to 1000MHz.



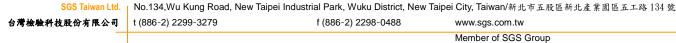
(C) Radiated Emission Test Set-Up, Frequency Above 1GHz.



#### 11.3 **Measurement Procedure**

- 1. The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 2. The EUT was placed on a turn table with 0.8m for frequency< 1GHz and 1.5m for frequency> 1GHz above ground plane.
- 3. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
- 4. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
- 5. Set the spectrum analyzer as RBW=100 kHz and VBW=300 kHz for Peak Detector (PK) at frequency between 30MHz and 1 GHz.
- 6. Use receiver mode as RBW=120 kHz for Quasi-peak (QP) at frequency between 30MHz and 1 GHz.

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- 7. Set the spectrum analyzer as RBW=1 MHz, VBW=3 MHz for Maximum Emission Measurements at frequency above 1 GHz.
- 8. Set the spectrum analyzer as RBW=1 MHz, VBW=10 Hz (Duty cycle > 98%) or VBW ≥ 1/T (Duty cycle < 98%) for Average Emission Measurements at frequency above 1 GHz.
- 9. 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.
- 10. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
- 11. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
- 12. Repeat above procedures until all default test channel measured were complete.

### 11.4 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	FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
	RA = Reading Amplitude	AG = Amplifier Gain
	AF = Antenna Factor	

The limit of the emission level is expressed in dBuV/m, which converts 20\*log(uV/m)

Actual  $FS(dB\mu V/m) = SPA$ . Reading level(dB $\mu V$ ) + Factor(dB) Factor(dB) = Antenna Factor(dB $\mu$ V/m) + Cable Loss(dB) – Pre\_Amplifier Gain(dB)

### 11.5 Test Results of Radiated Spurious Emissions from 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) & RSS-GEN §6.13.2 was not reported.

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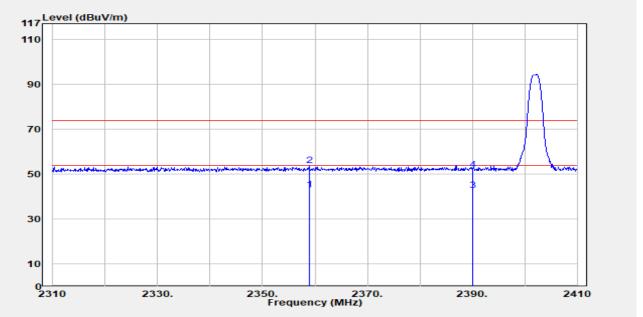


#### 11.6 **Measurement Result:**

### 11.6.1 **Radiated Band Edge Measurement Result**

## Internal Antenna (Type: Printed antenna, Model no: N/A)

Report Number	:TERF2212002704ER	Test Site	:SAC 1
Operation Mode	:BLE 1M	Test Date	:2023-02-13
Test Frequency	:2402 MHz	Temp./Humi.	:22.9/54
Test Mode	:Bandedge	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:GN Lin



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
2358.90	Average	42.59	0.66	43.25	54.00	-10.75
2358.90	Peak	53.34	0.66	54.00	74.00	-20.00
2390.00	Average	42.07	0.76	42.83	54.00	-11.17
2390.00	Peak	51.39	0.76	52.16	74.00	-21.84

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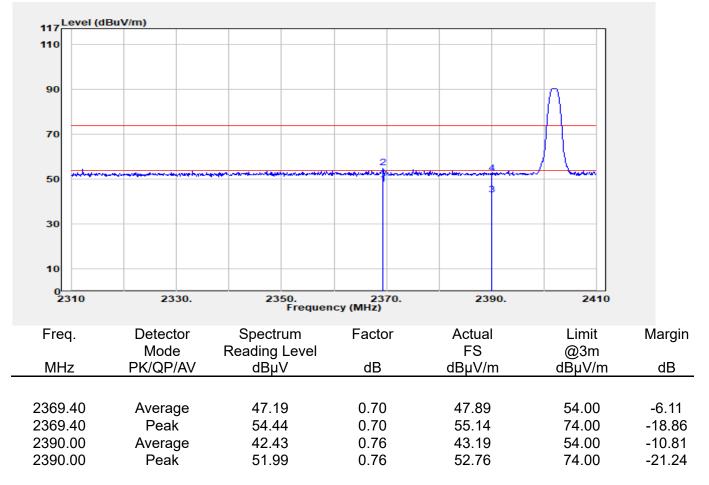
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Report Number	:TERF2212002704ER	Test Site	:SAC 1
Operation Mode	:BLE 1M	Test Date	:2023-02-13
Test Frequency	:2402 MHz	Temp./Humi.	:22.9/54
Test Mode	:Bandedge	Antenna Pol.	:Horizontal
EUT Pol	:H Plane	Engineer	:GN Lin



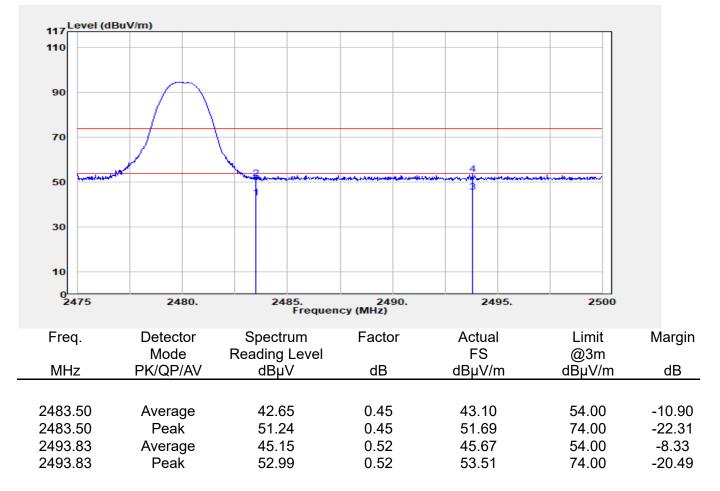
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 1M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-13
Temp./Humi.	:22.9/54
Antenna Pol.	:Vertical
Engineer	:GN Lin



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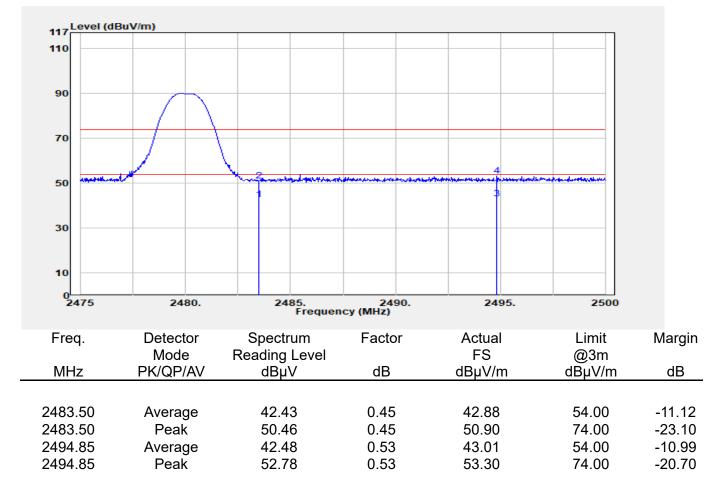
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Report No.: TERF2212002704ER Page: 42 of 90



Report Number	:TERF2212002704ER
Operation Mode	:BLE 1M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-13
Temp./Humi.	:22.9/54
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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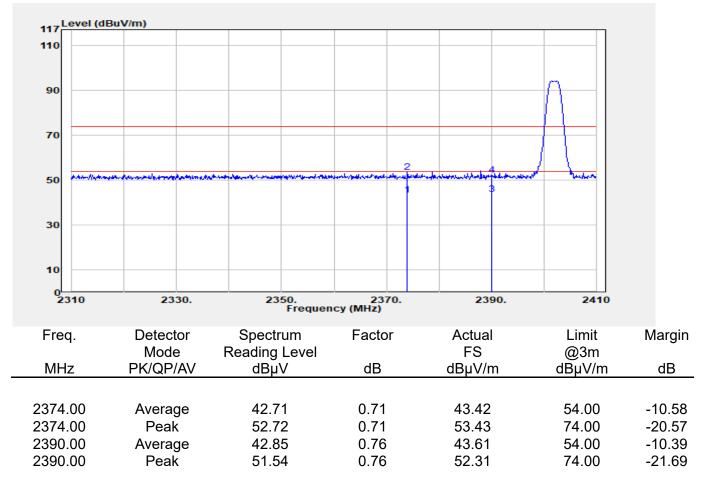
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Report Number	:TERF2212002704ER	Test Site	:SAC 1
Operation Mode	:BLE 2M	Test Date	:2023-02-13
Test Frequency	:2402 MHz	Temp./Humi.	:22.9/54
Test Mode	:Bandedge	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:GN Lin



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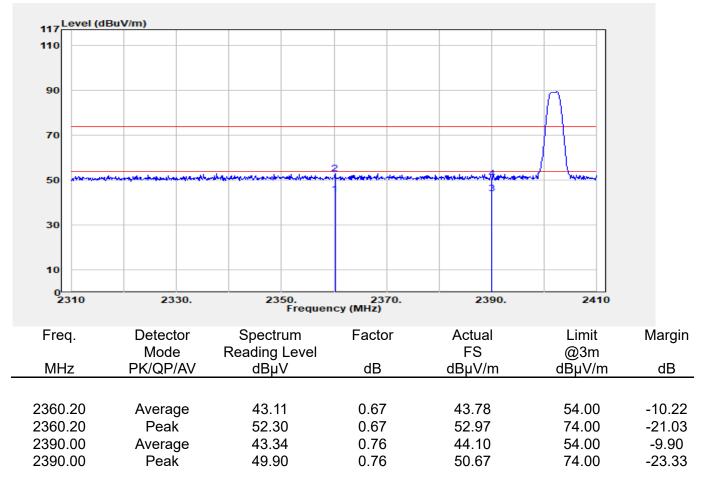
:SAC 1

:22.9/54 :Horizontal :GN Lin

:2023-02-13



Report Number	:TERF2212002704ER	Test Site	
Operation Mode	:BLE 2M	Test Date	
Test Frequency	:2402 MHz	Temp./Humi.	
Test Mode	:Bandedge	Antenna Pol.	
EUT Pol	:H Plane	Engineer	



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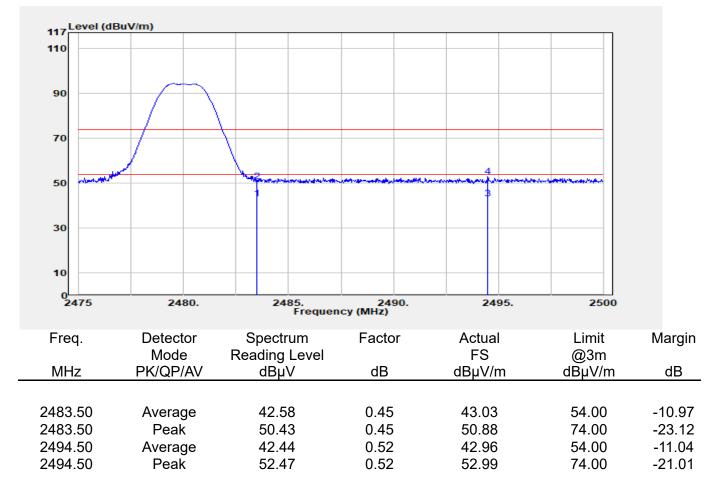
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-13
Temp./Humi.	:22.9/54
Antenna Pol.	:Vertical
Engineer	:GN Lin



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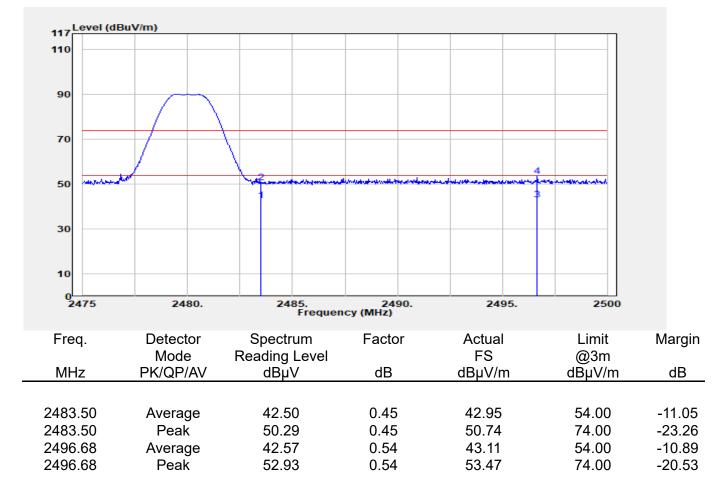
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Report No.: TERF2212002704ER Page: 46 of 90



Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-13
Temp./Humi.	:22.9/54
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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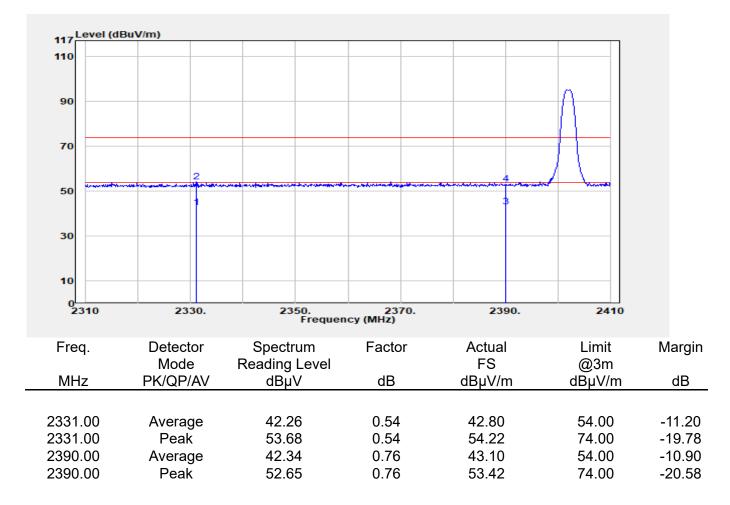
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# Report No.: TERF2212002704ER Page: 47 of 90



### External Antenna (Type: Dipole antenna, Model no: WTS 2450)

Report Number	:TERF2212002704ER	Test Site	:SAC 1
Operation Mode	:BLE 1M	Test Date	:2023-02-10
Test Frequency	:2402 MHz	Temp./Humi.	:23.9/59
Test Mode	:Bandedge	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:GN Lin



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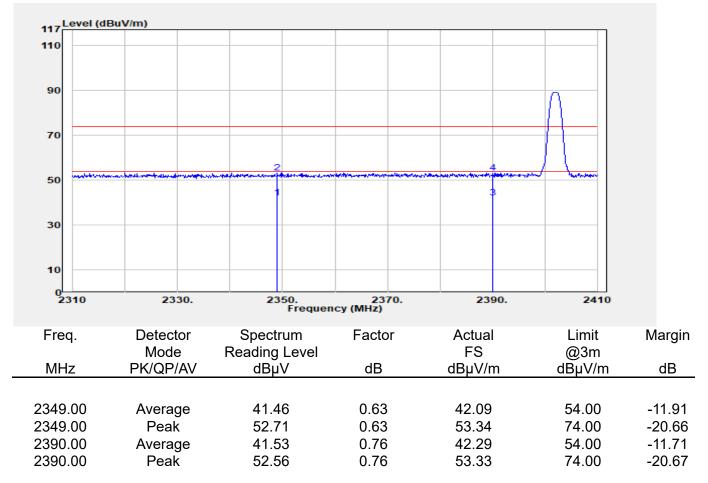
:SAC 1

:23.9/59 :Horizontal :GN Lin

:2023-02-10



Report Number	:TERF2212002704ER	Test Site
<b>Operation Mode</b>	:BLE 1M	Test Date
Test Frequency	:2402 MHz	Temp./Humi.
Test Mode	:Bandedge	Antenna Pol.
EUT Pol	:H Plane	Engineer



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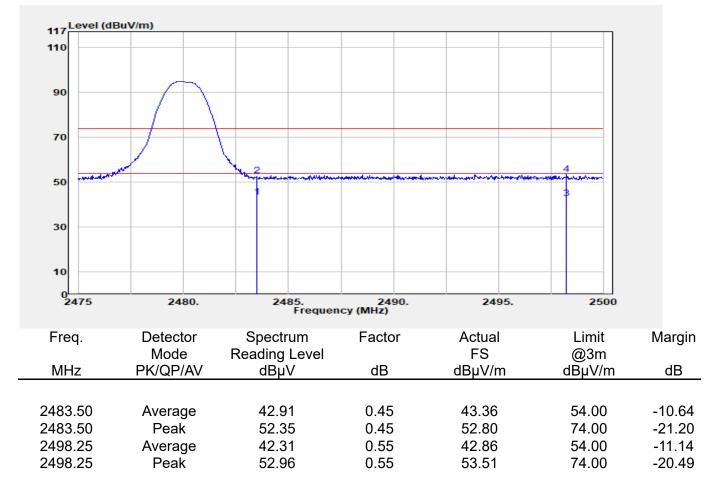
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Report Number	:TERF2212002704ER	Test S
Operation Mode	:BLE 1M	Test I
Test Frequency	:2480 MHz	Temp
Test Mode	:Bandedge	Anter
EUT Pol	:H Plane	Engir

Test Site	:SAC 1
Test Date	:2023-02-10
Temp./Humi.	:23.9/59
Antenna Pol.	:Vertical
Engineer	:GN Lin



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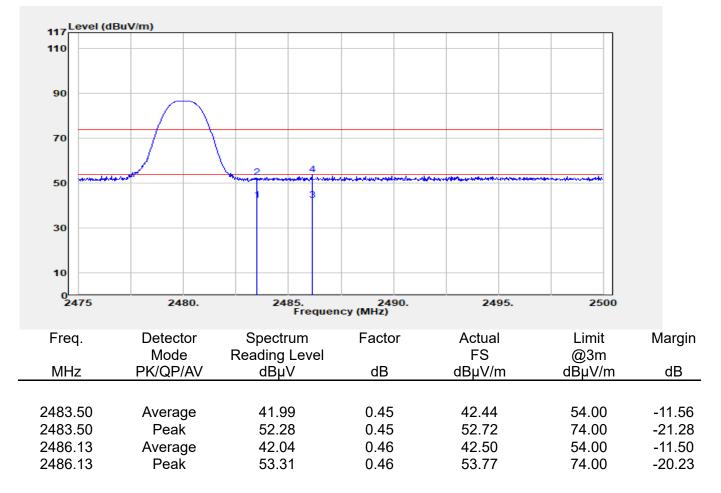
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 1M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-10
Temp./Humi.	:23.9/59
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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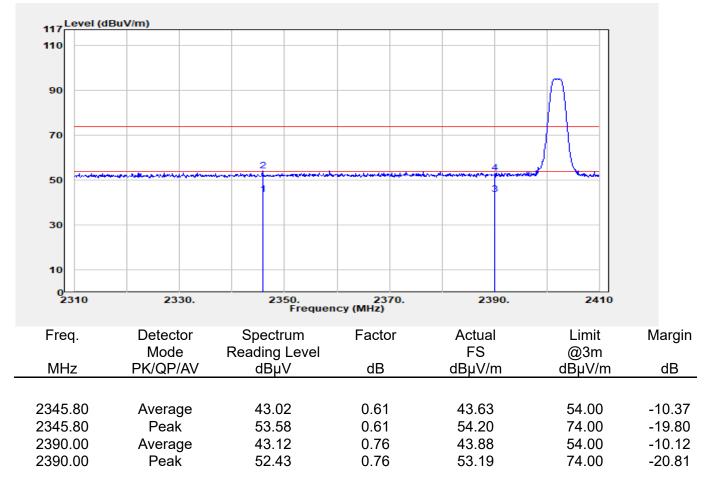
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Report Number	:TERF2212002704ER	Test Site	:SAC 1
Operation Mode	:BLE 2M	Test Date	:2023-02-10
Test Frequency	:2402 MHz	Temp./Humi.	:23.9/59
Test Mode	:Bandedge	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:GN Lin



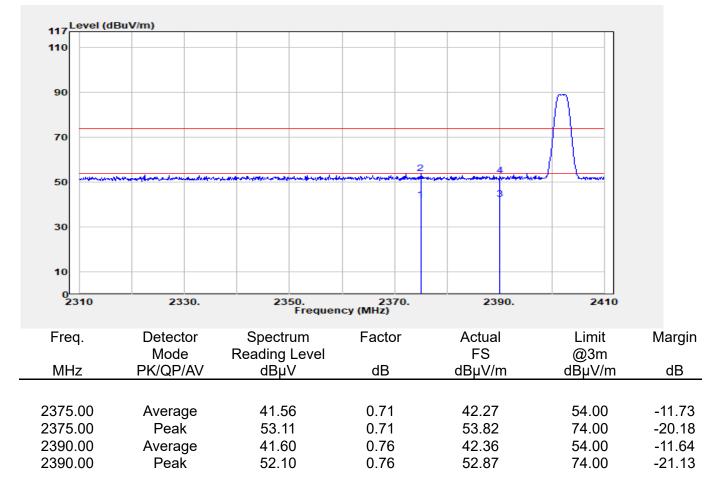
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Report Number	:TERF2212002704ER	Test Site
<b>Operation Mode</b>	:BLE 2M	Test Dat
Test Frequency	:2402 MHz	Temp./H
Test Mode	:Bandedge	Antenna
EUT Pol	:H Plane	Enginee

Test Site	:SAC 1
Test Date	:2023-02-10
Temp./Humi.	:23.9/59
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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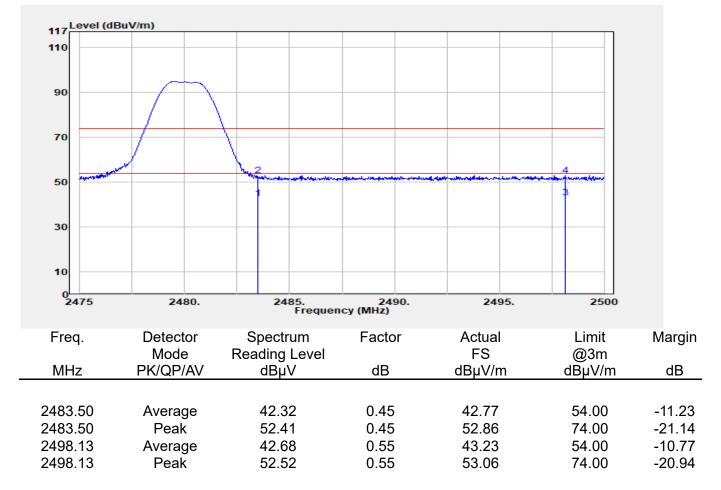
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-10
Temp./Humi.	:23.9/59
Antenna Pol.	:Vertical
Engineer	:GN Lin



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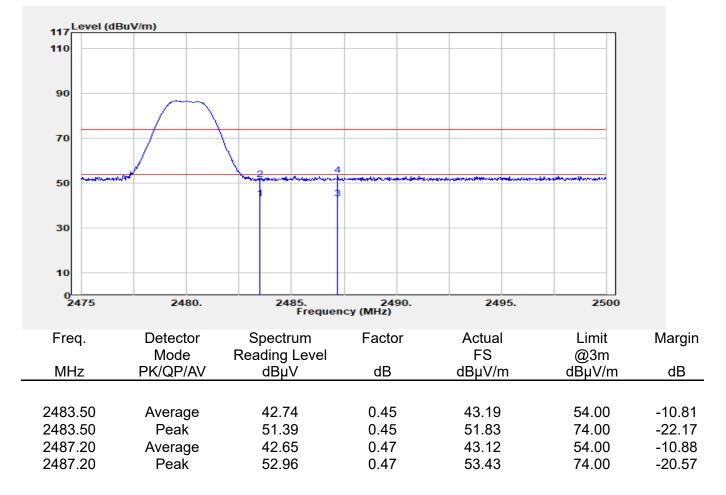
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Report No.: TERF2212002704ER Page: 54 of 90



Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2480 MHz
Test Mode	:Bandedge
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-10
Temp./Humi.	:23.9/59
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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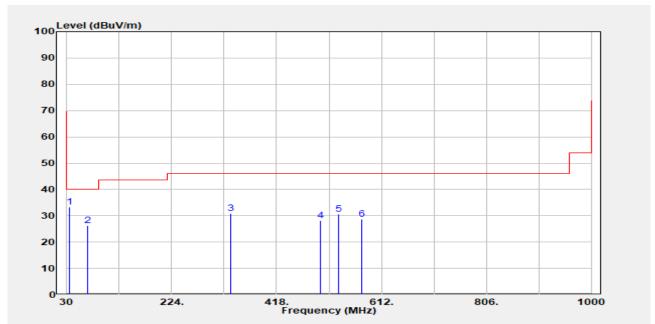
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### 11.6.2 **Radiated Spurious Emission**

### Internal Antenna (Type: Printed antenna, Model no: N/A)

F2212002704ER	Test Site	:SAC 1
1M	Test Date	:2023-02-13
2 MHz	Temp./Humi.	:22.9/54
	Antenna Pol.	:Vertical
ane	Engineer	:GN Lin
	1M 2 MHz	1MTest Date2 MHzTemp./Humi.Antenna Pol.



Freq.	Detector Mode	Spectrum Reading Level	Factor	Actual FS	Limit @3m	Margin
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
34.85	QP	40.64	-7.44	33.20	40.00	-6.80
67.83	Peak	44.33	-17.97	26.37	40.00	-13.63
332.64	Peak	39.04	-8.23	30.81	46.00	-15.19
499.48	Peak	33.33	-5.13	28.19	46.00	-17.81
532.46	Peak	35.75	-5.17	30.58	46.00	-15.42
576.11	Peak	33.25	-4.56	28.69	46.00	-17.31

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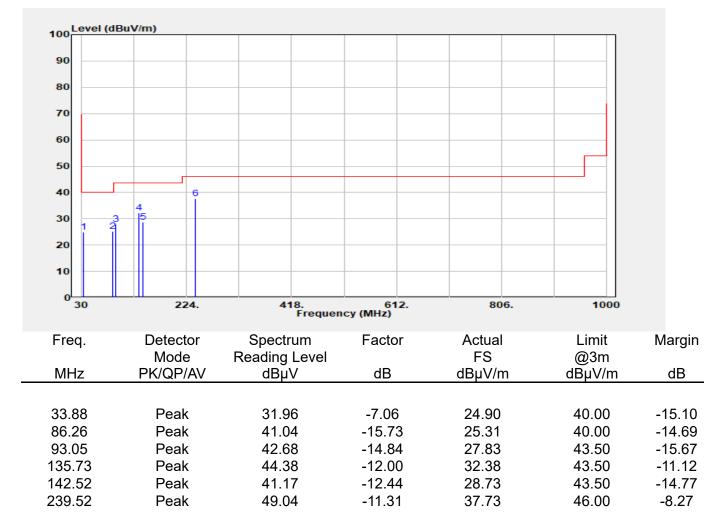
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Report No.: TERF2212002704ER Page: 56 of 90



Report Number	:TERF2212002704ER
Operation Mode	:BLE 1M
Test Frequency	:2442 MHz
Test Mode	:Tx
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-13
Temp./Humi.	:22.9/54
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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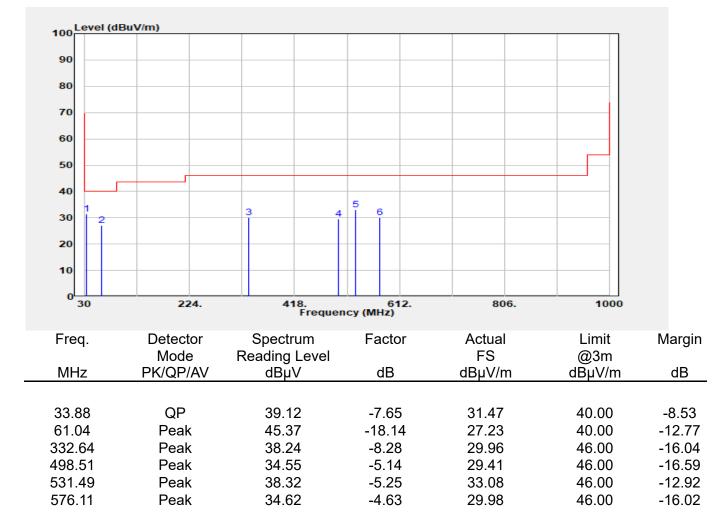
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2442 MHz
Test Mode	:Tx
EUT Pol	:H Plane

Test Site :SAC 1 Test Date :2023-02-13 Temp./Humi. :22.9/54 Antenna Pol. :Vertical :GN Lin Engineer



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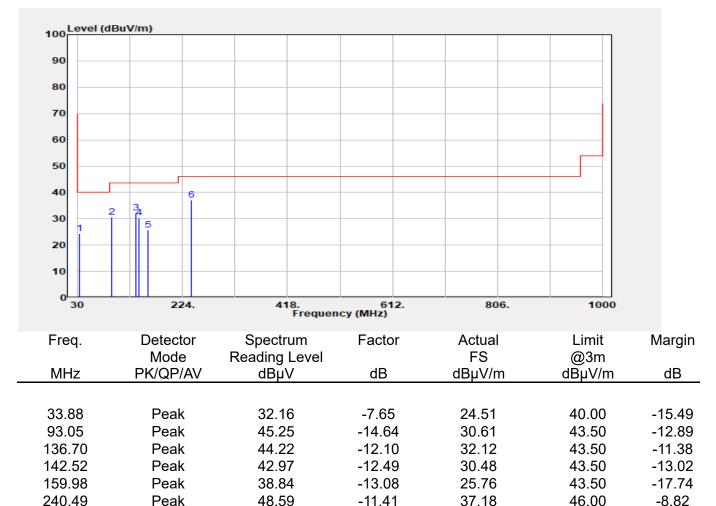
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Report No.: TERF2212002704ER Page: 58 of 90



Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2442 MHz
Test Mode	:Tx
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-13
Temp./Humi.	:22.9/54
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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Report Number Operation Mode Test Frequency Test Mode EUT Pol		12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-13 :22.9/54 :Vertical :GN Lin	3
100 Level (dBu)	//m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0L 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
			uD	app v/m		
4804.00	Average	27.98	8.09	36.07	54.00	-17.93
4804.00	Peak	38.90	8.09	46.99	74.00	-27.01
7206.00	Average	27.07	15.11	42.18	54.00	-11.82
7206.00	Peak	37.74	15.11	52.85	74.00	-21.15

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Report No.: TERF2212002704ER Page: 60 of 90



Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 1M	12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-13 :22.9/54 :Horizontal :GN Lin	3
100 Level (dBu)	V/m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
		Frequer	icy (MHz)	211000	20000	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
	FN/QF/AV	υσμν	UD	ubμv/m	υσμν/π	uБ
4804.00	Average	27.92	8.09	36.01	54.00	-17.99
4804.00	Peak	38.72	8.09	46.81	74.00	-27.19
7206.00	Average	27.29	15.11	42.40	54.00	-11.60
7206.00	Peak	38.30	15.11	53.41	74.00	-20.59

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	BLE 1M	:2442 MHz :Tx			:SAC 1 :2023-02-13 :22.9/54 :Vertical :GN Lin	}
100 Level (dBu)	//m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0L 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	чD	αυμν/m	αυμν/m	
4884.00	Average	27.58	7.69	35.27	54.00	-18.73
4884.00	Peak	38.60	7.69	46.29	74.00	-27.71
7326.00	Average	26.89	15.14	42.03	54.00	-11.97
7326.00	Peak	37.79	15.14	52.93	74.00	-21.07

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 1M	:2442 MHz :Tx			:SAC 1 :2023-02-13 :22.9/54 :Horizontal :GN Lin	3
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0 1000	6100.	11200. Frequer	16300. acy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBuV/m	@3m dBu\//m	dB
		υσμν	uD	dBµV/m	dBµV/m	UD
4884.00	Average	27.68	7.69	35.37	54.00	-18.63
4884.00	Peak	39.19	7.69	46.88	74.00	-27.12
7326.00	Average	26.95	15.14	42.09	54.00	-11.91
7326.00	Peak	37.96	15.14	53.10	74.00	-20.90

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	BLE 1M	:2480 MHz :Tx			:SAC 1 :2023-02-13 :22.9/54 :Vertical :GN Lin	}
100 Level (dBu)	//m)					
90						
80						
70						
60						
50	2					
40	3					
	1					
30						
20						
10						
0 1000	6100.	11200.	16300.	21400.	26500	
		Frequen	icy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	db	dbµv/m	dbµv/m	
4960.00	Average	27.40	8.62	36.02	54.00	-17.98
4960.00	Peak	38.84	8.62	47.46	74.00	-26.54
7440.00	Average	27.08	15.09	42.17	54.00	-11.83
7440.00	Peak	38.39	15.09	53.48	74.00	-20.52

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Report No.: TERF2212002704ER Page: 64 of 90



Report Number Operation Mod Test Frequency Test Mode EUT Pol	e :BLE 1M	:2480 MHz :Tx			:SAC 1 :2023-02-13 :22.9/54 :Horizontal :GN Lin	3
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
			icy (MHz)			
Freq.	Detector Mode	Spectrum	Factor	Actual FS	Limit	Margin
MHz	PK/QP/AV	Reading Level dBµV	dB	го dBµV/m	@3m dBµV/m	dB
		1 <sup>22</sup> -	-			
4960.00	Average	27.20	8.62	35.82	54.00	-18.18
4960.00	Peak	38.24	8.62	46.86	74.00	-27.14
7440.00	Average	26.77	15.09	41.86	54.00	-12.14
7440.00	Peak	37.95	15.09	53.04	74.00	-20.96

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 2M	:2402 MHz :Tx /			:SAC 1 :2023-02-13 :22.9/54 :Vertical :GN Lin	}
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0 <sup>L</sup> 1000	6100.	11200. Frequen	16300. icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
101112			uD	ασμν/m		
4804.00	Average	28.39	8.09	36.48	54.00	-17.52
4804.00	Peak	38.83	8.09	46.92	74.00	-27.08
7206.00	Average	27.07	15.11	42.18	54.00	-11.82
7206.00	Peak	37.51	15.11	52.62	74.00	-21.38

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	:TERF2212002704ER :BLE 2M :2402 MHz :Tx :H Plane			Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-13 :22.9/54 :Horizontal :GN Lin	
100 Level (dBuV/n	n)					
90						
80						
70						
60						
50	4					
	3					
40	1					
30						
20						
10						
0						
0L 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
		Reading Level	15	FS	@3m	
MHz P	K/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00		00.47	0.00	36.26	F4 00	47 74
4804.00 4804.00	Average Peak	28.17 38.87	8.09 8.09	36.26 46.96	54.00 74.00	-17.74 -27.04
	Average	27.29	15.11	40.90	54.00	-27.04
7206.00	Peak	37.52	15.11	52.63	74.00	-21.37

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100 Level (dBuV/m)	
90	
80	
70	
60	
50	
40	
30	
20	
10	
0 1000 6100. 11200. 16300. 21400. 26500 Frequency (MHz)	
Freq. Detector Spectrum Factor Actual Limit Margi	n
Mode Reading Level FS @3m	11
MHz PK/QP/AV dBµV dB dBµV/m dB	
4884.00 Average 28.20 7.69 35.89 54.00 -18.1	
4884.00Peak37.427.6945.1174.00-28.87326.00Average27.0015.1442.1454.00-11.8	
7326.00 Peak 37.74 15.14 52.88 74.00 -21.1	

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Report No.: TERF2212002704ER Page: 68 of 90



Report Number Operation Mode Test Frequency Test Mode EUT Pol	BLE 2M	:2442 MHz :Tx			:SAC 1 :2023-02-13 :22.9/54 :Horizontal :GN Lin	}
100 Level (dBu)	//m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0L 1000	6100.	11200. Frequen	16300. icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	чD	ασμν/π		
4884.00	Average	27.78	7.69	35.47	54.00	-18.53
4884.00	Peak	38.39	7.69	46.08	74.00	-27.92
7326.00	Average	27.21	15.14	42.35	54.00	-11.65
7326.00	Peak	37.83	15.14	52.97	74.00	-21.03

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Report No.: TERF2212002704ER Page: 69 of 90



Report Number Operation Mode Test Frequency Test Mode EUT Pol	:BLE 2M	:2480 MHz :Tx			:SAC 1 :2023-02-13 :22.9/54 :Vertical :GN Lin	}
100 Level (dBuV	//m)					
90						
80						
70						
60						
50	2					
40	- 1 3					
30						
20						
10						
0 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	UD	ασμν/π	սերչյու	UD
4960.00	Average	27.90	8.62	36.52	54.00	-17.48
4960.00	Peak	38.58	8.62	47.20	74.00	-26.80
7440.00	Average	27.17	15.09	42.26	54.00	-11.74
7440.00	Peak	37.87	15.09	52.96	74.00	-21.04

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Report No.: TERF2212002704ER Page: 70 of 90



Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 2M	:2480 MHz :Tx			:SAC 1 :2023-02-1 :22.9/54 :Horizontal :GN Lin	3
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0L 1000	6100.	11200. Frequer	16300. ncy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		αυμν	UD		ασμν/π	
4960.00	Average	27.77	8.62	36.39	54.00	-17.61
4960.00	Peak	38.48	8.62	47.10	74.00	-26.90
7440.00	Average	27.23	15.09	42.32	54.00	-11.68
7440.00	Peak	37.45	15.09	52.54	74.00	-21.46

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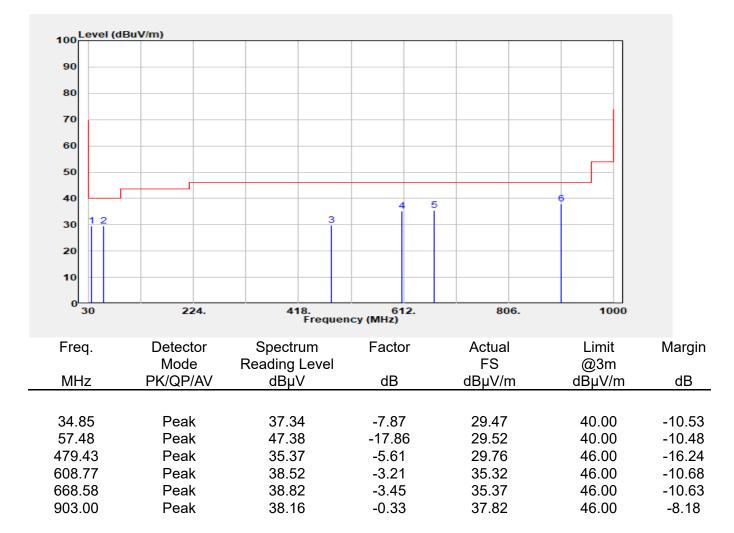
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### External Antenna (Type: Dipole antenna, Model no: WTS 2450)

Report Number	:TERF2212002704ER	Test Site	:SAC 1
Operation Mode	:BLE 1M	Test Date	:2023-02-10
Test Frequency	:2442 MHz	Temp./Humi.	:23.9/59
Test Mode	:Tx	Antenna Pol.	:Vertical
EUT Pol	:H Plane	Engineer	:GN Lin



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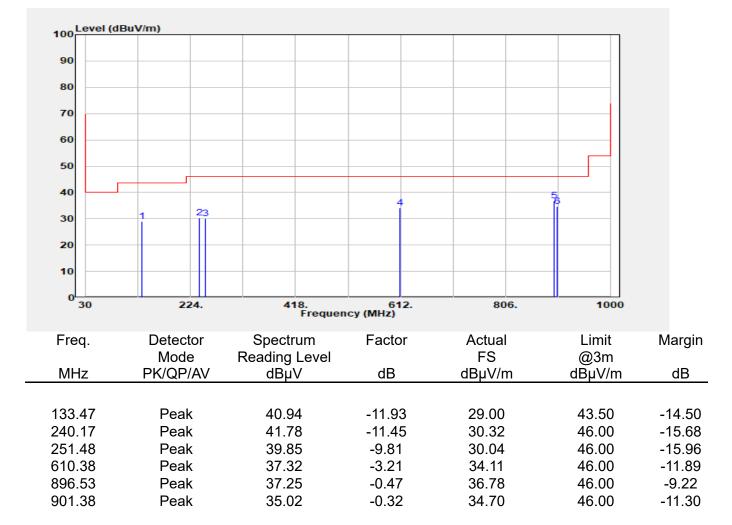
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 1M
Test Frequency	:2442 MHz
Test Mode	:Tx
EUT Pol	:H Plane

Test Site :SAC 1 :2023-02-10 Test Date Temp./Humi. :23.9/59 Antenna Pol. :Horizontal :GN Lin Engineer



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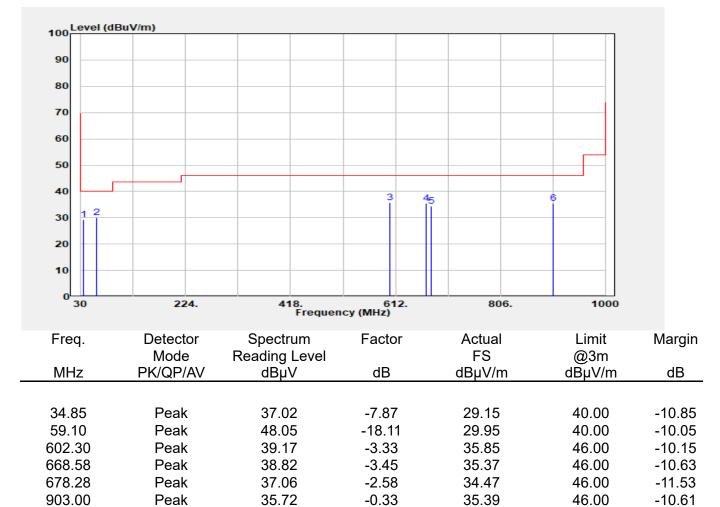
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2442 MHz
Test Mode	:Tx
EUT Pol	:H Plane

Test Site :SAC 1 Test Date :2023-02-10 Temp./Humi. :23.9/59 Antenna Pol. :Vertical :GN Lin Engineer



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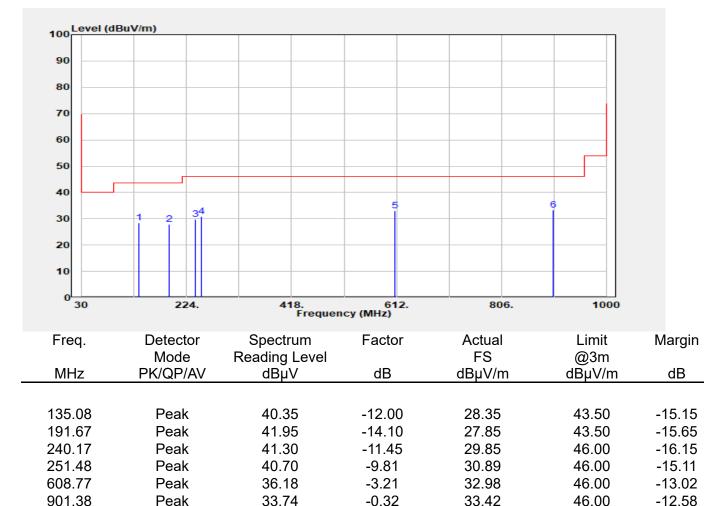
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Report Number	:TERF2212002704ER
Operation Mode	:BLE 2M
Test Frequency	:2442 MHz
Test Mode	:Tx
EUT Pol	:H Plane

Test Site	:SAC 1
Test Date	:2023-02-10
Temp./Humi.	:23.9/59
Antenna Pol.	:Horizontal
Engineer	:GN Lin



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Report Number Operation Mode Test Frequency Test Mode EUT Pol	:TERF221 :BLE 1M :2402 MHz :Tx :H Plane	2002704ER <u>z</u>		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Vertical :GN Lin	
100 Level (dBuV/	m)					
90						
80						
70						
60						
50	4					
40	2 3					
30						
20						
10						
0	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
•	Mode	Reading Level		FS	@3m	-
MHz F	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4804.00 4804.00	Average Peak	28.11 35.76	8.09 8.09	36.20 43.85	54.00 74.00	-17.80 -30.15
4804.00 7206.00	Average	27.05	8.09 15.11	43.85 42.16	74.00 54.00	-30.15 -11.84
7206.00	Peak	35.86	15.11	50.97	74.00	-23.03

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Report Number Operation Mode Test Frequency Test Mode EUT Pol		12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Horizontal :GN Lin	)
100 Level (dBuV	//m)					
90						
80						
70						
60						
50	4					
40	2					
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
		Frequen	cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		ασμν	UD UD	ασμν/π	ασμν/π	<u>ub</u>
4804.00	Average	28.32	8.09	36.41	54.00	-17.59
4804.00	Peak	37.15	8.09	45.24	74.00	-28.76
7206.00	Average	27.24	15.11	42.35	54.00	-11.65
7206.00	Peak	35.19	15.11	50.30	74.00	-23.70

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Report Number Operation Mode Test Frequency Test Mode EUT Pol		12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Vertical :GN Lin	)
100 Level (dBuV	//m)					
90						
80						
70						
60						
50	2					
40						
30						
20						
10						
0 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
				app v/m		
4884.00	Average	27.69	7.69	35.38	54.00	-18.62
4884.00	Peak	36.64	7.69	44.32	74.00	-29.68
7326.00	Average	26.77	15.14	41.91	54.00	-12.09
7326.00	Peak	35.81	15.14	50.95	74.00	-23.05

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Report Number Operation Mod Test Frequency Test Mode EUT Pol	e :BLE 1M	12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Horizontal :GN Lin	)
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	4					
40	2 3					
30						
20						
10						
0 1000	6100.	11200. Frequer	16300. Icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
	Mode	Reading Level		FS	@3m	-
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
					_ /	
4884.00	Average	27.49	7.69	35.18	54.00	-18.82
4884.00	Peak	36.43	7.69	44.12	74.00	-29.88
7326.00 7326.00	Average Peak	26.84 35.53	15.14 15.14	41.98 50.67	54.00 74.00	-12.02 -23.33
1020.00	i our	00.00		00.07	14.00	20.00

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 1M	12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Vertical :GN Lin	)
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40						
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
1000	0100.	Frequer	icy (MHz)	21400.	20500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
			45	<u></u>		4.0
4960.00	Average	27.38	8.62	36.00	54.00	-18.00
4960.00	Peak	35.48	8.62	44.10	74.00	-29.90
7440.00	Average	26.59	15.09	41.68	54.00	-12.32
7440.00	Peak	34.78	15.09	49.87	74.00	-24.13

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 1M	12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Horizontal :GN Lin	)
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2 4					
40	3					
30						
20						
10						
0 1000	6100.	11200. Frequen	16300. icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
	FIVQF/AV	ασμν	db	dbµv/m	սերտու	
4960.00	Average	27.39	8.62	36.01	54.00	-17.99
4960.00	Peak	38.22	8.62	46.84	74.00	-27.16
7440.00	Average	26.79	15.09	41.88	54.00	-12.12
7440.00	Peak	34.33	15.09	49.42	74.00	-24.58

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 2M	12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Vertical :GN Lin	)
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40	3					
30						
20						
10						
0 1000	6100.	11200. Frequen	16300. су (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		υσμν	uD	ασμν/π	սերչյու	uD
4804.00	Average	28.51	8.09	36.60	54.00	-17.40
4804.00	Peak	37.68	8.09	45.77	74.00	-28.23
7206.00	Average	27.24	15.11	42.35	54.00	-11.65
7206.00	Peak	34.97	15.11	50.08	74.00	-23.92

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	BLE 2M	12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Horizontal :GN Lin	)
100 Level (dBu)	//m)					
90						
80						
70						
60						
50	4					
40	2 3					
30						
20						
10						
0	6100.	11200.	16300.	21400.	26500	
		Frequen	cy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		αυμν	dD	ασμν/π		
4804.00	Average	28.35	8.09	36.44	54.00	-17.56
4804.00	Peak	36.52	8.09	44.61	74.00	-29.39
7206.00	Average	27.66	15.11	42.77	54.00	-11.23
7206.00	Peak	35.17	15.11	50.28	74.00	-23.72

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 2M	2002704ER <u>z</u>		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Vertical :GN Lin	
100 Level (dBu)	V/m)					
90						
80						
70						
60						
50	2					
40						
30						
20						
10						
0 1000			40000			
1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
4884.00	Average	28.12	7.69	35.81	54.00	-18.19
4884.00	Peak	37.51	7.69	45.20	74.00	-28.80
7326.00 7326.00	Average Peak	27.21 34.48	15.14 15.14	42.35 49.62	54.00 74.00	-11.65 -24.38
1320.00	reak	34.40	15.14	49.02	74.00	-24.30

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Report Number Operation Mode Test Frequency Test Mode EUT Pol		2002704ER z		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Horizontal :GN Lin	)
100 Level (dBuV	//m)					
90						
80						
70						
60						
50	4					
40	2 3					
30						
20						
10						
0 1000	6100.	11200. Frequen	16300. cy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
N 41 1-	Mode	Reading Level		FS	@3m	
MHz	PK/QP/AV	dBµV	dB	dBµV/m	dBµV/m	dB
4884.00	Average	27.99	7.69	35.68	54.00	-18.32
4884.00	Peak	35.92	7.69	43.60	74.00	-30.40
7326.00	Average	27.05	15.14	42.19	54.00	-11.81
7326.00	Peak	34.81	15.14	49.96	74.00	-24.04

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Report Number Operation Mode Test Frequency Test Mode EUT Pol	e :BLE 2M	12002704ER z		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Vertical :GN Lin	)
100 Level (dBu	V/m)					
90						
80						
70						
60						
50	2					
40						
30						
20						
10						
0 <sup>L</sup> 1000	6100.	11200. Frequer	16300. icy (MHz)	21400.	26500	
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
	FN/QF/AV	υσμν	UD	ασμν/π	uσμν/m	UD
4960.00	Average	27.62	8.62	36.24	54.00	-17.76
4960.00	Peak	35.78	8.62	44.40	74.00	-29.60
7440.00	Average	27.27	15.09	42.36	54.00	-11.64
7440.00	Peak	34.84	15.09	49.93	74.00	-24.07

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Report Number Operation Mode Test Frequency Test Mode EUT Pol		12002704ER Iz		Test Site Test Date Temp./Humi. Antenna Pol. Engineer	:SAC 1 :2023-02-10 :23.9/59 :Horizontal :GN Lin	)
100 Level (dBu)	//m)					
90						
80						
70						
60						
50	2					
40						
30						
20						
10						
0 1000	6100.	11200.	16300.	21400.	26500	
		Frequer	icy (MHz)			
Freq.	Detector	Spectrum	Factor	Actual	Limit	Margin
MHz	Mode PK/QP/AV	Reading Level dBµV	dB	FS dBµV/m	@3m dBµV/m	dB
		•		•	•	
4960.00	Average	27.90	8.62	36.52	54.00	-17.48
4960.00	Peak	35.46	8.62	44.08	74.00	-29.92
7440.00	Average	26.92	15.09	42.01	54.00	-11.99
7440.00	Peak	34.79	15.09	49.88	74.00	-24.12

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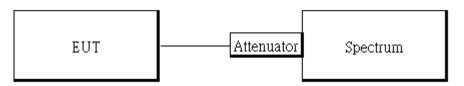


# **12 POWER SPECTRAL DENSITY**

## 12.1 Standard Applicable:

The power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

### 12.2 Test Setup



#### 12.3 Measurement Procedure:

- 1. Set analyzer center frequency to DTS channel center frequency.
- The testing follows the Measurement Procedure of FCC KDB 558074 D01 DTS Meas. Guidance.
- 3. Set the span to 1.5 times the DTS channel bandwidth.
- 4. Set the RBW = 3 kHz. & the VBW = 10 kHz
- 5. Detector = peak.
- 6. Sweep time = auto couple.
- 7. Trace mode = max hold.
- 8. Allow trace to fully stabilize.
- 9. Use the peak marker function to determine the maximum amplitude level.

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#### 12.4 **Measurement Result:**

#### **BLE 1M mode**

Frequency (MHz)	RF Power Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2402	-15.020	8	PASS
2442	-14.800	8	PASS
2480	-15.300	8	PASS

NOTE: cable loss as 0.88dB that offsets in the spectrum

#### **BLE 2M mode**

Frequency (MHz)	RF Power Density (dBm/3kHz)	Maximum Limit (dBm/3kHz)	Result
2402	-18.590	8	PASS
2442	-18.460	8	PASS
2480	-18.890	8	PASS

NOTE: cable loss as 0.88dB that offsets in the spectrum

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.

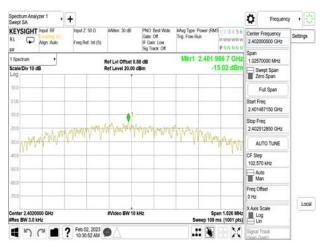
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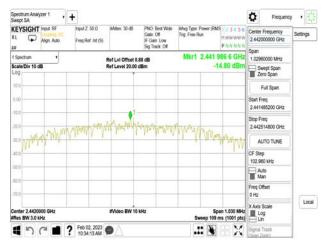
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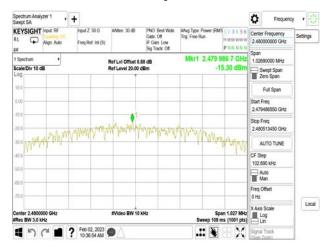
#### PSD\_BLE 1M\_LowCH00-2402MHz



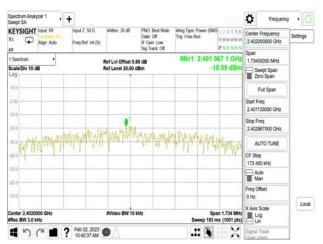
PSD\_BLE 1M\_MidCH20-2442MHz



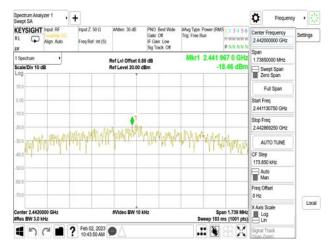
PSD\_BLE 1M\_HighCH39-2480MHz



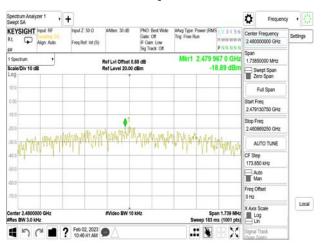
#### PSD\_BLE 2M\_LowCH00-2402MHz



PSD\_BLE 2M\_MidCH20-2442MHz







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# **13 ANTENNA REQUIREMENT**

### 13.1 Standard Applicable:

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 this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §§ 15.211, 15.213, 15.217, 15.219, 15.221, or § 15.236. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with § 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

### 13.2 Antenna Connected Construction:

The antenna complies with this requirement and no consideration of replacement. Please see EUT photo for details.

~ End of Report ~

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