Audix Technology Corp.
No. 491, Zhongfu Rd., Linkou, Dist.,
New Taipei City244, Taiwan

Tel: +886 2 26099301
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FCC 15.247
2.4 GHz Test Report

for

MAXTEK Go-Go CO., LTD.

7F., No. 196, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City, Taiwan.

Product Name	:	**Bluetooth 1To7 Units**
Model Name	:	**Tens-C**
Brand		**MAXPAL**
FCC ID	:	**2AWKBMAXPALAPPTENSC**

Prepared by: : **AUDIX Technology Corporation, EMC Department**

Testing Laboratory
1724

TESTING
NVLAP LAB CODE 200077-0

The test report is based on a single evaluation of one sample of the above-mentioned products. It does not imply an assessment of the whole production and does not permit the use of the test lab logo.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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TEST REPORT CERTIFICATION

Applicant	:	MAXTEK Go-Go CO., LTD.
Manufacturer	:	MAXTEK Go-Go CO., LTD.
Factory	:	Ta-Lai Sporting Goods Ent. Co., Ltd.
EUT Description		
(1) Product	:	Bluetooth 1To7 Units
(2) Model	:	Tens-C
(3) Brand	:	MAXPAL
(4) Power Supply	:	(1)DC 5V (Via USB) (2)DC 3.7V (Via Battery)

Applicable Standards:

47 CFR FCC Part 15 Subpart C
ANSI C63.10:2013

Audix Technology Corp. tested the equipment mentioned in accordance with the requirements set forth in the above standards. Test results indicate that the equipment tested is capable of demonstrating compliance with the requirements as documented within this report.
Audix Technology Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens and samples.

Date of Report: 2021. 03. 31

Reviewed by: Tina Huang (Tina Huang/Section Manager)

Approved by: Johnny Hsueh (Johnny Hsueh/Section Manager)

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1. REVISION RECORD OF TEST REPORT

Edition No	Issued Data	Revision Summary	Report Number
0	2021. 03. 31	Original Report	EM-F200303

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2. SUMMARY OF TEST RESULTS

Rule	Description	Results
15.207	Conducted Emission	**PASS**
15.247(d)/15.205	Radiated Band Edge and Radiated Spurious Emission	**PASS**
15.247(a)(2)	6dB Bandwidth	**PASS**
15.247(b)(3)	Maximum Peak Output Power	**PASS**
15.247(d)	Conducted Band Edges and Conducted Spurious Emission	**PASS**
15.247 (e)	Peak Power Spectral Density	**PASS**
15.203	Antenna Requirement	**Compliance**
Note: The uncertainties value is not used in determining the result.		

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3. GENERAL INFORMATION

3.1. Description of Application

Applicant	MAXTEK Go-Go CO., LTD. 7F., No. 196, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City, Taiwan
Manufacturer	MAXTEK Go-Go CO., LTD. 7F., No. 196, Sec. 2, Zhongxing Rd., Xindian Dist., New Taipei City, Taiwan
Factory	Ta-Lai Sporting Goods Ent. Co., Ltd. 5F, No. 12, Alley 6, Lane 45, Baoxing Road, Xindian District, New Taipei City, Taiwan
Product	Bluetooth 1To7 Units
Model	Tens-C
Brand	MAXPAL

3.2. Description of EUT

Test Model	Tens-C
Serial Number	N/A
Power Rating	(1)DC 5V (Via USB) (2)DC 3.7V (Via Battery)
RF Features	BLE
Transmit Type	1T1R
Sample Status	Production
Date of Receipt	2020. 05. 27
Date of Test	2020. 07. 02 ~ 08
Interface Ports of EUT	• One Micro USB Port
Accessories Supplied	• Micro USB Charging Cord • Bluetooth Receiver Gel Pads

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3.3. Antenna Information

Antenna Model Number	Manufacture	Antenna Type	Frequency (GHz)	Max Gain (dBi)
SST_PCB_ANT1	SST	PCB Antenna	2412-2462	-5.47

3.4. EUT Specifications Assessed in Current Report

Mode	Fundamental Range (MHz)	Channel Number	Modulation	Data Rate (Mbps)
BLE	2402-2480	40	GFSK	1

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

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3.5. Descriptions of Key Components

None

3.6. Data Rate Relative to Output Power

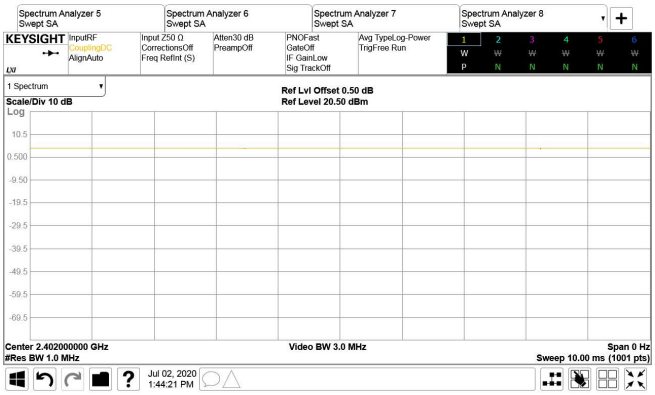
BLE			
Channel	Modulation	Date Rate(Mbps)	Power(dBm)
37	GFSK	1	-0.32

Note: Above results are assessed in peak power.

3.7. Test Configuration

Mode	TX_{on} (ms)	1/ TX_{on} (kHz)	VBW(>1/ TX_{on}) (kHz)
BLE	---	---	---

Note: When duty cycle is less than 98% (0.98) that duty cycle factor 10log(1/x) is needed to add in conducted test items measured in average detector.

Mode	T (ms)
BLE	

Item		Mode	Data Rate	Test Channel
Radiated Test Case	Radiated Band Edge Note1	BLE	1Mbps	37/39
	Radiated Spurious Emission Note1	BLE	1Mbps	37/17/39
Conducted Test Case	6dB Bandwidth	BLE	1Mbps	37/17/39
	Peak Output Power	BLE	1Mbps	37/17/39
	Band Edge	BLE	1Mbps	37/39
	Spurious Emission	BLE	1Mbps	37/17/39
	Peak Power Spectral Density	BLE	1Mbps	37/17/39

Note 1: ☐Mobile Device
■Portable Device, and 3 axis were assessed. The worst scenario for Radiated Spurious Emission as follow: ■Lie ☐ Side☐ Stand

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3.8. Tested Supporting System List

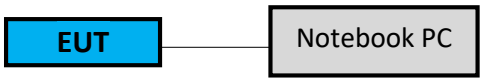
No.	Product	Brand	Model No.	Serial No.	Approval
1.	Notebook PC	hp	TPN-Q189	5CD8175992	Contains FCC ID: PD93168NG
2.	Jig	TI	CC2650 LaunchPad	N/A	N/A

3.8.1. Cable Lists

No.	Cable Description Of The Above Support Units
1.	Adapter: hp, M/N PPP-012C-S DC Cord：Shielded, Undetachable, 1.8m, Bonded a ferrite core AC Power Cord：Unshielded, Detachable, 1.0m
2.	Micro USB Cable: Unshielded, Undetachable, 29.6cm

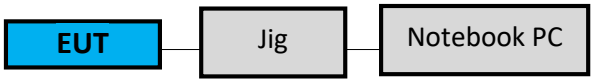
3.9. Setup Configuration

3.9.1. EUT Configuration for Power Line



3.9.2. EUT Configuration for Radiated Emission

3.9.3. EUT Configuration for RF Conducted Test Items



3.10. Operating Condition of EUT

Test program “SmartRF Studio 7 v2.9.0” is used for enabling EUT BT function under continues transmitting and choosing data rate/ channel.

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3.11.Description of Test Facility

Name of Test Firm	Audix Technology Corporation / EMC Department No. 491, Zhongfu Rd., Linkou Dist., New Taipei City 244, Taiwan Tel: +886-2-26092133 Fax: +886-2-26099303 Website : www.audixtech.com Contact e-mail: attemc_report@audixtech.com
Accreditations	The laboratory is accredited by following organizations under ISO/IEC 17025:2017 (1) NVLAP(USA) NVLAP Lab Code 200077-0 (2) TAF(Taiwan) No. 1724
Test Facilities	FCC OET Designation Number under APEC MRA by NCC is : TW1724 ISED CAB Identifier Number under APEC TEL MRA by NCC is TW1724 (1) No.8 Shielded Room (2) No.1 3m Semi Anechoic Chamber (3) Fully Anechoic Chamber

3.12.Measurement Uncertainty

Test Item	Frequency Range	Uncertainty
Radiation Test (Distance: 3m)	30MHz~1000MHz	± 3.68dB
	Above 1GHz	± 5.82dB

Remark：Uncertainty = $ku_c(y)$

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dB
Power spectral density	± 0.13dB
Conducted Emission Limitations	± 0.13dB

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4. MEASUREMENT EQUIPMENT LIST

4.1. Conducted Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Test Receiver	R&S	ESR3	101774	2020. 02. 04	1 Year
2.	A.M.N.	R&S	ENV432	101567	2020. 04. 20	1 Year
3.	L.I.S.N.	R&S	ESH3-Z2	100354	2020. 01. 05	1 Year
4.	Signal Cable	Yeida	RG/58AU	CE-08	2019. 09. 20	1 Year
5.	Digital Thermo-Hygro Meter	iMax	HTC-1	No.8 S/R	2020. 04. 17	1 Year
6.	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.

4.2. Radiated Emission Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Agilent	N9010A-526	MY53400071	2019. 09. 11	1 Year
2.	Spectrum Analyzer	Keysight	N9030A-526	MY53310269	2020. 01. 16	1 Year
3.	Amplifier	HP	8447D	2944A06305	2020. 01. 16	1 Year
4.	Amplifier	HP	8449B	3008A02678	2020. 02. 27	1 Year
5.	Amplifier	Keysight	83051A	MY53010042	2019. 08. 05	1 Year
6.	Bilog Antenna	CHASE	CBL6112D	33821	2020. 01. 17	1 Year
7.	Double-Ridged Waveguide Horn	ETS-Lindgren	3117	00135902	2020. 03. 10	1 Year
8.	Horn Antenna	COM-POWER	AH-840	101092	2020. 05. 08	1 Year
9	2.4GHz Notch Filter	K&L	7NSL10-2441. 5E130.5-00	1	2019 .07. 24	1 Year
10.	3GHz Notch Filter	Microwave	H3G018G1	484796	2020. 08. 20	1 Year
11.	Coaxial Cable	MIYAZAKI	5D2W	RE-11	2020. 01. 31	1 Year
12.	Coaxial Cable	HUBER+ SUHNER	SUCOFLEX 104	RF CABLE-01	2019. 09. 20	1 Year
13.	Coaxial Cable	HUBER+SUH NER	SUCOFLEX 102	No.1 18-40GHz Cable	2019. 09. 20	1 Year
14.	Digital Thermo-Hygro Meter	IMax	HTC-1	No.1 3m A/C	2020. 04. 17	1 Year
15	Digital Thermo-Hygro Meter	EVERY DAY	E-512	RF-02	2020. 04. 17	1 Year
16	Test Software	Audix	e3	V6.120619c	N.C.R.	N.C.R.
17	Test Software	Audix	e3	V6.110601	N.C.R.	N.C.R.

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4.3. RF Conducted Measurement

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Interval
1.	Spectrum Analyzer	Keysight	N9020B-544	MY57120357	2020.01.10	1 Year
4.	Digital Thermo-Hygro Meter	Shenzhen Datronn Electronics	KT-905	RF	2020.04.17	1 Year

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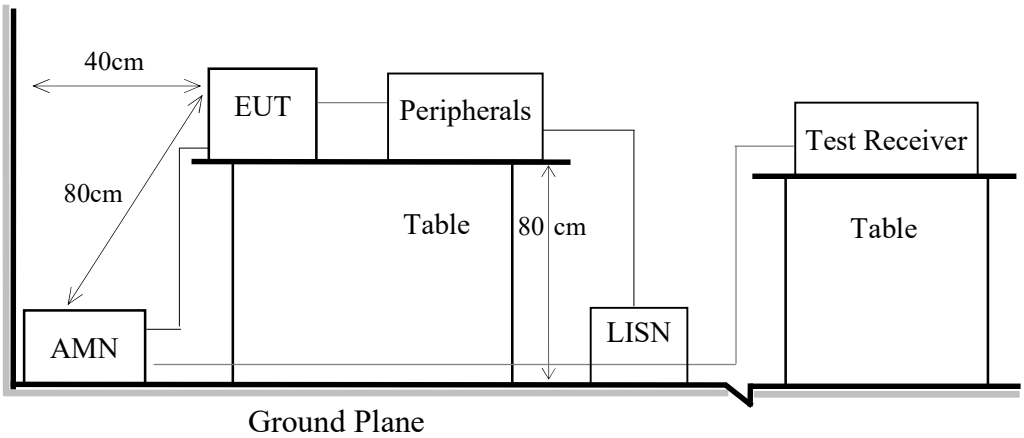
5. CONDUCTED EMISSION

5.1. Block Diagram of Test Setup

5.1.1. Block Diagram of EUT

Indicated as section 3.9

5.1.2. Shielded Room Setup Diagram



5.2. Conducted Emission Limit

Frequency	Conducted Limit	
	Quasi-Peak Level	Average Level
150kHz ~ 500kHz	66 ~ 56 dBμV	56 ~ 46 dBμV
500kHz ~ 5MHz	56 dBμV	46 dBμV
5MHz ~ 30MHz	60 dBμV	50 dBμV

Remark 1.: If the average limit is met when using a Quasi-Peak detector, the measurement using the average detector is not required.
2.: The lower limit applies to the band edges.

5.3. Test Procedure

5.3.1. To set up the EUT as indicated in ANSI C 63.10. The EUT was placed on the table which has 80 cm height to the ground and 40 cm distance to the conducting wall.

5.3.2. Power supplier of the EUT was connected to the AC mains through an Artificial Mains Network (A.M.N.).

5.3.3. The AC power supplies to all peripheral devices must be provided through line impedance stabilization network (L.I.S.N.)

5.3.4. Checking frequency range from 150 kHz to 30 MHz and record the emission which does not have 20 dB below limit.

5.4. Test Results

Please refer to Appendix A.

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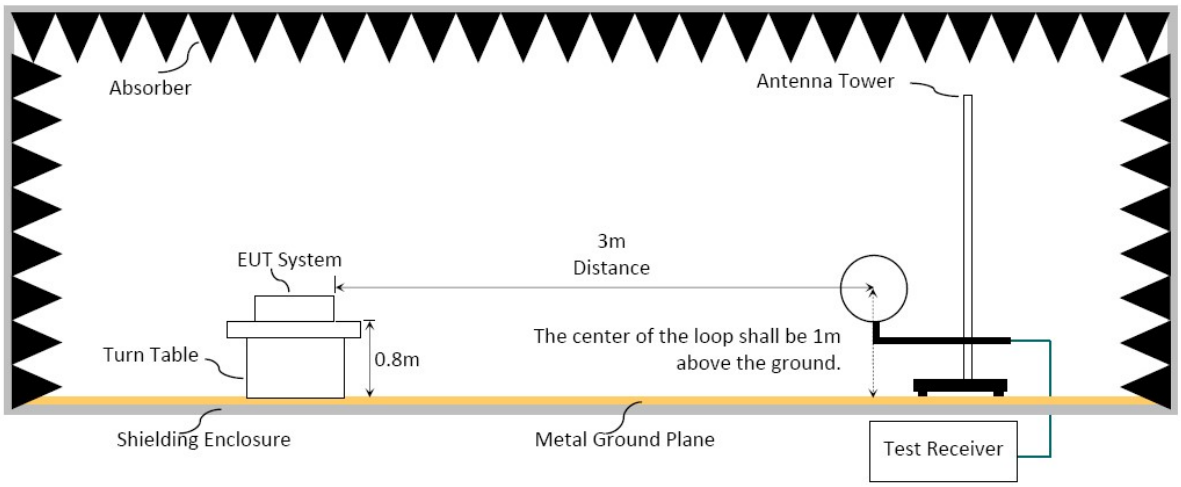
6. RADIATED EMISSION

6.1. Block Diagram of Test Setup

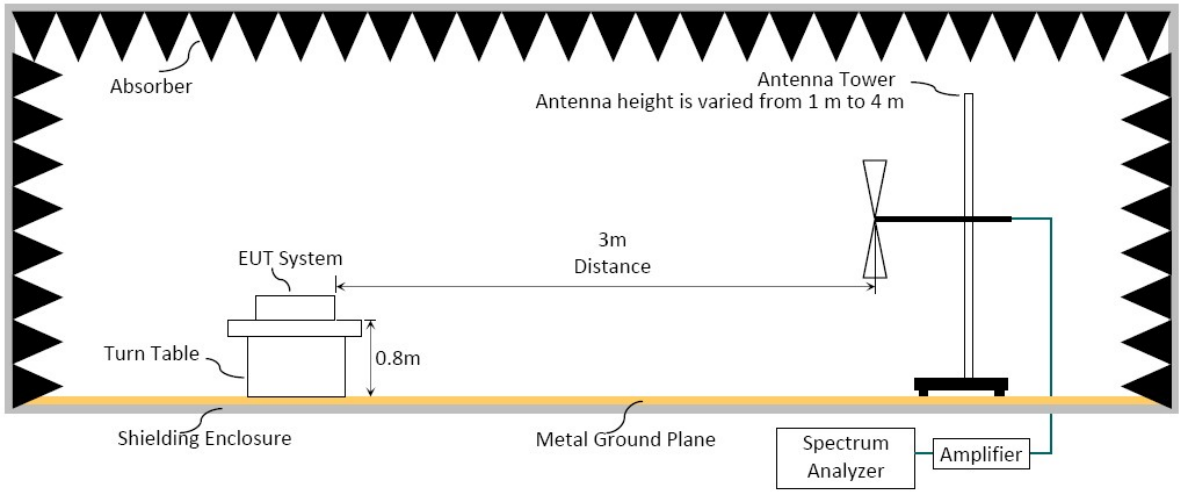
6.1.1. Block Diagram of EUT

Indicated as section 3.9

6.1.2. Setup Diagram for 9kHz-30MHz



6.1.3. Setup Diagram for 30-1000 MHz



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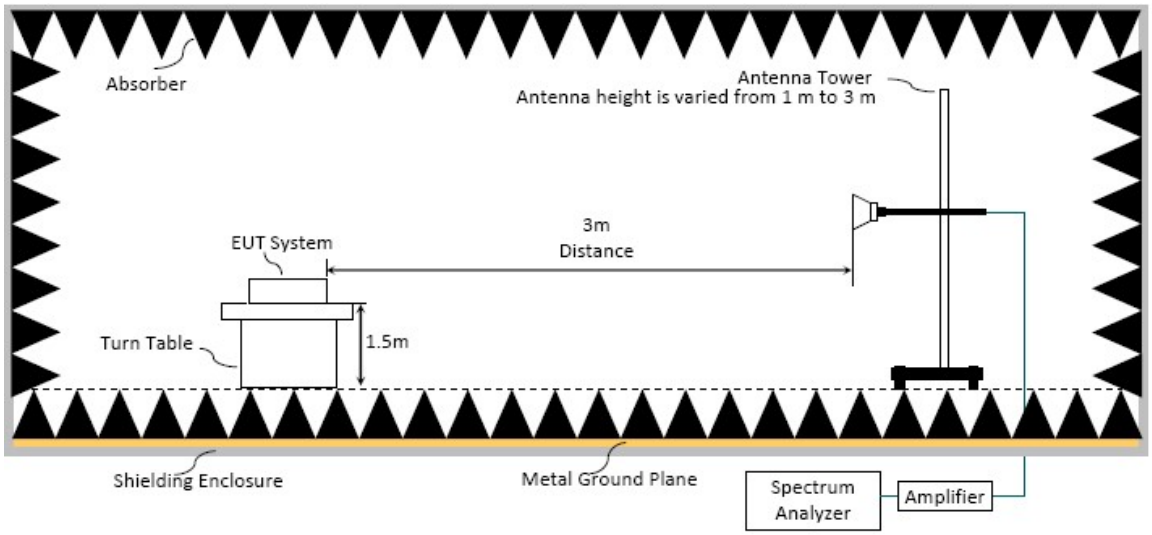
6.1.4. Setup Diagram for above 1GHz



6.2. Radiated Emission Limits

In any 100kHz bandwidth outside the frequency band, the radio frequency power produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205, must also comply with the radiated emission limits specified as below.

Frequency (MHz)	Distance (m)	Limits	
		dBμV/m	μV/m
0.009 - 0.490	300	67.6-20 log f(kHz)	2400/f kHz
0.490 - 1.705	30	87.6-20 log f(kHz)	24000/f kHz
1.705 - 30	30	29.5	30
30 - 88	3	40.0	100
88- 216	3	43.5	150
216- 960	3	46.0	200
Above 960	3	54.0	500
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) dBμV/m = 20 log (μV/m)
(2) The tighter limit applies to the edge between two frequency bands.
(3) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
(4) Fundamental and emission fall within operation band are exempted from this section.
(5) Pursuant to ANSI C63.10: 6.6.4.3, if the maximized peak measured value complies with the average limit, then it is unnecessary to perform an average measurement.

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6.3. Test Procedure

Frequency Range 9kHz~30MHz:
The EUT setup on the turn table which has 0.8 m height to the ground. The turn table rotated 360 degrees and antenna fixed to 1 m to find the maximum emission level.
In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013 regulation.

(1) RBW = 9kHz with peak and average detector.
(2) Detector: average and peak (9kHz-490kHz)
Q.P. (490kHz - 30MHz)

Frequency Range 30MHz ~ 25GHz:
The EUT setup on the turntable which has 80 cm (for 30-1000MHz) and 1.5m (for above 1GHz) height to the ground. The turn table rotated 360 degrees and antenna varied from 1 m to 4 m (for 30-1000MHz) or antenna varied from 1 m to 3 m (for above 1GHz) to find the maximum emission level. Both horizontal and vertical polarization are required. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10-2013regulation.

Frequency below 1 GHz:
Spectrum Analyzer is used for pre-testing with following setting:
(1)RBW = 120KHz
(2)VBW ≥ 3 x RBW.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.
Note 1: When peak-detected value is lower than limit that the measurement using the Q.P. detector is not required, otherwise using Q.P. for final measurement.
Note 2: When the radiated emissions limits are expressed in terms of the average value of the emissions, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds.

Frequency above 1GHz to 10th harmonic (up to 25 GHz):
Peak Detector:
(1)RBW = 1MHz
(2)VBW ≥ 3 x RBW.
(3)Detector = Peak.
(4)Sweep time = auto.
(5)Trace mode = max hold.
(6)Allow sweeps to continue until the trace stabilizes.
Note: When peak-detected value is lower than limit that the measurement using the average detector is not required, otherwise using average detector for final measurement.

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Average Detector:

■**Option 1:**

(1)RBW = 1MHz

(2)VBW ≥ 1/ T.

Modulation Type	VBW Setting (kHz)
BLE	10Hz

(1)Detector = Peak.

(2)Sweep time = auto.

(3)Trace mode = max hold.

(4)Allow sweeps to continue until the trace stabilizes.

☐**Option 2:**

Average Emission Level= Peak Emission Level+ D.C.C.F.

6.4. Measurement Result Explanation

■Peak Emission Level= Read Level +Antenna Factor + Cable Loss - Preamp Gain + Filter loss (If use)

■Average Emission Level l=Read Level +Antenna Factor + Cable Loss - Preamp Gain + Filter loss (If use)

☐Average Emission Level= Peak Emission Level+ DCCF

Duty Cycle Correction Factor (DCCF)= 20log (TX_{on}/TX_{on+off}) presented in section 3.7

☐ERP= Peak Emission Level-95.2dB-2.14dB

6.5. Test Results

Please refer to Appendix A.

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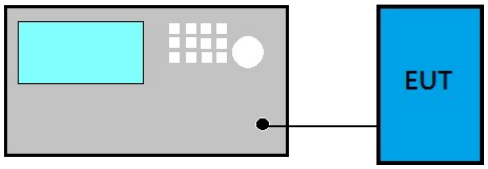
7. 6dB BANDWIDTH

7.1. Block Diagram of Test Setup



7.2. Specification Limits

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

7.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

(1) Set RBW = 100 kHz.
(2) Set the video bandwidth (VBW) ≥ 3 × RBW.
(3) Detector = Peak.
(4) Trace mode = max hold.
(5) Sweep = auto couple.
(6) Allow the trace to stabilize.
(7) Setting channel bandwidth function x dB to -6 dB to record the final bandwidth.

7.4. Test Results

Please refer to Appendix A

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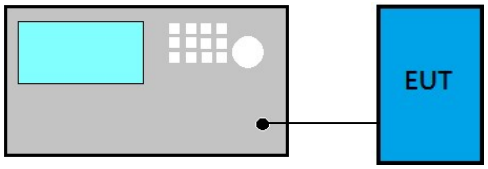
8. MAXIMUM PEAK OUTPUT POWER

8.1. Block Diagram of Test Setup



8.2. Specification Limits

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm), and E.I.R.P.: 4Watt (36dBm).

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8.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

☐**PKPM1 Peak power meter method:**

EUT is connected to power sensor and record the maximum output power.

■**Maximum peak conducted output power method:**

(1) Set the RBW ≥ DTS bandwidth
(2) Set VBW ≥ 3 × RBW
(3) Set span ≥ 3 × RBW.
(4) Sweep time = auto couple
(5) Detector = peak.
(6) Trace mode = max hold.
(7) Allow trace to fully stabilize.
(8) Use peak marker function to determine the peak amplitude level.

☐**Method AVGPM (Measurement using an RF average power meter):**

EUT is connected to power sensor and record the maximum average output power and duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

☐**Method AVGSA-2 (Spectrum channel power)**

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 -5% of OBW
(3) Set the video bandwidth (VBW) ≥ 3 × RBW.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) Compute power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function with band limits set equal to the OBW band edges.
(8) Duty cycle factor is added when duty cycle presented in section 3.7 is < 98%.

8.4. Test Results

Please refer to Appendix A

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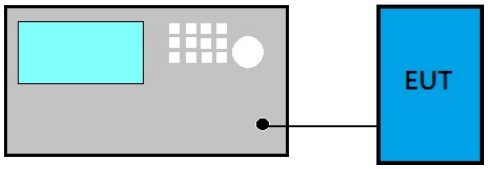
9. EMISSION LIMITATIONS

9.1. Block Diagram of Test Setup



9.2. Specification Limits

In any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, that the required attenuation shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (See Section 15.205(c)).

9.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■Reference Level

(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(5) Detector = peak.
(6) Sweep time = auto couple.
(7) Trace mode = max hold.
(8) Allow trace to fully stabilize to find the max PSD as reference level.

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■Emission Level Measurement

(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(5) Detector = peak.
(6) Sweep time = auto couple.
(7) Trace mode = max hold.
(8) Allow trace to fully stabilize to find the max level.

9.4. Test Results

Please refer to Appendix A

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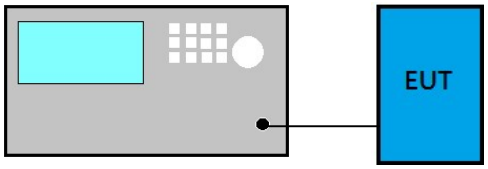
10. POWER SPECTRAL DENSITY

10.1. Block Diagram of Test Setup



10.2. Specification Limits

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

10.3. Test Procedure

Following measurement procedure is reference to KDB 558074 D01 DTS Meas Guidance v05:

■Method PKPSD (peak PSD)

(1) Set analyzer center frequency to DTS channel center frequency.
(2) Set the span to 1.5 times the DTS bandwidth.
(3) Set the RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
(4) Set the VBW ≥ 3 × RBW.
(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.
(10) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

□Method AVGPSD-2

(1) Using peak PSD procedure step 1 to step 4.
(2) Detector= RMS detector
(3) Sweep time = auto couple
(4) Trace mode = trace averaging over a minimum of 100 traces
(5) Use the peak marker function to determine the maximum amplitude level.
(6) Duty cycle factor is added when duty cycle presented in section 3.7 < 98%.
(7) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

10.4. Test Results

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11. DEVIATION TO TEST SPECIFICATIONS

【NONE】

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APPDNDIX A

TEST DATA AND PLOTS

(Model: Tens-C)

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A.1 CONDUCTED EMISSION

Test Date	2020/07/08	Temp./Hum.	27℃/57%
Test Voltage	DC 5V (via Notebook PC)		

Site No. : No.8 Shielded Room
Instrument 1 : Receiver ESR(774)
Instrument 2 : ENV432 (567)(A)|CE-08|ESH3-Z2 (354)
Limit : CLASS-B
Environment : 27°C / 57%
EUT Model : Tens-C
Test Mode : Charge

Data No. : 3
Phase : NEUTRAL
Engineer : Roy Hung
Test Rating : DC5V(Via USB)

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	10.20	0.04	9.85	17.59	37.68	55.91	18.23	Average
2	0.152	10.20	0.04	9.85	25.68	45.77	65.91	20.14	QP
3	0.381	10.20	0.04	9.85	17.48	37.57	48.25	10.68	Average
4	0.381	10.20	0.04	9.85	20.11	40.20	58.25	18.05	QP
5	0.530	10.20	0.04	9.86	10.59	30.69	46.00	15.31	Average
6	0.530	10.20	0.04	9.86	16.83	36.93	56.00	19.07	QP
7	1.218	10.21	0.05	9.86	9.71	29.83	46.00	16.17	Average
8	1.218	10.21	0.05	9.86	16.03	36.15	56.00	19.85	QP
9	1.889	10.30	0.07	9.86	6.05	26.28	46.00	19.72	Average
10	1.889	10.30	0.07	9.86	12.90	33.13	56.00	22.87	QP
11	13.552	10.65	0.16	9.93	11.37	32.11	50.00	17.89	Average
12	13.552	10.65	0.16	9.93	16.13	36.87	60.00	23.13	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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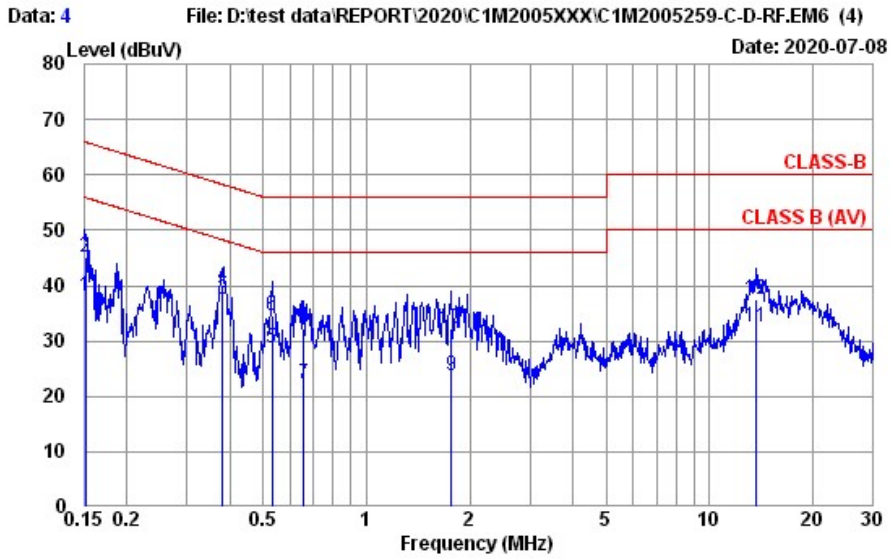
Test Date	2020/07/08	Temp./Hum.	27℃/57%
Test Voltage	DC 5V (via Notebook PC)		



Site No. : No.8 Shielded Room
Instrument 1 : Receiver ESR(774)
Instrument 2 : ENV432 (567)(A)|CE-08|ESH3-Z2 (354)
Limit : CLASS-B
Environment : 27°C / 57%
EUT Model : Tens-C
Test Mode : Charge

Data No. : 4
Phase : LINE
Engineer : Roy Hung
Test Rating : DC5V(Via USB)

	Freq. (MHz)	AMN Factor (dB)	Cable Loss (dB)	Pulse Att. (dB)	Reading (dBμV)	Emission Level (dBμV)	Limits (dBμV)	Margin (dB)	Remark
1	0.152	10.20	0.04	9.85	17.98	38.07	55.91	17.84	Average
2	0.152	10.20	0.04	9.85	25.18	45.27	65.91	20.64	QP
3	0.381	10.20	0.04	9.85	17.38	37.47	48.25	10.78	Average
4	0.381	10.20	0.04	9.85	19.69	39.78	58.25	18.47	QP
5	0.529	10.20	0.04	9.86	8.70	28.80	46.00	17.20	Average
6	0.529	10.20	0.04	9.86	14.60	34.70	56.00	21.30	QP
7	0.658	10.20	0.05	9.85	2.13	22.23	46.00	23.77	Average
8	0.658	10.20	0.05	9.85	12.21	32.31	56.00	23.69	QP
9	1.772	10.30	0.07	9.86	3.49	23.72	46.00	22.28	Average
10	1.772	10.30	0.07	9.86	11.90	32.13	56.00	23.87	QP
11	13.623	10.48	0.16	9.93	11.98	32.55	50.00	17.45	Average
12	13.623	10.48	0.16	9.93	16.87	37.44	60.00	22.56	QP

Remarks: 1. Emission Level= AMN Factor + Cable Loss + Pulse Att. + Reading.
2. If the average limit is met when using a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.

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A.2 RADIATED EMISSION

Test Date	2020/07/06	Temp./Hum.	25-27℃/46-47%
Test Voltage	DC 3.7V (via Battery)	Tested By	Kuper Hsu

A.2.1 Emissions within Restricted Frequency Bands

A.2.1.1 Frequency 9kHz~30MHz

The emissions (9kHz~30MHz) not reported for there is no emission be found.

A.2.2 A.2.1.2 Frequency Below 1 GHz

Mode	BLE	Frequency	TX 2402MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
32.910	22.98	1.29	26.53	27.51	25.25	40.00	14.75	Peak
101.780	16.92	2.45	26.31	30.54	23.60	43.50	19.90	Peak
326.820	20.03	4.95	25.95	31.95	30.98	46.00	15.02	Peak
547.980	24.14	6.98	27.36	30.40	34.16	46.00	11.84	Peak
784.660	25.95	8.05	27.42	29.26	35.84	46.00	10.16	Peak
984.480	27.32	9.09	26.87	28.48	38.02	54.00	15.98	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
46.490	15.75	1.60	26.50	43.79	34.64	40.00	5.36	Peak
117.300	18.49	2.64	26.22	33.83	28.74	43.50	14.76	Peak
260.860	18.83	4.13	25.76	38.18	35.38	46.00	10.62	Peak
353.980	20.75	5.35	26.19	35.81	35.72	46.00	10.28	Peak
466.500	22.99	6.62	27.02	40.20	42.79	46.00	3.21	Peak
539.250	24.04	6.97	27.33	32.61	36.29	46.00	9.71	Peak

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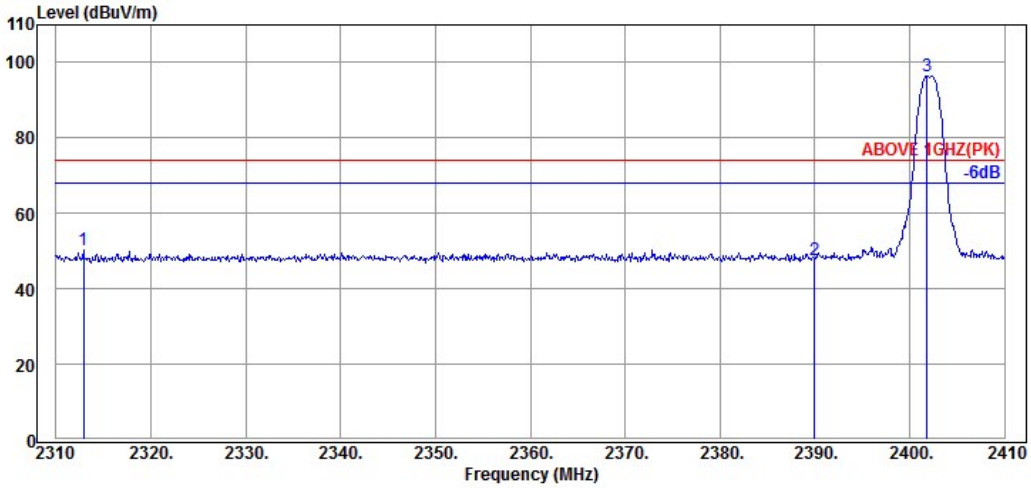
A.2.1.3 Frequency Above 1 GHz to 10th harmonics

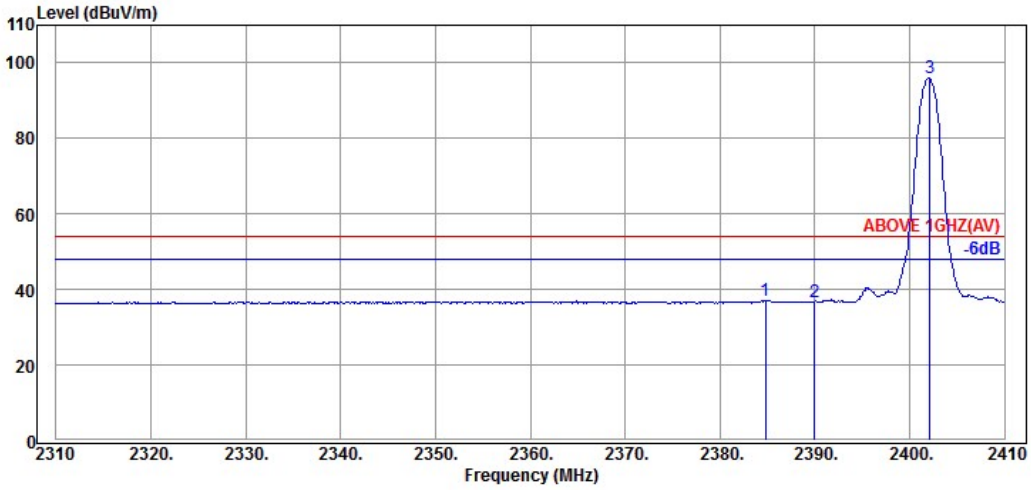
Band Edge:

Mode	BLE	Frequency	TX 2402MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2312.900	31.92	8.46	34.56	44.39	50.21	74.00	23.79	Peak
2390.000	32.44	8.52	34.58	41.25	47.63	74.00	26.37	Peak
2401.800	32.50	8.52	34.59	89.89	96.32	---	---	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2384.800	32.44	8.51	34.58	30.86	37.23	54.00	16.77	Average
2390.000	32.44	8.52	34.58	30.43	36.81	54.00	17.19	Average
2402.100	32.50	8.52	34.59	89.61	96.04	---	---	Average

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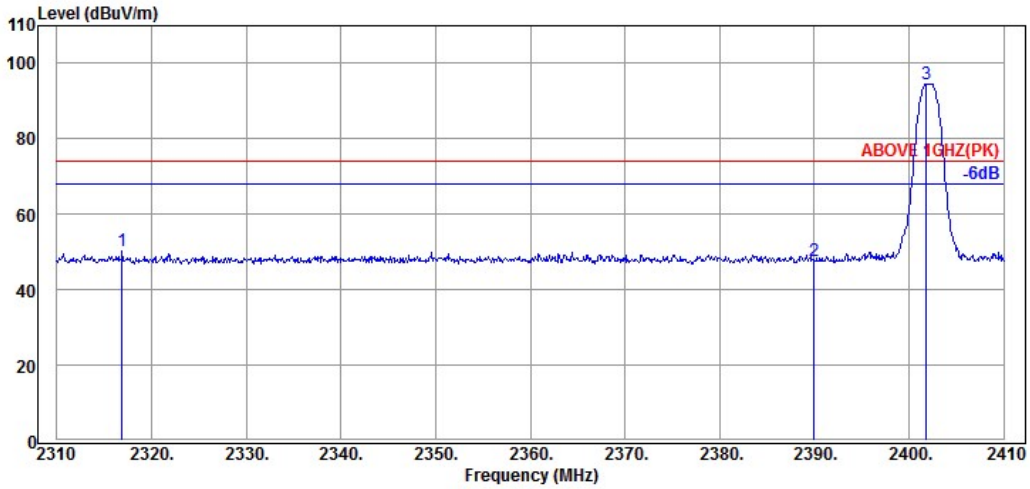
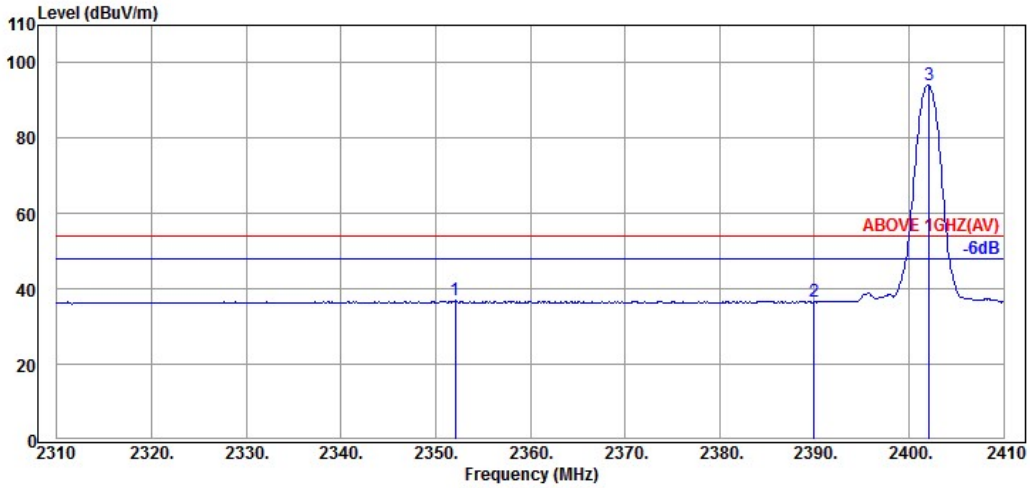
Mode	BLE	Frequency	TX 2402MHz



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2316.900	31.99	8.46	34.56	44.34	50.23	74.00	23.77	Peak
2390.000	32.44	8.52	34.58	41.40	47.78	74.00	26.22	Peak
2401.800	32.50	8.52	34.59	88.07	94.50	---	---	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2352.100	32.30	8.49	34.57	30.64	36.86	54.00	17.14	Average
2390.000	32.44	8.52	34.58	30.12	36.50	54.00	17.50	Average
2402.100	32.50	8.52	34.59	87.61	94.04	---	---	Average

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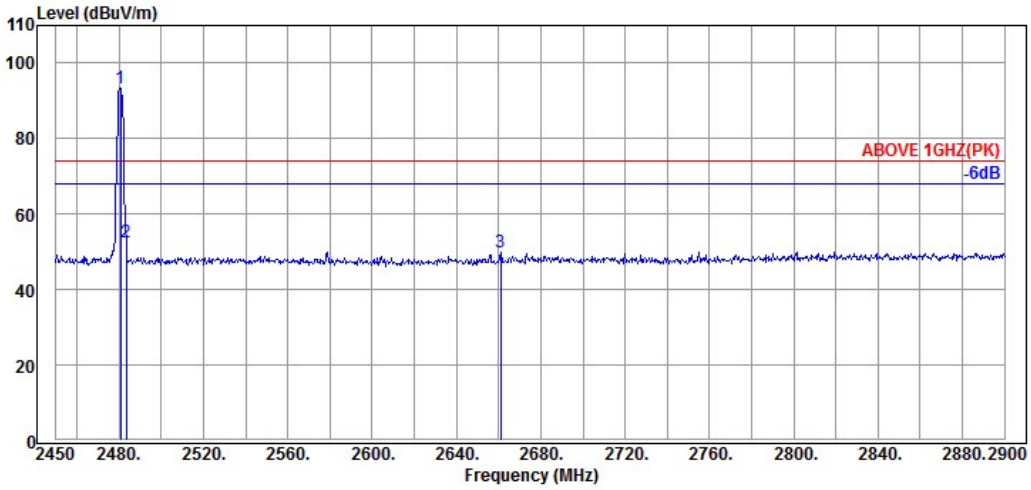
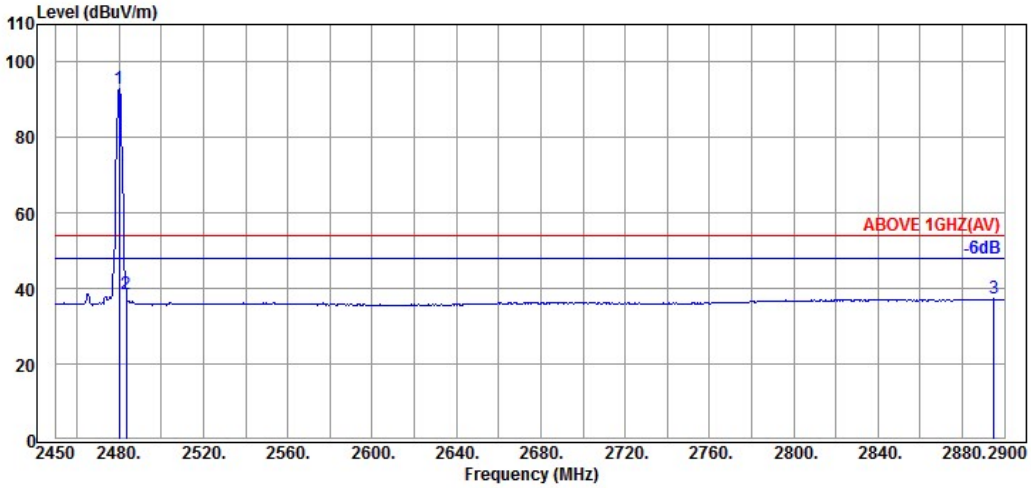
Mode	BLE	Frequency	TX 2480MHz



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.600	32.11	8.58	34.60	87.25	93.34	---	---	Peak
2483.300	32.14	8.58	34.61	46.51	52.62	74.00	21.38	Peak
2661.050	32.26	8.63	34.64	43.83	50.08	74.00	23.92	Peak



Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.150	32.11	8.58	34.60	86.73	92.82	---	---	Average
2483.300	32.14	8.58	34.61	32.27	38.38	54.00	15.62	Average
2895.050	32.80	8.68	34.68	30.51	37.31	54.00	16.69	Average

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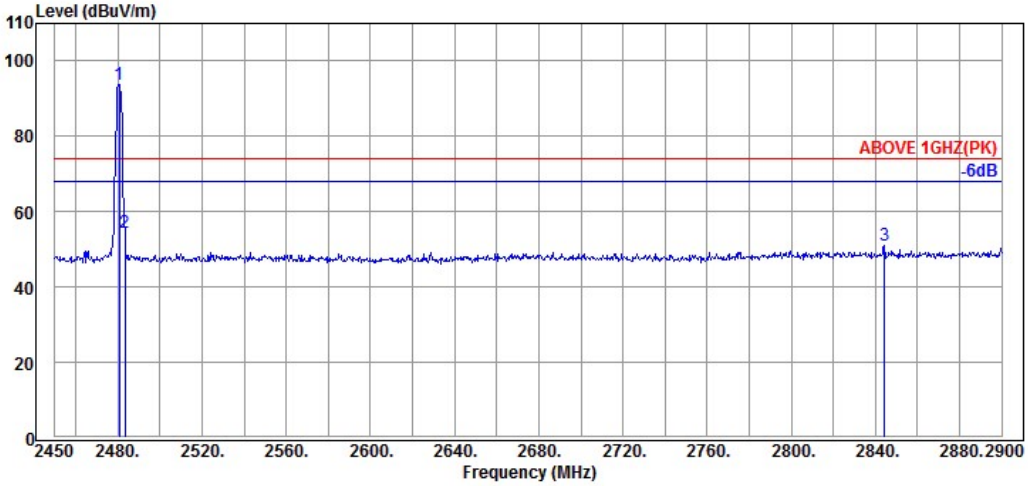
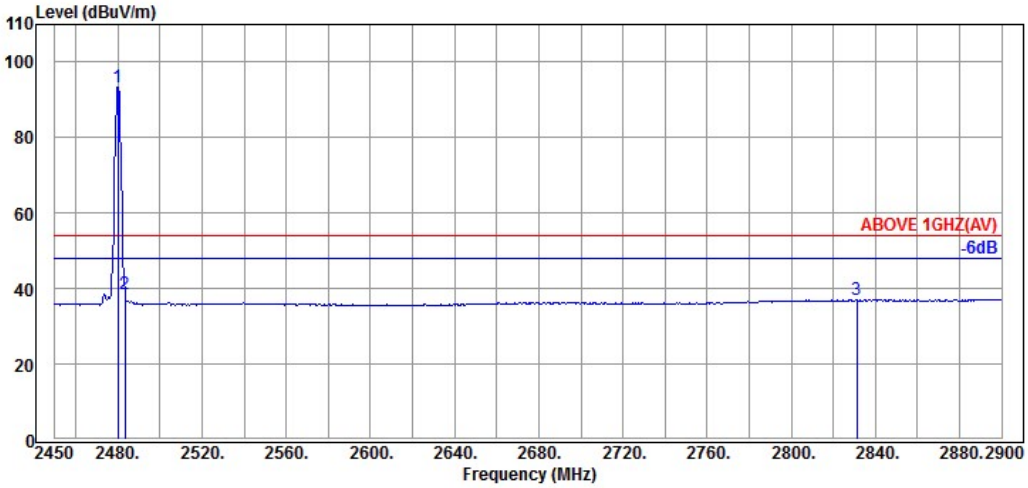
Mode	BLE	Frequency	TX 2480MHz



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.600	32.11	8.58	34.60	87.84	93.93	---	---	Peak
2483.300	32.14	8.58	34.61	48.49	54.60	74.00	19.40	Peak
2844.200	33.10	8.67	34.67	43.75	50.85	74.00	23.15	Peak



Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
2480.150	32.11	8.58	34.60	87.37	93.46	---	---	Average
2483.300	32.14	8.58	34.61	32.60	38.71	54.00	15.29	Average
2831.150	32.93	8.67	34.67	30.23	37.16	54.00	16.84	Average

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A.2.3 Emissions outside the frequency band:

The emissions (up to 25GHz) not reported for there is no emission be found.

Mode	BLE	Frequency	TX 2402MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4804.000	34.10	10.22	34.47	35.29	45.14	54.00	8.86	Peak
7206.000	35.60	12.05	34.60	37.05	50.10	54.00	3.90	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4804.000	34.10	10.22	34.47	35.46	45.31	54.00	8.69	Peak
7206.000	35.60	12.05	34.60	36.88	49.93	54.00	4.07	Peak

Mode	BLE	Frequency	TX 2440MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.000	34.05	10.24	34.45	35.43	45.27	54.00	8.73	Peak
7320.000	35.60	12.12	34.68	36.22	49.26	54.00	4.74	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4880.000	34.05	10.24	34.45	34.75	44.59	54.00	9.41	Peak
7320.000	35.60	12.12	34.68	37.16	50.20	54.00	3.80	Peak

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Mode	BLE	Frequency	TX 2480MHz

Antenna at Horizontal Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.000	34.10	10.27	34.44	35.16	45.09	54.00	8.91	Peak
7440.000	35.63	12.18	34.78	38.01	51.04	54.00	2.96	Peak

Antenna at Vertical Polarization

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Gain (dB)	Read Level (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector
4960.000	34.10	10.27	34.44	36.15	46.08	54.00	7.92	Peak
7440.000	35.63	12.18	34.78	36.56	49.59	54.00	4.41	Peak

A.2.4 Emissions in Non-restricted Frequency Bands:

Pursuant to ANSI C63.10:2013 that emission levels below the FCC 15.209(a) general radiated emissions limits is not required.

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A.3 6dB BANDWIDTH

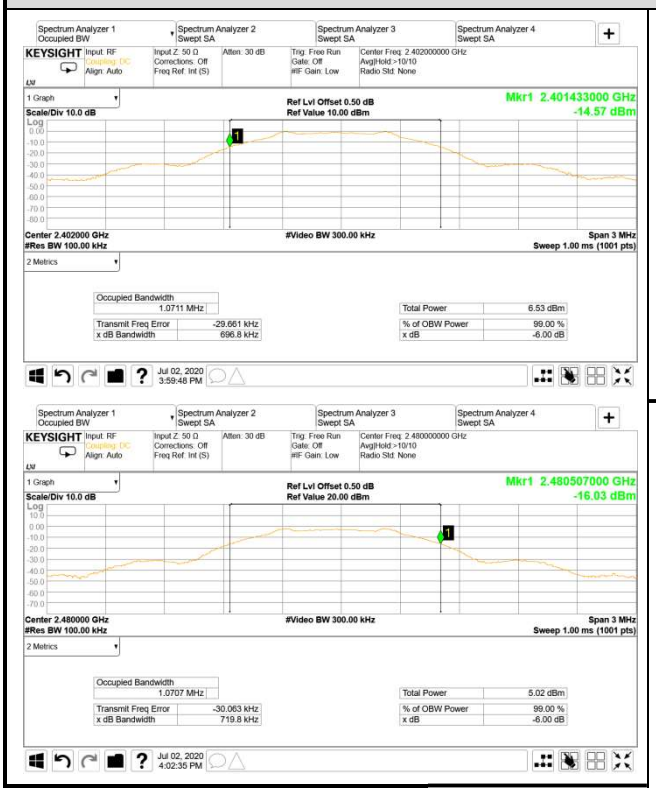
Test Date	2020/07/02	Temp./Hum.	25℃/54%
Cable Loss	0.50dB	Tested By	Kuper Hsu
Test Voltage	DC 3.7V (via Battery)		

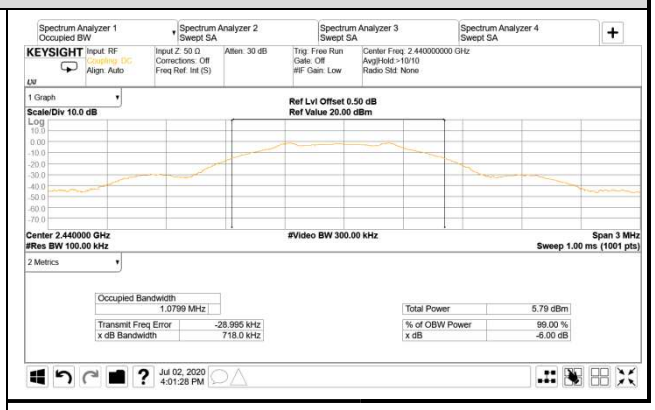
A.3.1 6dB Bandwidth Result

Mode	Centre Frequency (MHz)	6 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz) (Reference only)	Limit
BLE	2402	0.6968	1.0711	>500kHz
	2440	0.7180	1.0799	
	2480	0.7198	1.0707	

A.3.2 Measurement Plots

BLE





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A.4 MAXIMUM PEAK OUTPUT POWER

Test Date	2020/07/02	Temp./Hum.	25℃/54%
Cable Loss	0.50dB	Tested By	Kuper Hsu
Test Voltage	DC 3.7V (via Battery)		

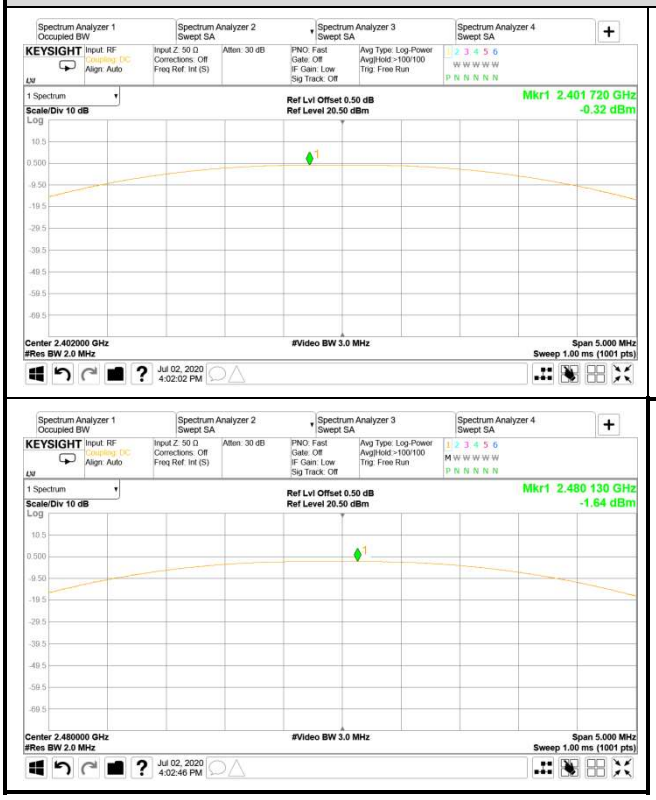
A.4.1 Peak Output Power

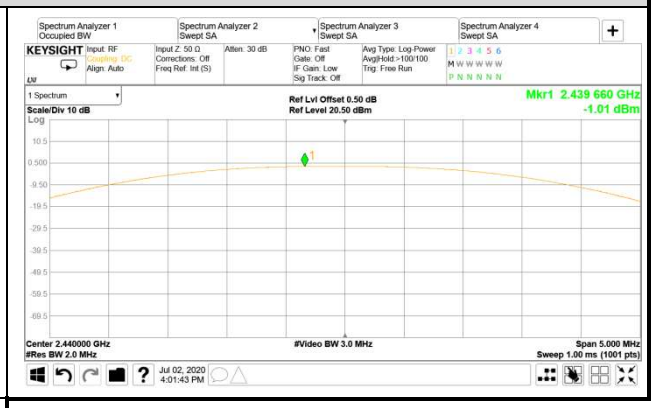
Mode	Centre Frequency (MHz)	MAX Output Power		Limit
		(dBm)	(W)	
BLE	2402	-0.32	0.000929	< 30dBm (1W)
	2440	-1.01	0.000793	
	2480	-1.64	0.000685	

Note: The results have been included cable loss.

A.4.2 Measurement Plots

BLE





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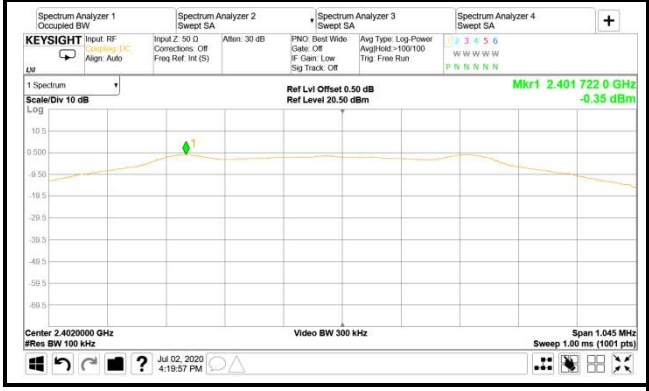
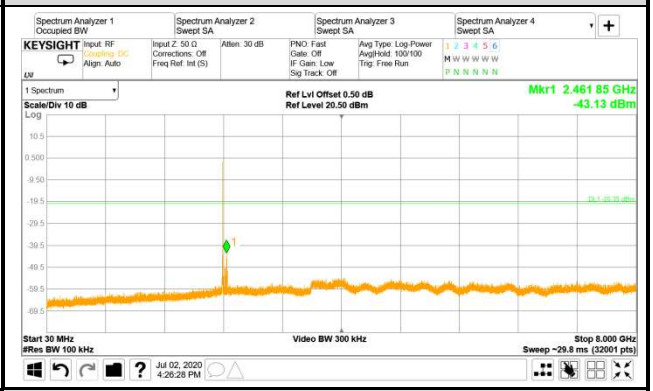
A.5 EMISSION LIMITATIONS

Test Date	2020/07/02	Temp./Hum.	25℃/54%
Cable Loss	0.50dB	Test Voltage	DC 3.7V (via Battery)
Mode	BLE	Tested By	Kuper Hsu
Frequency	TX 2402MHz		
Simultaneous Factor10 log(n) (Note: “n” is antenna number)			0

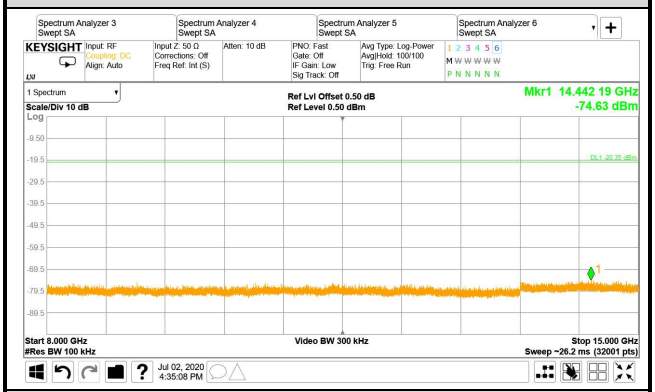
Reference Level



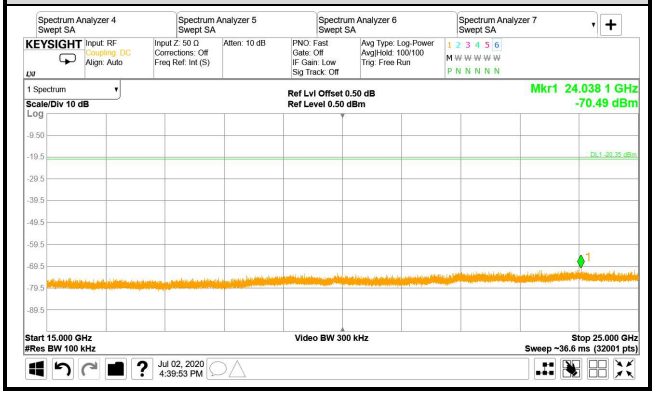
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz



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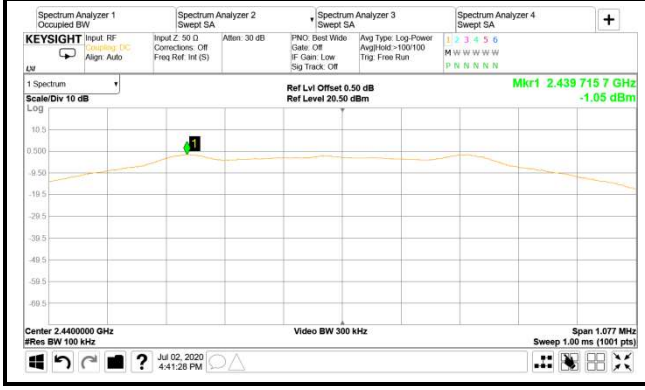
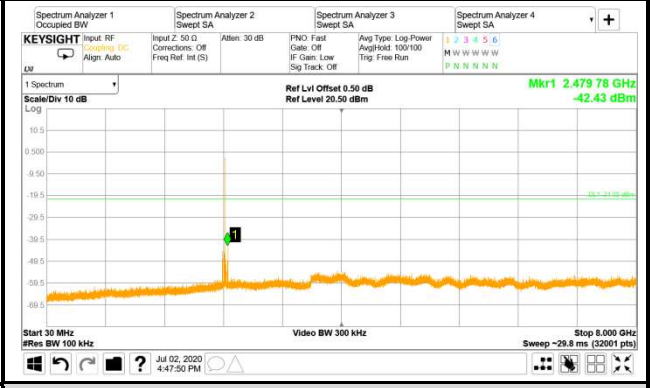
Test Date	2020/07/02	Temp./Hum.	25℃/54%
Cable Loss	0.50dB	Test Voltage	DC 3.7V (via Battery)
Mode	BLE	Tested By	Kuper Hsu
Frequency	TX 2440MHz		
Simultaneous Factor10 log(n) (Note: “n” is antenna number)			0

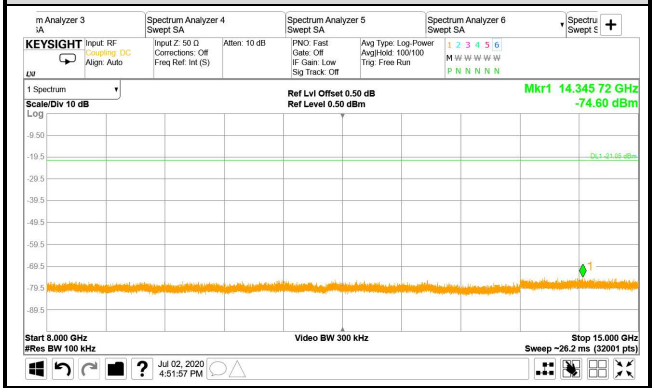
Reference Level



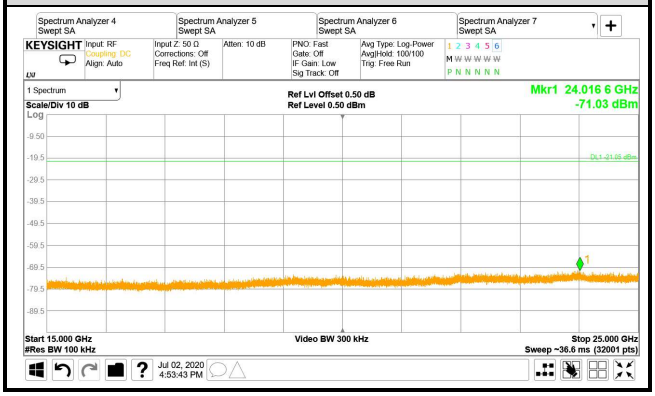
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz



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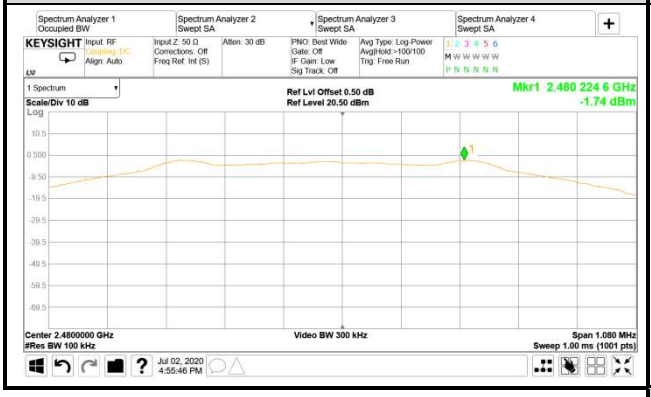
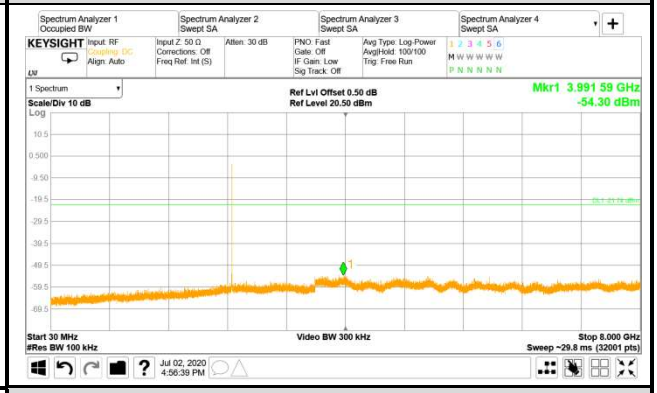
Test Date	2020/07/02	Temp./Hum.	25℃/54%
Cable Loss	0.50dB	Test Voltage	DC 3.7V (via Battery)
Mode	BLE	Tested By	Kuper Hsu
Frequency	TX 2480MHz		
Simultaneous Factor10 log(n) (Note: "n" is antenna number)			0

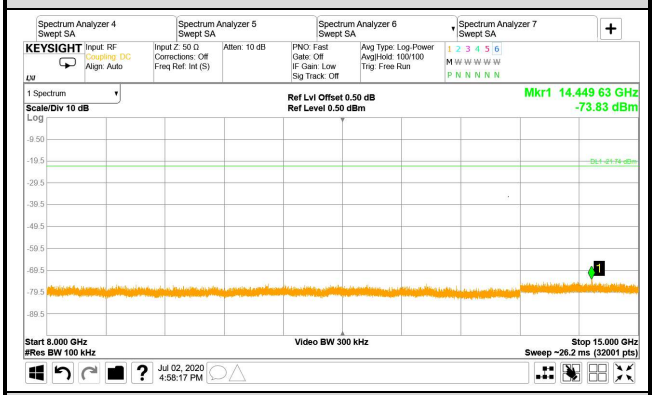
Reference Level



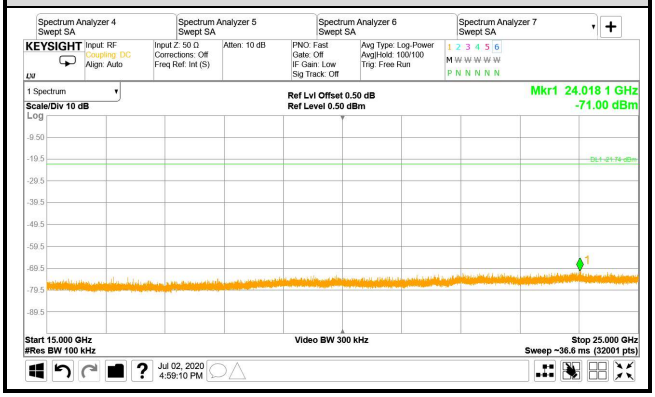
30MHz – 8GHz



8GHz – 15GHz



15GHz – 25GHz



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A.6 POWER SPECTRAL DENSITY

Test Date	2020/07/02	Temp./Hum.	25℃/54%
Cable Loss	0.50dB	Test Voltage	DC 3.7V (via Battery)
Mode	BLE	Tested By	Kuper Hsu
Simultaneous Factor10 log(n) (Note: “n” is antenna number)			0

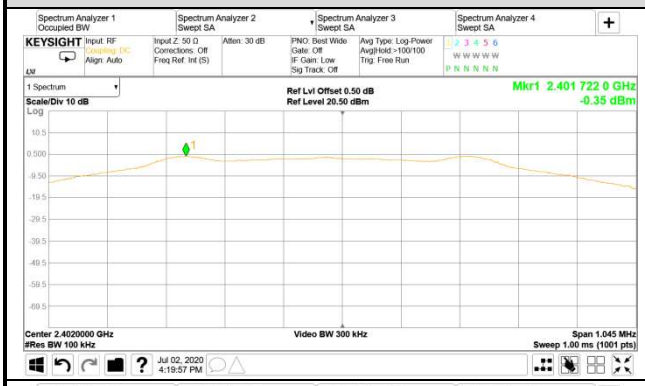
A.6.1 Power Spectral Density Result

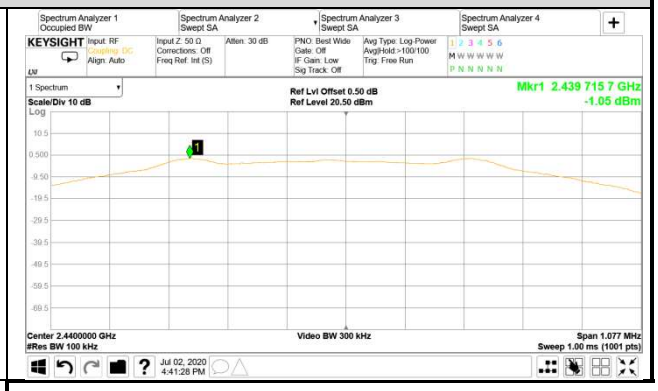
Mode	Centre Frequency (MHz)	Power Spectral Density (dBm)	Limit
BLE	2402	-0.35	< 8 dBm/3kHz
	2440	-1.05	
	2480	-1.74	

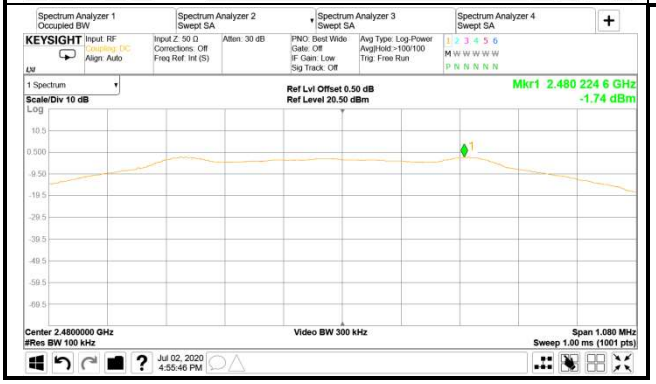
Note: All results have been included cable loss and Simultaneous Factor.

A.6.2 Measurement Plots

BLE







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