

Forcite Helmet Systems PTY LTD

TEST REPORT

Model:

MK1-HBC

REPORT NUMBER

220600074THC-001

ISSUE DATE

Oct. 17, 2022

PAGES

44

DOCUMENT CONTROL NUMBER

GFT-OP-10h (28-Nov-2018)

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Radio Spectrum TEST REPORT

Applicant:	Forcite Helmet Systems PTY LTD Unit A1, 35-39 Bourke Rd, Alexandria NSW 2015, Australia
Product:	FORCITE BT CONTROLLER MK01
Model No.:	MK1-HBC
Brand Name:	MK1S-HBC, MK1R-HBC, MK1X-HBC, MK1SE-HBC, MK1D-HBC
FCC ID:	2A8MD-MK1HBC
Test Method/ Standard:	47 CFR FCC Part 15.247 & ANSI C63.10 2013 KDB 558074 D01 v05r02
Test By:	Intertek Testing Services Taiwan Ltd., Hsinchu Laboratory No. 11, Lane 275, Ko-Nan 1 Street, Chia-Tung Li, Shiang-Shan District, Hsinchu City, Taiwan



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TEST REPORT

Revision History

Report No.	Issue Date	Revision Summary
220600074THC-001	Oct. 17, 2022	Original report

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Summary of Test Data

Test Requirement	Applicable Rule (Section 15.247)	Result
Minimum 6 dB Bandwidth	15.247(a)(2)	Pass
Maximum Peak Conducted Output Power	15.247(b)(3)	Pass
Power Spectral Density	15.247(e)	Pass
Emissions In Non-Restricted Frequency Bands	15.247(d)	Pass
Emissions In Restricted Frequency Bands (Radiated emission measurements)	15.247(d), 15.205, 15.209	Pass
Emission On The Band Edge	15.247(d), 15.205	Pass
AC Power Line Conducted Emission	15.207	N/A
Antenna Requirement	15.203	Pass

Note: Please note that the test results with statement of conformity, the decision rules which are based on: Safety Testing: the specification, standard or IEC Guide 115.

Other Testing: the specification, standard and not taking into account the measurement uncertainty.

1. General Information

1.1 Identification of the EUT

Product:	FORCITE BT CONTROLLER MK01
Model No.:	MK1-HBC
Operating Frequency:	2402 MHz ~ 2480 MHz
Channel Number:	40 channels
Frequency of Each Channel:	2402+2k, k=0 ~ 39
Rated Power:	DC 5V
Power Cord:	N/A
Sample receiving date:	2022/07/21
Sample condition:	Workable
Test Date(s):	2022/08/02 ~ 2022/08/12

1.2 Additional information about the EUT

The customer confirmed there are several trade names, the different brands served as marketing strategy.

Brand Name	Model Number	Different
MK1S-HBC	MK1-HBC	Only laser mark different, to match the name of MK1S helmet
MK1R-HBC	MK1-HBC	Only laser mark different, to match the name of MK1R helmet
MK1X-HBC	MK1-HBC	Only laser mark different, to match the name of MK1X helmet
MK1SE-HBC	MK1-HBC	Only laser mark different, to match the name of MK1SE helmet
MK1D-HBC	MK1-HBC	Only laser mark different, to match the name of MK1D helmet

1.3 Antenna description

Antenna Gain	: 0.16 dBi
Antenna Type	: Meander PCB Printed Antenna
Connector Type	: Fixed

1.4 Operation mode

Connected to Notebook via USB Cable, executing “nRF connect v3.11.1” to select different frequency and modulation.

Mode	Channel	Frequency (MHz)	Signal on time(ms)	Signal on & off time(ms)	Duty cycle	Duty Cycle factor
BLE 1M	19	2440	2.14	2.5	0.856	0.675
BLE 2M	19	2440	1.08	1.88	0.574	2.407

1.5 Peripherals equipment

Peripherals	Brand	Model No.	Serial No.	Data cable
Notebook PC	HP	HP ProBook 440 G3	5CD8021S9H	N/A
Fixture	N/A	N/A	N/A	N/A
USB Power Adapter	Apple	A1357	N/A	Type-C USB Cable 1.3m

2. Minimum 6 dB Bandwidth

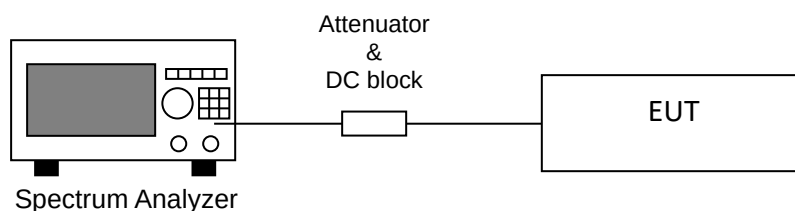
2.1 Instrument Setting

Spectrum Parameter	Setting
Detector	Peak
RBW	100kHz
VBW	$\geq 3 \times \text{RBW}$
Sweep	Auto couple
Trace	Allow the trace to stabilize.
Span	Between two times and five times the occupied bandwidth
Attenuation	Auto

2.2 Test Procedure

Step 1	The transmitter output was connected to the spectrum analyzer.
Step 2	Test was performed accordance with ANSI C63.10.
Step 3	Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

2.3 Test Diagram



2.4 Limit

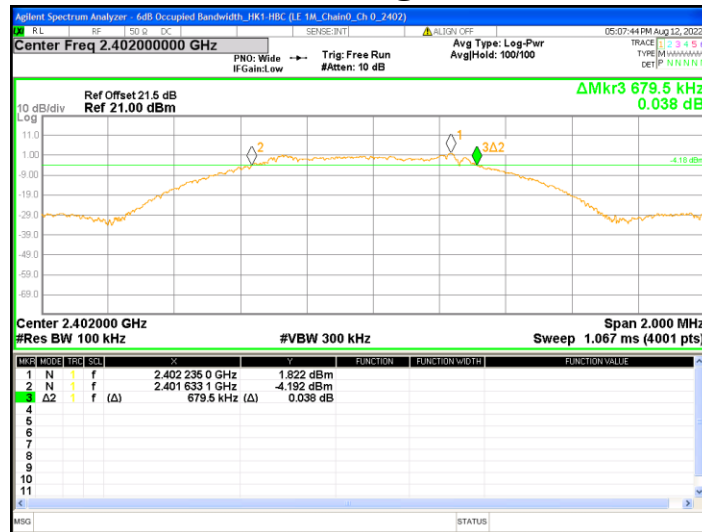
The minimum 6 dB bandwidth shall be at least 500 kHz.

2.5 Test Results

Temperature (°C) :	27
Relative Humidity (%) :	55

Mode	Channel	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)	Result
BLE 1M	0	2402	0.679	>0.5	Pass
	19	2440	0.670	>0.5	Pass
	39	2480	0.717	>0.5	Pass
BLE 2M	0	2402	1.132	>0.5	Pass
	19	2440	1.162	>0.5	Pass
	39	2480	1.237	>0.5	Pass

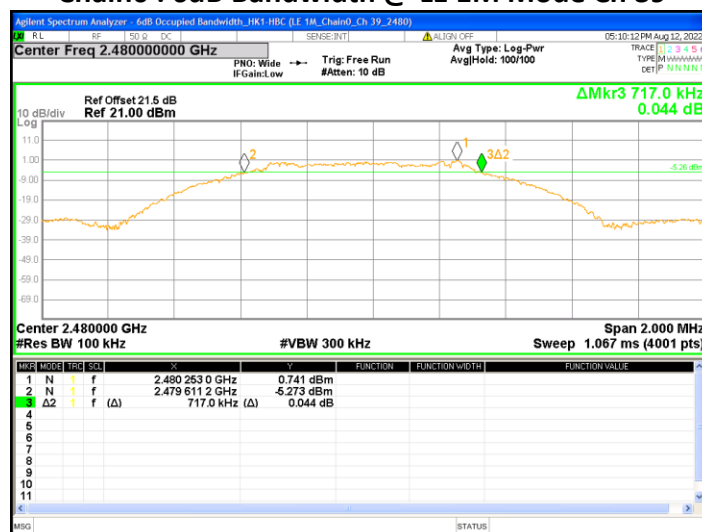
Chain0 : 6dB Bandwidth @ LE 1M Mode Ch 0



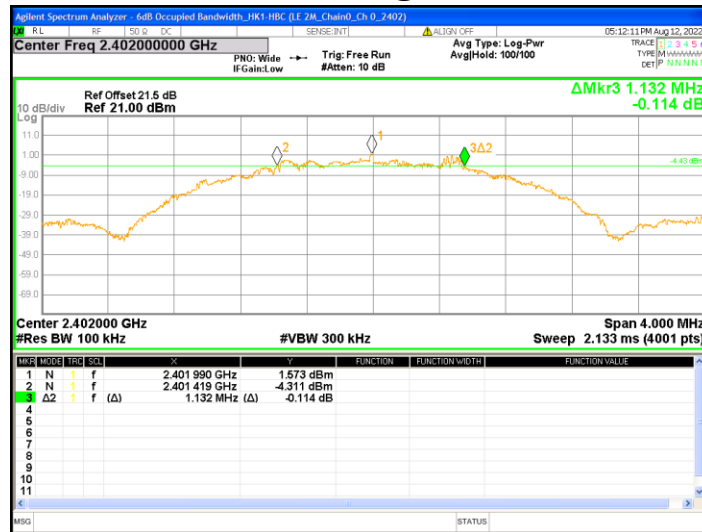
Chain0 : 6dB Bandwidth @ LE 1M Mode Ch 19



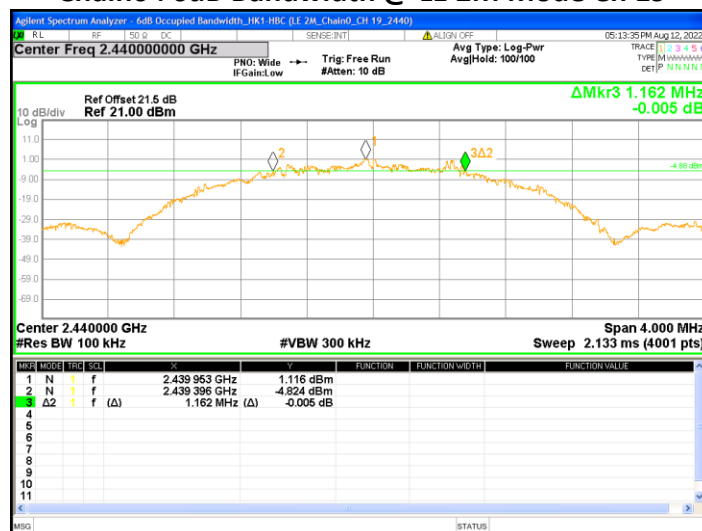
Chain0 : 6dB Bandwidth @ LE 1M Mode Ch 39



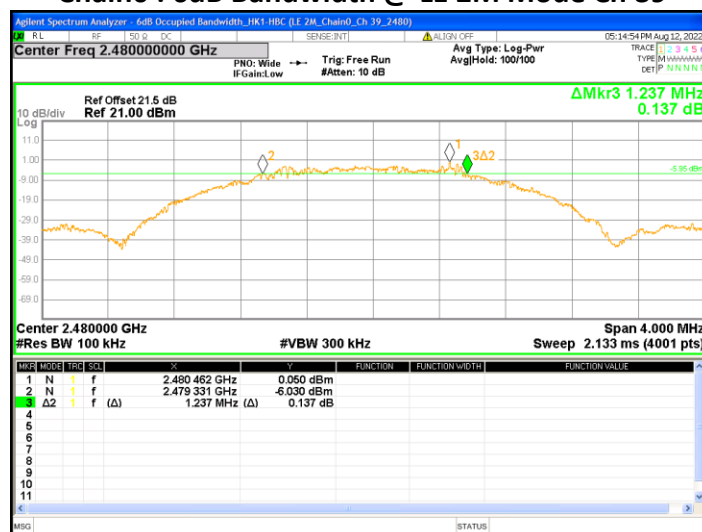
Chain0 : 6dB Bandwidth @ LE 2M Mode Ch 0



Chain0 : 6dB Bandwidth @ LE 2M Mode Ch 19



Chain0 : 6dB Bandwidth @ LE 2M Mode Ch 39



3. Maximum Peak Conducted Output Power

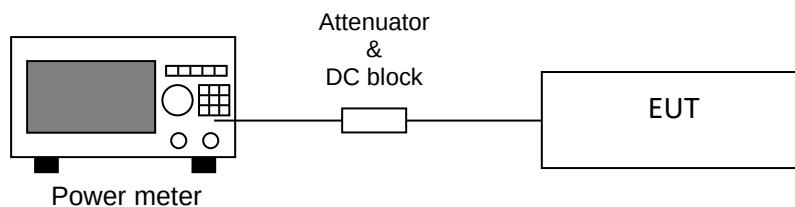
3.1 Instrument Setting

Power Meter Parameter	Setting
Bandwidth	65MHz bandwidth is greater than the EUT emission bandwidth
Detector	Peak & Average

3.2 Test Procedure

The preferred methodology is to use integrated average power measurements, as described in 11.9.2 and 11.13.3 of ANSI C63.10. The peak integrated band power methods of 11.9.1.2 and 11.13.3.2 of ANSI C63.10 are not applicable for FCC compliance testing purposes.

3.3 Test Diagram



3.4 Limit

For systems using digital modulation in the 2400-2483.5 MHz: 1 Watt (30dBm)

3.5 Test Results

Temperature (°C) :	27
Relative Humidity (%) :	55

Mode	Channel	Frequency (MHz)	Output Power (AV) (dBm)	Total Power (AV) (mW)	Maximum power (PK) (dBm)	Maximum power (PK) (mW)	Limit (dBm)	Margin (dB)
BLE 1M	0	2402	2.50	1.78	3.40	2.19	30	-26.60
	19	2440	2.30	1.70	3.20	2.09	30	-26.80
	39	2480	2.00	1.58	2.80	1.91	30	-27.20
BLE 2M	0	2402	2.60	1.82	3.30	2.14	30	-26.70
	19	2440	2.20	1.66	3.10	2.04	30	-26.90
	39	2480	1.90	1.55	2.70	1.86	30	-27.30

4. Power Spectral Density

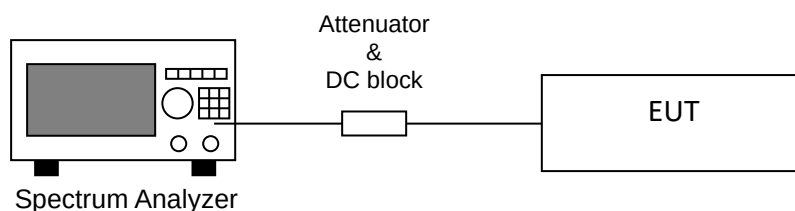
4.1 Instrument Setting

Spectrum Function	Setting
Detector	Peak
RBW	≥ 3 kHz
VBW	$\geq 3 \times$ RBW
Sweep	Auto couple
Trace	Max hold
Span	1.5 times x 6dB bandwidth
Attenuation	Auto

4.2 Test Procedure

Step 1	Test procedure refer to subclause 11.10 of ANSI C63.10.
Step 2	Using the maximum conducted output power in the fundamental emission demonstrates compliance. The EUT must be configured to transmit continuously at full power over the measurement duration.
Step 3	Use the peak marker function to determine the maximum amplitude level within the RBW.

4.3 Test Diagram



4.4 Limit

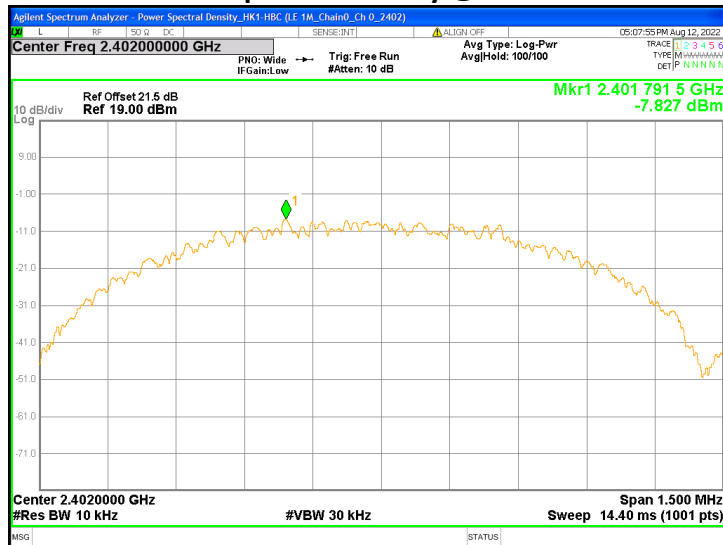
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 10 kHz band during any time interval of continuous transmission

4.5 Test Results

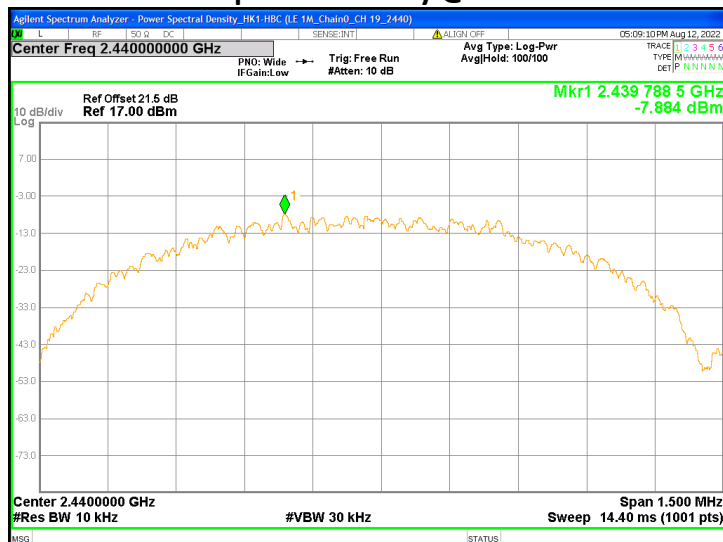
Temperature (°C) :	27
Relative Humidity (%) :	55

Mode	Channel	Frequency (MHz)	PSD (dBm)	Limit (dBm)	Margin (dB)
BLE 1M	0	2402	-7.827	8	-15.827
	19	2440	-7.884	8	-15.884
	39	2480	-8.278	8	-16.278
BLE 2M	0	2402	-9.103	8	-17.103
	19	2440	-8.773	8	-16.773
	39	2480	-9.207	8	-17.207

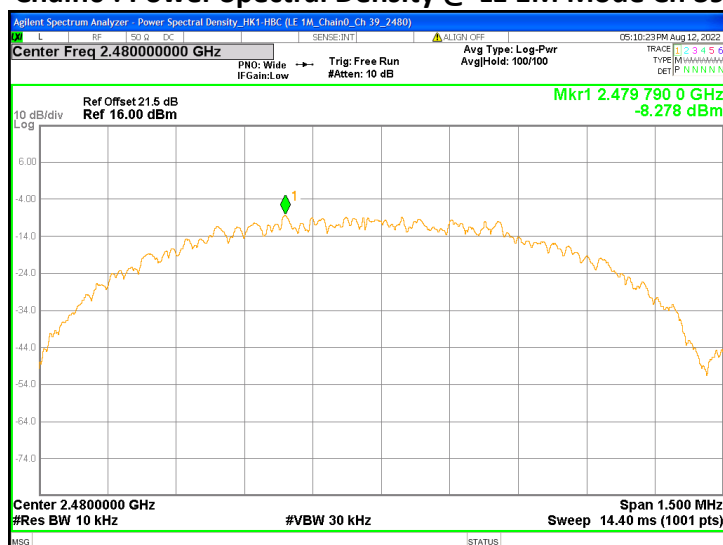
Chain0 : Power Spectral Density @ LE 1M Mode Ch 0



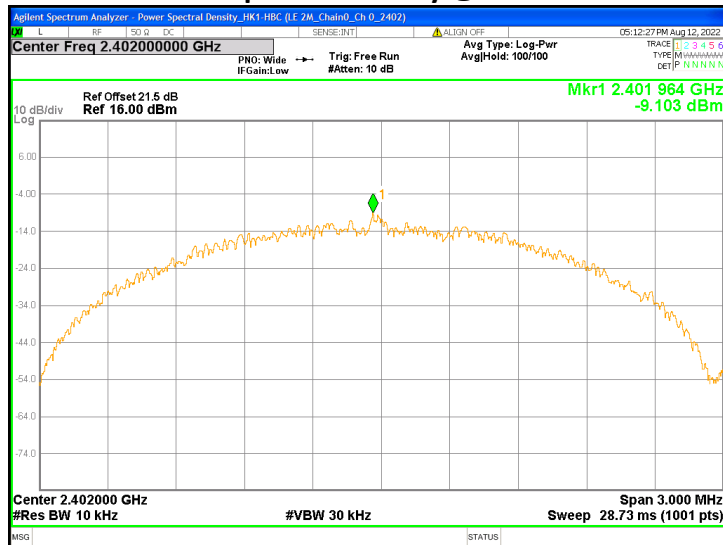
Chain0 : Power Spectral Density @ LE 1M Mode CH 19



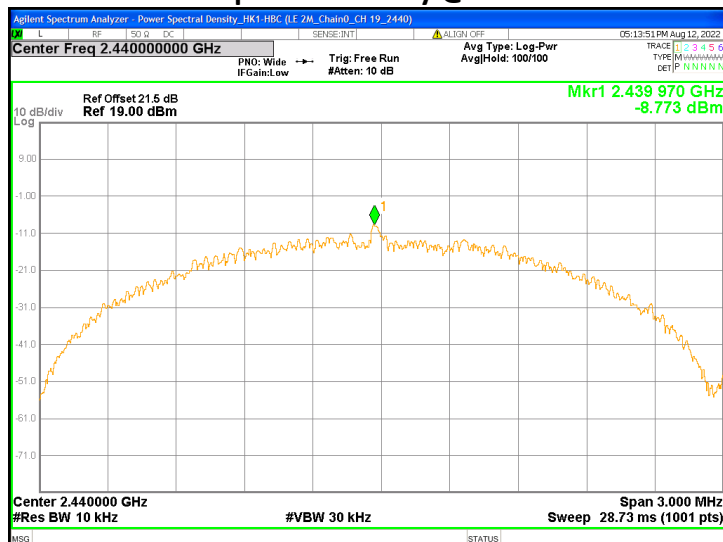
Chain0 : Power Spectral Density @ LE 1M Mode Ch 39



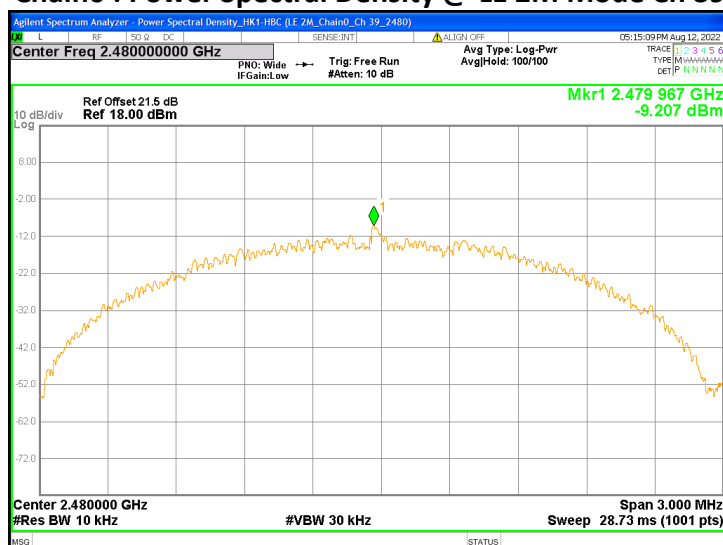
Chain0 : Power Spectral Density @ LE 2M Mode Ch 0



Chain0 : Power Spectral Density @ LE 2M Mode CH 19



Chain0 : Power Spectral Density @ LE 2M Mode Ch 39



5. Emissions in Non-Restricted Frequency Bands

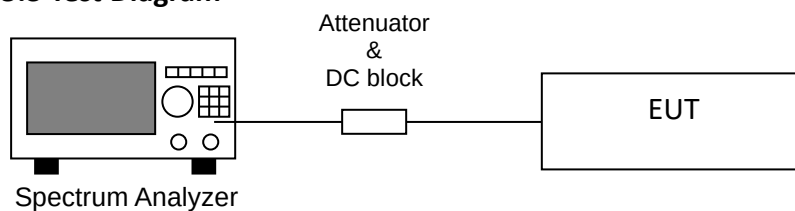
5.1 Instruments Setting

Spectrum Function	Setting (Reference Level)	Setting (Emission Level)
Detector	Peak	Peak
RBW	≥ 100 kHz	≥ 100 kHz
VBW	$\geq 3 \times$ RBW	$\geq 3 \times$ RBW
Sweep	Auto couple	Auto couple
Trace	Max hold	Max hold
Span	≥ 1.5 time 6dB bandwidth	
Attenuation	Auto	Auto

5.2 Test Procedure

- Step 1 The procedure was used in antenna-port conducted and connected to the spectrum analyzer.
- Step 2 Set instrument center frequency to center frequency.
- Step 3 Use the parameter configured in subclause 11.11 of ANSI C63.10 to measure.
- Step 4 Use the peak marker function to determine the maximum amplitude level.

5.3 Test Diagram



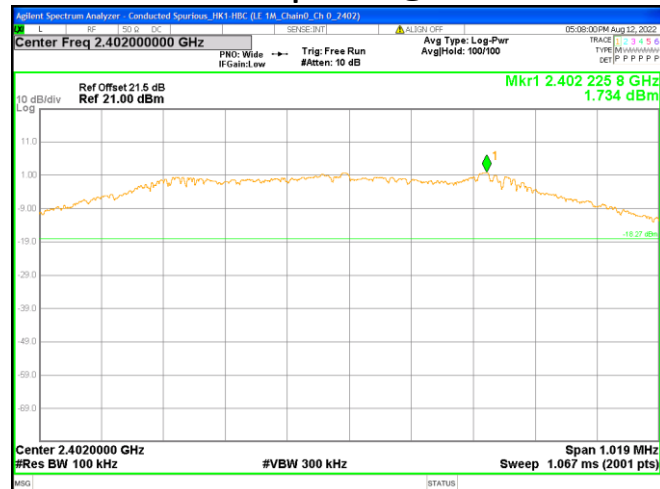
5.4 Limit

The peak output power measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz

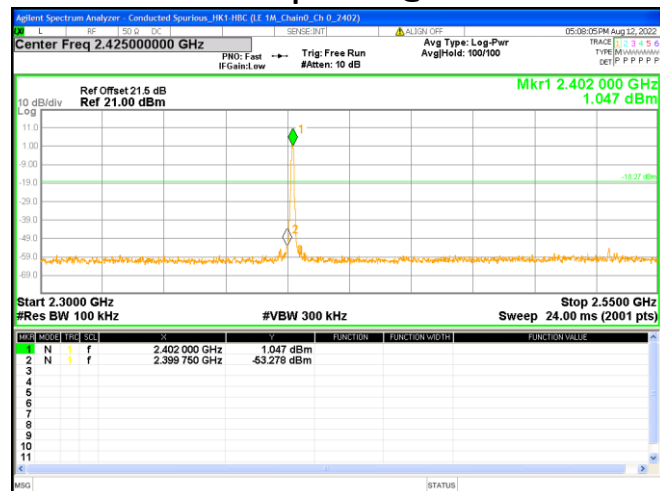
5.5 Test Results

Temperature (°C) :	27
Relative Humidity (%) :	55

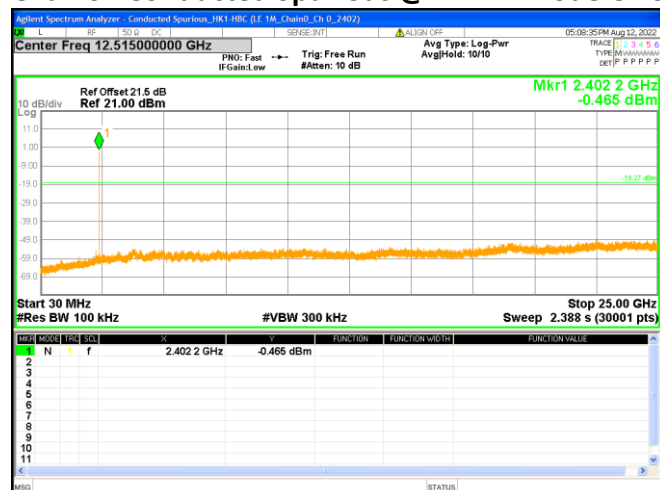
Chain0 : Conducted Spurious @ LE 1M Mode Ch 0



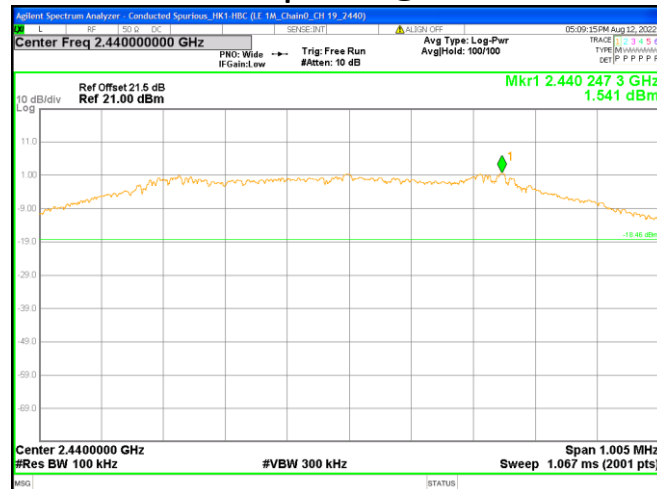
Chain0 : Conducted Spurious @ LE 1M Mode Ch 0



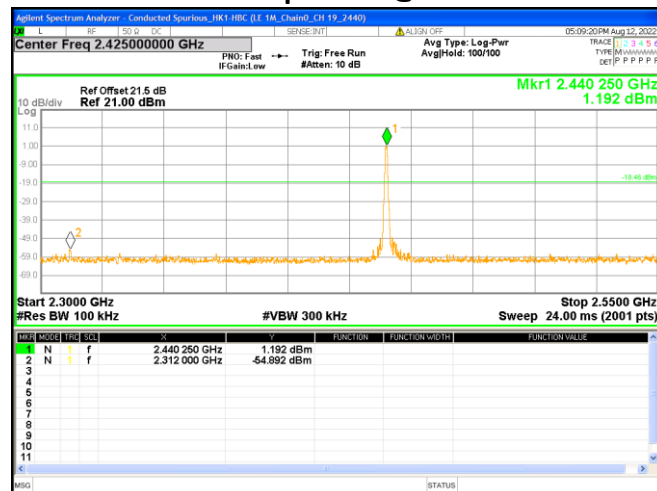
Chain0 : Conducted Spurious @ LE 1M Mode Ch 0



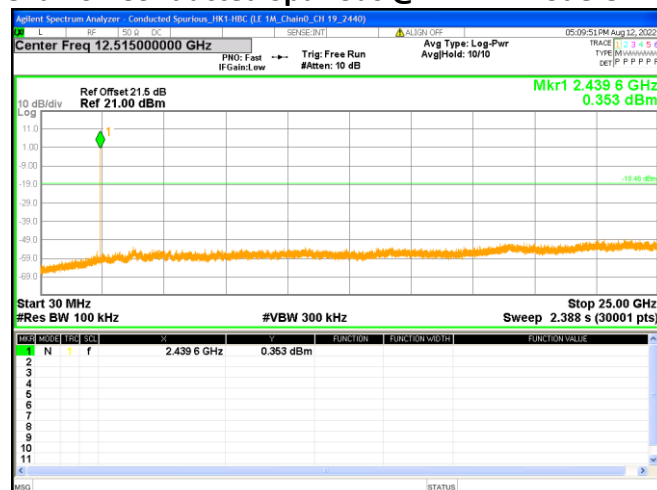
Chain0 : Conducted Spurious @ LE 1M Mode Ch 19



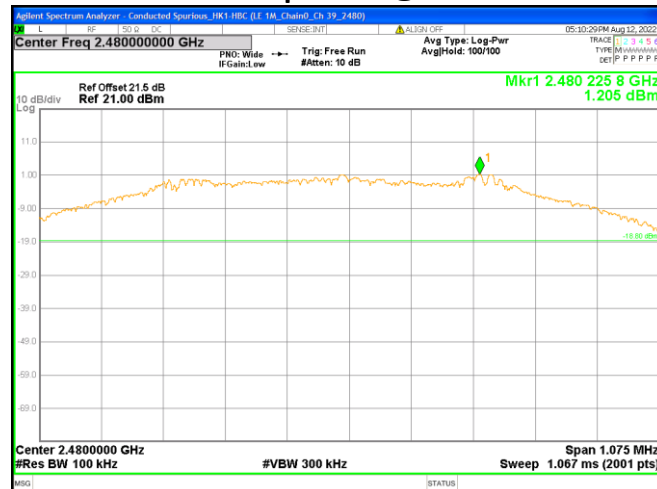
Chain0 : Conducted Spurious @ LE 1M Mode Ch 19



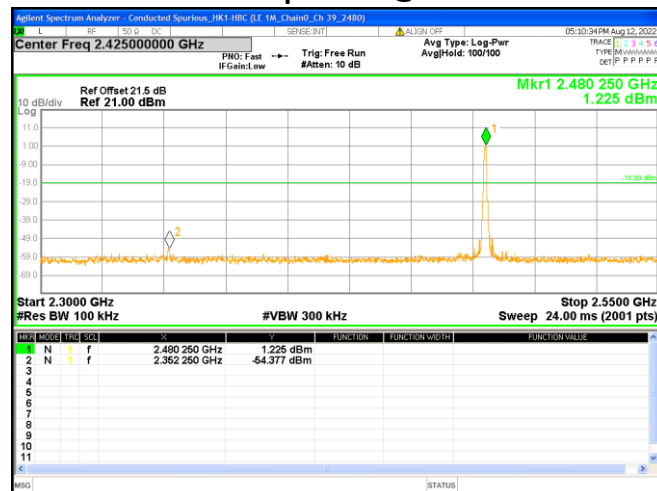
Chain0 : Conducted Spurious @ LE 1M Mode Ch 19



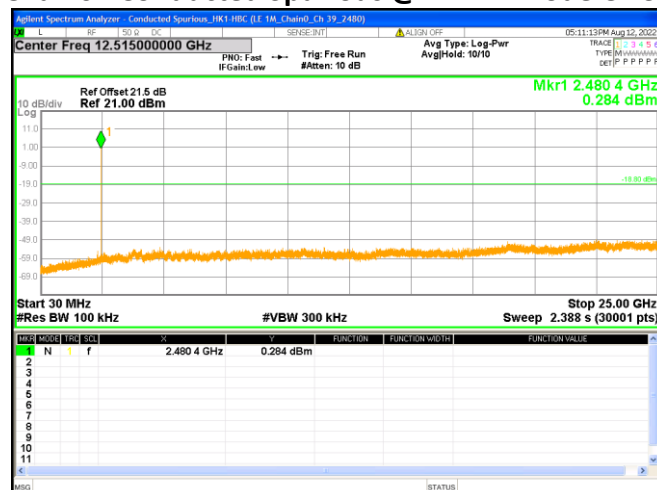
Chain0 : Conducted Spurious @ LE 1M Mode Ch 39



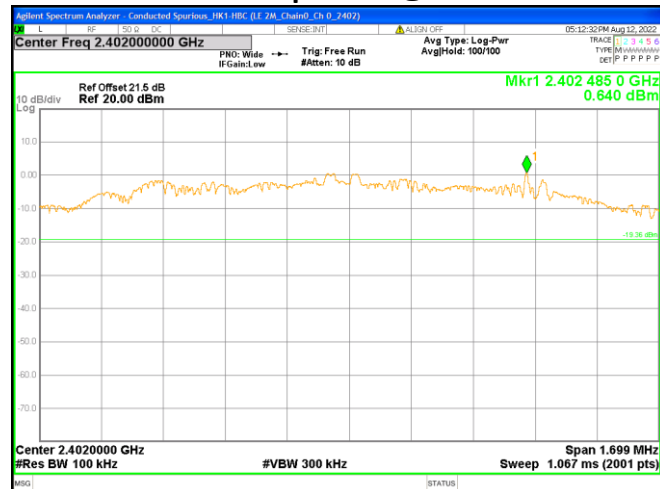
Chain0 : Conducted Spurious @ LE 1M Mode Ch 39



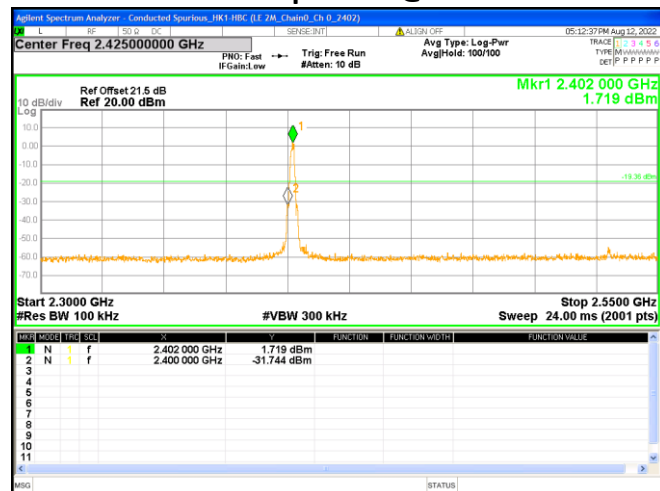
Chain0 : Conducted Spurious @ LE 1M Mode Ch 39



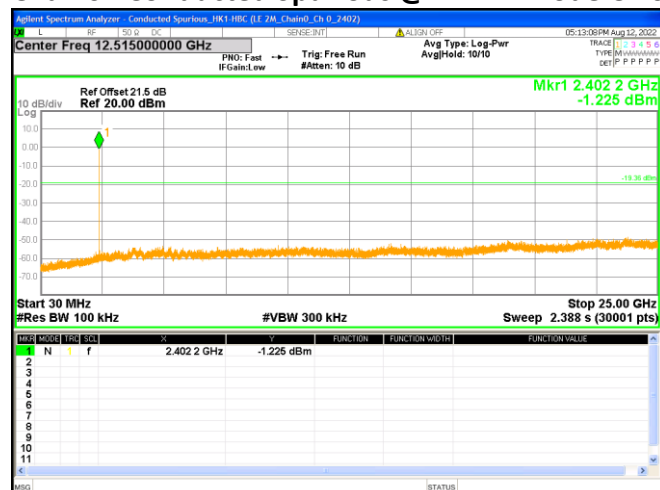
Chain0 : Conducted Spurious @ LE 2M Mode Ch 0



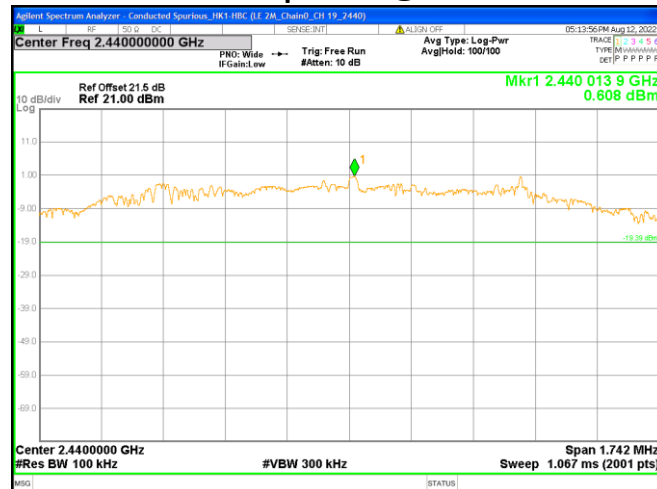
Chain0 : Conducted Spurious @ LE 2M Mode Ch 0



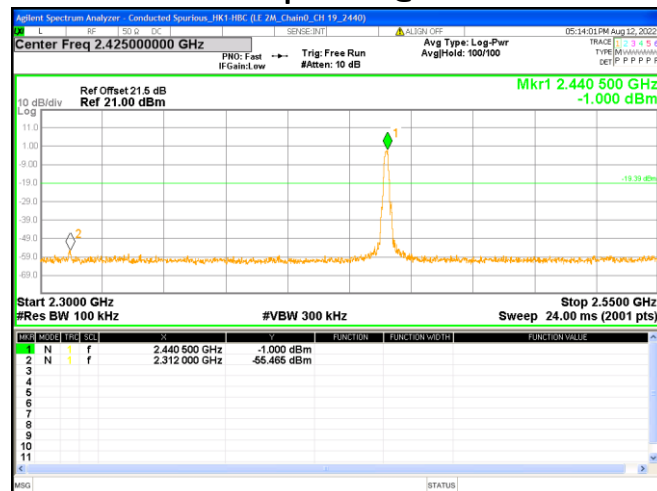
Chain0 : Conducted Spurious @ LE 2M Mode Ch 0



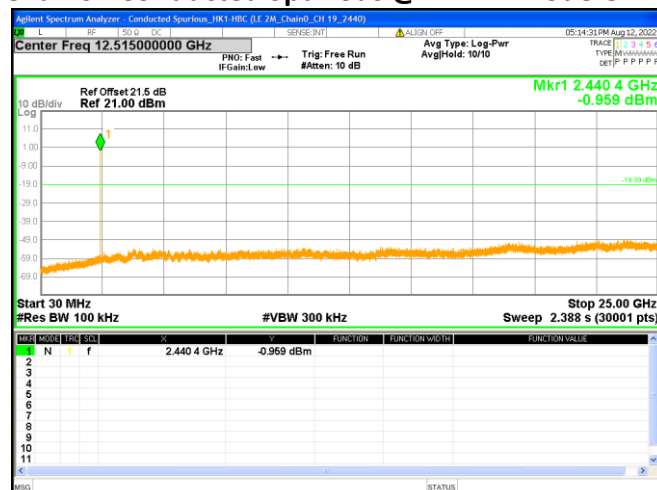
Chain0 : Conducted Spurious @ LE 2M Mode Ch 19



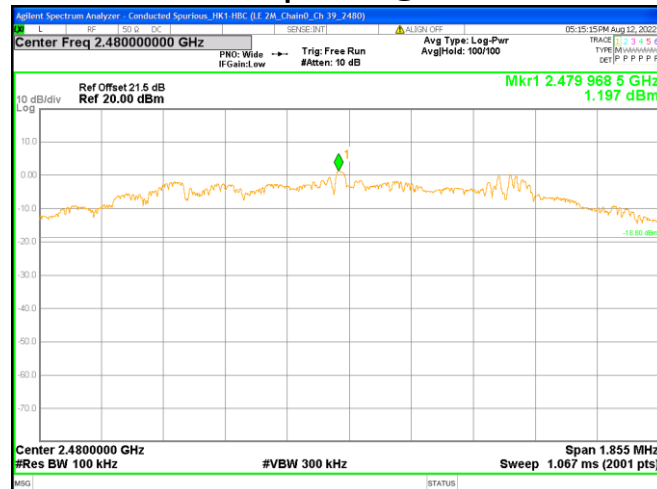
Chain0 : Conducted Spurious @ LE 2M Mode Ch 19



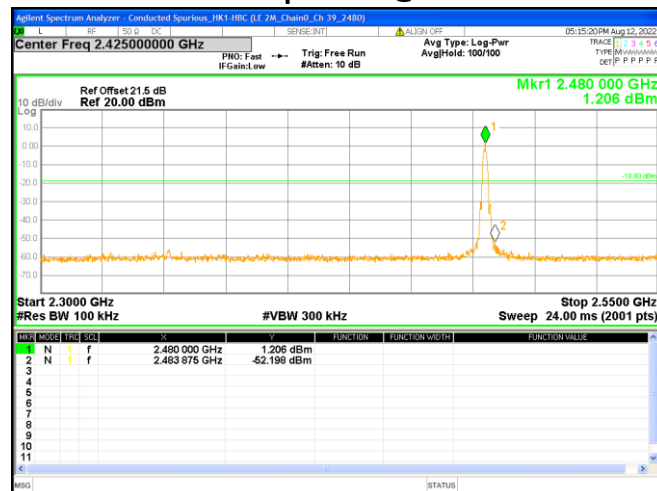
Chain0 : Conducted Spurious @ LE 2M Mode Ch 19



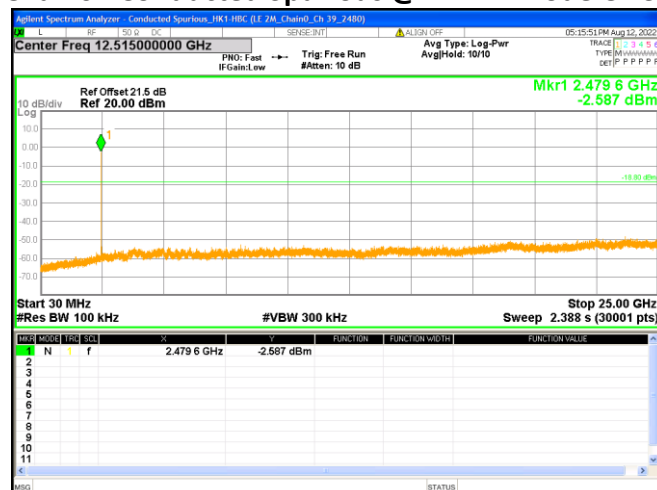
Chain0 : Conducted Spurious @ LE 2M Mode Ch 39



Chain0 : Conducted Spurious @ LE 2M Mode Ch 39



Chain0 : Conducted Spurious @ LE 2M Mode Ch 39



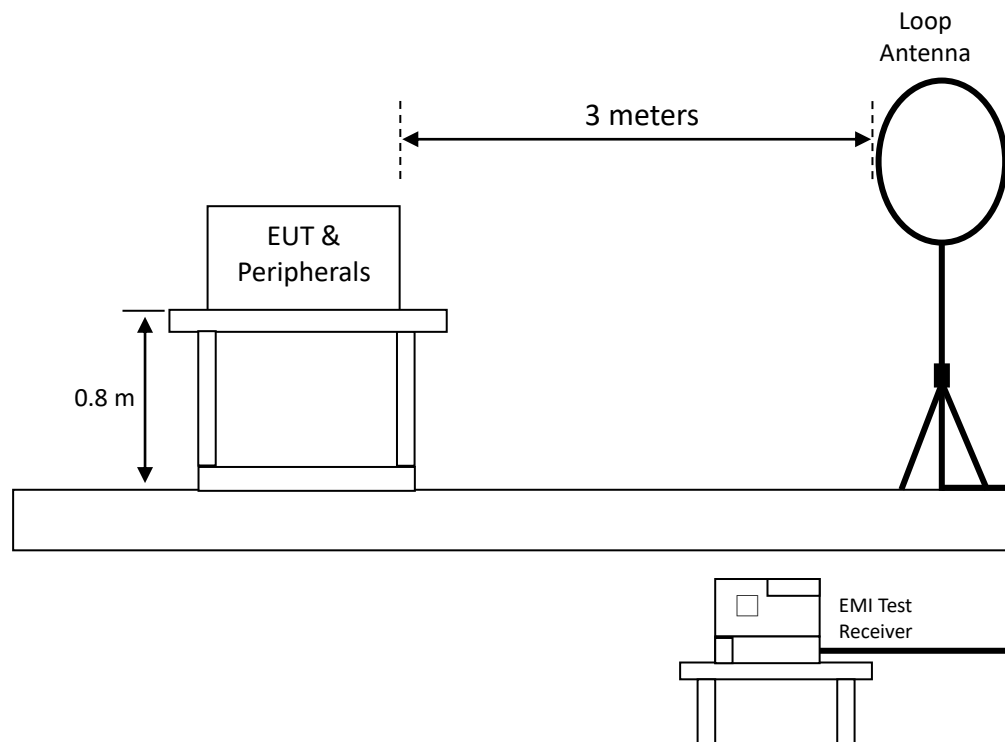
6. Emissions in Restricted Frequency Bands (Radiated emission measurements)

6.1 Instrument Setting

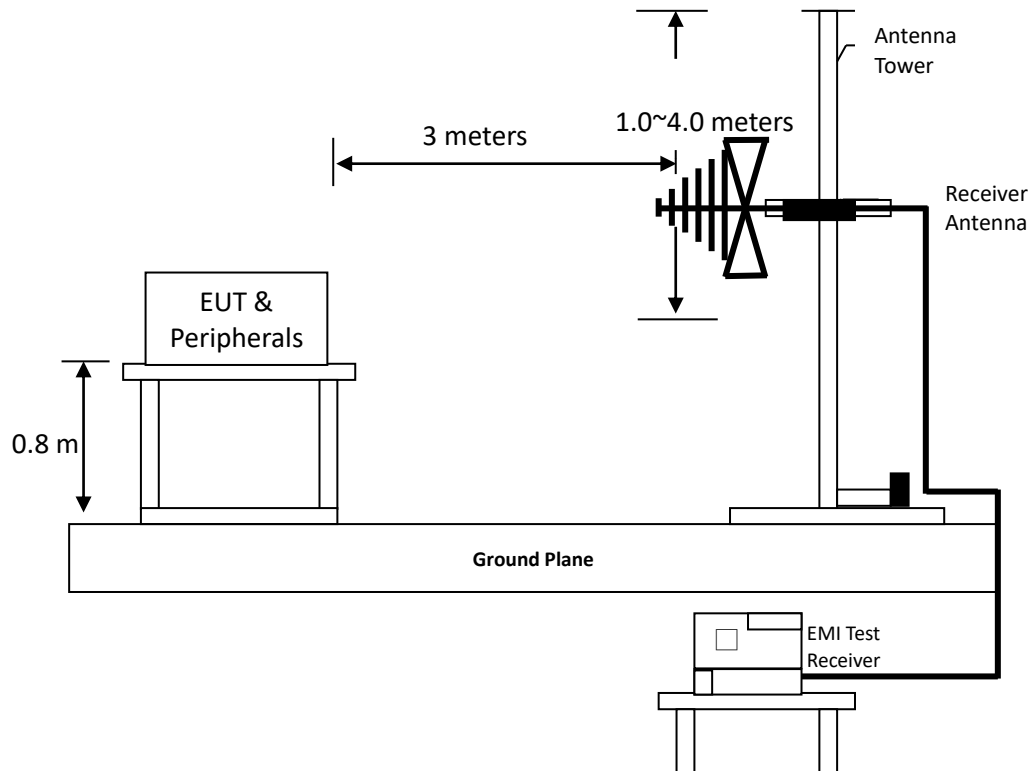
Receiver Function	Setting (Below 1GHz)	Setting (Above 1GHz)
Detector	QP	Peak and Average
RBW	9-150 kHz ; 200-300 Hz 0.15-30 MHz; 9-10 kHz 30-1000 MHz; 100-120 kHz	1MHz
VBW	$\geq 3 \times \text{RBW}$	3MHz & 1/T minimum kHz
Sweep	Auto couple	Auto couple
Start Frequency	9 kHz	1GHz
Stop Frequency	1 GHz	Tenth harmonic
Attenuation	Auto	Auto

6.2 Test setup & procedure

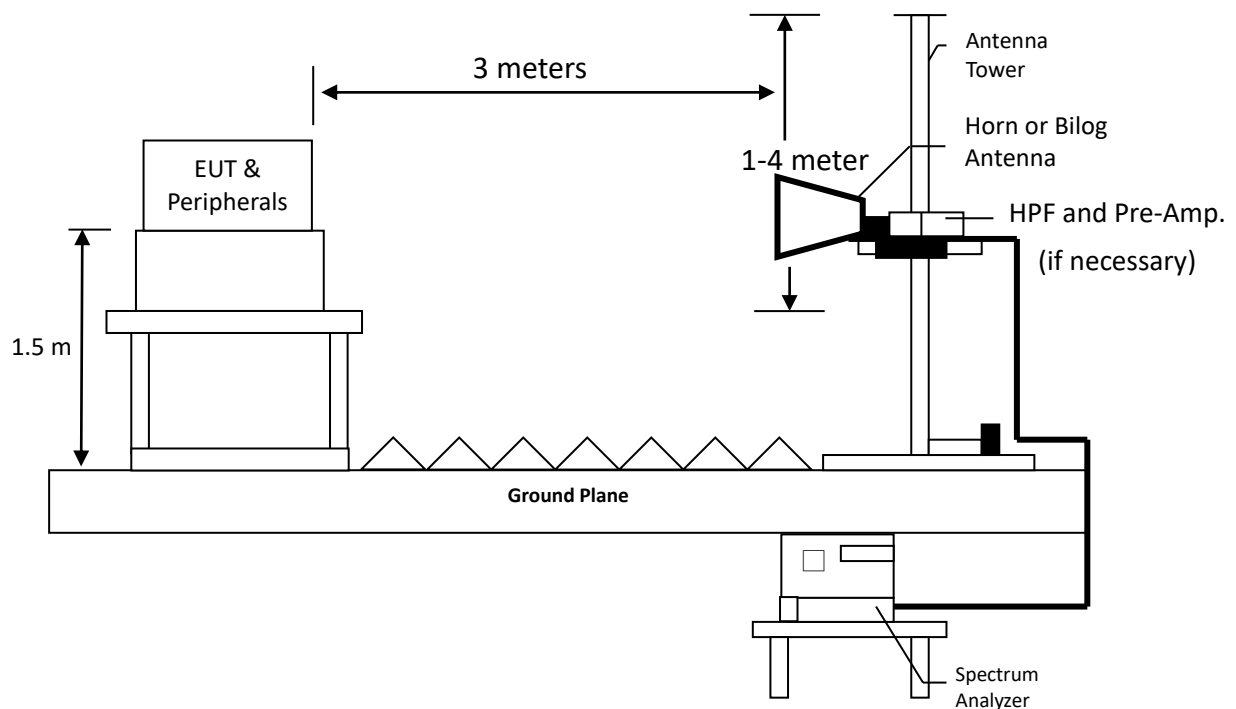
Radiated emission from 9kHz to 30MHz uses Loop Antenna:



Radiated emission below 1GHz using Bilog Antenna



Radiated emission above 1GHz using Horn Antenna



TEST REPORT

Radiated emissions were investigated cover the frequency range from 30MHz to 1000MHz using a receiver RBW of 120kHz record QP reading, and the frequency over 1GHz using a spectrum analyzer RBW of 1MHz and 1/T minimum kHz VBW record Average reading. (15.209 paragraph), the Peak reading (1 MHz RBW/ 3 MHz VBW) recorded also on the report.

The EUT for testing is arranged on a turntable. If some peripherals apply to the EUT, the peripherals will be connected to EUT and the whole system. During the test, all cables were arranged to produce worst-case emissions. The signal is maximized through rotation. The height of antenna and polarization is changing constantly for exploring for maximum signal level. The height of antenna can be up to 4 meters and down to 1 meter.

The measurement for radiated emission will be done at the distance of three meters unless the signal level is too low to measure at that distance. In the case of the reading under noise floor, a pre-amplifier is used and/or the test is conducted at a closer distance. And then all readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

6.3 Limit

Frequency(MHz)	Field Strength(uV/m)	Measurement distance(m)
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

Remark:

1. In the above table, the tighter limit applies at the band edges.
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system

6.4 Test Result

6.4.1 Measurement results: frequencies 9kHz to 30MHz

Temperature (°C) :	21
Relative Humidity (%) :	55

The test was performed on EUT under continuously transmitting mode. The worst case occurred at BLE 1M Ch 0.

Antenna Polarity	Frequency (MHz)	Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Perpendicular	0.579	QP	18.85	17.51	36.36	72.35	-35.99
Perpendicular	1.239	QP	19.10	15.36	34.46	65.74	-31.28
Perpendicular	1.928	QP	19.09	14.38	33.47	69.54	-36.07
Perpendicular	4.148	QP	19.38	11.98	31.36	69.54	-38.18
Perpendicular	6.907	QP	20.14	10.78	30.92	69.54	-38.62
Perpendicular	9.606	QP	20.92	10.83	31.75	69.54	-37.79

Antenna Polarity	Frequency (MHz)	Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Parallel	1.239	QP	19.10	15.92	35.02	65.74	-30.72
Parallel	2.078	QP	19.10	12.64	31.74	69.54	-37.80
Parallel	3.968	QP	19.33	12.37	31.70	69.54	-37.84
Parallel	6.037	QP	19.89	11.91	31.80	69.54	-37.74
Parallel	9.606	QP	20.92	10.43	31.35	69.54	-38.19
Parallel	11.196	QP	21.09	11.29	32.38	69.54	-37.16

Antenna Polarity	Frequency (MHz)	Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Ground-parallel	0.579	QP	18.85	19.25	38.10	72.35	-34.25
Ground-parallel	0.969	QP	19.08	15.61	34.69	67.88	-33.19
Ground-parallel	1.239	QP	19.10	15.57	34.67	65.74	-31.07
Ground-parallel	1.928	QP	19.09	13.56	32.65	69.54	-36.89
Ground-parallel	4.778	QP	19.54	12.18	31.72	69.54	-37.82
Ground-parallel	5.797	QP	19.82	11.53	31.35	69.54	-38.19

Remark: Corr. Factor = Antenna Factor + Cable Loss

6.5.2 Measurement results: frequencies below 1 GHz

Temperature (°C) :	21
Relative Humidity (%) :	55

The test was performed on EUT under continuously transmitting mode. The worst case occurred at BLE 1M Ch 0.

Antenna Polarity (H/V)	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Horizontal	475.23	QP	26.07	0.53	26.60	46.00	-19.40
Horizontal	553.80	QP	27.52	2.20	29.72	46.00	-16.28
Horizontal	662.44	QP	29.53	1.56	31.09	46.00	-14.91
Horizontal	773.02	QP	31.87	1.13	33.00	46.00	-13.00
Horizontal	801.15	QP	32.08	1.62	33.70	46.00	-12.30
Horizontal	848.68	QP	32.53	2.17	34.70	46.00	-11.30

Antenna Polarity (H/V)	Frequency (MHz)	Spectrum Analyzer Detector	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
Vertical	141.55	QP	19.95	2.35	22.30	43.50	-21.20
Vertical	372.41	QP	23.61	3.13	26.74	46.00	-19.26
Vertical	523.73	QP	27.03	1.15	28.18	46.00	-17.82
Vertical	644.01	QP	29.68	2.70	32.38	46.00	-13.62
Vertical	757.50	QP	31.57	0.95	32.52	46.00	-13.48
Vertical	816.67	QP	32.48	0.88	33.36	46.00	-12.64

Remark: Corr. Factor = Antenna Factor + Cable Loss

TEST REPORT

6.5.3 Measurement results: frequency above 1GHz to 25GHz

Temperature (°C) :	23
Relative Humidity (%) :	51

Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)
BLE 1M Ch 0	4804	PK	H	-6.59	66.90	60.31	74	-13.69
	4804	AV	H	-6.59	59.00	52.41	54	-1.59
	4804	PK	V	-6.59	59.50	52.91	74	-21.09
BLE 1M Ch 19	4880	PK	H	-6.11	65.00	58.89	74	-15.11
	4880	AV	H	-6.11	56.90	50.79	54	-3.21
	7320	PK	H	2.66	48.80	51.46	74	-22.54
	4880	PK	V	-6.11	57.50	51.39	74	-22.61
	7320	PK	V	2.66	47.50	50.16	74	-23.84
BLE 1M Ch 39	4960	PK	H	-6.04	62.70	56.66	74	-17.34
	4960	AV	H	-6.04	55.00	48.96	54	-5.04
	7440	PK	H	2.68	51.31	53.99	74	-20.01
	7440	AV	H	2.68	43.31	45.99	54	-8.01
	4960	PK	V	-6.04	52.80	46.76	74	-27.24
BLE 2M Ch 0	4804	PK	H	-6.59	68.00	61.41	74	-12.59
	4804	AV	H	-6.59	55.60	49.01	54	-4.99
	4804	PK	V	-6.59	58.70	52.11	74	-21.89
BLE 2M Ch 19	4880	PK	H	-6.11	65.50	59.39	74	-14.61
	4880	AV	H	-6.11	53.50	47.39	54	-6.61
	7320	PK	H	2.66	49.70	52.36	74	-21.64
	4880	PK	V	-6.11	56.30	50.19	74	-23.81
	7320	PK	V	2.66	47.80	50.46	74	-23.54
BLE 2M Ch 39	4960	PK	H	-6.04	63.10	57.06	74	-16.94
	4960	AV	H	-6.04	49.90	43.86	54	-10.14
	7440	PK	H	2.68	50.71	53.39	74	-20.61
	7440	AV	H	2.68	40.81	43.49	54	-10.51
	4960	PK	V	-6.04	54.60	48.56	74	-25.44

Remark: Correction Factor = Antenna Factor + Cable Loss + High Pass Filter Loss - Pre_Amplifier Gain

7. Emission on Band Edge

7.1 Instrument Setting

Spectrum Function	Setting
Detector	Peak and Average
RBW	1MHz
VBW	3MHz & 1/T minimum kHz
Sweep	Auto couple
Restrict bands	2310 MHz ~ 2390 MHz 2483.5 MHz ~ 2500 MHz
Attenuation	Auto

7.2 Test Procedure

The test procedure is the same as Emissions in Restricted Frequency Bands (Radiated emission measurements).

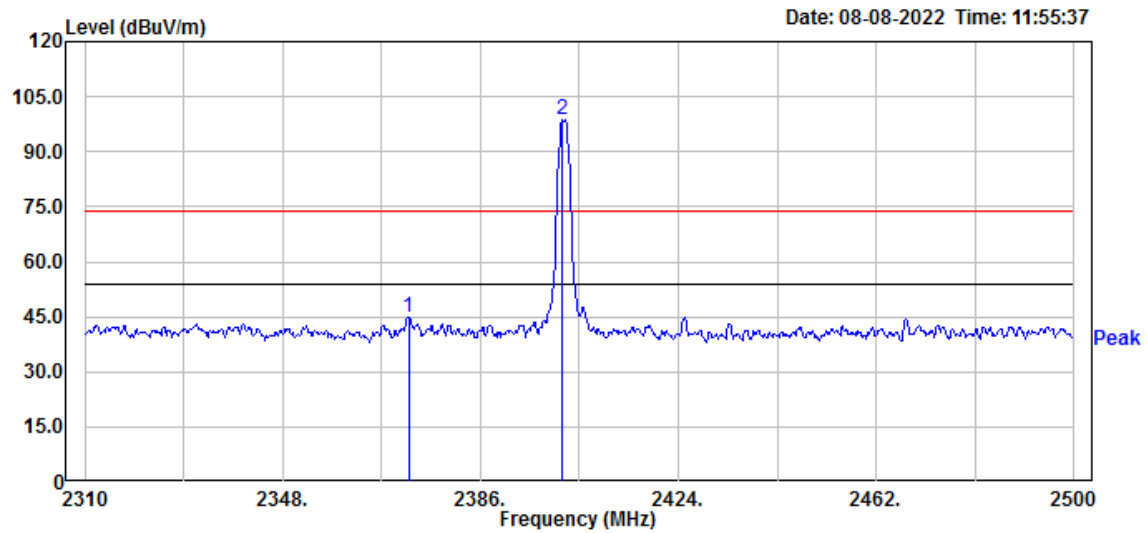
7.3 Test Results

Temperature (°C) :	21
Relative Humidity (%) :	55

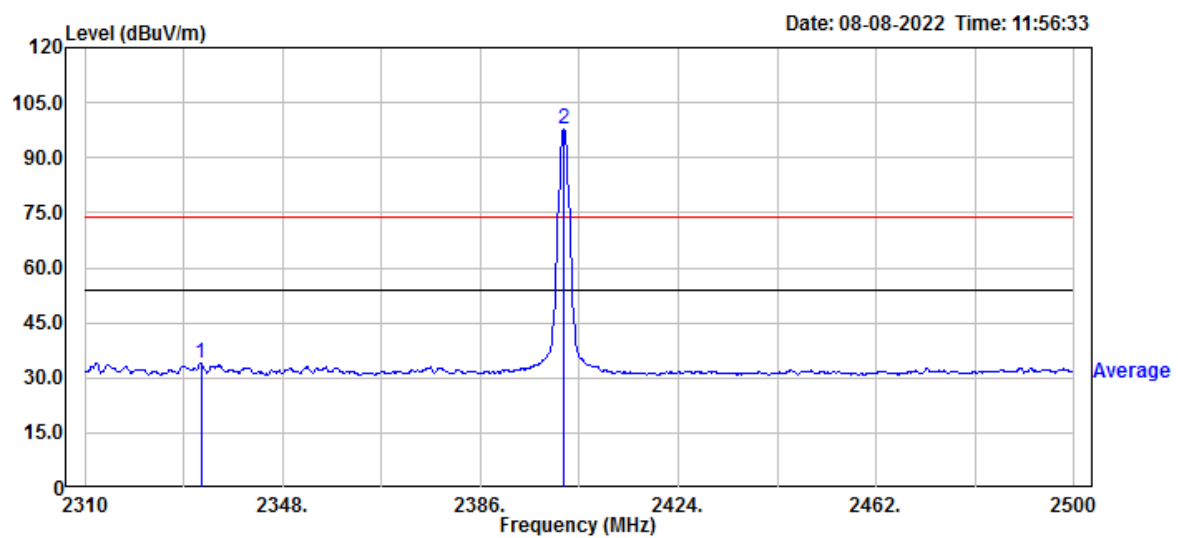
Mode	Frequency (MHz)	Spectrum Analyzer Detector	Ant. Pol. (H/V)	Correction Factor (dB/m)	Reading (dBμV)	Corrected Reading (dBμV/m)	Limit @ 3 m (dBμV/m)	Margin (dB)	Restricted band (MHz)
BLE 1M	2372.13	PK	H	34.33	10.67	45.00	74	-29.00	2310~2390
	2332.23	AV	H	34.49	-0.39	34.10	54	-19.90	
	2483.50	PK	H	34.58	12.15	46.73	74	-27.27	2483.5~2500
	2483.50	AV	H	34.58	2.14	36.72	54	-17.28	
BLE 2M	2346.10	PK	H	34.45	9.12	43.57	74	-30.43	2310~2390
	2335.46	AV	H	34.48	-1.86	32.62	54	-21.38	
	2483.50	PK	H	34.58	18.22	52.80	74	-21.20	2483.5~2500
	2483.50	AV	H	34.58	7.24	41.82	54	-12.18	

Remark: Correction Factor = Antenna Factor + Cable Loss

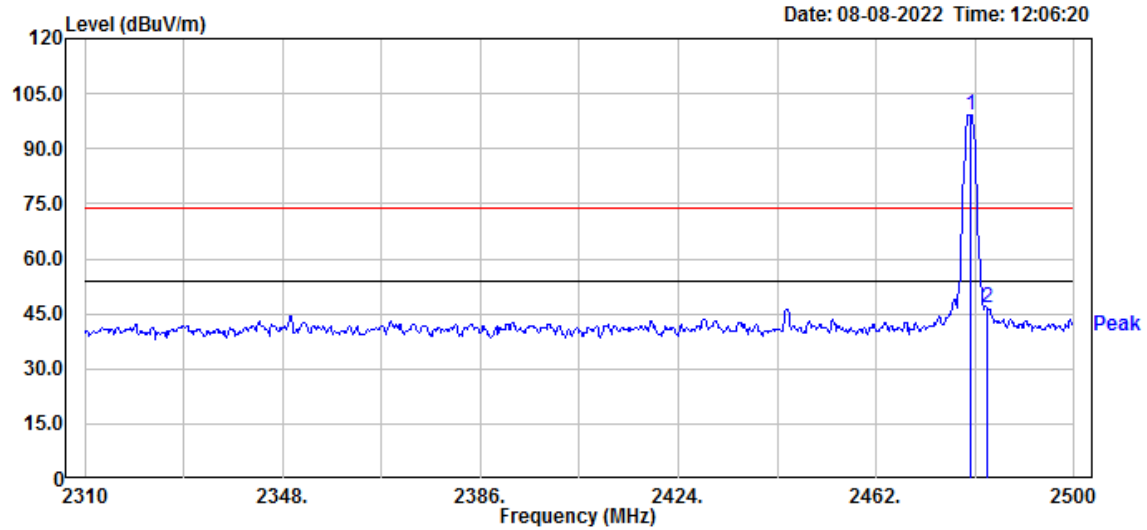
Restricted Band Bandedge @ BLE 1M Mode Ch0 PK



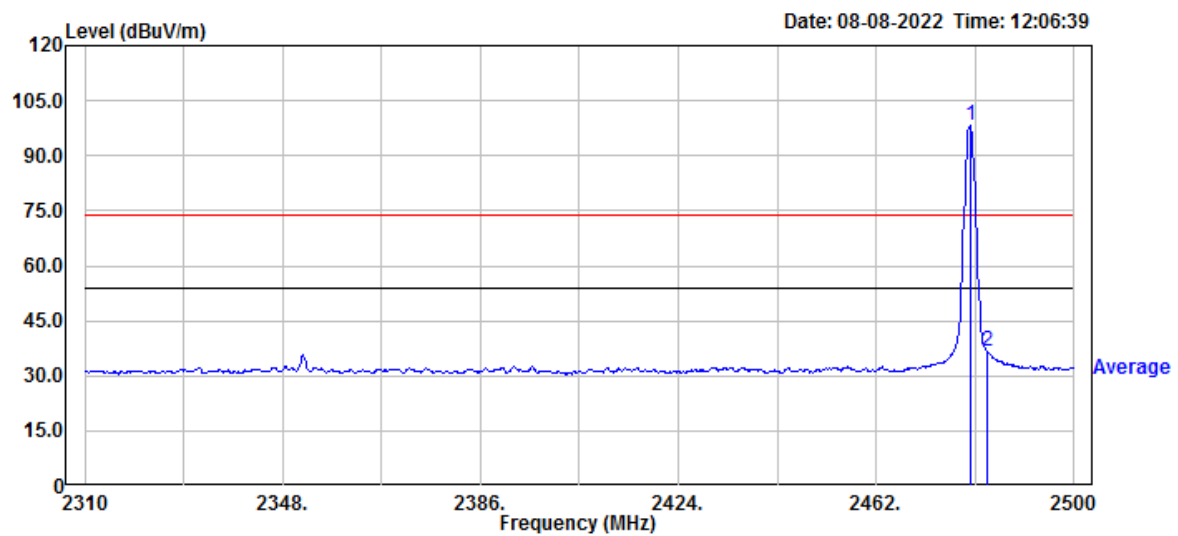
Restricted Band Bandedge @ BLE 1M Mode Ch0 AV



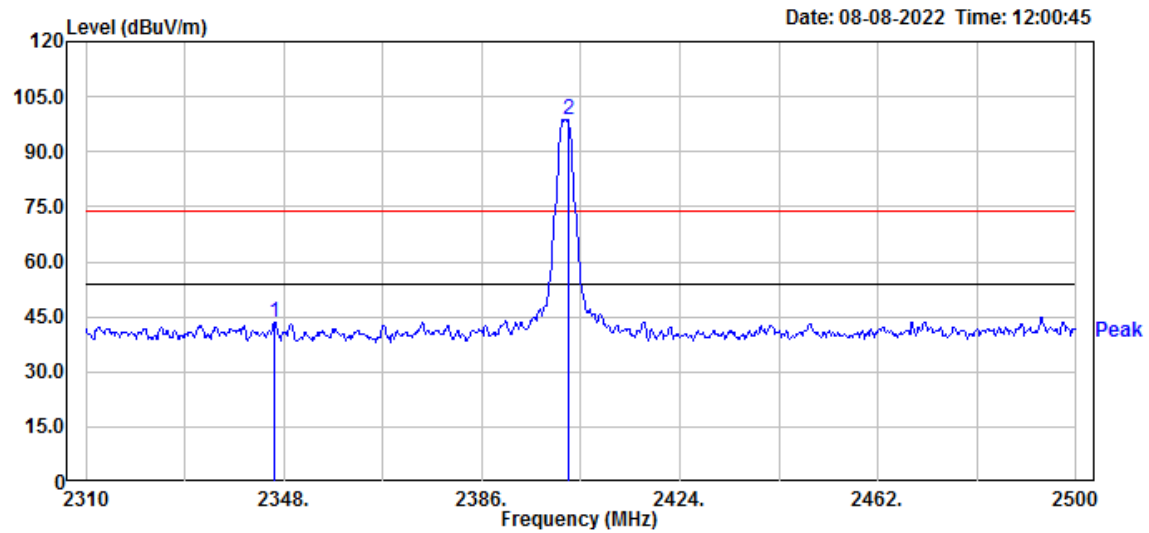
Restricted Band Bandedge @ BLE 1M Mode Ch39 PK



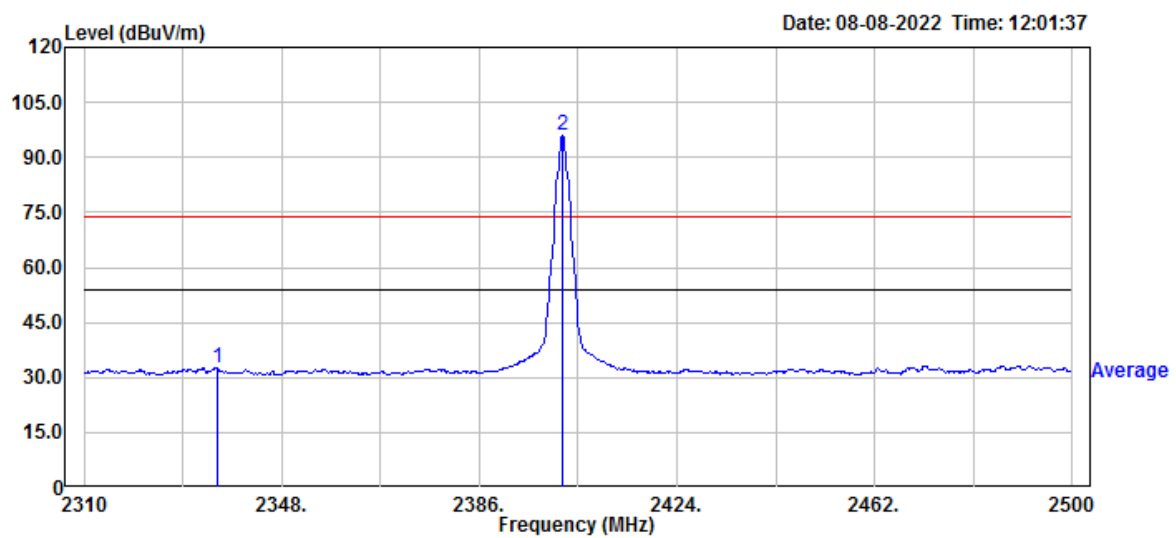
Restricted Band Bandedge @ BLE 1M Mode Ch39 AV



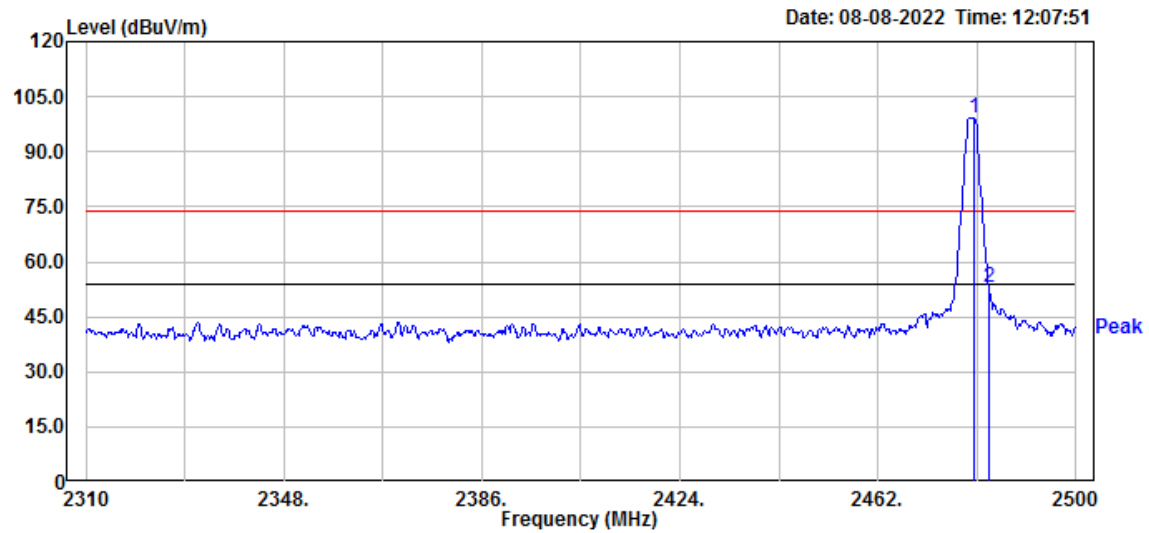
Restricted Band Bandedge @ BLE 2M Mode Ch0 PK



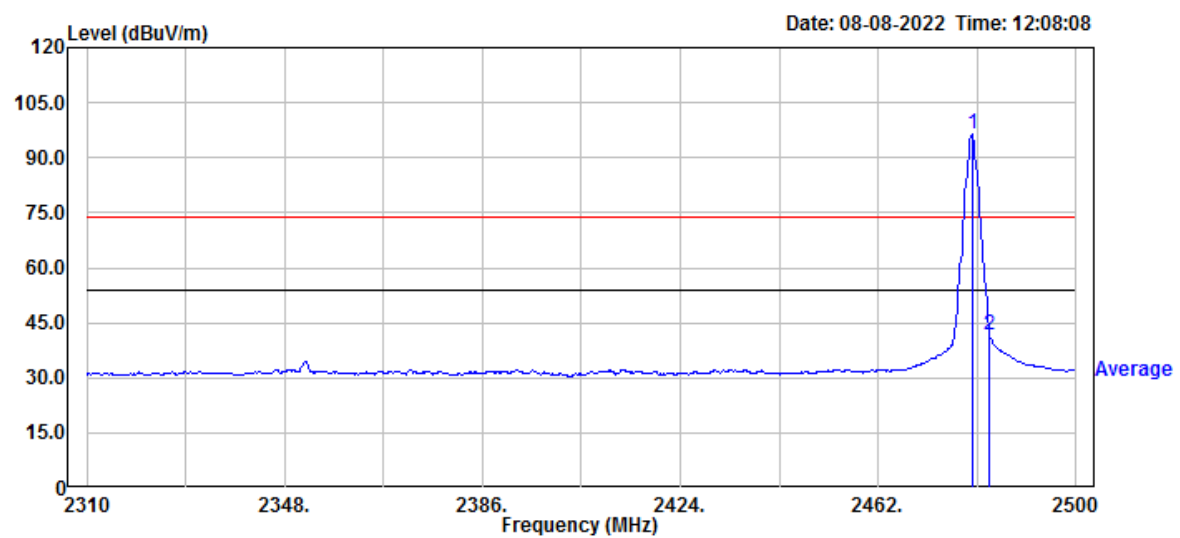
Restricted Band Bandedge @ BLE 2M Mode Ch0 AV



Restricted Band Bandedge @ BLE 2M Mode Ch39 PK



Restricted Band Bandedge @ BLE 2M Mode Ch39 AV



8. AC Power Line Conducted Emission

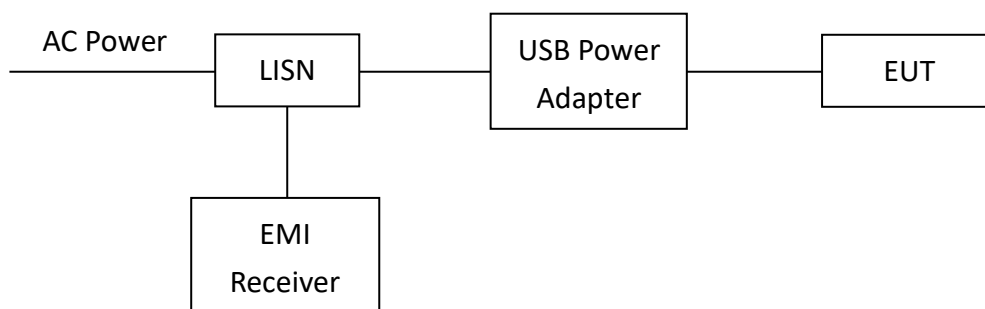
8.1 Measuring instrument setting

Receiver Function	Setting
Detector	QP
Start frequency	0.15MHz
Stop frequency	30MHz
IF bandwidth	9 kHz
Attenuation	10dB

8.2 Test Procedure

Step 1	Configure the EUT according to ANSI C63.10:2013. The EUT or host of EHT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
Step 2	Connect EUT or host of EUT to the power mains through a line impedance stabilization network.
Step 3	All the companion devices are connected to the other LISN. The LISN should provide 50Uh/50ohms coupling impedance.
Step 4	The frequency range from 150 kHz to 30MHz was searched.
Step 5	Set the test-receiver system to peak detector and specified bandwidth with maximum hold mode.
Step 6	The measurement has to be done between each power line and ground at the power terminal.

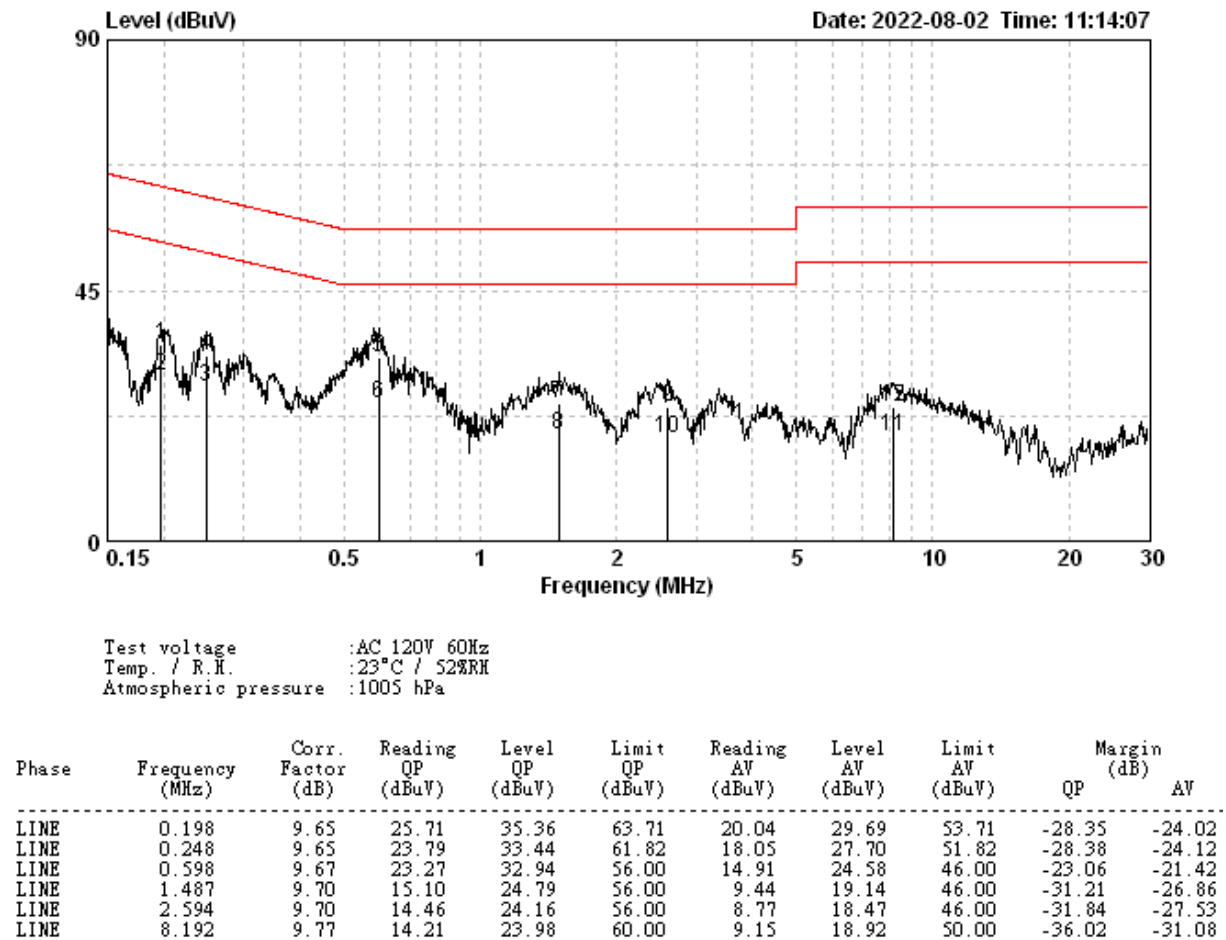
8.3 Test Diagram



8.4 Limit

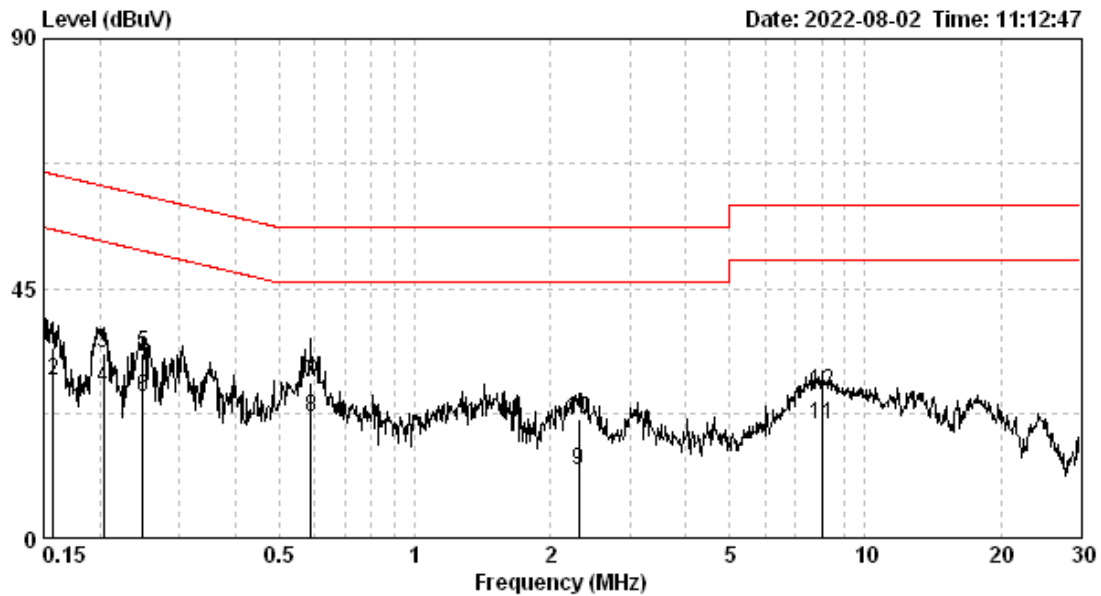
Frequency (MHz)	Conducted Limit (dBuV)	
	Q.P.	Ave.
0.15~0.50	66 – 56	56 – 46
0.50~5.00	56	46
5.00~30.0	60	50

8.5 Test Results



Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)



Test voltage : AC 120V 60Hz
Temp. / R.H. : 23°C / 52%RH
Atmospheric pressure : 1005 hPa

Phase	Frequency (MHz)	Corr. Factor (dB)	Reading QP (dBuV)	Level QP (dBuV)	Limit QP (dBuV)	Reading AV (dBuV)	Level AV (dBuV)	Limit AV (dBuV)	Margin (dB)	
									QP	AV
NEUTRAL	0.157	9.66	24.67	34.34	65.60	18.70	28.37	55.60	-31.27	-27.23
NEUTRAL	0.204	9.66	23.66	33.32	63.45	17.47	27.13	53.45	-30.12	-26.32
NEUTRAL	0.249	9.66	23.55	33.21	61.78	15.64	25.30	51.78	-28.56	-26.48
NEUTRAL	0.589	9.68	18.46	28.15	56.00	12.08	21.77	46.00	-27.85	-24.23
NEUTRAL	2.309	9.71	11.66	21.38	56.00	2.58	12.29	46.00	-34.62	-33.71
NEUTRAL	8.020	9.79	16.74	26.53	60.00	10.53	20.32	50.00	-33.47	-29.68

Remark:

1. Corr. Factor (dB) = LISN Factor (dB) + Cable Loss (dB)
2. Level (dBuV) = Corr. Factor (dB) + Reading (dBuV)
3. Margin (dB) = Level (dBuV) – Limit (dBuV)

TEST REPORT

Appendix A: Test equipment list

Test Equipment/ Test site	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	Rohde & Schwarz	ESR7	101822	2022/08/09	2023/08/08
Signal Analyzer	Agilent	N9030A	MY51380492	2022/08/09	2023/08/08
Active Loop Antenna	SCHWARZBECK MESS-ELEKTRONIC	FMZB1519	1519-067	2022/04/13	2023/04/12
Broadband Antenna	SHWARZBECK	VULB 9168	9168-172	2022/01/20	2023/01/19
Horn Antenna	EMCO	BBHA 9120 D	9120D-456	2022/01/21	2023/01/20
Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170159	2021/04/08	2024/04/06
Microwave Amplifier	HP	8348A	3111A00567	2022/08/30	2023/08/29
Pre-amplifier	SGH	SGH184	20201124-1	2021/12/06	2022/12/05
Power Meter	Anritsu	ML2495A	0844001	2022/07/04	2023/07/03
966-2(A) Cable	SUHNER	SUCOFLEX 104	295105/4	2022/03/04	2023/03/03
966-2(B) Cable	SUHNER	SUCOFLEX 104P	CB0005	2022/03/04	2023/03/03
RF Cable	SUHNER	SUCOFLEX 104P	9403 / 4P	2021/11/30	2022/11/29
966-2_3m Semi-Anechoic Chamber	966_2	CEM-966_2	N/A	2022/01/14	2023/01/13
20dB Attenuator	Mini-Circuits	BW-S20W5+	N/A	2022/05/25	2023/05/24
Test software	Audix	e3	V9	NCR	NCR

Note: No Calibration Required (NCR).

Test Equipment	Brand	Model No.	Serial No.	Calibration Date	Next Calibration Date
EMI Test Receiver	R&S	ESCI	100018	2021/11/16	2022/11/15
LISN	R&S	ENV216	101160	2022/07/13	2023/07/12
CON-2 Cable	SUHNER	EMCCFD300-BM -NM-6000	170502	2022/04/29	2023/04/28
Test software	Audix	e3	V4.20040112L	NCR	NCR

Note: No Calibration Required (NCR).

Appendix B: Measurement Uncertainty

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

Item	Uncertainty
Vertically polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.16 dB
Horizontally polarized radiated disturbances from 30MHz~1GHz in a semi-anechoic chamber at a distance of 3m	5.02 dB
Radiated disturbances from 1GHz~18GHz in a semi-anechoic chamber at a distance of 3m	5.17 dB
Vertically polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m	2.39 dB
Horizontally polarized Radiated disturbances from 18GHz~26.5GHz in a semi-anechoic chamber at a distance of 1m	2.39 dB
Radiated disturbances from 9kHz~30MHz in a semi-anechoic chamber at a distance of 3m	3.70 dB
Emission on the Band Edge Test	4.32 dB
Occupied Bandwidth	7.78 %
Maximum Peak Conducted Output Power	0.44 dB
Power Spectral Density	1.27 dB
Emissions In Non-Restricted Frequency Bands	1.27 dB
AC Power Line Conducted Emission	3.08 dB