Prüfbericht-Nr.: *Test report no.:*	**CN22RMUT 001**	**Auftrags-Nr.:** *Order no.:*	**168397041**	**Seite 1 von 23** *Page 1 of 23*
Kunden-Referenz-Nr.: *Client reference no.:*	**N/A**	**Auftragsdatum:** *Order date:*	2022-11-03	
Auftraggeber: *Client:*	**Shokz Holding Limited** Room 2603A, 26/F., Tower 1, Lippo Centre, 89 Queensway, Admiralty, Hong Kong			
Prüfgegenstand: *Test item:*	Opencomm2 UC			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	C110 (Trademark: SHOKZ)			
Auftrags-Inhalt: *Order content:*	Test Report			
Prüfgrundlage: *Test specification:*	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-247 Issue 2 February 2017 RSS-Gen Issue 5 February 2021			
Wareneingangsdatum: *Date of sample receipt:*	2022-11-09	Please refer to Photo Document		
Prüfmuster-Nr.: *Test sample no:*	A003363222-009~012			
Prüfzeitraum: *Testing period:*	2022-11-10 – 2022-11-16			
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von: *tested by:*	X Alex Lan Signed by: Alex Lan	**genehmigt von:** *authorized by:*	X Lin Lin Signed by: Lin Lin
Datum: *Date:* 2022-12-20		**Ausstellungsdatum:** *Issue date:* 2022-12-27	
Stellung */ Position:*	Assistant Project Manager	**Stellung** */ Position:*	Reviewer
Sonstiges */ Other:*	FCC ID: 2A5CDC110 IC: 28271-C110, HVIN: C110		

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:*	Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 99% BANDWIDTH
RESULT: Pass

5.1.4 20DB BANDWIDTH
RESULT: Pass

5.1.5 CARRIER FREQUENCY SEPARATION
RESULT: Pass

5.1.6 NUMBER OF HOPPING FREQUENCY
RESULT: Pass

5.1.7 TIME OF OCCUPANCY
RESULT: Pass

5.1.8 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.9 RADIATED SPURIOUS EMISSION
RESULT: Pass

5.1.10 CONDUCTED EMISSION ON AC MAINS
RESULT: Pass

Contents

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Photographs of the Test Set-up

Appendix B: Test Results of Bluetooth BR/EDR mode

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (SRD-Tonscend)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	2023-10-10
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	2023-10-10
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	2023-10-10
DC power supply	Keysight	E3642A	MY61276100	2023-10-10
Power Control Unit	Tonscend	JS0806-4ADC	N/A	2023-10-10
Automation Control Unit	Tonscend	JS0806-2	21C8060396	2023-10-10
Test Software	Tonscend	JS1120-3	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Shielding Room 8#	Albatross	SR8	APC17151-SR8	2024-06-22
Unwanted Emission Testing (TS9975)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	2023-08-02
Signal Analyzer	R&S	FSV 40	101439	2023-08-01
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	2023-08-01
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2023-08-02
Amplifier	R&S	SCU-18F	180070	2023-08-02
Amplifier	R&S	SCU40A	100475	2023-08-02
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2024-08-06
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	2024-08-06
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2024-08-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2023-08-06
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2024-06-22

Conducted Emission on AC Mains				
Equipment	**Manufacturer**	**Model No.**	**Serial No.**	**Cal. Until**
EMI Test Receiver	R&S	ESR3	102680	2023-02-27
Artificial Mains Network	R&S	ENV216	101445	2023-02-27
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Table 2: Measurement Uncertainty

Parameter	Uncertainty (k=2)
Occupied Channel Bandwidth	± 2.08 %
RF output power, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	±4.17 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	±4.17 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at 362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The EUT is a Bluetooth Headset which supports Classic Bluetooth wireless technology.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment:	Opencomm2 UC
Type Designation:	C110
Trademark:	SHOKZ
FCC ID:	2A5CDC110
IC:	28271-C110
HVIN:	C110
Operating Voltage:	USB port operated (5Vdc) Internal Battery operated (3.8Vdc, Li-ion battery)
Operating Temperature Range:	0 °C ~ 45 °C
Technical Specification of Bluetooth BR/EDR	
Operating Frequency:	2402 MHz to 2480 MHz
Type of Modulation:	GFSK, π/4-DQPSK, 8DPSK
Channel Number:	79 channels
Channel Separation:	1MHz
Antenna Type:	Integral Antenna
Antenna Gain of Bluetooth:	0.00 dBi

Table 4: RF Channel and Frequency of Bluetooth BR/EDR

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
0	**2402.00**	20	2422.00	40	2442.00	60	2462.00
1	2403.00	21	2423.00	41	2443.00	61	2463.00
2	2404.00	22	2424.00	42	2444.00	62	2464.00
3	2405.00	23	2425.00	43	2445.00	63	2465.00
4	2406.00	24	2426.00	44	2446.00	64	2466.00
5	2407.00	25	2427.00	45	2447.00	65	2467.00
6	2408.00	26	2428.00	46	2448.00	66	2468.00
7	2409.00	27	2429.00	47	2449.00	67	2469.00
8	2410.00	28	2430.00	48	2450.00	68	2470.00
9	2411.00	29	2431.00	49	2451.00	69	2471.00
10	2412.00	30	2432.00	50	2452.00	70	2472.00
11	2413.00	31	2433.00	51	2453.00	71	2473.00
12	2414.00	32	2434.00	52	2454.00	72	2474.00
13	2415.00	33	2435.00	53	2455.00	73	2475.00
14	2416.00	34	2436.00	54	2456.00	74	2476.00
15	2417.00	35	2437.00	55	2457.00	75	2477.00
16	2418.00	36	2438.00	56	2458.00	76	2478.00
17	2419.00	37	2439.00	57	2459.00	77	2479.00
18	2420.00	38	2440.00	58	2460.00	78	**2480.00**
19	2421.00	39	**2441.00**	59	2461.00		

Test frequencies are lowest channel: 2402 MHz, middle channel: 2441 MHz and highest channel: 2480 MHz for Bluetooth BR/EDR

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Bluetooth transmitting mode
    1) Low Channel
    2) Middle Channel
    3) High Channel

B. On, Transmitting on Hopping channel

C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- FCC/IC Label and Location Info
- Schematics
- Operation Description
- Block Diagram
- PCB Layout

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model C110 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8
Adapter	HUAWEI	HW-050100C01	B77933J4L04550

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

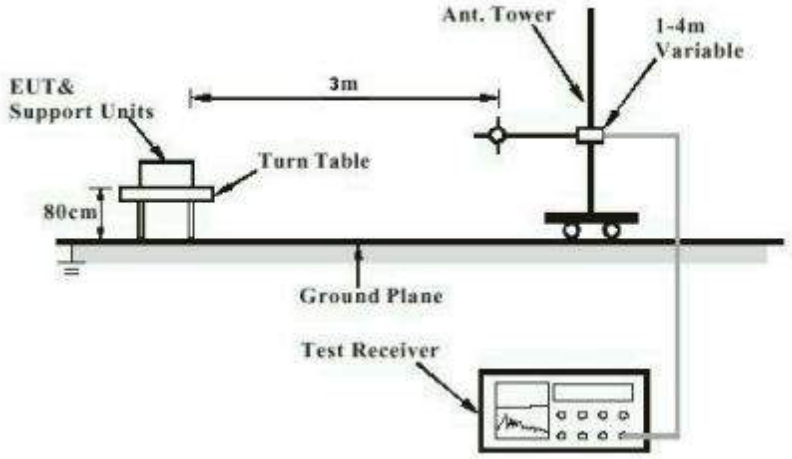


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

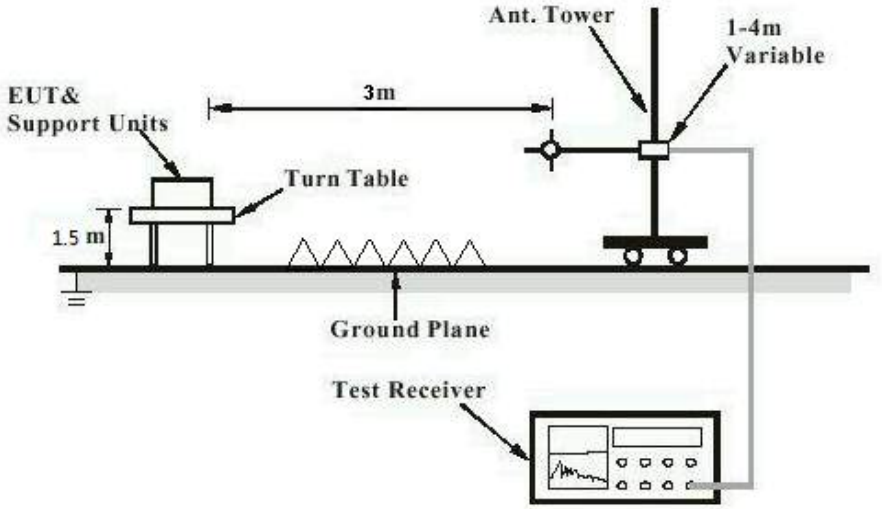


Diagram of Measurement Configuration for Conducted Transmitter Measurement

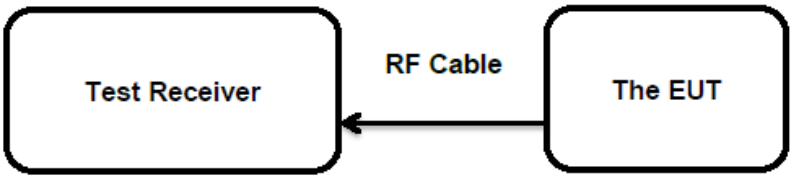
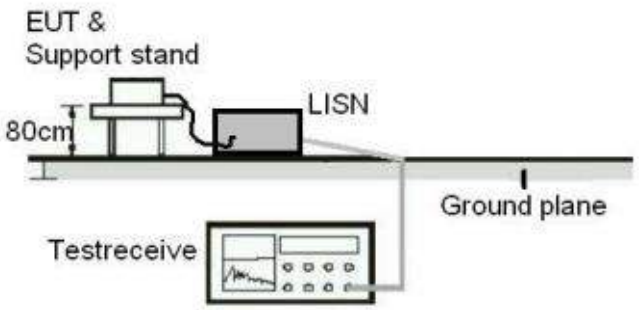


Diagram of Measurement Equipment Configuration for Mains Conduction Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203
RSS-Gen Clause 6.8

According to the manufacturer declared, the EUT has an Integral antenna, the directional gain of antenna is 0.00 dBi, and the antenna connector is designed with permanent attachment and no consideration of replacement.

Therefore the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(1) RSS-247 Clause 5.4(b)
Basic standard	:	ANSI C63.10: 2013
Limits	:	FHSS < 0.125 Watts
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-10
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

Table 6: Test Result of Maximum Peak Conducted Output Power, Bluetooth BR & EDR

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
GFSK (BR)	2402.0	7.20	0.0052	< 0.125
	2441.0	7.66	0.0058	
	2480.0	7.75	0.0060	
Maximum Measured Value		7.75	0.0060	

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
8DPSK (EDR)	2402.0	10.07	0.0102	< 0.125
	2441.0	10.63	0.0116	
	2480.0	10.25	0.0106	
Maximum Measured Value		10.63	0.0116	

Note: The cable loss is taken into account in results and the maximum e.i.r.p. is 10.63 dBm less than 4W(36dBm).

Note:

1) The cable loss is taken into account in results.
2) Antenna gain(G): 0.00 dBi

5.1.3 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a) RSS-Gen Clause 6.7
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-10
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.4 20dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(1) RSS-247 Clause 5.1(a)
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-10
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.5 Carrier Frequency Separation

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(1) RSS-247 Clause 5.1(b)
Basic standard	:	ANSI C63.10: 2013
Limits	:	≥ 25kHz or 2/3 of 20dB bandwidth, whichever is greater
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-10
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	B
Test channel	:	Low / Middle / High
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.6 Number of Hopping Frequency

RESULT: **Pass**

Test Specification

Test standard	:	FCC part 15.247(a)(1)(iii) RSS-247 Clause 5.1(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	≥ 15 non-overlapping channels
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-10
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	B
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.7 Time of Occupancy

RESULT: **Pass**

Test Specification

Test standard	:	FCC part 15.247(a)(1)(iii) RSS-247 Clause 5.1(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 0.4s
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-10
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	B
Test channel	:	Low / Middle / High
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B.

5.1.8 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) RSS-247 Clause 5.5
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	Refer to test result
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.9 ℃
Relative humidity	:	41 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix B.

5.1.9 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Section 8.9 & 8.10
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2022-11-15 to 2022-11-16
Input voltage	:	Internal battery operated (3.8Vdc)
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

5.1.10 Conducted Emission on AC Mains

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	:	ANSI C63.10: 2013
Frequency range	:	0.15 – 30MHz
Limits	:	FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2022-11-16 to 2022-11-17
Input voltage	:	USB operated (Adapter input voltage 120Vac, 60Hz)
Operation mode	:	A
Earthing	:	Not connected
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	Refer to test result

For the measurement records, refer to the appendix B.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix A.

7 List of Tables

Appendix B: Test Results of Bluetooth BR & EDR

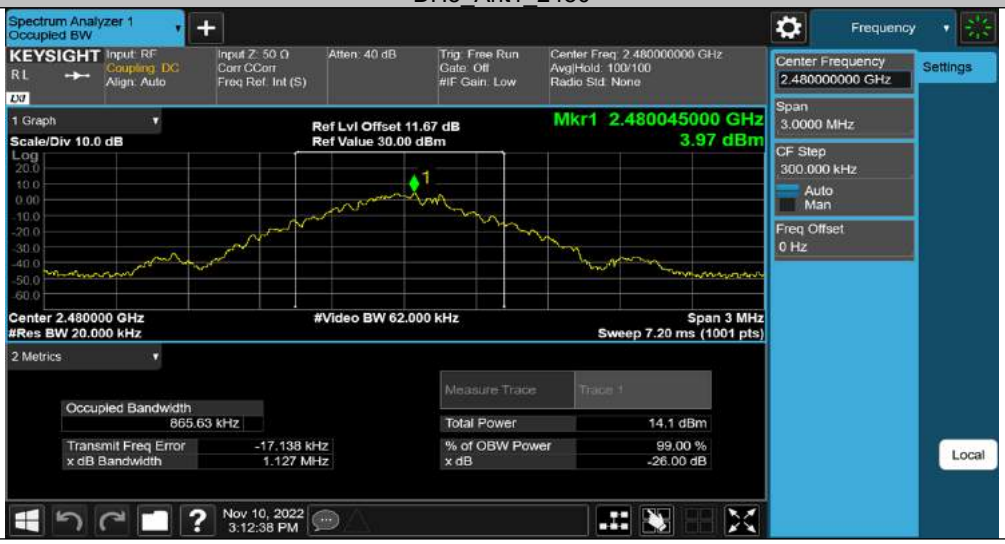
Appendix B.1: Test Results of 99% Bandwidth

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.87833	2401.5462	2402.4245	---	PASS
		2441	0.87848	2440.5450	2441.4235	---	PASS
		2480	0.86563	2479.5500	2480.4157	---	PASS
3DH5	Ant1	2402	1.2038	2401.3740	2402.5778	---	PASS
		2441	1.2063	2440.3714	2441.5777	---	PASS
		2480	1.2062	2479.3695	2480.5757	---	PASS

DH5_Ant1_2402

DH5_Ant1_2441

DH5_Ant1_2480



3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

Appendix B.2: Test Results of 20dB Bandwidth

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.951	2401.520	2402.471	---	PASS
		2441	0.942	2440.523	2441.465	---	PASS
		2480	0.945	2479.526	2480.471	---	PASS
3DH5	Ant1	2402	1.320	2401.316	2402.636	---	PASS
		2441	1.323	2440.316	2441.639	---	PASS
		2480	1.329	2479.316	2480.645	---	PASS

DH5_Ant1_2402

DH5_Ant1_2441

DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

Appendix B.3: Test Results of Carrier Frequency Separation

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	0.864	≥0.634	PASS
3DH5	Ant1	Hop	1.128	≥0.886	PASS

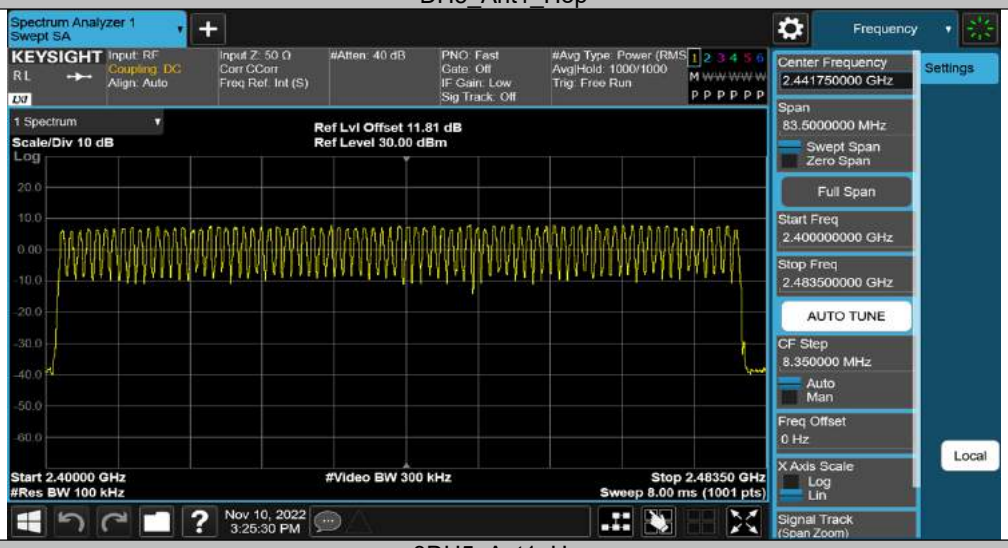
DH5_Ant1_Hop

3DH5_Ant1_Hop

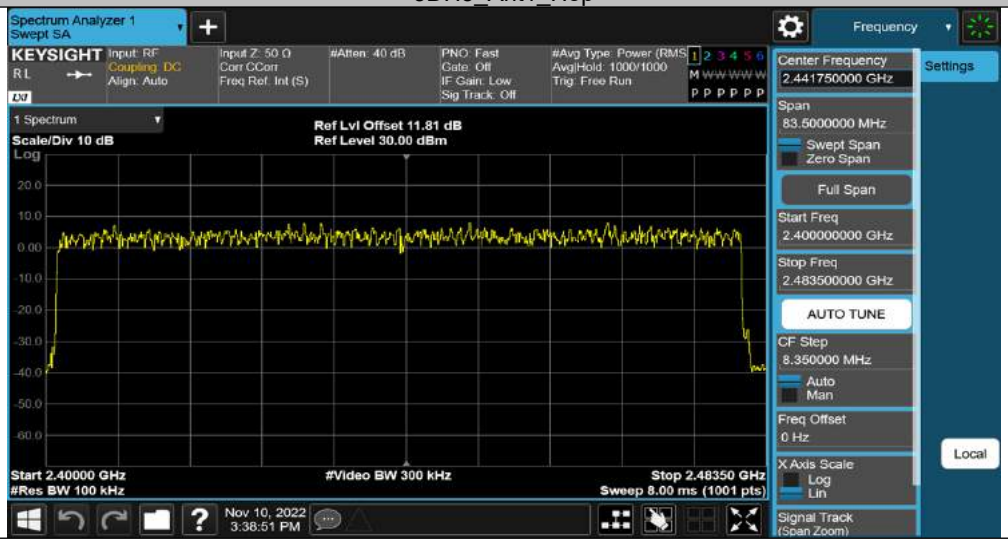
Appendix B.4: Test Results of Number of Hopping Frequency

TestMode	Antenna	Channel	Result[Num]	Limit[Num]	Verdict
DH5	Ant1	Hop	79	≥15	PASS
3DH5	Ant1	Hop	79	≥15	PASS

DH5_Ant1_Hop



3DH5_Ant1_Hop

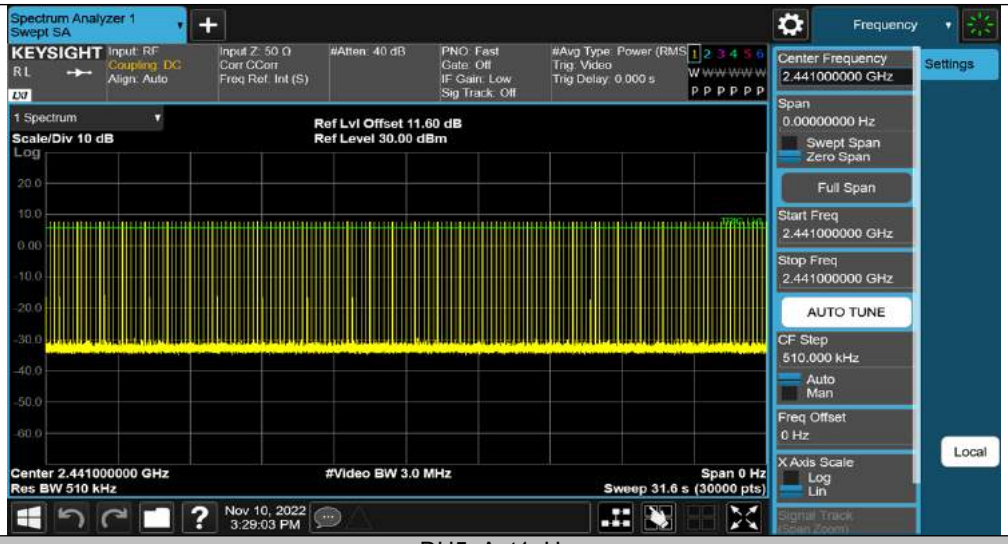


Appendix B.5: Test Results of Time of Occupancy

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.385	319	0.123	≤0.4	PASS
DH3	Ant1	Hop	1.640	159	0.261	≤0.4	PASS
DH5	Ant1	Hop	2.889	107	0.309	≤0.4	PASS
3DH1	Ant1	Hop	0.386	319	0.123	≤0.4	PASS
3DH3	Ant1	Hop	1.644	159	0.261	≤0.4	PASS
3DH5	Ant1	Hop	2.896	107	0.31	≤0.4	PASS

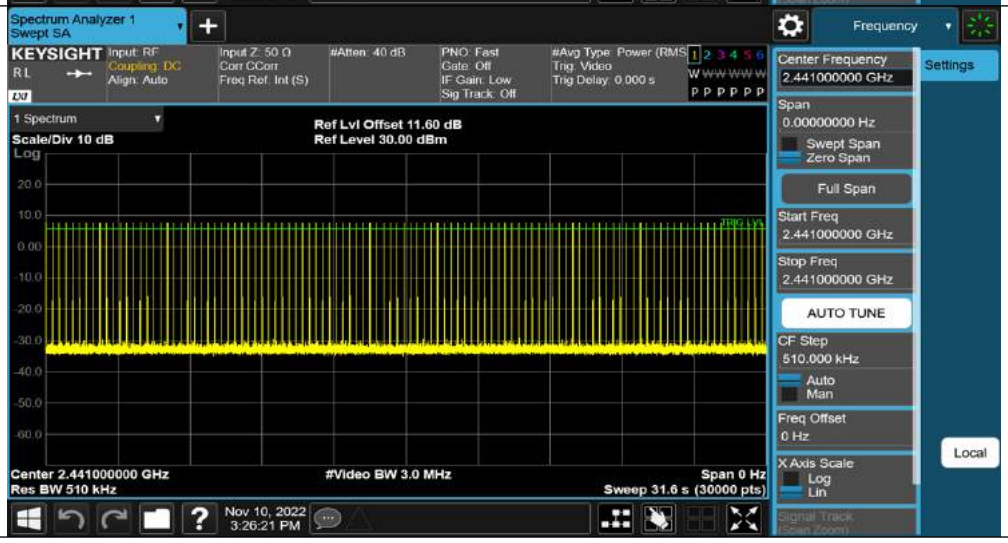
DH1_Ant1_Hop

DH3_Ant1_Hop


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Frequency
Center Frequency
2.441000000 GHz
Settings
Span
0.00000000 Hz
Swept Span
Zero Span
Full Span
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
AUTO TUNE
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Local
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 11.60 dB
Ref Level 30.00 dBm
Center 2.441000000 GHz
Res BW 510 kHz
#Video BW 3.0 MHz
Span 0 Hz
Sweep 31.6 s (30000 pts)
Nov 10, 2022
3:29:03 PM

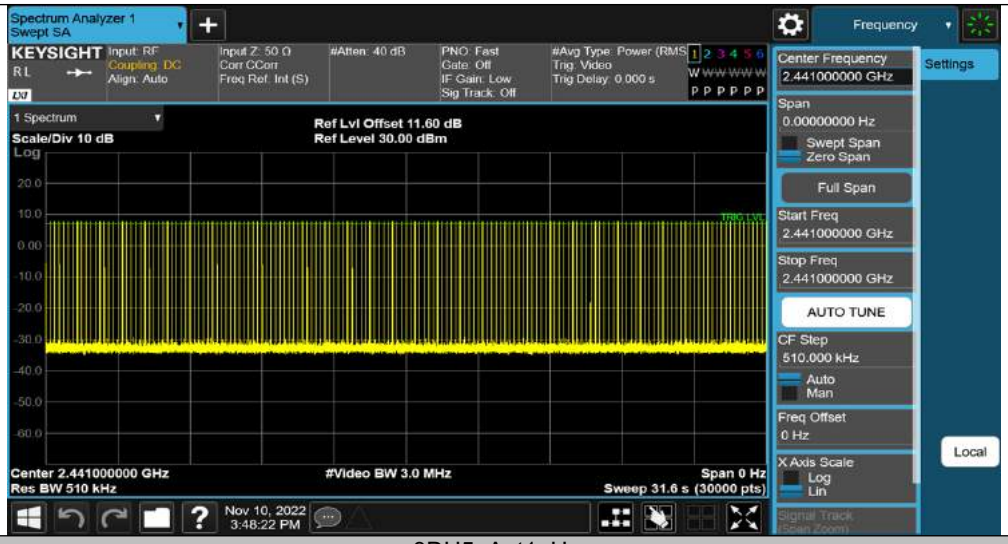
DH5_Ant1_Hop


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Frequency
Center Frequency
2.441000000 GHz
Settings
Span
0.00000000 Hz
Swept Span
Zero Span
Full Span
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
AUTO TUNE
CF Step
1.000000 MHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Local
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 11.60 dB
Ref Level 30.00 dBm
ΔMkr2 2.889 ms
22.00 dB
2Δ1
1
Center 2.441000000 GHz
Res BW 1.0 MHz
#Video BW 3.0 MHz
Span 0 Hz
Sweep 10.1 ms (8000 pts)
Nov 10, 2022
3:25:46 PM

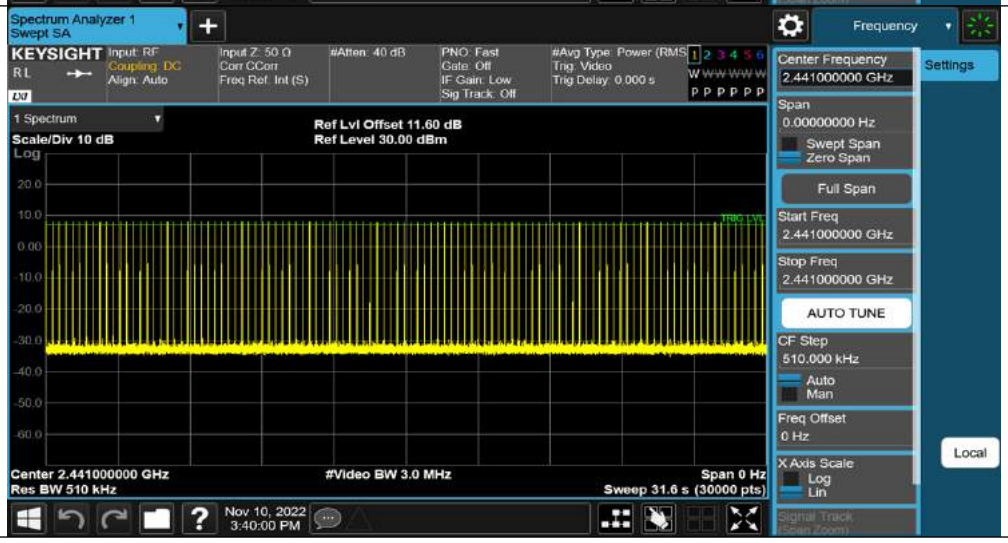

Spectrum Analyzer 1
Swept SA
KEYSIGHT
Frequency
Center Frequency
2.441000000 GHz
Settings
Span
0.00000000 Hz
Swept Span
Zero Span
Full Span
Start Freq
2.441000000 GHz
Stop Freq
2.441000000 GHz
AUTO TUNE
CF Step
510.000 kHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Local
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 11.60 dB
Ref Level 30.00 dBm
Center 2.441000000 GHz
Res BW 510 kHz
#Video BW 3.0 MHz
Span 0 Hz
Sweep 31.6 s (30000 pts)
Nov 10, 2022
3:26:21 PM

3DH1_Ant1_Hop

3DH3_Ant1_Hop



3DH5_Ant1_Hop



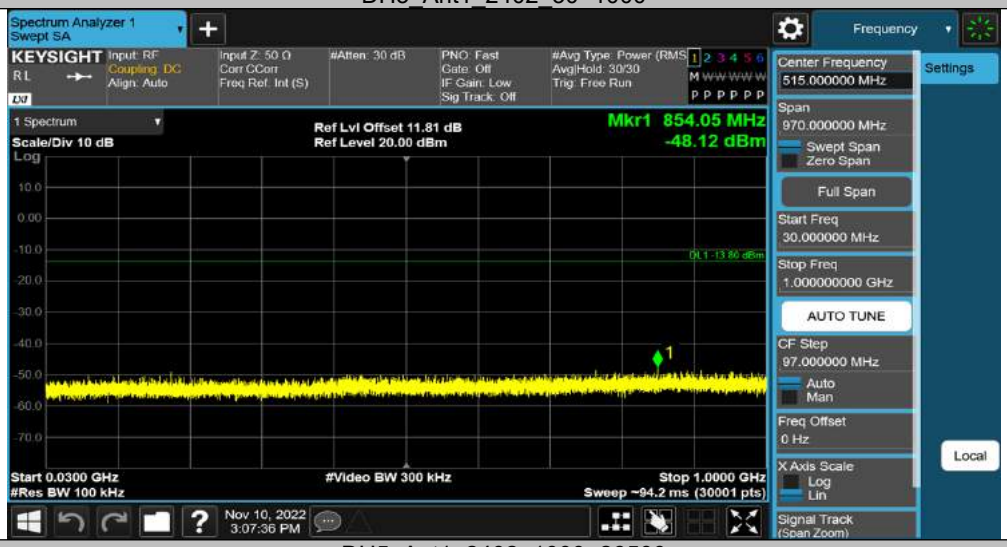
Appendix B.6: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Conducted Spurious Emission

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	6.20	6.20	---	PASS
			30~1000	6.20	-48.12	≤-13.8	PASS
			1000~26500	6.20	-39.1	≤-13.8	PASS
		2441	Reference	6.93	6.93	---	PASS
			30~1000	6.93	-49.04	≤-13.07	PASS
			1000~26500	6.93	-39.66	≤-13.07	PASS
		2480	Reference	6.93	6.93	---	PASS
			30~1000	6.93	-48.9	≤-13.07	PASS
			1000~26500	6.93	-39.56	≤-13.07	PASS
3DH5	Ant1	2402	Reference	4.28	4.28	---	PASS
			30~1000	4.28	-48.43	≤-15.72	PASS
			1000~26500	4.28	-39.61	≤-15.72	PASS
		2441	Reference	5.99	5.99	---	PASS
			30~1000	5.99	-48.74	≤-14.01	PASS
			1000~26500	5.99	-39.7	≤-14.01	PASS
		2480	Reference	5.64	5.64	---	PASS
			30~1000	5.64	-48.4	≤-14.36	PASS
			1000~26500	5.64	-39.6	≤-14.36	PASS

DH5_Ant1_2402_0~Reference

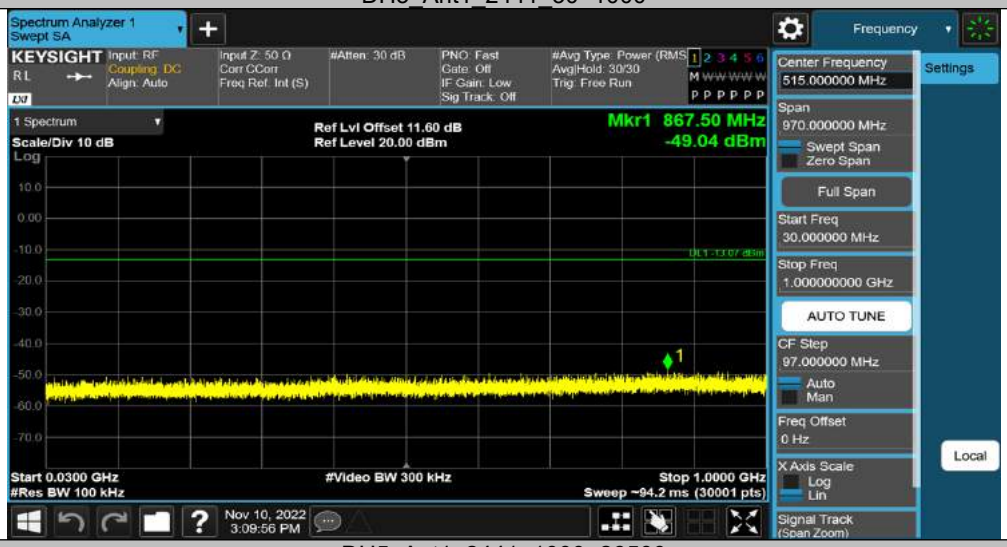
DH5_Ant1_2402_30~1000



DH5_Ant1_2402_1000~26500

DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000



DH5_Ant1_2441_1000~26500

DH5_Ant1_2480_0~Reference

DH5_Ant1_2480_30~1000

DH5_Ant1_2480_1000~26500

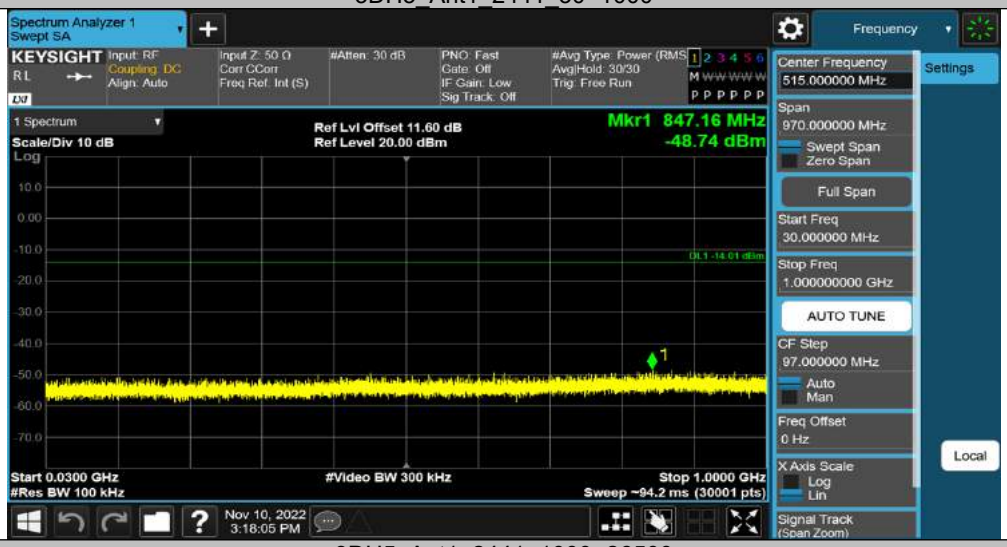
3DH5_Ant1_2402_0~Reference

3DH5_Ant1_2402_30~1000

3DH5_Ant1_2402_1000~26500

3DH5_Ant1_2441_0~Reference

3DH5_Ant1_2441_30~1000



3DH5_Ant1_2441_1000~26500

3DH5_Ant1_2480_0~Reference

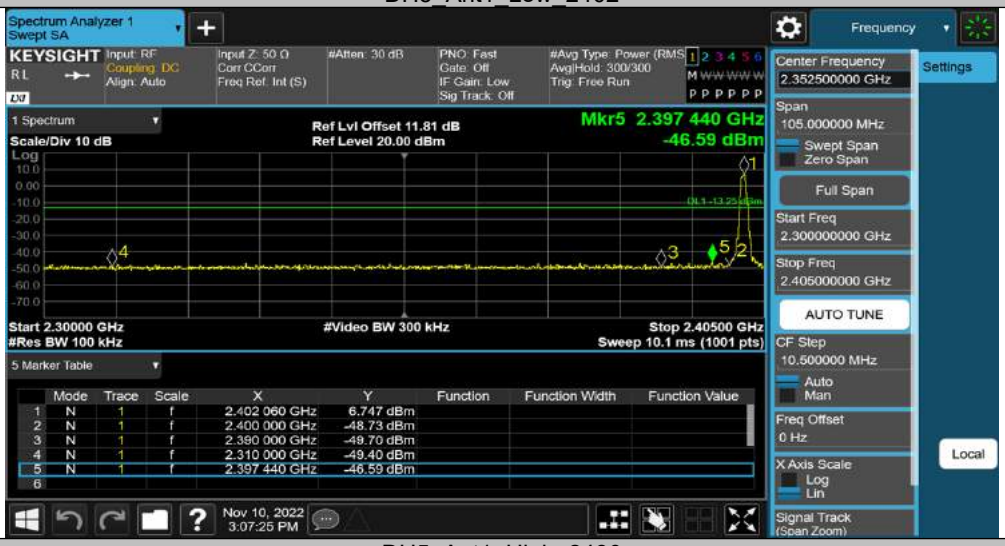
3DH5_Ant1_2480_30~1000

3DH5_Ant1_2480_1000~26500

Band Edge

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	6.75	-46.59	≤-13.25	PASS
		High	2480	7.49	-45.64	≤-12.51	PASS
		Low	Hop_2402	6.63	-47.02	≤-13.37	PASS
		High	Hop_2480	7.45	-47.32	≤-12.55	PASS
3DH5	Ant1	Low	2402	6.69	-43.85	≤-13.31	PASS
		High	2480	6.88	-46.32	≤-13.12	PASS
		Low	Hop_2402	4.29	-47.39	≤-15.71	PASS
		High	Hop_2480	6.93	-46.66	≤-13.07	PASS

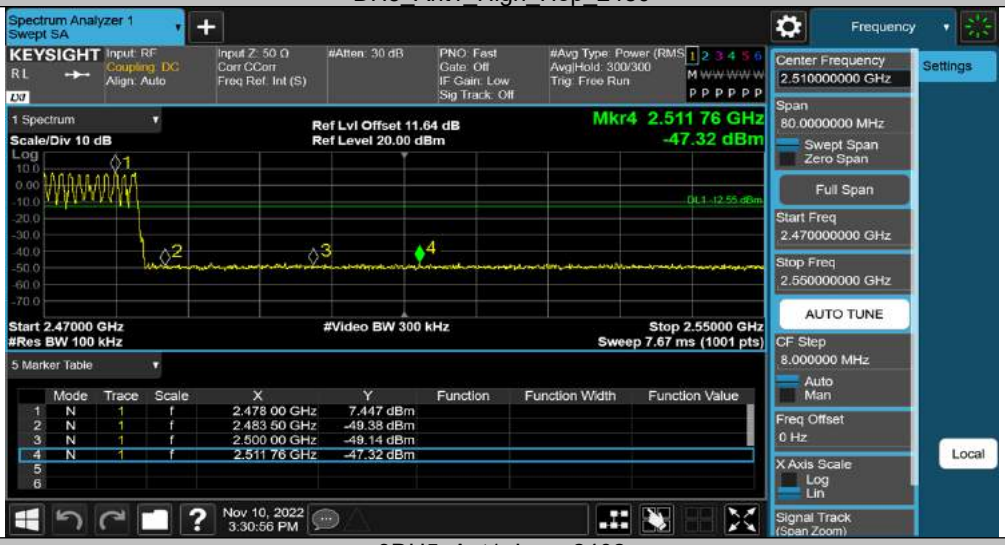
DH5_Ant1_Low_2402



DH5_Ant1_High_2480

DH5_Ant1_Low_Hop_2402

DH5_Ant1_High_Hop_2480

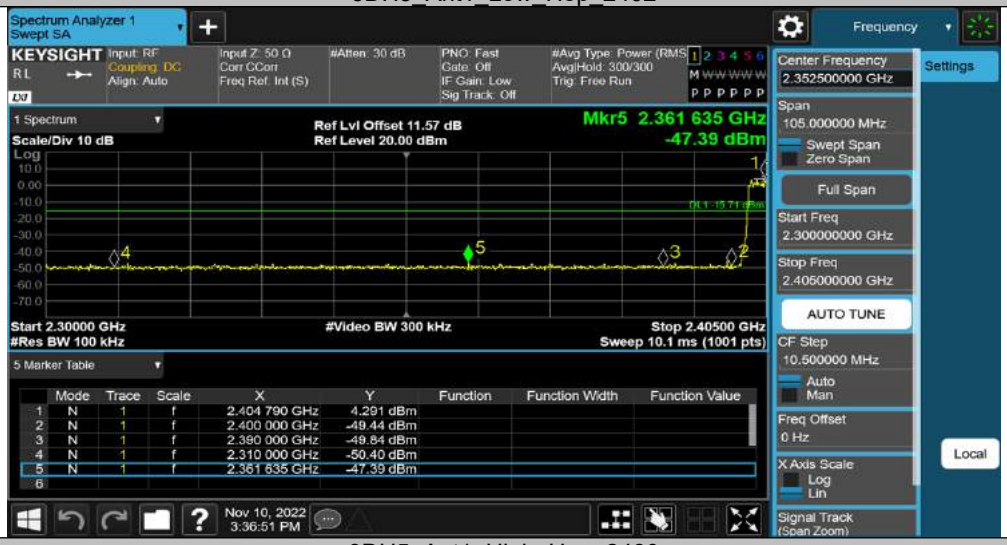


3DH5_Ant1_Low_2402

3DH5_Ant1_High_2480

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
N	1	f	2.480 16 GHz	6.879 dBm			
N	1	f	2.483 50 GHz	-49.97 dBm			
N	1	f	2.500 00 GHz	-50.06 dBm			
N	1	f	2.500 32 GHz	-46.32 dBm			

3DH5_Ant1_Low_Hop_2402



Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
N	1	f	2.404 790 GHz	4.291 dBm			
N	1	f	2.400 000 GHz	-49.44 dBm			
N	1	f	2.390 000 GHz	-49.84 dBm			
N	1	f	2.310 000 GHz	-50.40 dBm			
N	1	f	2.361 635 GHz	-47.39 dBm			

3DH5_Ant1_High_Hop_2480

Mode	Trace	Scale	X	Y	Function	Function Width	Function Value
N	1	f	2.479 12 GHz	6.930 dBm			
N	1	f	2.483 50 GHz	-51.28 dBm			
N	1	f	2.500 00 GHz	-49.07 dBm			
N	1	f	2.543 04 GHz	-46.66 dBm			

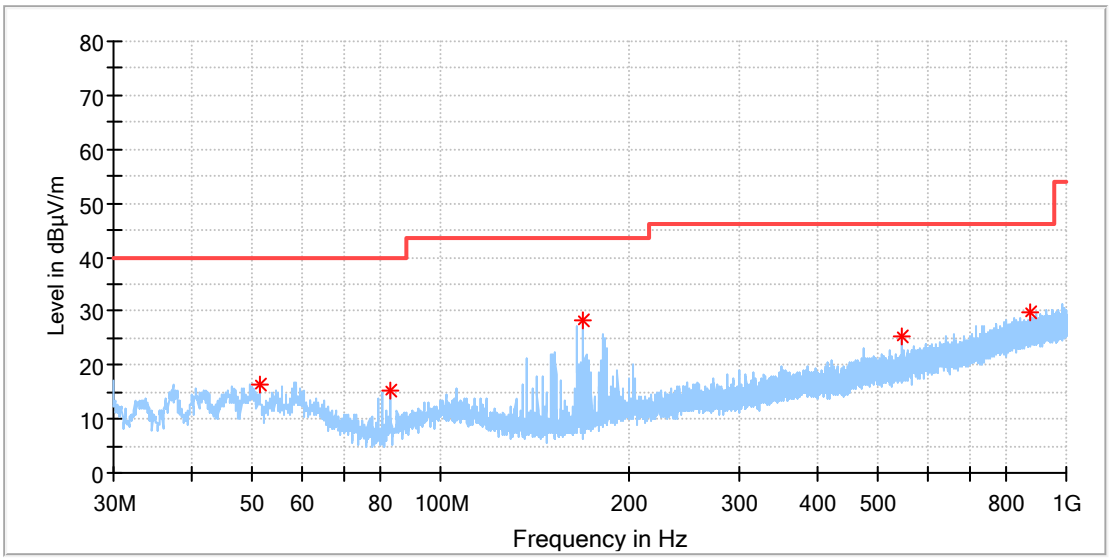
Appendix B.7: Test Results of Radiated Spurious Emissions

Note: 1. Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and 18GHz - 26.5GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported. 2. This testing was carried out on different modulations, but only the worst case (GFSK) was presented in this report.

30 MHz - 1GHz

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

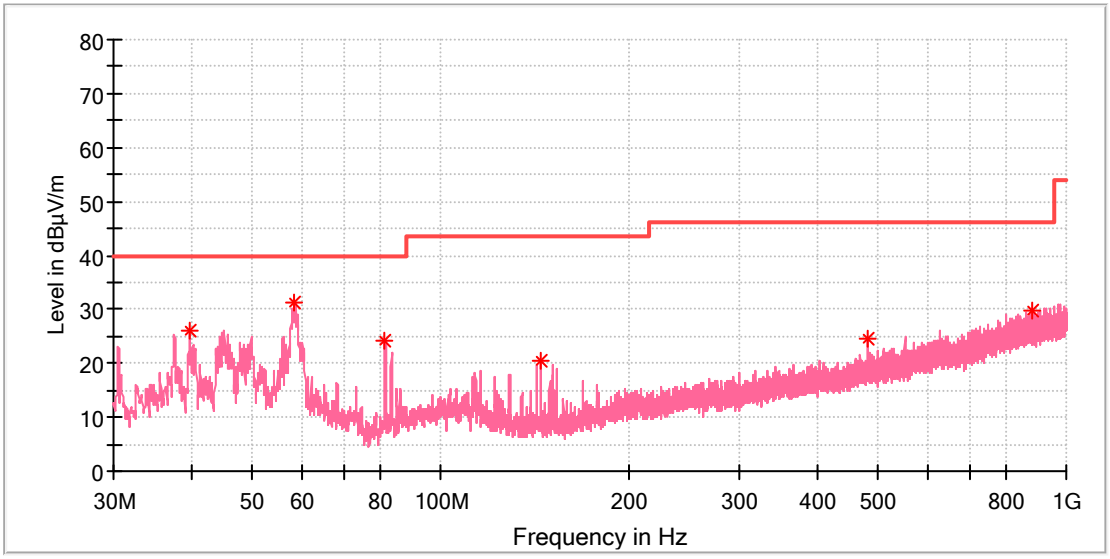


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
51.291500	16.27	40.00	23.73	100.0	H	135.0	-18.3
83.107500	15.41	40.00	24.59	100.0	H	142.0	-22.8
168.710000	28.43	43.50	15.07	100.0	H	87.0	-21.3
544.003000	25.16	46.00	20.84	100.0	H	148.0	-11.1
874.821500	29.65	46.00	16.35	100.0	H	100.0	-5.2

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

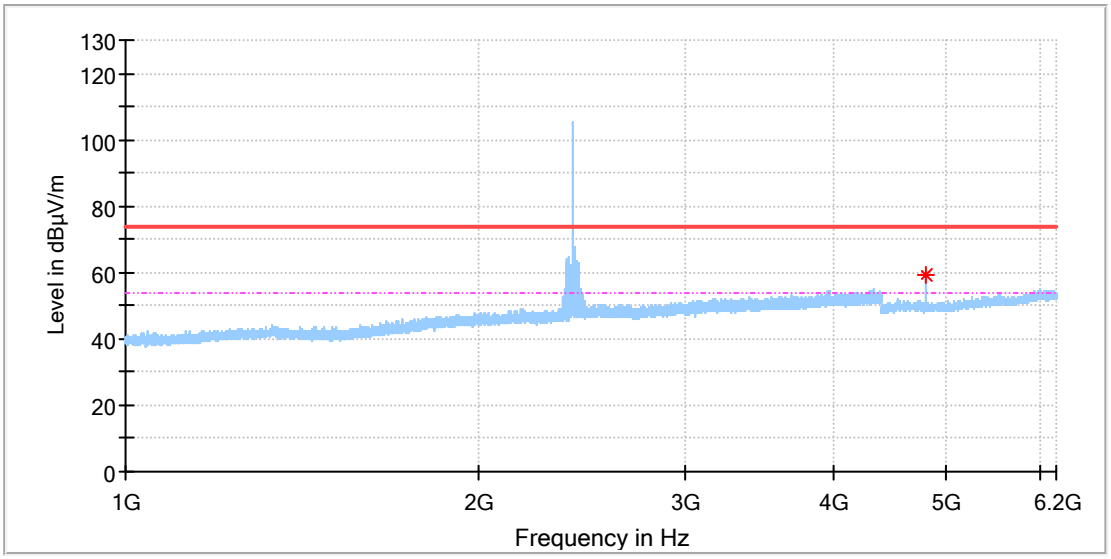
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
39.748500	26.11	40.00	13.89	100.0	V	126.0	-20.2
58.469500	31.38	40.00	8.62	100.0	V	100.0	-18.8
81.555500	24.32	40.00	15.68	100.0	V	333.0	-23.1
144.508500	20.38	43.50	23.12	100.0	V	33.0	-22.2
480.031500	24.46	46.00	21.54	100.0	V	243.0	-12.2
878.944000	29.78	46.00	16.22	100.0	V	89.0	-5.1

1GHz - 18GHz

Note: The highest waveform in the figure is Bluetooth Fundamental.

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

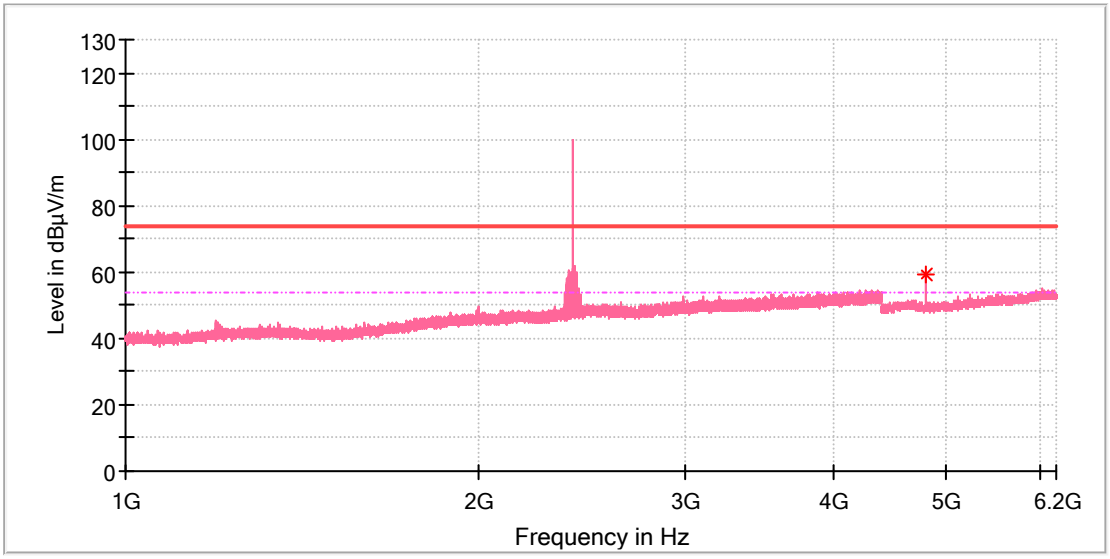


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.500000	59.47	---	74.00	14.53	100.0	H	83.0	11.8
4804.500000	---	28.67	54.00	25.33	100.0	H	83.0	11.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

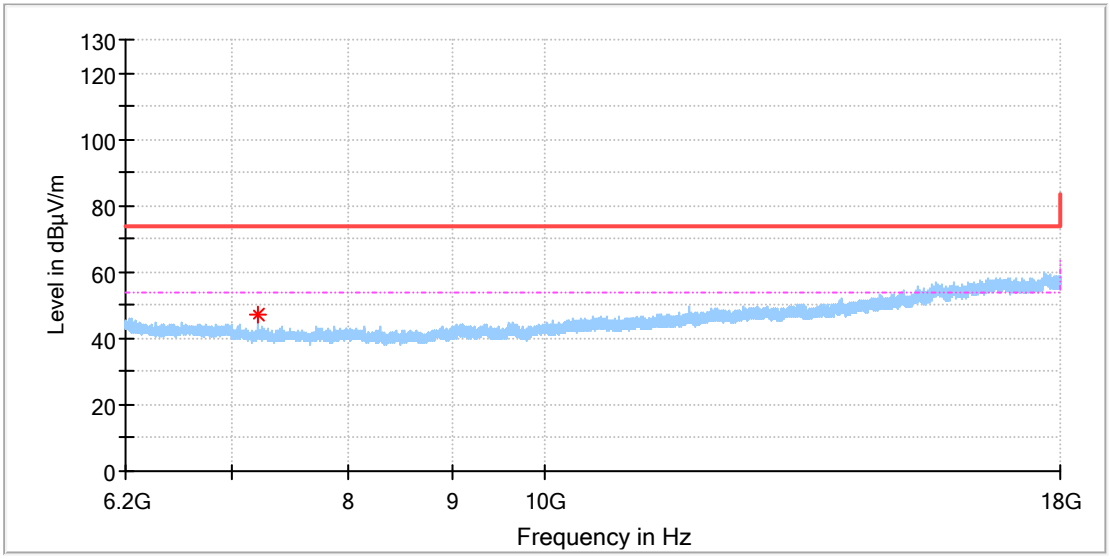


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4804.500000	59.30	---	74.00	14.70	100.0	V	202.0	11.8
4804.500000	---	28.50	54.00	25.50	100.0	V	202.0	11.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

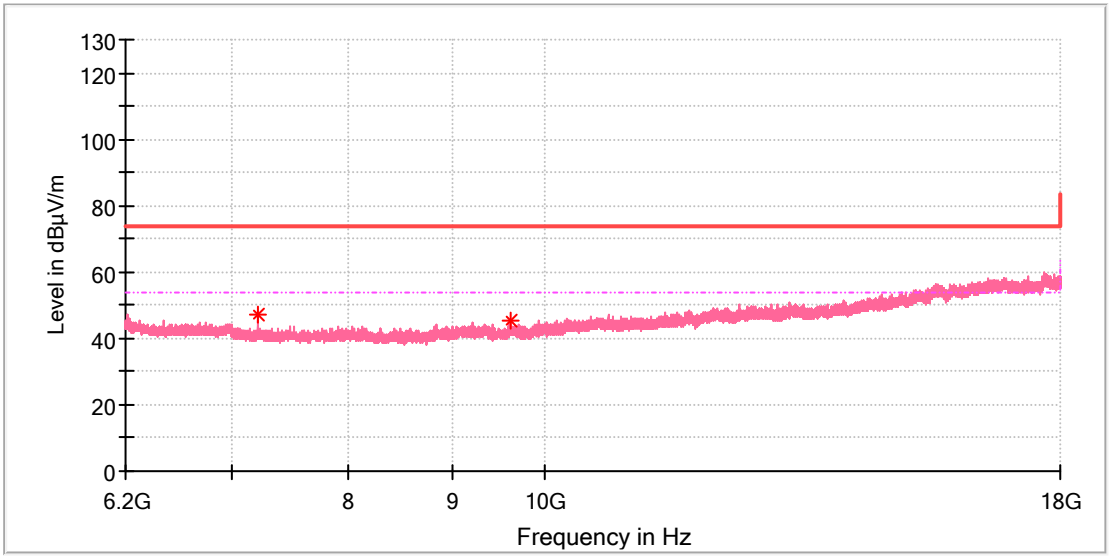


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7206.441667	47.04	---	74.00	26.96	100.0	H	292.0	8.8
7206.441667	---	16.24	54.00	37.76	100.0	H	292.0	8.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

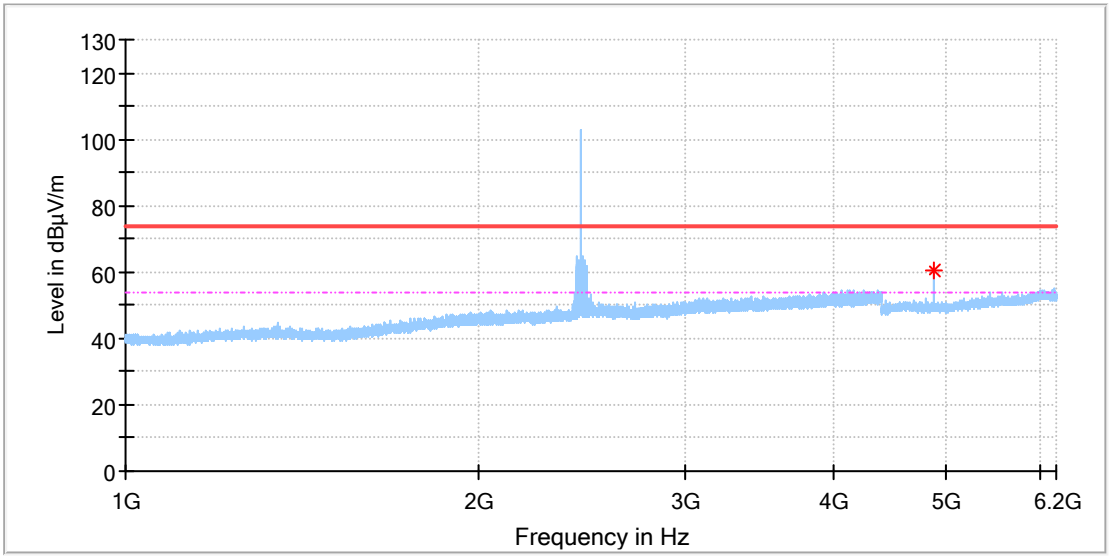


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7205.458333	47.02	---	74.00	26.98	100.0	V	179.0	8.8
7205.458333	---	16.22	54.00	37.78	100.0	V	179.0	8.8
9608.233333	45.38	---	74.00	28.62	100.0	V	219.0	10.4
9608.233333	---	14.58	54.00	39.42	100.0	V	219.0	10.4

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

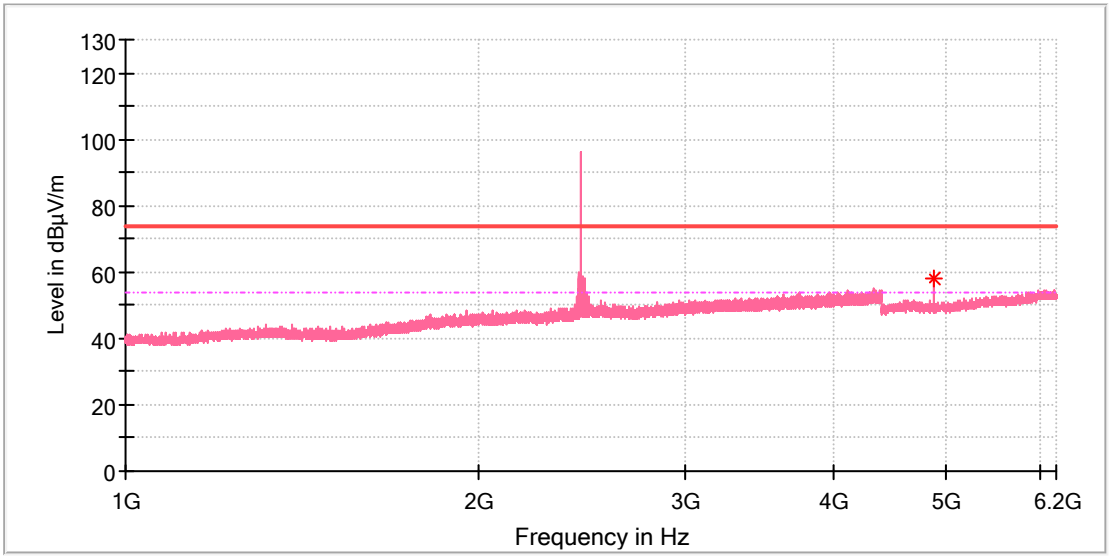


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4882.000000	60.22	---	74.00	13.78	100.0	H	89.0	11.8
4882.000000	---	29.42	54.00	24.58	100.0	H	89.0	11.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

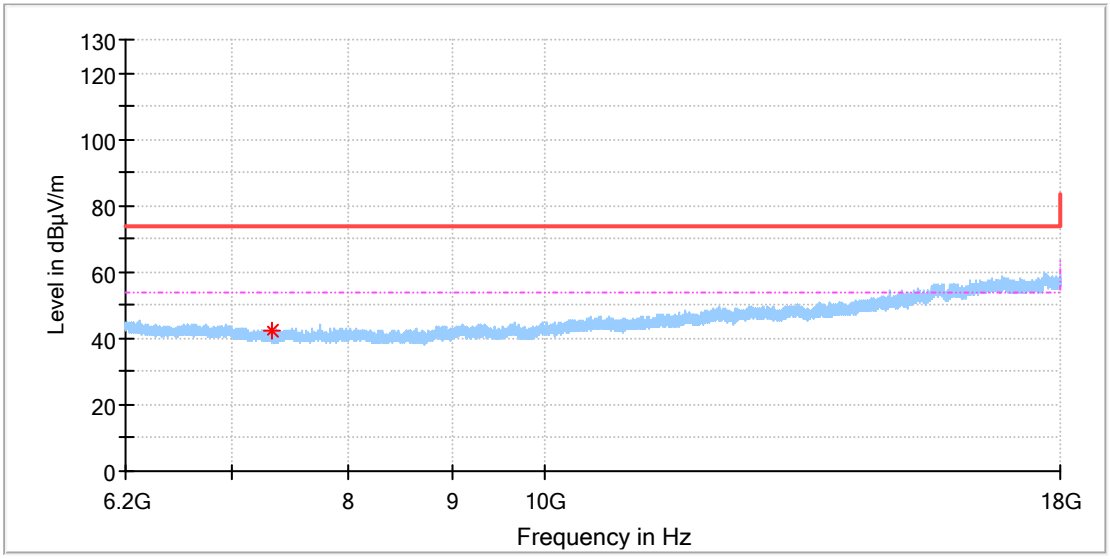


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4881.500000	58.03	---	74.00	15.97	100.0	V	199.0	11.8
4881.500000	---	27.23	54.00	26.77	100.0	V	199.0	11.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

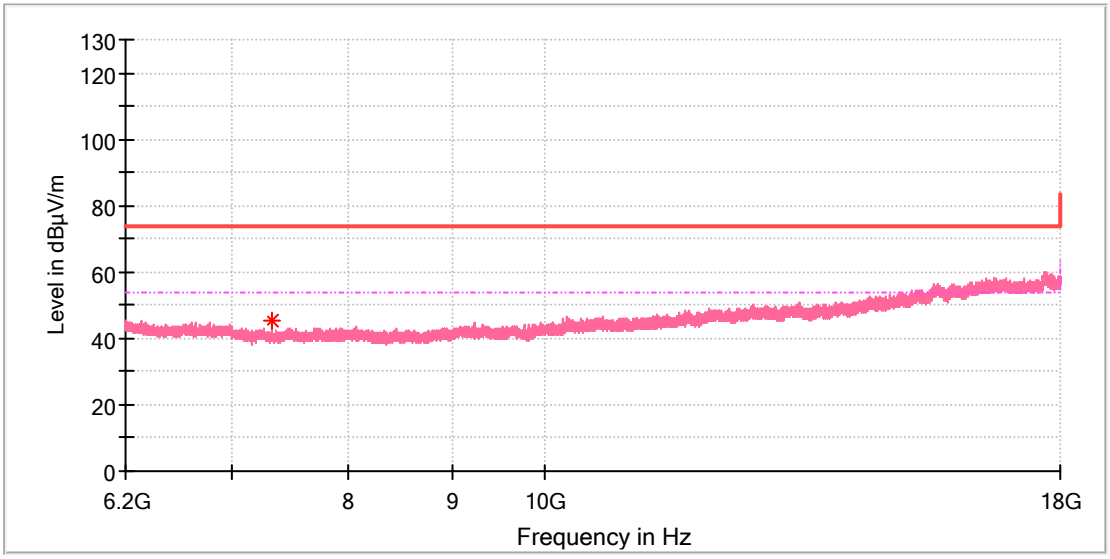


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7330.341667	42.41	---	74.00	31.59	100.0	H	171.0	8.1
7330.341667	---	11.61	54.00	42.39	100.0	H	171.0	8.1

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

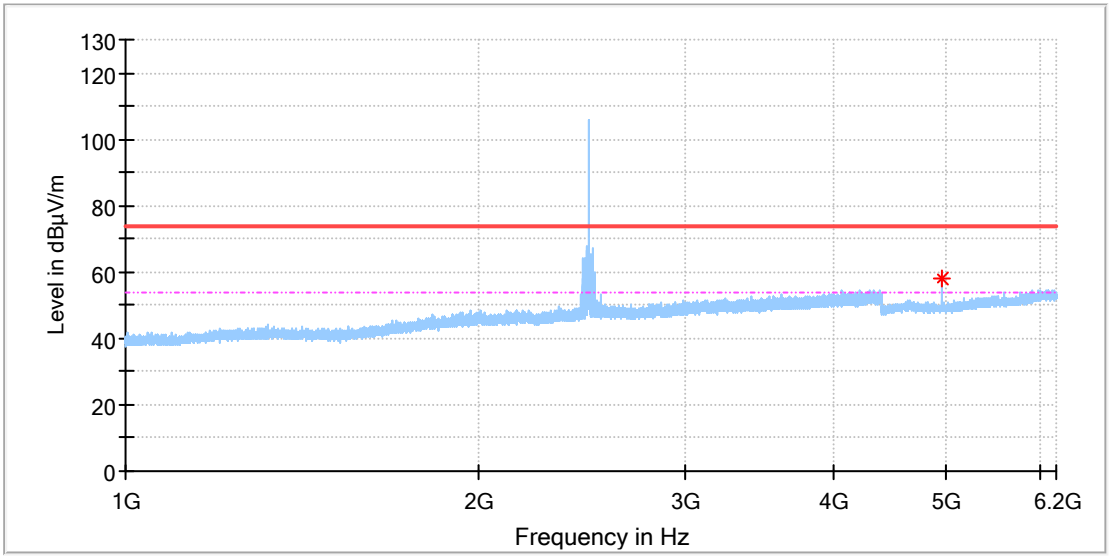


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7322.966667	45.64	---	74.00	28.36	100.0	V	83.0	8.2
7322.966667	---	14.84	54.00	39.16	100.0	V	83.0	8.2

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

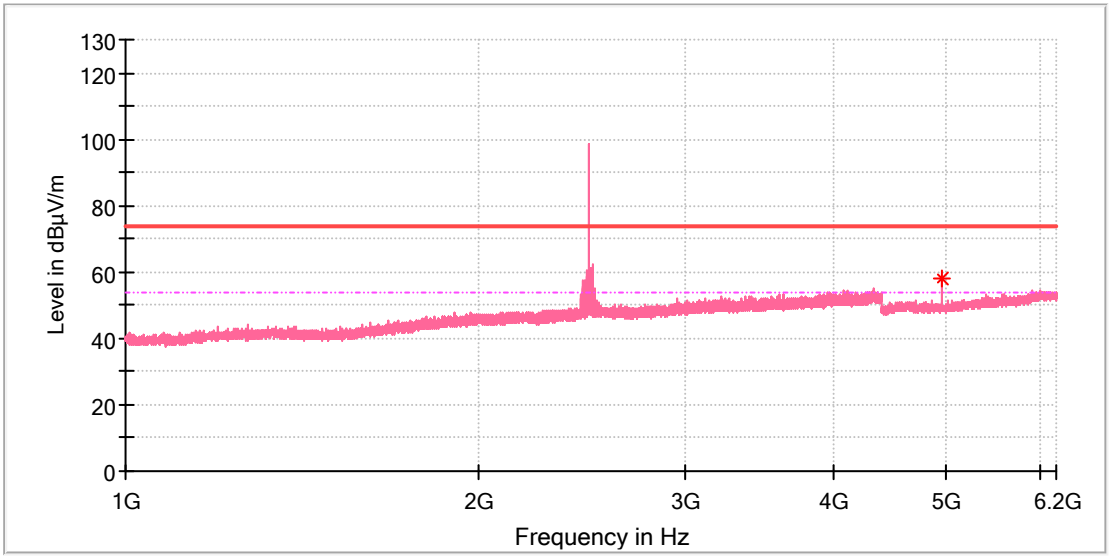


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.500000	57.77	---	74.00	16.23	100.0	H	83.0	11.8
4959.500000	---	26.97	54.00	27.03	100.0	H	83.0	11.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

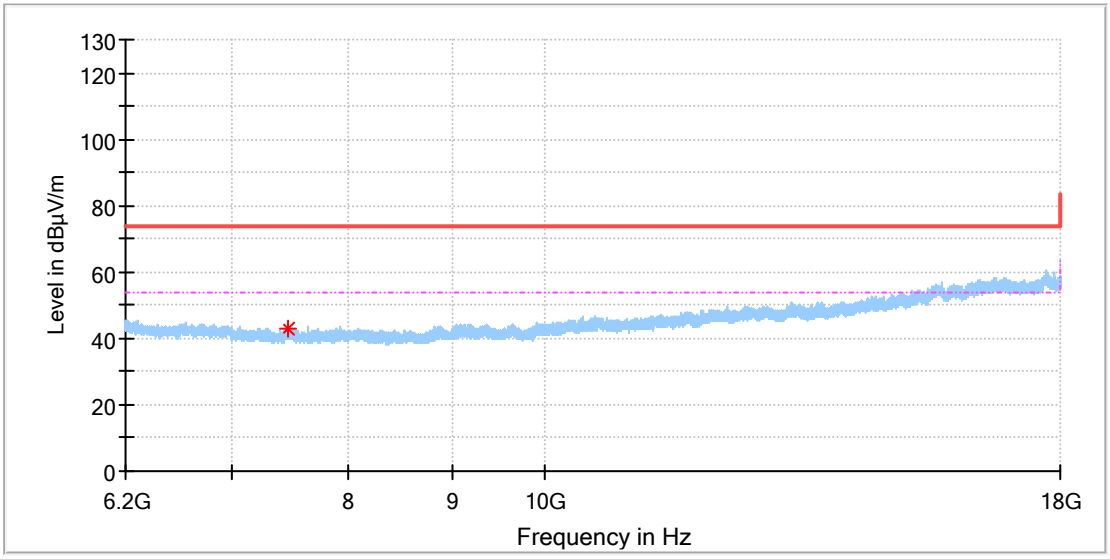


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4960.000000	57.90	---	74.00	16.10	100.0	V	192.0	11.8
4960.000000	---	27.10	54.00	26.90	100.0	V	192.0	11.8

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

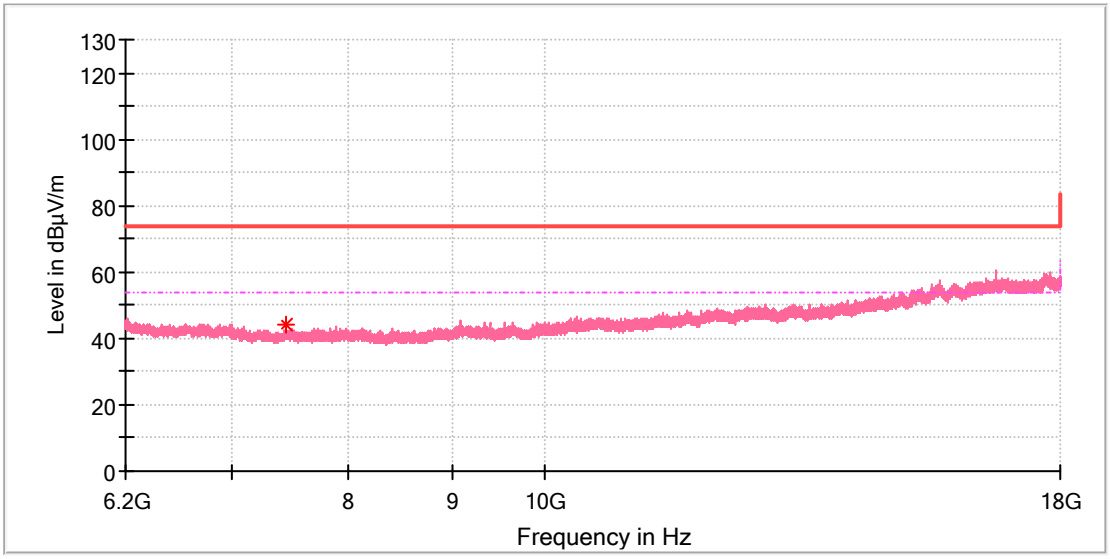


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7469.483333	42.70	---	74.00	31.30	100.0	H	72.0	8.6
7469.483333	---	11.9	54.00	42.10	100.0	H	72.0	8.6

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



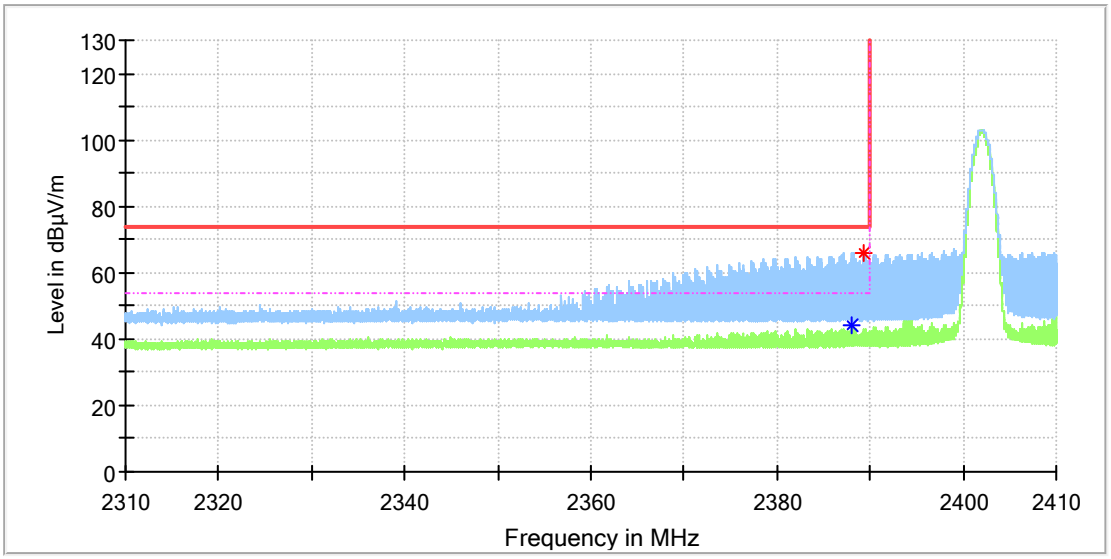
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.983333	44.42	---	74.00	29.58	100.0	V	78.0	8.4
7439.983333	---	13.62	54.00	40.38	100.0	V	78.0	8.4

Appendix B.8: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

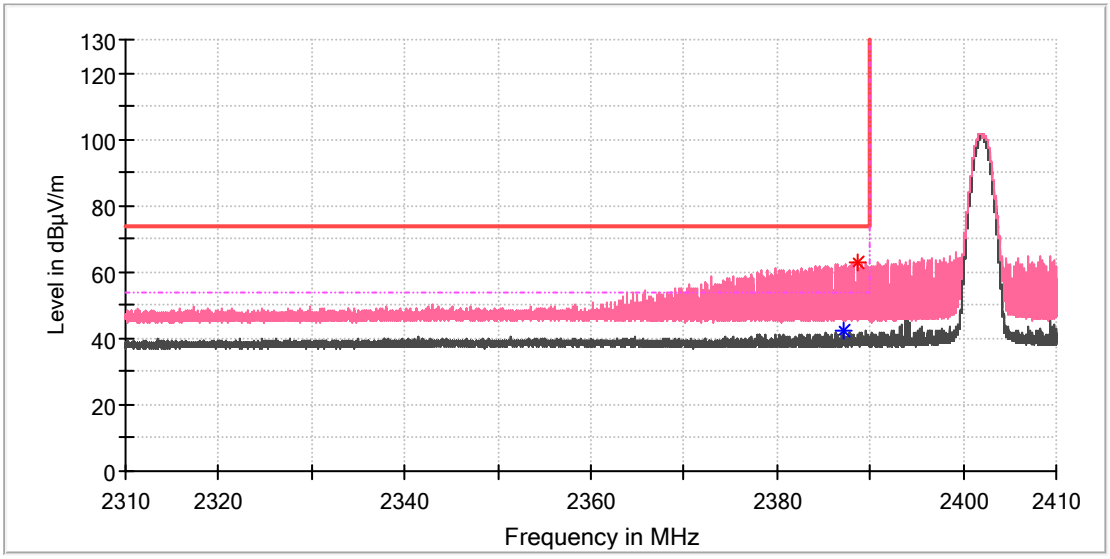


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.040000	---	43.99	54.00	10.01	100.0	H	214.0	7.0
2389.250000	65.64	---	74.00	8.36	100.0	H	214.0	7.0

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

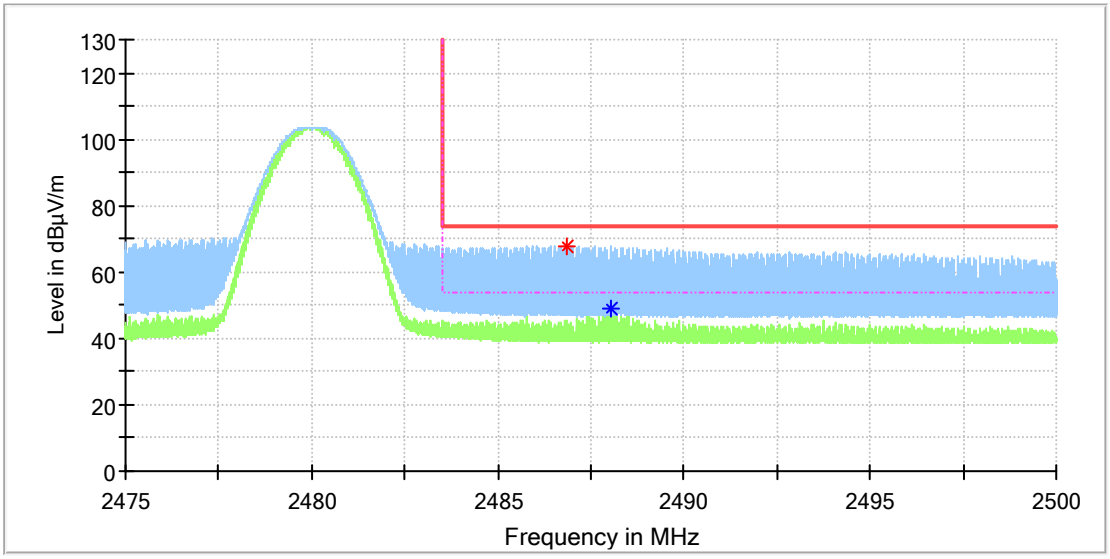


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2387.110000	---	42.35	54.00	11.65	100.0	V	190.0	7.0
2388.605000	63.16	---	74.00	10.84	100.0	V	203.0	7.0

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin

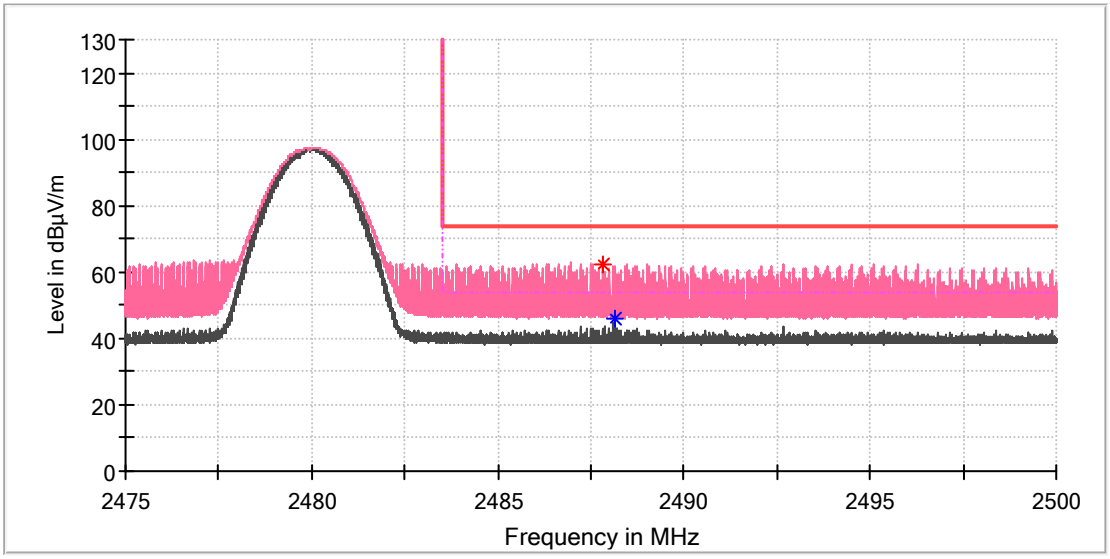


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2486.851250	67.63	---	74.00	6.37	100.0	H	16.0	7.4
2488.047500	---	49.21	54.00	4.79	100.0	H	16.0	7.4

EUT Information

EUT Name:	Opencomm2 UC
Model:	C110
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168397041/A003363222-010
Test Voltage:	Battery
Remark:	Temp 23 Humi:58%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



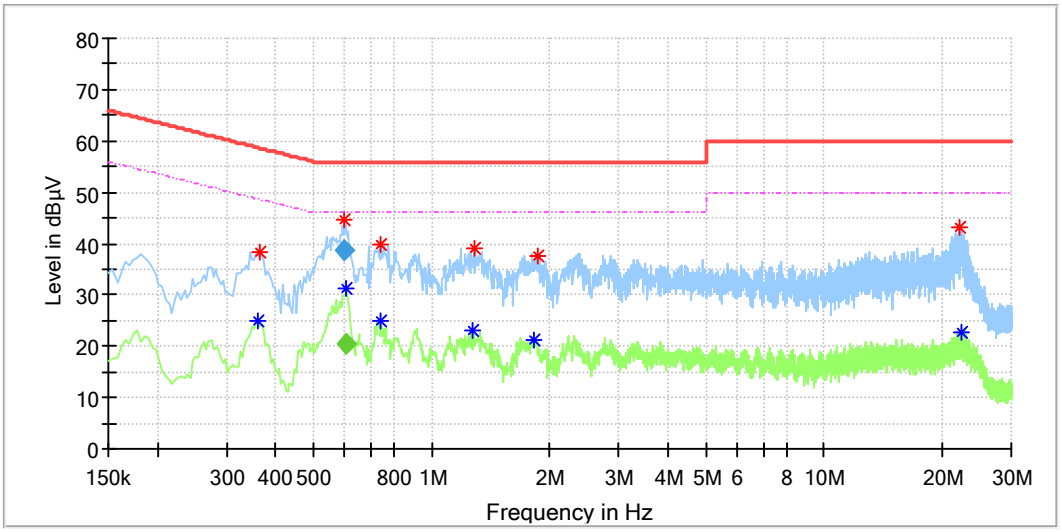
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2487.807500	62.17	---	74.00	11.83	100.0	V	27.0	7.4
2488.148750	---	46.21	54.00	7.79	100.0	V	91.0	7.4

Appendix B.9: Test Results of Conducted Emissions on AC Mains

EUT Information

EUT Name:	Opencomm2 UC
Order Number:	168397041_P00869886
Model:	C110
Test Mode:	Bluetooth
Test Voltage:	AC 120V/60Hz
Test By:/Review By:	Steve Lan/Gary Chen
Test Standard:	FCC Part 15C
Tem./Hum./Pressure:	25.0°C/51.2%/101kPa
Remark:	SR2



Critical_Freqs

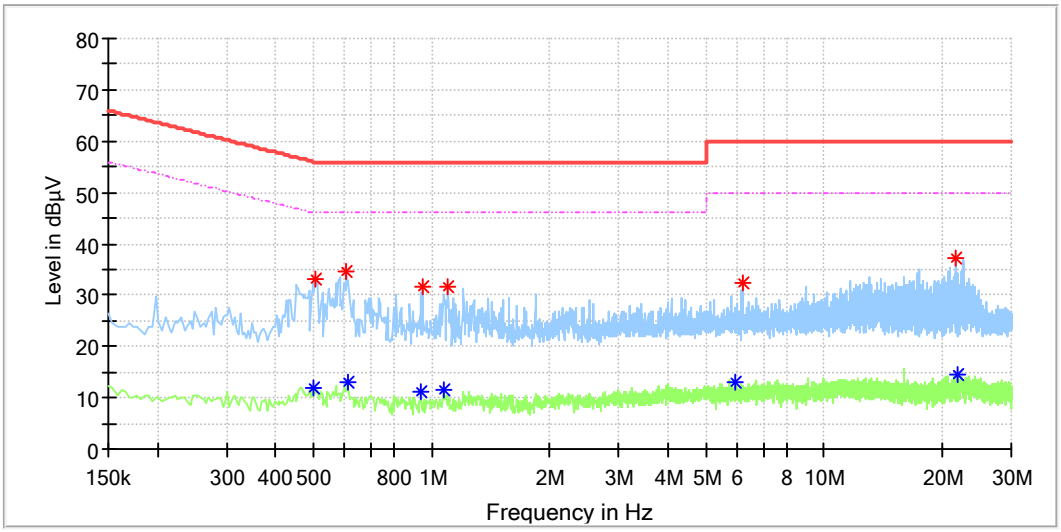
Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.362000	---	24.78	48.68	23.90	L1	9.9
0.366000	38.37	---	58.59	20.22	L1	9.9
0.601500	44.48	---	56.00	11.52	L1	10.0
0.605500	---	31.31	46.00	14.69	L1	10.0
0.742000	---	25.05	46.00	20.95	L1	10.0
0.742000	39.90	---	56.00	16.10	L1	10.0
1.274000	---	23.12	46.00	22.88	L1	10.1
1.286000	39.13	---	56.00	16.88	L1	10.1
1.830000	---	21.38	46.00	24.62	L1	10.1
1.862000	37.50	---	56.00	18.50	L1	10.1
22.046000	43.28	---	60.00	16.72	L1	10.4
22.362000	---	22.87	50.00	27.13	L1	10.4

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.601500	38.59	---	56.00	17.41	1000.0	9.000	L1	10.0
0.605500	---	20.56	46.00	25.44	1000.0	9.000	L1	10.0

EUT Information

EUT Name:	Opencomm2 UC
Order Number:	168397041_P00869886
Model:	C110
Test Mode:	Bluetooth
Test Voltage:	AC 120V/60Hz
Test By:/Review By:	Steve Lan/Gary Chen
Test Standard:	FCC Part 15C
Tem./Hum./Pressure:	25.0°C/51.2%/101kPa
Remark:	SR2



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.498000	---	11.87	46.03	34.17	N	9.8
0.506000	33.12	---	56.00	22.88	N	9.8
0.606000	34.57	---	56.00	21.43	N	9.8
0.610000	---	12.87	46.00	33.13	N	9.8
0.938000	---	11.05	46.00	34.95	N	9.8
0.950000	31.67	---	56.00	24.33	N	9.8
1.070000	---	11.41	46.00	34.59	N	9.8
1.102000	31.45	---	56.00	24.55	N	9.8
5.958000	---	12.97	50.00	37.03	N	9.9
6.182000	32.43	---	60.00	27.57	N	9.9
21.642000	37.38	---	60.00	22.62	N	10.3
21.850000	---	14.42	50.00	35.58	N	10.3