Prüfbericht-Nr.: *Test report no.*:	**CN25615P 003**	**Auftrags-Nr.:** *Order no.*:	168516757	Seite 1 von 26 *Page 1 of 26*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2024-12-03	
Auftraggeber: *Client*:	Aptiv Electronics (Suzhou) Co., Ltd. No. 123, Changyang Street, Suzhou Industrial Park, Suzhou, China			
Prüfgegenstand: *Test item*:	DHU2.5_A (Digital Cockpit Head Unit)			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	DHU2.5_A			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification*:	CFR Title 47 FCC Part 15: Subpart C Section 15.247			

Wareneingangsdatum: *Date of sample receipt*:	2024-12-20	Please refer to Photo Document
Prüfmuster-Nr.: *Test sample no:*	A003881754-001~018	
Prüfzeitraum: *Testing period*:	2025-01-14 - 2025-01-20	
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 Jonathan Li Signed by: Jonathan Li	**genehmigt von:** *authorized by*:	X Bell Hu Signed by: Bell Hu
Datum: *Date:* 2025-02-10		**Ausstellungsdatum:** *Issue date:* 2025-02-10	
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other*: FCC ID: 2AX7A-DHU2-5-A

This report is for Bluetooth dual mode and 2.4GHz Wi-Fi (Module AF66T).

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

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. *The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.* *Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
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3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
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Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY
RESULT: Pass

5.1.4 6DB BANDWIDTH
RESULT: Pass

5.1.5 99% BANDWIDTH
RESULT: Pass

5.1.6 20DB BANDWIDTH
RESULT: Pass

5.1.7 CARRIER FREQUENCY SEPARATION
RESULT: Pass

5.1.8 NUMBER OF HOPPING FREQUENCY
RESULT: Pass

5.1.9 TIME OF OCCUPANCY
RESULT: Pass

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

5.1.11 RADIATED SPURIOUS EMISSION
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: Test Results of Bluetooth BR & EDR

Appendix B: Test Results of Bluetooth LE

Appendix C: Test Results of 2.4GHz Wi-Fi

Appendix D: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street, Longhua District, Shenzhen 518000, People's Republic of China
FCC Accreditation Designation No.: CN1260

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. Date**	**Cal. until**
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	2024-09-26	2025-09-25
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	2024-09-26	2025-09-25
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	2024-09-26	2025-09-25
DC power supply	Keysight	E3642A	MY61276100	2024-09-26	2025-09-25
Power Control Unit	Tonscend	JS0806-4ADC	N/A	2024-09-26	2025-09-25
Automation Control Unit	Tonscend	JS0806-2	21C8060396	2024-09-26	2025-09-25
Test Software	Tonscend	JS1120-3	N/A	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A	N/A
Shielding Room	Albatross	SR1	APC17151-SR1	2024-09-14	2027-09-13
Unwanted Emission Testing (TS9975)					
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. Date**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	2024-09-29	2025-09-28
Signal Analyzer	R&S	FSV 40	101439	2024-09-29	2025-09-28
System Controller Interface	R&S	SCI-100	S10010038	N/A	N/A
Filterbank	R&S	Wlan	100759	2024-09-29	2025-09-28
OSP	R&S	OSP 120	102040	N/A	N/A
Pre-amplifier	R&S	SCU08F1	08320031	2024-09-29	2025-09-28
Amplifier	R&S	SCU-18F	180070	2024-09-29	2025-09-28
Amplifier	R&S	SCU40A	100475	2024-09-29	2025-09-28
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	2024-09-28	2025-09-27
Double-Ridged Antenna	ETS-LINDGREN	3117	00218717	2024-09-28	2025-09-27

(1 -18 GHz)					
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	2024-09-28	2025-09-27
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	2024-09-28	2025-09-27
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A	N/A
Control PC	Dell	OptiPlex 7050	36NV9P2	N/A	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	2024-09-14	2027-09-13

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
RF output power, conducted	± 0.99 dB
Occupied Channel Bandwidth	± 2.08 %
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	± 4.17 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B & C & D 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 2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street, Longhua District, Shenzhen 518000, 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 an Intelligent cockpit domain controller which supports Bluetooth dual mode, 2.4GHz Wi-Fi, 5GHz Wi-Fi and FM/DAB wireless technologies.
The EUT has a BT module AH20C and a BT/WIFI module AF66T.

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:	DHU2.5_A (Digital Cockpit Head Unit)
Type Designation:	DHU2.5_A
FCC ID:	2AX7A-DHU2-5-A
Operating Voltage:	DC 9~16V
Testing Voltage:	DC 12V
Operating Temperature Range:	-40 °C ~ +85 °C
Technical Specification of Bluetooth dual mode (Module AF66T)	
Operating Frequency:	2402 MHz to 2480 MHz
Type of Modulation:	GFSK, π/4-DQPSK, 8DPSK
Channel Number:	BR & EDR mode:79 channels, Low Energy mode:40 channels
Channel Separation:	BR & EDR mode:1MHz, Low Energy mode:2MHz
Data Rate:	BR & EDR mode: 1Mbps, 2Mbps, 3Mbps Low Energy mode: 1Mbps, 2Mbps
Antenna Type:	Integral Antenna
Antenna Gain:	1.41 dBi Max. (Provided by the Client)
Technical Specification of 2.4GHz Wi-Fi (Module AF66T)	
Operating Frequency:	2412 - 2462 MHz for 802.11b/g/n(HT20)/ax(HE20) 2422 - 2452 MHz for 802.11n(HT40)/ax(HE40)
Type of Modulation:	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM/256QAM/1024QAM)
Data Rate:	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n MCS0 ~ MCS11 for 802.11ax(only Full RU)
Channel Number:	11 channels for 802.11b/g/n(HT20)/ax(HE)20 7 channels for 802.11n(HT40)/ax(HE40)
Channel Separation:	5 MHz
Antenna Type:	Integral Antenna
Antenna Number:	1Tx1Rx for SISO mode, 2Tx2Rx for MIMO mode
Antenna Gain:	1.41 dBi Max. for ANT1 0.58dBi Max for ANT2 (Provided by the Client)

Beamforming Gain	Not support

Note: The correctness of all data provided by customer in the test report is ensured and responsible of the customer. Any misjudgment of the test results caused by the use of incorrect data provided by customer shall be borne by the customer.

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

Table 5: RF Channel and Frequency of Bluetooth LE

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

Test frequencies are lowest channel: 2402 MHz, middle channel: 2440 MHz and highest channel:

2480 MHz for Bluetooth LE

Table 6: RF Channel and Frequency of 2.4GHz Wi-Fi

RF Channel	802.11 b/g/n(HT20)/ax(HE20)	802.11 n(HT40)/ax(HE40)
	Frequency (MHz)	Frequency (MHz)
01	**2412**	**/**
02	2417	/
03	2422	**2422**
04	2427	2427
05	2432	2432
06	**2437**	**2437**
07	2442	2442
08	2447	2447
09	2452	**2452**
10	2457	/
11	**2462**	**/**

Test frequencies are lowest channel: 2412 MHz, middle channel: 2437 MHz and highest channel: 2462 MHz for 802.11b/g/n(HT20)/ax(HE20)

Test frequencies are lowest channel: 2422 MHz, middle channel: 2437 MHz and highest channel: 2452 MHz for 802.11n(HT40)/ax(HE40)

3.3 Independent Operation Modes

The basic operation modes are:

A. On, Bluetooth transmitting mode (BR & EDR mode)
   1) Low Channel
   2) Middle Channel
   3) High Channel

B. On, Bluetooth transmitting mode (Bluetooth LE mode)
   1) Low Channel
   2) Middle Channel
   3) High Channel

C. On, 2.4G Wi-Fi transmitting mode
   1) Low Channel
   2) Middle Channel
   3) High Channel

D. On, Transmitting on Hopping channel

E. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- ID Label and Location Info
- User Manual
- Operation Description

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 *DHU2.5_A* in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 7: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N	Rating
DC power Supply	Topward	3303D	809332	0-30 Volts, 0-3 Amps
Laptop	Lenovo	T480	PF-16A6N8	N/A

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)

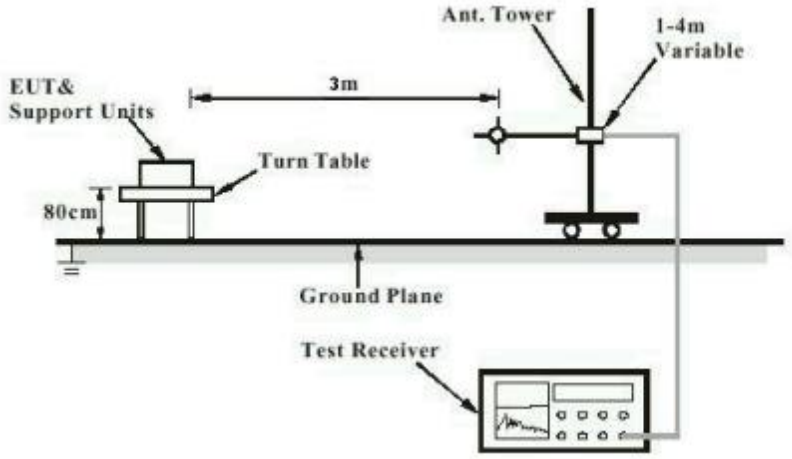


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

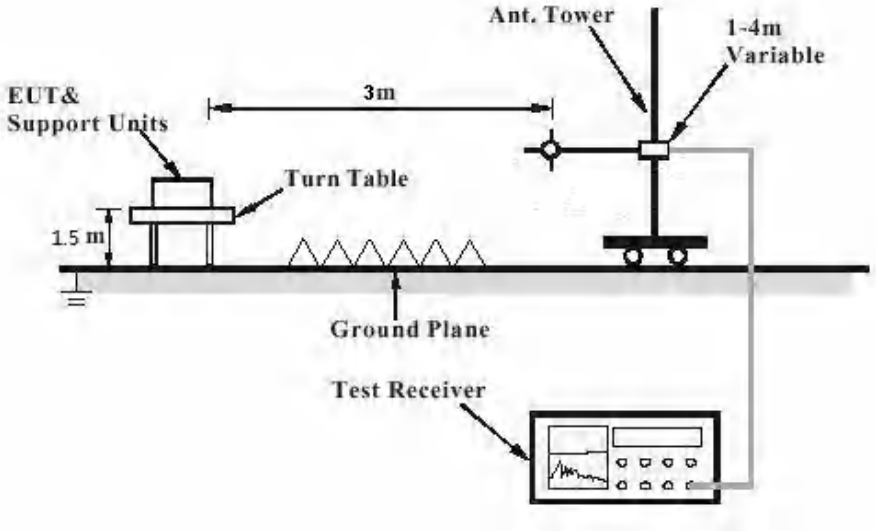
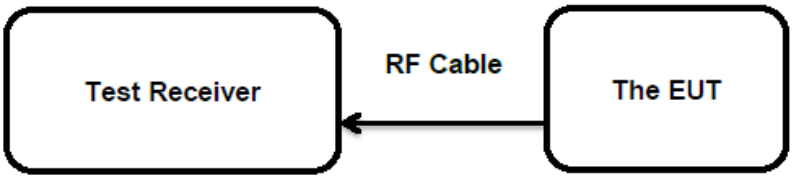


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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

According to the manufacturer declared, the EUT has two Integral Antennas, the directional gain of antenna is 1.41dBi Max. for Bluetooth and 1.41dBi-ant1, 0.58dBi-ant2 for 2.4G Wi-Fi, 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)&(3)
Basic standard	:	ANSI C63.10: 2013
Limits	:	FHSS < 0.125 Watts, DSSS < 1.0 Watts (Maximum Conducted Peak Power)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	A, B, C
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 8: Test Result of Maximum Peak Conducted Output Power, BR & EDR

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
GFSK (BR)	2402.0	6.75	0.0047	< 0.125
	2441.0	9.30	0.0085	
	2480.0	6.95	0.0050	
8DPSK (EDR)	2402.0	6.55	0.0045	
	2441.0	8.81	0.0076	
	2480.0	6.67	0.0046	
Maximum Measured Value		**9.30**	**0.0085**	

Table 9: Test Result of Maximum Peak Conducted Output Power, Bluetooth LE

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
Bluetooth LE	1 Mbps	2402	6.58	0.0045	< 1.0
		2440	9.09	0.0081	
		2480	6.92	0.0049	
	2 Mbps	2402	6.30	0.0043	
		2440	8.63	0.0073	
		2480	6.33	0.0043	
Max. Measured Value			**9.09**	**0.0081**	

Table 10: Test Result of Maximum Peak Conducted Output Power, 2.4G Wi-Fi

SISO mode:

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power (ANT1)		Measured Peak Power (ANT2)		Limit (W)
			(dBm)	(W)	(dBm)	(W)	
802.11b	1 Mbps	2412	14.12	0.0258	14.81	0.0303	< 1.0
		2437	14.33	0.0271	14.08	0.0256	
		2462	14.76	0.0299	14.48	0.0281	
802.11g	6 Mbps	2412	18.18	0.0658	19.11	0.0815	
		2437	18.22	0.0664	18.53	0.0713	
		2462	18.75	0.0750	18.90	0.0776	
802.11n (HT20)	MCS0	2412	18.06	0.0640	19.07	0.0807	
		2437	18.10	0.0646	18.33	0.0681	
		2462	18.53	0.0713	18.71	0.0743	
802.11n (HT40)	MCS0	2422	18.72	0.0745	19.41	0.0873	
		2437	18.74	0.0748	19.01	0.0796	
		2452	18.92	0.0780	19.00	0.0794	
802.11ax (HE20)	MCS0	2412	18.99	0.0793	19.82	0.0959	
		2437	19.11	0.0815	19.15	0.0822	
		2462	19.43	0.0877	19.41	0.0873	
802.11ax (HE40)	MCS0	2422	19.25	0.0841	19.83	0.0962	
		2437	19.22	0.0836	19.30	0.0851	
		2452	19.50	0.0891	19.41	0.0873	
Maximum Measured Value			**19.50**	**0.0891**	**19.83**	**0.0962**	

MIMO mode(combiner test):

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps	2412	18.30	0.0676	< 1.0
		2437	17.99	0.0630	
		2462	18.45	0.0700	
802.11g	6 Mbps	2412	22.48	0.1770	
		2437	22.20	0.1660	
		2462	22.64	0.1837	
802.11n (HT20)	MCS0	2412	22.41	0.1742	
		2437	22.07	0.1611	
		2462	22.47	0.1766	
802.11n (HT40)	MCS0	2422	22.94	0.1968	
		2437	22.72	0.1871	
		2452	22.84	0.1923	
802.11ax (HE20)	MCS0	2412	23.25	0.2113	
		2437	22.94	0.1968	
		2462	23.26	0.2118	
802.11ax (HE40)	MCS0	2422	23.38	0.2178	
		2437	23.07	0.2028	
		2452	23.29	0.2133	
Maximum Measured Value			**23.38**	**0.2178**	

Note:

1) The cable loss is taken into account in results.
2) Antenna gain(G): 1.41 dBi Max. for ANT1 and 0.58 dBi Max. for ANT2.

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 8 dBm / 3kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	B, C
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

5.1.4 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2)
Basic standard	:	ANSI C63.10: 2013
Limits	:	> 500 kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	B, C
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix B & C.

5.1.5 99% Bandwidth

RESULT: **Pass**

Test Specification

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

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	A, B, C
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A, B & C.

5.1.6 20dB Bandwidth

RESULT: **Pass**

Test Specification

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

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.7 Carrier Frequency Separation

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(1)
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	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	D
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.8 Number of Hopping Frequency

RESULT: **Pass**

Test Specification

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

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	D
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.9 Time of Occupancy

RESULT: **Pass**

Test Specification

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

Test Setup

Date of testing	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	D
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

5.1.10 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d)
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	:	2025-01-14 - 2025-03-20
Input voltage	:	DC 12V
Operation mode	:	A, B, C, D
Test channel	:	Low / Middle / High
Ambient temperature	:	25 ℃
Relative humidity	:	45 %
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 A, B & C.

5.1.11 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

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

Test Setup

Date of testing	:	2025-01-17 to 2025-01-20
Input voltage	:	DC 12V
Operation mode	:	A, B, C
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 A, B & C.

6 Photographs of the Test Set-Up

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

7 List of Tables

Appendix A: Test Results of Bluetooth BR & EDR

Appendix A.1: Test Results of 20dB Bandwidth

Test Result

TestMode	Antenna	Channel	20db EBW[MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.885	2401.550	2402.435	---	PASS
		2441	0.918	2440.553	2441.471	---	PASS
		2480	0.864	2479.547	2480.411	---	PASS
3DH5	Ant1	2402	1.290	2401.358	2402.648	---	PASS
		2441	1.269	2440.355	2441.624	---	PASS
		2480	1.275	2479.355	2480.630	---	PASS

Test Graphs

DH5_Ant1_2402

DH5_Ant1_2441

DH5_Ant1_2480

3DH5_Ant1_2402

3DH5_Ant1_2441

3DH5_Ant1_2480

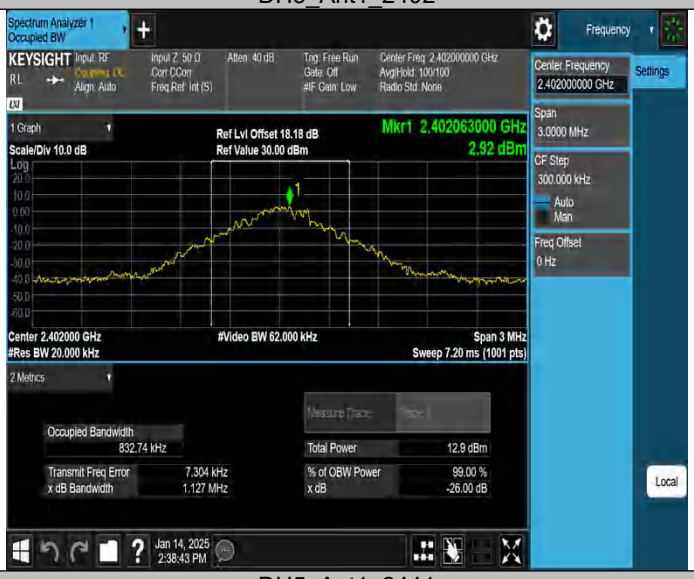
Appendix A.2: Test Results of 99% Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
DH5	Ant1	2402	0.83274	2401.5909	2402.4237	---	PASS
		2441	0.83439	2440.5904	2441.4248	---	PASS
		2480	0.81142	2479.5945	2480.4059	---	PASS
3DH5	Ant1	2402	1.2126	2401.3904	2402.6030	---	PASS
		2441	1.2124	2440.3909	2441.6033	---	PASS
		2480	1.2128	2479.3874	2480.6002	---	PASS

Test Graphs

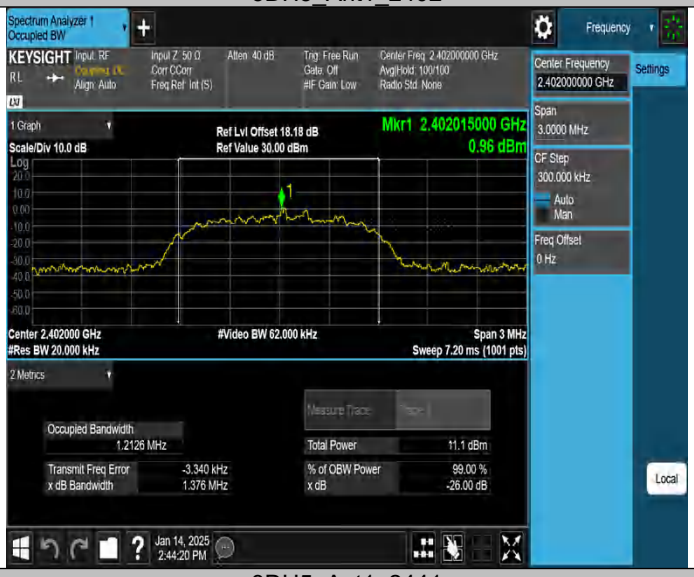
DH5_Ant1_2402



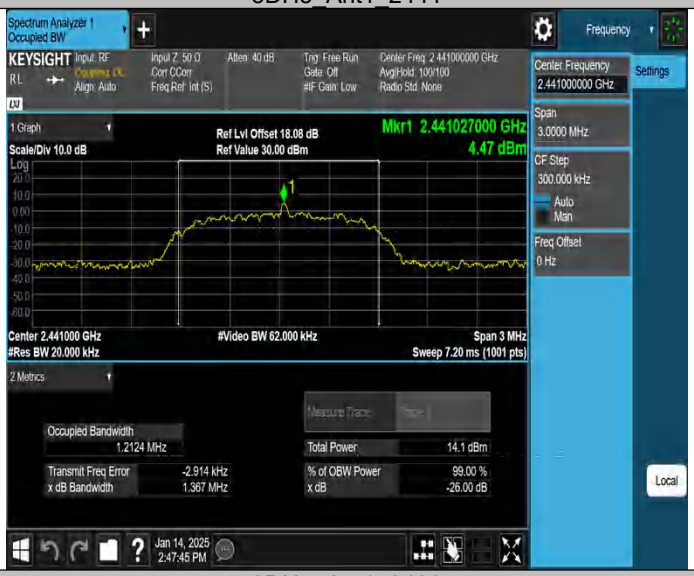
DH5_Ant1_2441

DH5_Ant1_2480

3DH5_Ant1_2402



3DH5_Ant1_2441



3DH5_Ant1_2480

Appendix A.3: Test Results of Carrier Frequency Separation

Test Result

TestMode	Antenna	Channel	Result[MHz]	Limit[MHz]	Verdict
DH5	Ant1	Hop	1.044	≥0.918	PASS
3DH5	Ant1	Hop	1.006	≥0.860	PASS

Test Graphs

DH5_Ant1_Hop

3DH5_Ant1_Hop

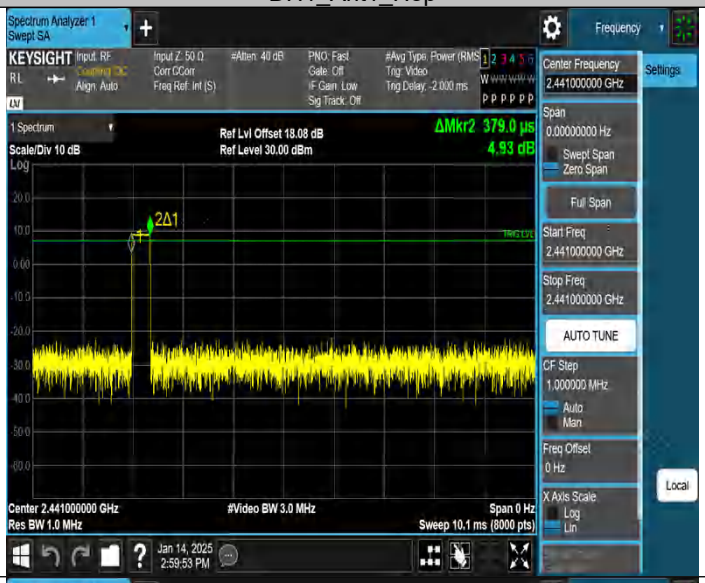
Appendix A.4: Test Results of Time of Occupancy

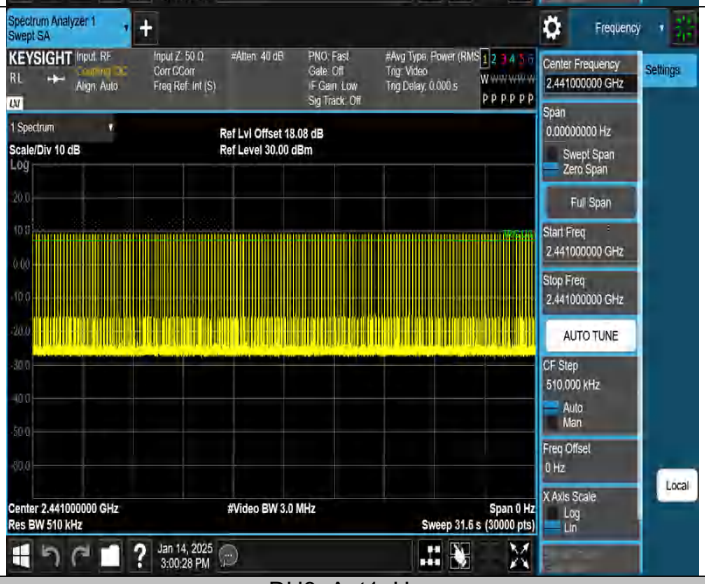
Test Result

TestMode	Antenna	Channel	BurstWidth [ms]	TotalHops [Num]	Result[s]	Limit[s]	Verdict
DH1	Ant1	Hop	0.379	313	0.119	≤0.4	PASS
DH3	Ant1	Hop	1.634	160	0.261	≤0.4	PASS
DH5	Ant1	Hop	2.883	103	0.297	≤0.4	PASS
3DH1	Ant1	Hop	0.384	312	0.12	≤0.4	PASS
3DH3	Ant1	Hop	1.635	153	0.25	≤0.4	PASS
3DH5	Ant1	Hop	2.885	116	0.335	≤0.4	PASS

Test Graphs

DH1_Ant1_Hop

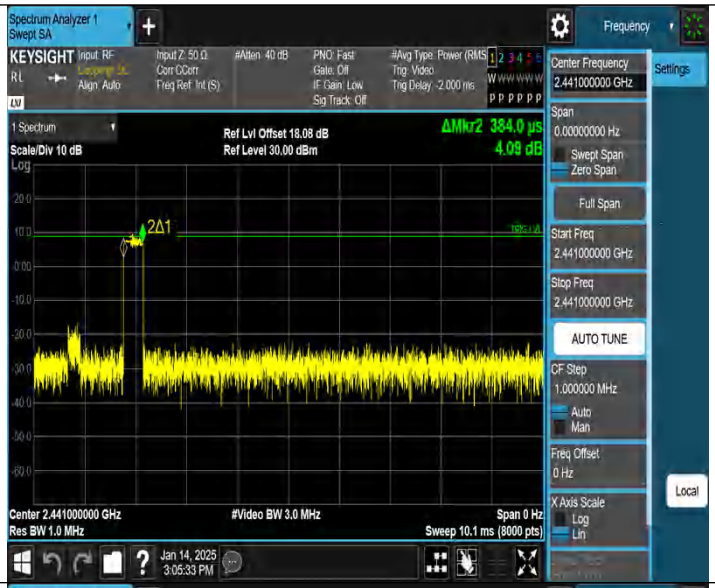




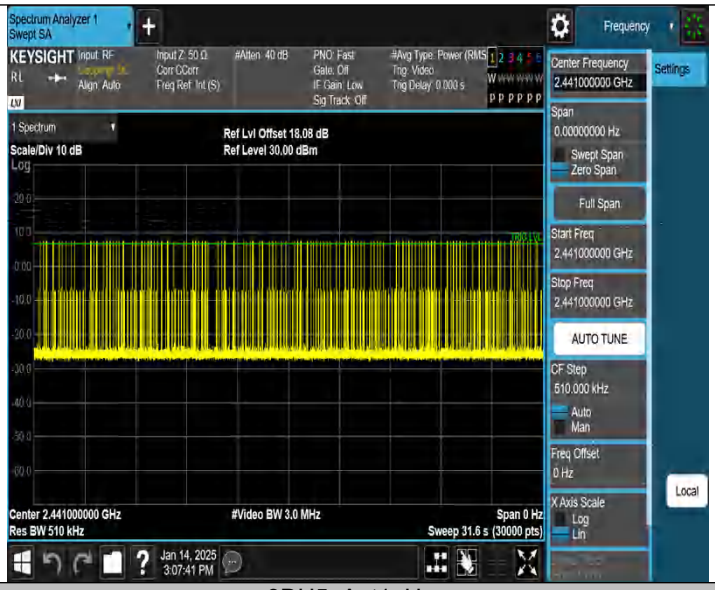
DH3_Ant1_Hop

DH5_Ant1_Hop

3DH1_Ant1_Hop



3DH3_Ant1_Hop



3DH5_Ant1_Hop

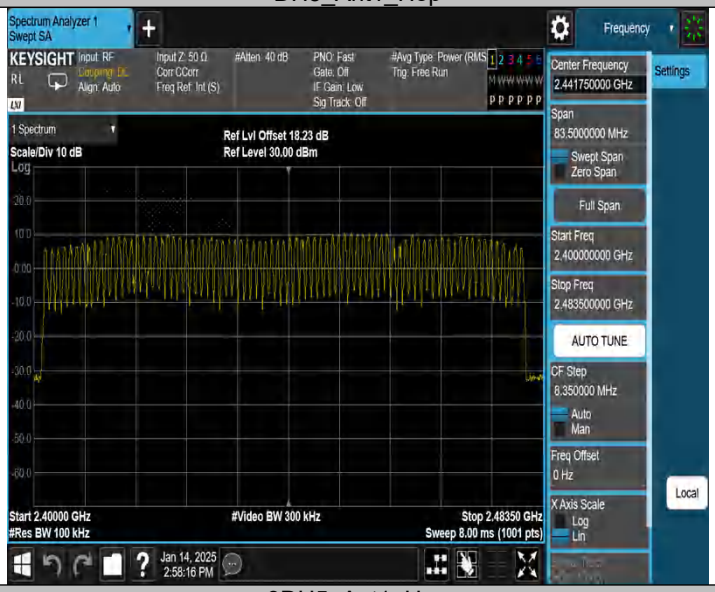
Appendix A.5: Test Results of Number of Hopping Frequency

Test Result

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

Test Graphs

DH5_Ant1_Hop



3DH5_Ant1_Hop

Appendix A.6: Test Results of Band Edge Measurements

Test Result

TestMode	Antenna	ChName	Channel	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	Low	2402	5.71	-44.34	≤-14.29	PASS
		High	2480	6.05	-43.80	≤-13.95	PASS
3DH5	Ant1	Low	2402	3.51	-44.29	≤-16.49	PASS
		High	2480	3.95	-43.53	≤-16.05	PASS
DH5	Ant1	Hopping	2402	5.45	-42.82	≤-14.55	PASS
		Hopping	2480	5.60	-42.73	≤-14.40	PASS
3DH5	Ant1	Hopping	2402	1.09	-43.59	≤-18.91	PASS
		Hopping	2480	1.63	-42.80	≤-18.37	PASS

Test Graphs

DH5_Ant1_Low_2402

DH5_Ant1_High_2480

3DH5_Ant1_Low_2402

3DH5_Ant1_High_2480

DH5_Ant1_Hopping_2402

DH5_Ant1_Hopping_2480

3DH5_Ant1_Hopping_2402

3DH5_Ant1_Hopping_2480

Appendix A.7: Test Results of Conducted Spurious Emission

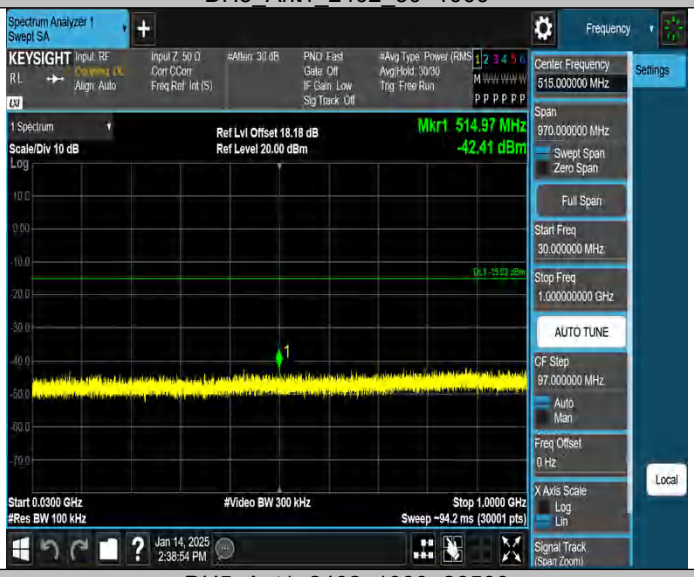
Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
DH5	Ant1	2402	Reference	4.98	4.98	---	PASS
			30~1000	4.98	-42.41	≤-15.02	PASS
			1000~26500	4.98	-32.93	≤-15.02	PASS
		2441	Reference	7.88	7.88	---	PASS
			30~1000	7.88	-41.52	≤-12.12	PASS
			1000~26500	7.88	-33.21	≤-12.12	PASS
		2480	Reference	5.36	5.36	---	PASS
			30~1000	5.36	-41.85	≤-14.64	PASS
			1000~26500	5.36	-32.57	≤-14.64	PASS
3DH5	Ant1	2402	Reference	1.78	1.78	---	PASS
			30~1000	1.78	-42.14	≤-18.22	PASS
			1000~26500	1.78	-33.16	≤-18.22	PASS
		2441	Reference	4.44	4.44	---	PASS
			30~1000	4.44	-42	≤-15.56	PASS
			1000~26500	4.44	-32.45	≤-15.56	PASS
		2480	Reference	2.55	2.55	---	PASS
			30~1000	2.55	-41.34	≤-17.45	PASS
			1000~26500	2.55	-32.65	≤-17.45	PASS

Test Graphs

DH5_Ant1_2402_0~Reference

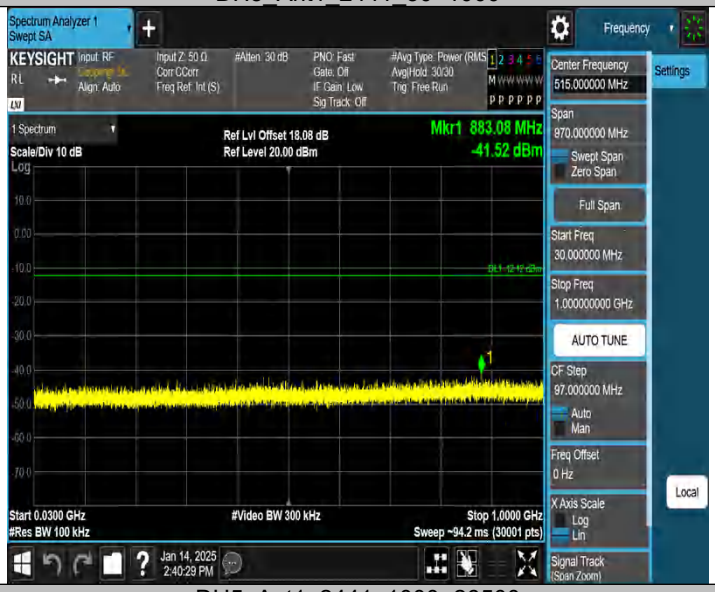
DH5_Ant1_2402_30~1000



DH5_Ant1_2402_1000~26500

DH5_Ant1_2441_0~Reference

DH5_Ant1_2441_30~1000



DH5_Ant1_2441_1000~26500

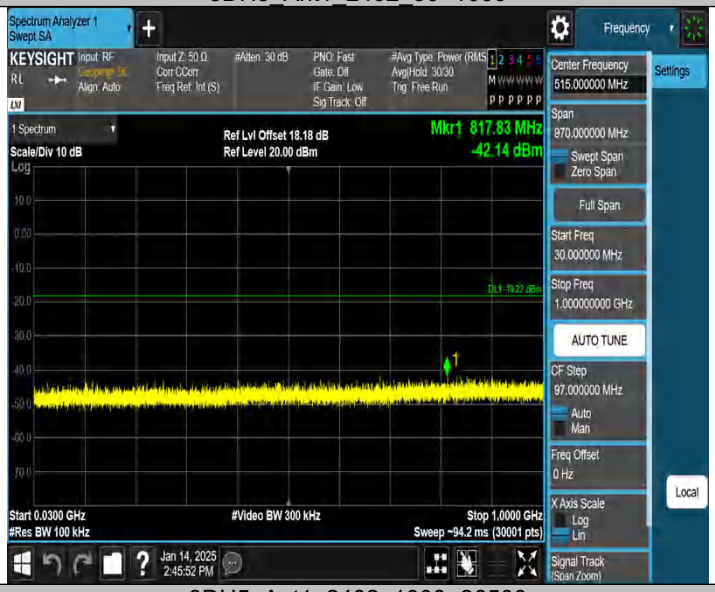
DH5_Ant1_2480_0~Reference

DH5_Ant1_2480_30~1000

DH5_Ant1_2480_1000~26500

3DH5_Ant1_2402_0~Reference

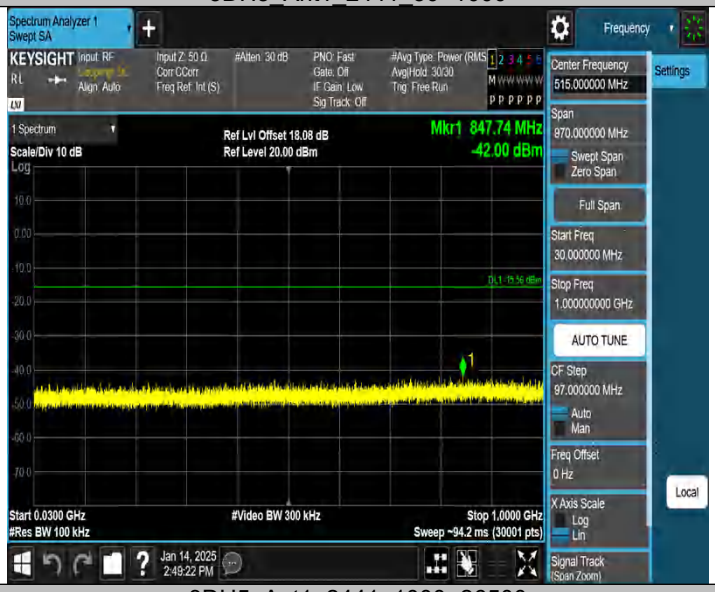
3DH5_Ant1_2402_30~1000



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

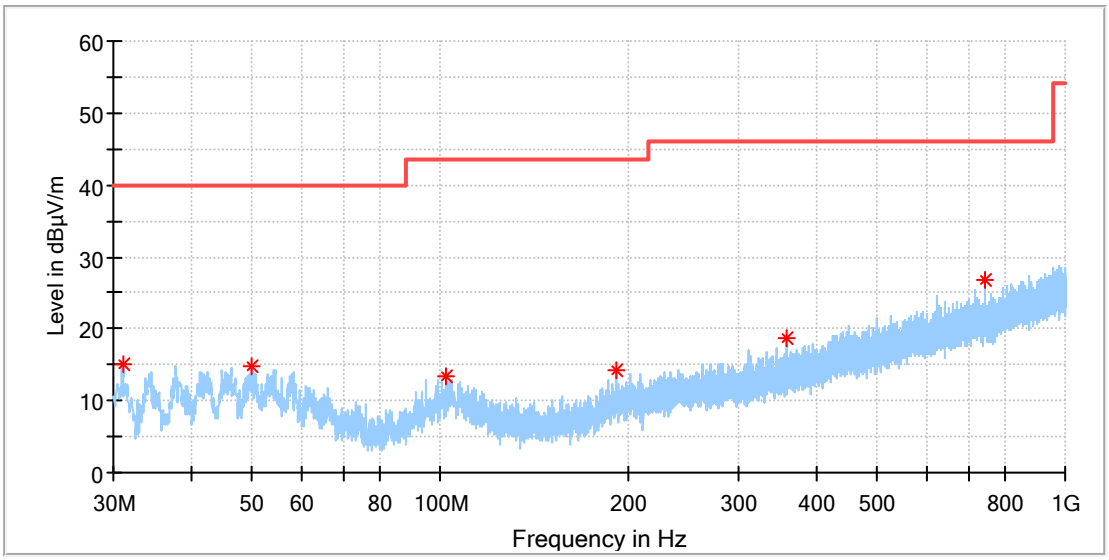

Appendix A.8: Test Results of Radiated Spurious Emissions

Note:
1) This testing was carried out on different modulations, but only the worst case was presented in this report.
2) 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.

30 MHz - 1GHz

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

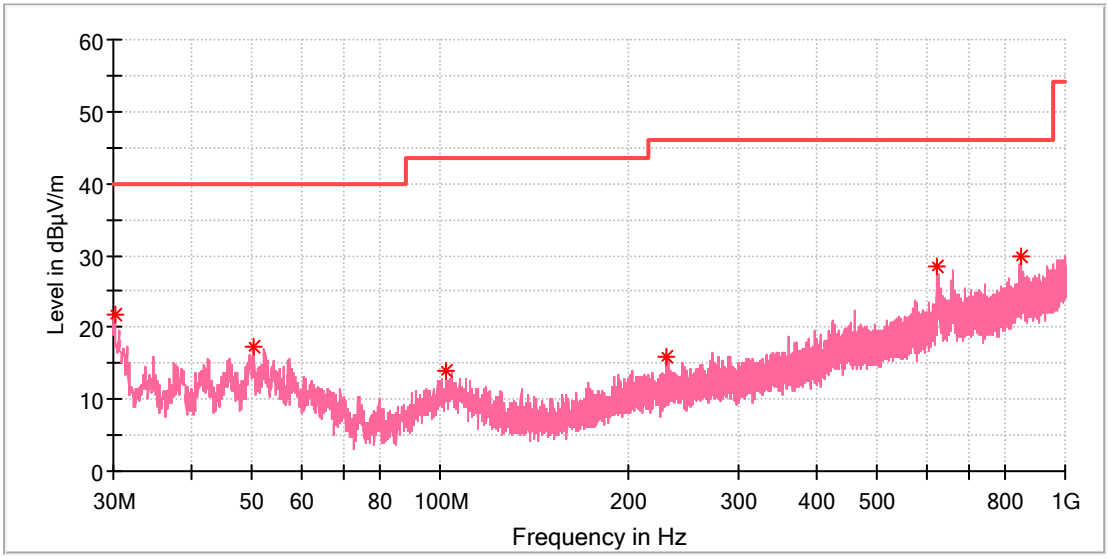
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
31.044615	15.18	40.00	24.82	100.0	H	121.0	-22.9
50.071539	14.91	40.00	25.09	100.0	H	342.0	-18.4
102.190385	13.40	43.50	30.10	100.0	H	319.0	-19.0
191.542308	14.26	43.50	29.24	100.0	H	121.0	-19.5
357.748077	18.84	46.00	27.16	100.0	H	216.0	-14.7
742.502308	26.74	46.00	19.26	100.0	H	6.0	-7.2

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
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)
30.149231	21.87	40.00	18.13	100.0	V	0.0	-23.0
50.444615	17.21	40.00	22.79	100.0	V	245.0	-18.4
101.854615	13.96	43.50	29.54	100.0	V	54.0	-19.0
230.230385	15.96	46.00	30.04	100.0	V	317.0	-18.1
625.020385	28.59	46.00	17.41	100.0	V	173.0	-9.2
853.156923	29.78	46.00	16.22	100.0	V	197.0	-5.3

Final_Result

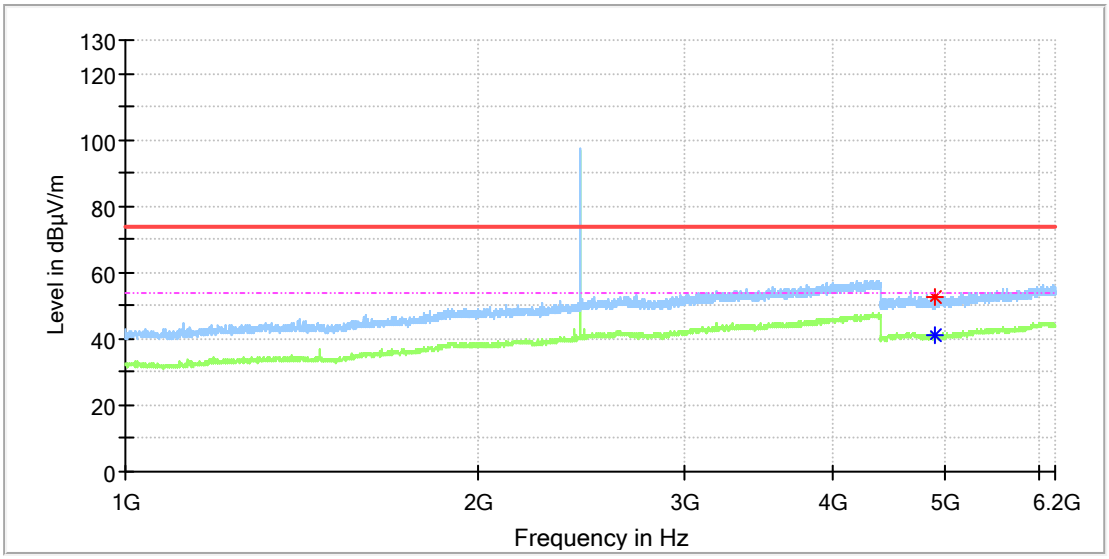
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1GHz - 18GHz

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

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

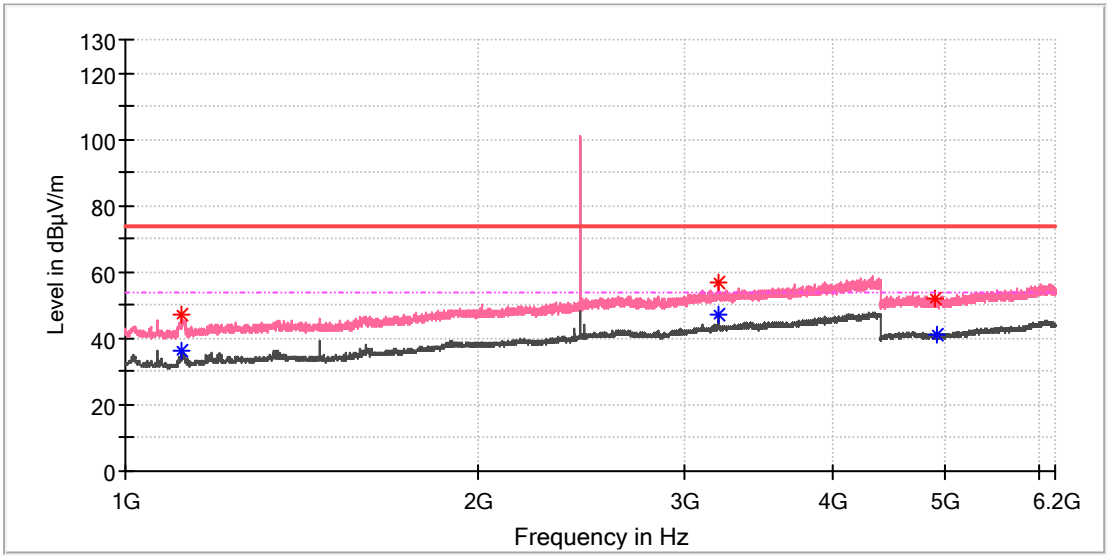
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4893.000000	52.42	---	74.00	21.58	150.0	H	106.0	13.3
4899.500000	---	41.11	54.00	12.89	150.0	H	44.0	13.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

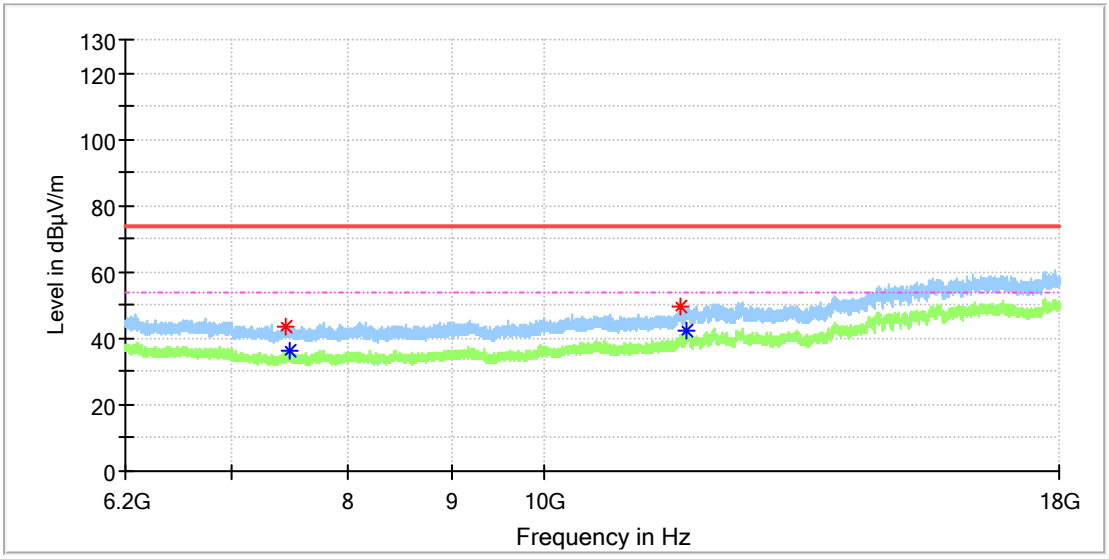
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1116.500000	---	36.05	54.00	17.95	150.0	V	266.0	0.8
1118.000000	47.02	---	74.00	26.98	150.0	V	255.0	0.8
3201.500000	56.58	---	74.00	17.42	150.0	V	338.0	10.8
3201.500000	---	47.08	54.00	6.92	150.0	V	338.0	10.8
4900.000000	51.91	---	74.00	22.09	150.0	V	121.0	13.3
4908.000000	---	41.11	54.00	12.89	150.0	V	108.0	13.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

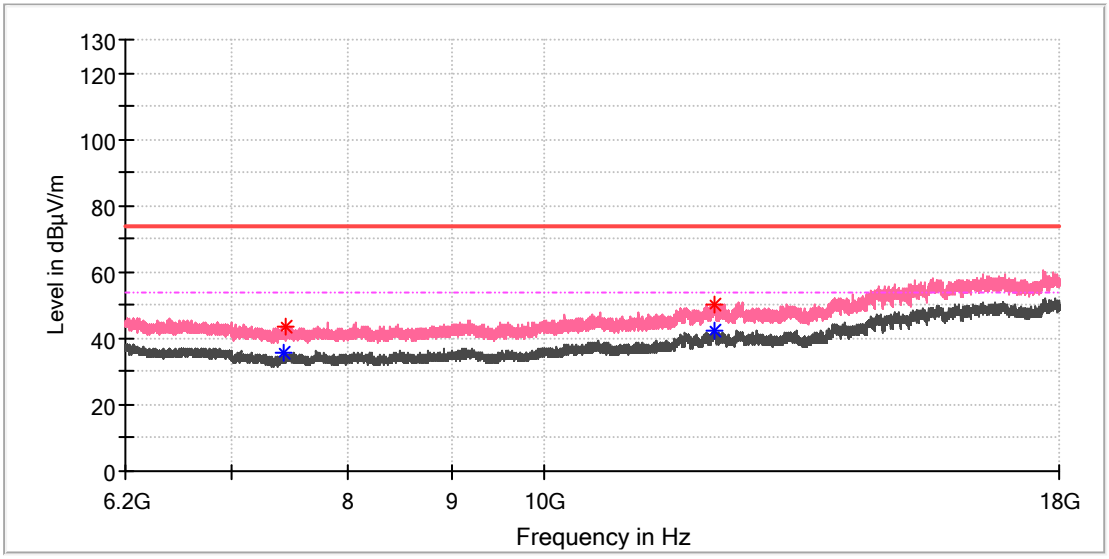
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7444.900000	43.63	---	74.00	30.37	150.0	H	98.0	8.5
7479.808333	---	36.22	54.00	17.78	150.0	H	98.0	8.7
11683.558333	49.64	---	74.00	24.36	150.0	H	59.0	15.1
11766.650000	---	42.03	54.00	11.97	150.0	H	176.0	15.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
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)
7422.775000	---	35.73	54.00	18.27	150.0	V	284.0	8.4
7451.291667	43.58	---	74.00	30.42	150.0	V	306.0	8.5
12135.891667	50.34	---	74.00	23.66	150.0	V	350.0	16.4
12145.233333	---	42.33	54.00	11.67	150.0	V	239.0	16.6

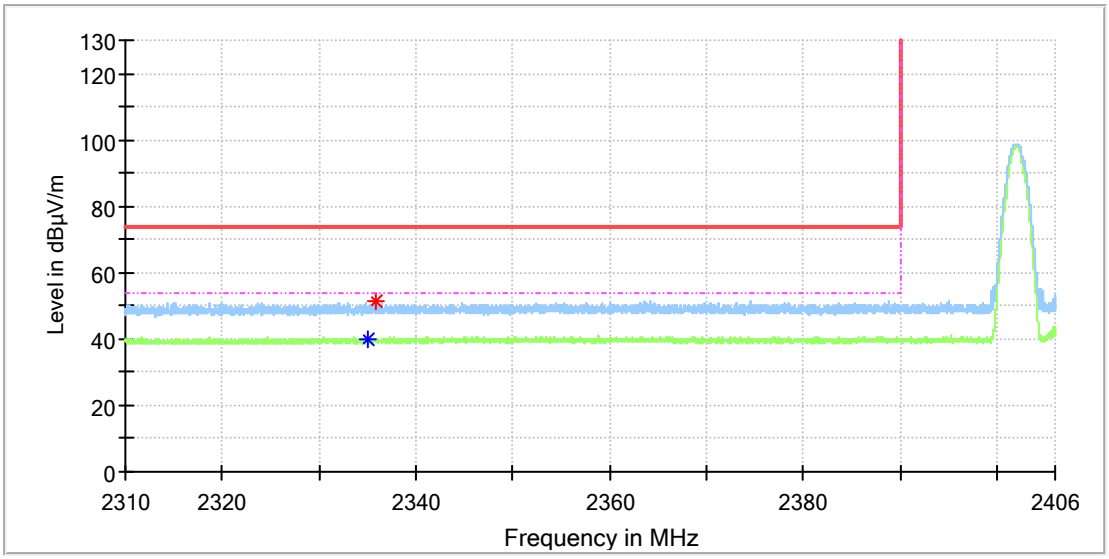
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Appendix A.9: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

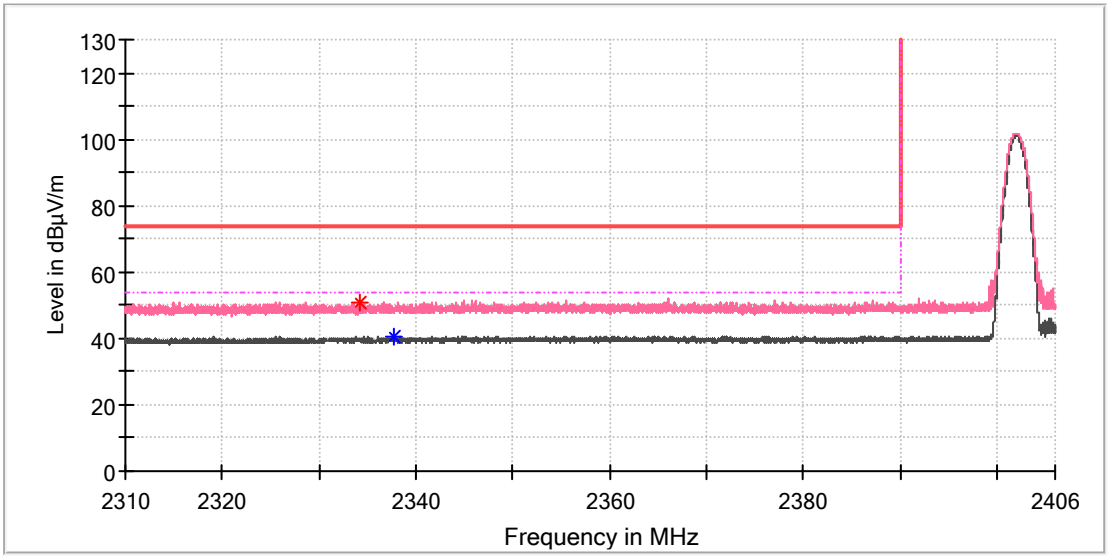
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2335.058824	---	40.12	54.00	13.88	150.0	H	328.0	8.3
2335.948235	51.23	---	74.00	22.77	150.0	H	256.0	8.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_Low channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

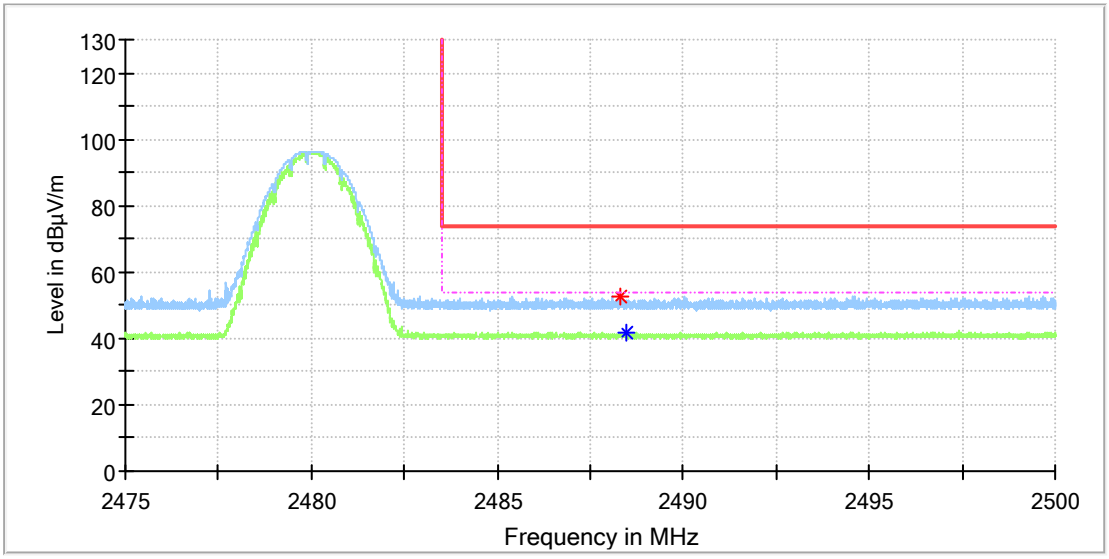
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2334.127059	51.06	---	74.00	22.94	150.0	V	151.0	8.3
2337.712941	---	40.78	54.00	13.22	150.0	V	232.0	8.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

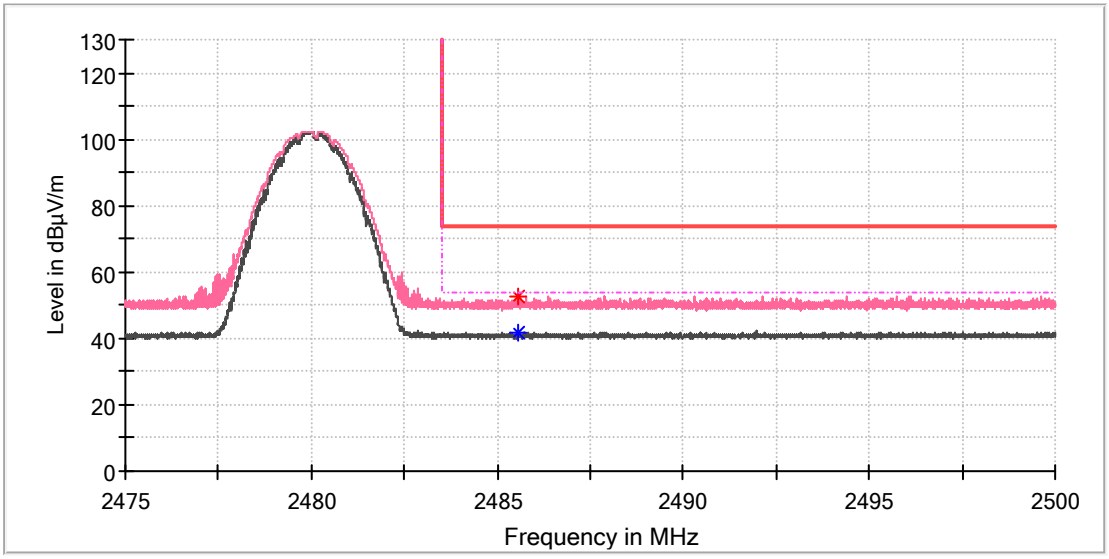
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2488.297794	52.70	---	74.00	21.30	150.0	H	0.0	9.0
2488.455882	---	41.62	54.00	12.38	150.0	H	217.0	9.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BR_DH5_High channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
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)
2485.555147	52.89	---	74.00	21.11	150.0	V	179.0	9.0
2485.569853	---	41.79	54.00	12.21	150.0	V	0.0	9.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Appendix B: Test Results of Bluetooth LE

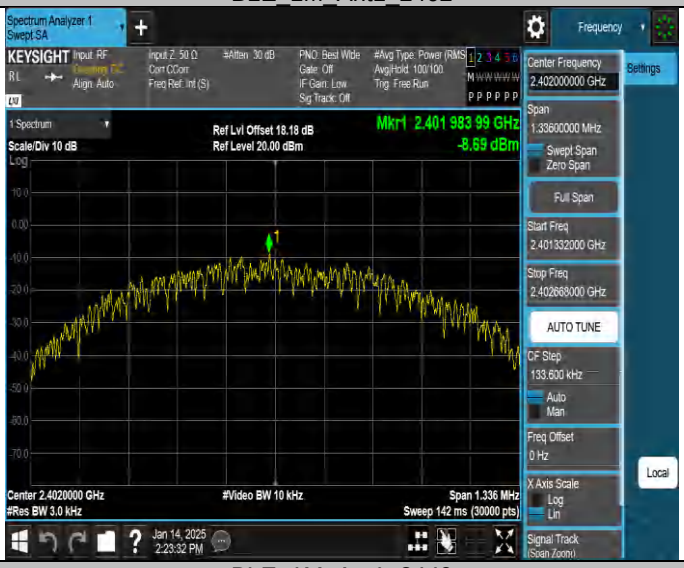
Appendix B.1: Test Results of Conducted Power Spectral Density

Test Result

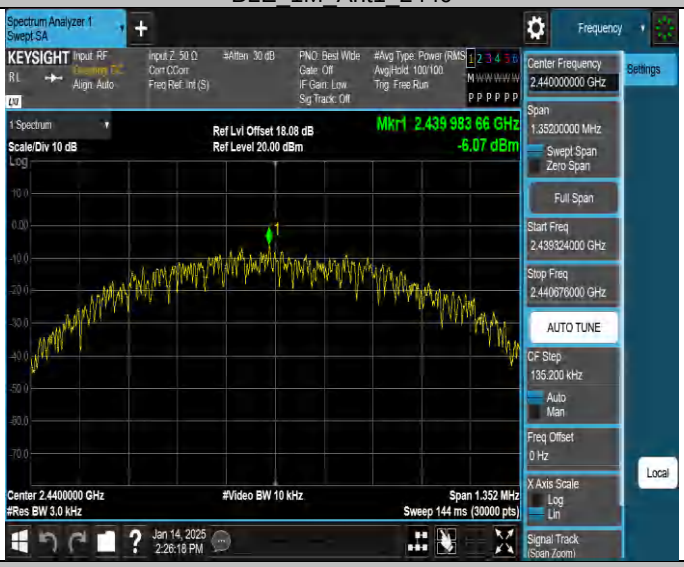
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE_1M	Ant1	2402	-8.69	≤8.00	PASS
		2440	-6.07	≤8.00	PASS
		2480	-8.50	≤8.00	PASS

Test Graphs

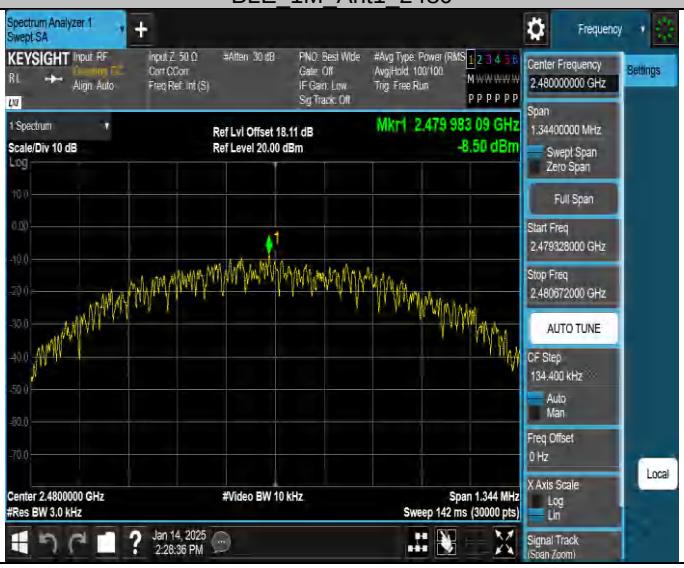
BLE_1M_Ant1_2402



BLE_1M_Ant1_2440



BLE_1M_Ant1_2480



Appendix B.2: Test Results of 6dB Bandwidth

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	0.668	2401.672	2402.340	0.5	PASS
		2440	0.676	2439.664	2440.340	0.5	PASS
		2480	0.672	2479.668	2480.340	0.5	PASS

Test Graphs

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

Appendix B.3: Test Results of 99% Bandwidth

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE_1M	Ant1	2402	1.0316	2401.4998	2402.5314	---	PASS
		2440	1.0247	2439.5061	2440.5308	---	PASS
		2480	1.0302	2479.4958	2480.5260	---	PASS

Test Graphs

BLE_1M_Ant1_2402

BLE_1M_Ant1_2440

BLE_1M_Ant1_2480

Appendix B.4: Test Results of Band Edge Measurements

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	Low	2402	5.06	-46.34	≤-14.95	PASS
		High	2480	5.82	-44.64	≤-14.18	PASS

Test Graphs

BLE_1M_Ant1_Low_2402

BLE_1M_Ant1_High_2480


Appendix B.5: Test Results of Conducted Spurious Emission

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE_1M	Ant1	2402	Reference	5.36	5.36	---	PASS
			30~1000	5.36	-41.09	≤-14.64	PASS
			1000~26500	5.36	-32.81	≤-14.64	PASS
		2440	Reference	8.18	8.18	---	PASS
			30~1000	8.18	-42.7	≤-11.82	PASS
			1000~26500	8.18	-33.07	≤-11.82	PASS
		2480	Reference	5.72	5.72	---	PASS
			30~1000	5.72	-41.9	≤-14.28	PASS
			1000~26500	5.72	-32.82	≤-14.28	PASS

Test Graphs

BLE_1M_Ant1_2402_0~Reference

BLE_1M_Ant1_2402_30~1000

BLE_1M_Ant1_2402_1000~26500

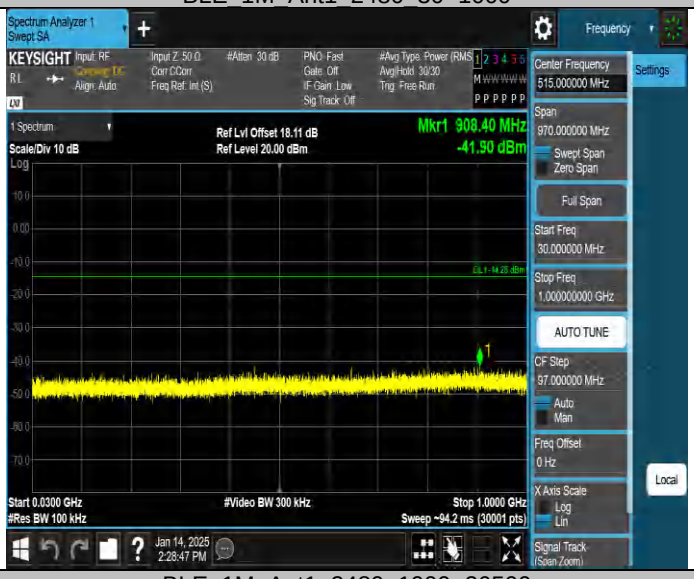
BLE_1M_Ant1_2440_0~Reference

BLE_1M_Ant1_2440_30~1000

BLE_1M_Ant1_2440_1000~26500


BLE_1M_Ant1_2480_0~Reference

BLE_1M_Ant1_2480_30~1000



BLE_1M_Ant1_2480_1000~26500

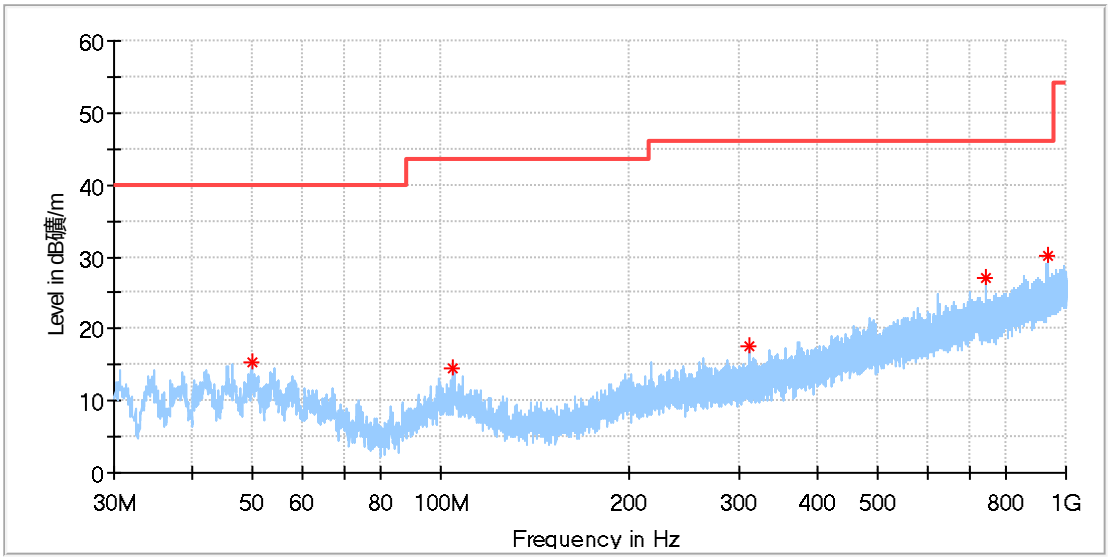
Appendix B.6: Test Results of Radiated Spurious Emissions

Note:
1) This testing was carried out on different modulations, but only the worst case was presented in this report.
2) 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.

30 MHz - 1GHz

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

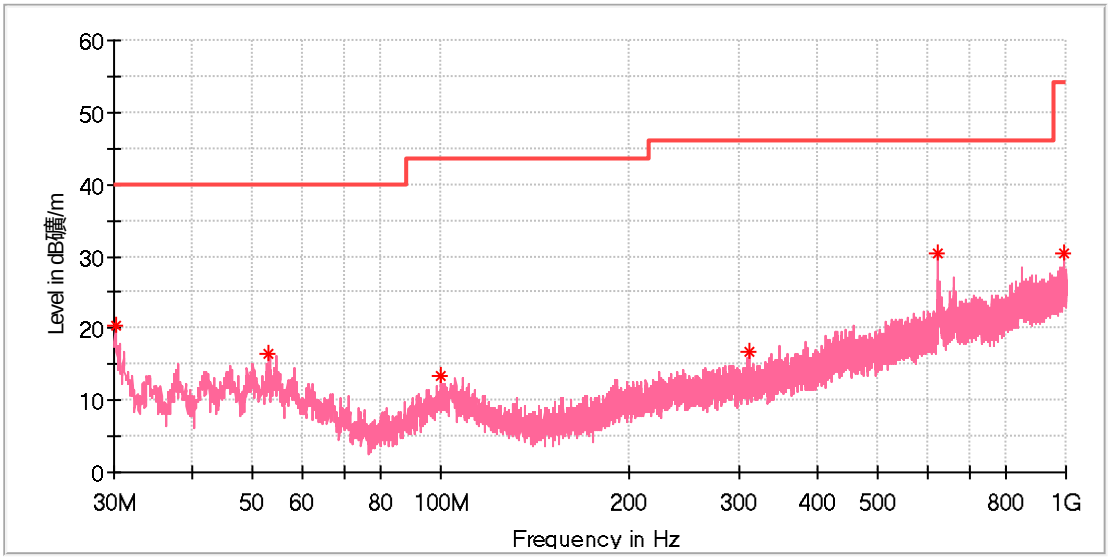
Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.773077	15.21	40.00	24.79	100.0	H	55.0	-18.4
104.391539	14.45	43.50	29.05	100.0	H	5.0	-18.9
312.493846	17.52	46.00	28.48	100.0	H	359.0	-15.9
742.502308	27.08	46.00	18.92	100.0	H	294.0	-7.2
934.226539	30.10	46.00	15.90	100.0	H	31.0	-4.4

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
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)
30.149231	20.44	40.00	19.56	100.0	V	186.0	-23.0
53.130769	16.52	40.00	23.48	100.0	V	103.0	-18.5
100.063846	13.45	43.50	30.05	100.0	V	73.0	-19.1
311.188077	16.83	46.00	29.17	100.0	V	0.0	-16.0
625.020385	30.44	46.00	15.56	100.0	V	216.0	-9.2
994.403846	30.43	54.00	23.57	100.0	V	149.0	-3.5

Final_Result

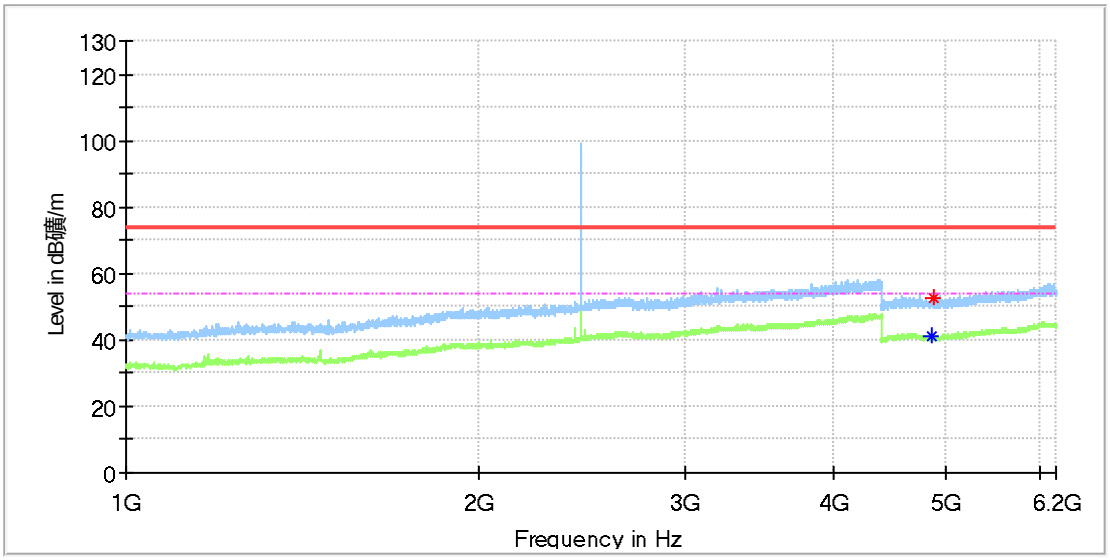
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1GHz - 18GHz

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

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

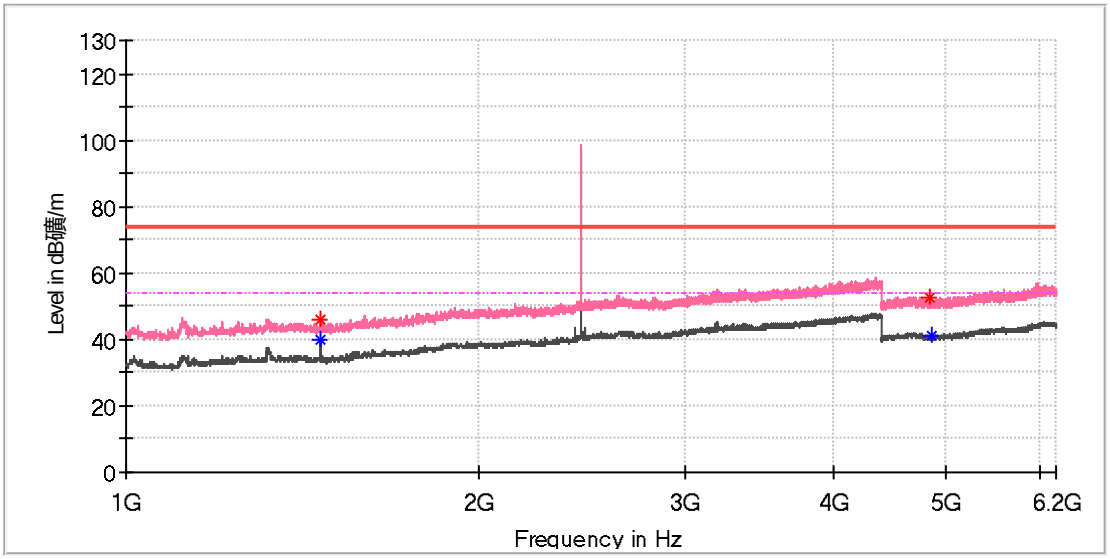
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4863.500000	---	41.24	54.00	12.76	150.0	H	1.0	13.3
4874.000000	52.80	---	74.00	21.20	150.0	H	141.0	13.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

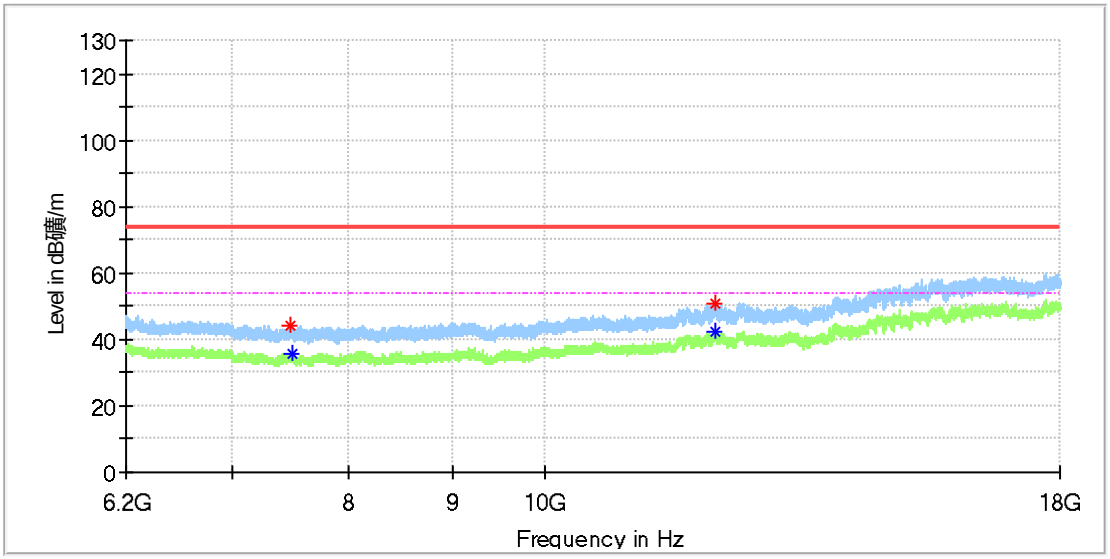
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1464.000000	---	40.18	54.00	13.82	150.0	V	223.0	2.6
1464.500000	45.88	---	74.00	28.12	150.0	V	223.0	2.6
4848.000000	52.34	---	74.00	21.66	150.0	V	166.0	13.3
4854.000000	---	41.23	54.00	12.77	150.0	V	68.0	13.3

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
Test Standard:	FCC 15.247
Tested By:	Kei Zhang
Reviewed By:	Terry Yin



Critical_Freqs

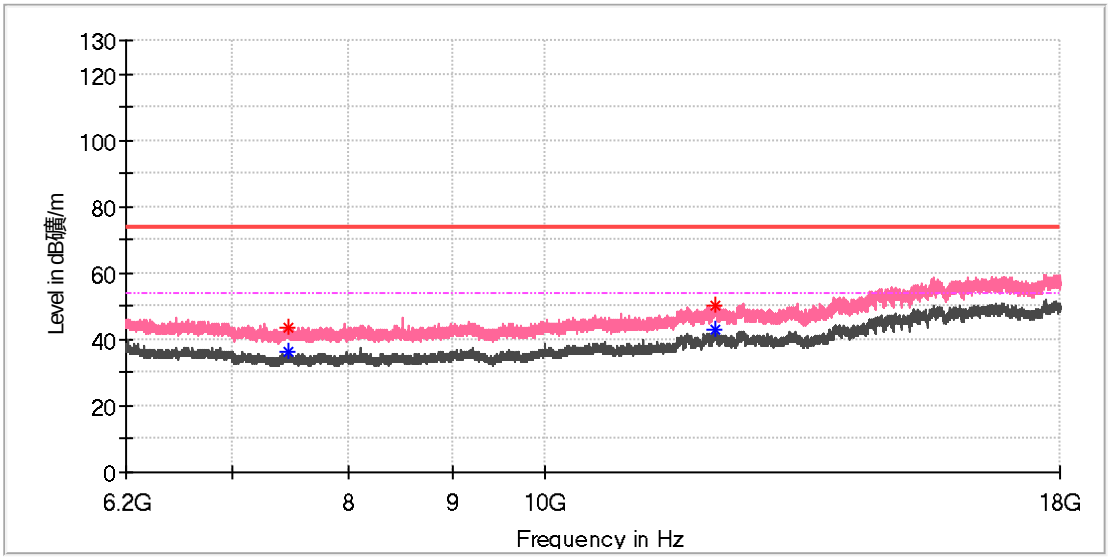
Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7472.925000	43.96	---	74.00	30.04	150.0	H	151.0	8.6
7502.916667	---	35.71	54.00	18.29	150.0	H	141.0	8.7
12152.116667	50.58	---	74.00	23.42	150.0	H	129.0	16.6
12154.575000	---	42.56	54.00	11.44	150.0	H	37.0	16.5

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

EUT Information

EUT Name:	Digital Cockpit Head Unit
Model:	DHU2.5_A
Test Mode:	BLE 1M_Mid channel
Order No/Sample No:	168516757/A003881754-002
Test Voltage:	DC 12V From DC Source
Remark:	Temp 23 Humi:53%
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)
7457.683333	---	36.09	54.00	17.91	150.0	V	286.0	8.5
7468.008333	43.51	---	74.00	30.49	150.0	V	198.0	8.6
12141.791667	49.95	---	74.00	24.05	150.0	V	65.0	16.5
12146.216667	---	42.79	54.00	11.21	150.0	V	112.0	16.6

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---