FCC 47 CFR PART 15 SUBPART C
ISED RSS-247 Issue 2

CERTIFICATION TEST REPORT

For

WLAN+Bluetooth Module

MODEL NUMBER: LBEE5PK2BC

PROJECT NUMBER: 4790016144.1

REPORT NUMBER: 4790016144.1-BC-2

FCC ID: VPYLB2BC

IC: 772C-LB2BC

ISSUE DATE: Aug. 02, 2022

Prepared for

Murata Manufacturing Co., Ltd.

Prepared by

UL-CCIC COMPANY LIMITED
No. 2, Chengwan Road, Suzhou Industrial Park, People's Republic of China
Tel: +86 512-6808 6400
Fax: +86 512-6808 4099
Website: www.ul.com

Revision History

Rev.	Issue Date	Revisions	Revised By
V0	08/02/2022	Initial Issue	

1. Introduction

LBEE5PK2BC and LBEE5PK2AE have identical PCB layout, antenna, SW implementation for Bluetooth and Wi-Fi. Based on their similarity, the FCC Part 15C (equipment class: DTS), Part 15E (equipment class: NII) test data issued data of VPYLB2AE references the text data of existing report.

The applicant takes full responsibility that the test data referenced below represents compliance for this FCC ID.

2. Differences

LBEE5PK2BC and LBEE5PK2AE have identical PCB layout, antenna, SW implementation for Bluetooth and Wi-Fi. The two models are identical except for the operation temperature declared by the client.

3. Spot Check Verification Data Section

The two models are identical except for the operation temperature declared by the client, according to general guidance of KDB 484596 D01(please refer to clause 1). a) b) c)), we used all the original test data to apply the new FCC ID for VPYLB2BC (IC: 772C-LB2BC), but added the conducted output power, conducted spurious emission spot check and radiated spurious emission worst case test in this report to demonstrate that the referenced test data remains valid for the new device.

4. Reference Section

The Murata Manufacturing Co., Ltd. takes full responsibility that the test data as referenced table 1 below represents compliance for FCC ID: LBEE5PK2BC.

[Table 1]

Data type	FCC Rule Parts	Operating Frequency rage (MHz)	Technology	Test Report No.
Reference data	15C	2402 - 2480	Bluetooth	4790016144.1-AE-1
	15C	2402 - 2480	Bluetooth LE	4790016144.1-AE-2
	15C	2412 - 2472	WLAN 802.11b/g/n	4790016144.1-AE-3
	15E	5180-5825	WLAN 802.11a/n/ac	4790016144.1-EA-4

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

Applicant Information

Company Name:	Murata Manufacturing Co., Ltd.
Address:	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan

Manufacturer Information

Company Name:	Murata Manufacturing Co., Ltd.
Address:	10-1, Higashikotari 1-chome, Nagaokakyo-shi, Kyoto 617-8555, Japan

EUT Description

Product Name:	WLAN+Bluetooth Module
Model Name:	LBEE5PK2BC
Sample Number:	4059724
Data of Receipt Sample:	Jul. 12, 2021
Date Tested:	Jul. 23, 2021 ~ Aug. 02, 2022

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	PASS
ISED RSS-247 Issue 2	PASS
ISED RSS-GEN Issue 5	PASS

Summary of Test Results			
Clause	**Test Items**	**FCC/ISED Rules**	**Test Results**
1	Conducted Output Power Spot Check	FCC 15.247 (b) (1) RSS-247 Clause 5.1 (b)	Pass
2	Conducted Bandedge Spot Check	FCC 15.247 (d) RSS-247 Clause 5.5	Pass
3	Radiated Band edges and Spurious emission	FCC 15.247 (d) FCC 15.209 FCC 15.205 RSS-247 Clause 5.5 RSS-GEN Clause 8.9 RSS-GEN Clause 8.10	Pass
4	Conducted Emission Test for AC Power Port	FCC 15.207 RSS-GEN Clause 8.8	Pass
5	Antenna Requirement	FCC 15.203 RSS-GEN Clause 6.8	Pass
Note: The measurement result for the sample received is <Pass> according to < ANSI C63.10-2013, FCC CFR 47 Part 2, FCC CFR 47 Part 15C, ISED RSS-GEN, ISED RSS-247> when <Accuracy Method> decision rule is applied.			

Prepared By:

Tom Tang

Tom Tang

Reviewed By:

Leon Wu

Leon Wu

Authorized By:

Chris Zhong

Chris Zhong
Laboratory Leader

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with KDB 558074 D01 15.247 Meas Guidance v05r02, 414788 D01 Radiated Test Site v01r01, CFR 47 FCC Part 2, CFR 47 FCC Part 15, ANSI C63.10-2013, ISED RSS-247 Issue 2 and ISED RSS-GEN Issue 5.

3. FACILITIES AND ACCREDITATION

Accreditation Certificate	**A2LA (Certificate No.: 4829.01)** **UL-CCIC COMPANY LIMITED has been assessed and proved to be in compliance with A2LA.** **FCC (FCC Designation No.: CN1247)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.** **IC (IC Designation No.: 25056; CAB No.: CN0073)** **UL-CCIC COMPANY LIMITED has been recognized to perform compliance testing on equipment subject to the Commission's Declaration of Conformity (DoC) and Certification rules.**

Note 1: All tests measurement facilities use to collect the measurement data are located at No. 2, Chengwan Road, Suzhou Industrial Park, Suzhou 215122, People's Republic of China

Note 2: For below 30MHz, lab had performed measurements at test anechoic chamber and comparing to measurements obtained on an open field site. These measurements below 30MHz had been correlated to measurements performed on an OFS.

Note 3: The test anechoic chamber in UL-CCIC COMPANY LIMITED had been calibrated and compared to the open field sites and the test anechoic chamber is shown to be equivalent to or worst case from the open field site.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations and is traceable to recognized national standards.

4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Uncertainty
Conduction emission	3.1dB
Radiation Emission test (include Fundamental emission) (9kHz-30MHz)	3.4dB
Radiation Emission test (include Fundamental emission) (30MHz-1GHz)	3.4dB
Radiation Emission test (1GHz to 26GHz) (include Fundamental emission)	3.9dB (1GHz-18GHz)
	4.2dB (18GHz-26.5GHz)
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

Product Name:	WLAN+Bluetooth Module		
Model No.:	LBEE5PK2BC		
Technology	Bluetooth – BR & EDR		
Transmit Frequency Range	2402 MHz ~ 2480 MHz		
Mode	Basic Rate		Enhanced Data Rate
Modulation	GFSK	∏/4-DQPSK	8DPSK
Packet Type (Maximum Payload):	DH5	2DH5	3DH5
Data Rate	1 Mbps	2 Mbps	3 Mbps
Rated Input	DC 3.3V		
Test software of EUT:	Cybluetool (manufacturer declare)		
Antenna Type:	Type 1: PCB Antenna Type 2: External Dipole Antenna		
Antenna Gain:	Type 1: 3.0 dBi for 2.4G band; 3.3 dBi for 5G band Type 2: 3.4 dBi for 2.4G band; 4.75 dBi for 5G band		
	Note: 1. The product has only one transmission chain and two antenna types are provided. 2. This data is provided by customer and our lab isn't responsible for this data.		

5.2. MAXIMUM OUTPUT POWER

Test Mode	Frequency (MHz)	Channel Number	Maximum Output Power (dBm)
GFSK	2402 ~ 2480	0-78[79]	6.71
∏/4-DQPSK	2402 ~ 2480	0-78[79]	4.27
8DPSK	2402 ~ 2480	0-78[79]	4.29

5.3. PACKET TYPE CONFIGURATION

Test Mode	Packet Type	Setting (Packet Length)
GFSK	DH1	27
	DH3	183
	DH5	339
∏/4-DQPSK	2-DH1	54
	2-DH3	367
	2-DH5	679
8DPSK	3-DH1	83
	3-DH3	552
	3-DH5	1021

5.4. CHANNEL LIST

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	20	2422	40	2442	60	2462
01	2403	21	2423	41	2443	61	2463
02	2404	22	2424	42	2444	62	2464
03	2405	23	2425	43	2445	63	2465
04	2406	24	2426	44	2446	64	2466
05	2407	25	2427	45	2447	65	2467
06	2408	26	2428	46	2448	66	2468
07	2409	27	2429	47	2449	67	2469
08	2410	28	2430	48	2450	68	2470
09	2411	29	2431	49	2451	69	2471
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	/	/

5.5. TEST CHANNEL CONFIGURATION

Test Mode	Test Channel	Frequency
GFSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
∏/4-DQPSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
8DPSK	CH 0(Low Channel), CH 39(MID Channel), CH 78(High Channel)	2402 MHz, 2441 MHz, 2480 MHz
GFSK	Hopping	2402 MHz ~ 2480 MHz
∏/4-DQPSK	Hopping	2402 MHz ~ 2480 MHz
8DPSK	Hopping	2402 MHz ~ 2480 MHz

5.6. WORST-CASE CONFIGURATIONS

Test Mode	Modulation Technology	Modulation Type	Data Rate	Packet Type
BR	FHSS	GFSK	1Mbit/s	DH5
EDR	FHSS	∏/4-DQPSK	2Mbit/s	2DH5
EDR	FHSS	8DPSK	3Mbit/s	3-DH5

5.7. THE WORSE CASE POWER SETTING PARAMETER

The Worse Case Power Setting Parameter under 2400 ~ 2483.5 MHz Band				
Test Software		Cybluetool		
Test Mode	Transmit Antenna Number	Test Software Setting Value		
		CH 00	CH 39	CH 78
GFSK	1	Index 0	Index 0	Index 0
∏/4-DQPSK	1	Index 0	Index 0	Index 0
8DPSK	1	Index 0	Index 0	Index 0

5.8. DESCRIPTION OF AVAILABLE ANTENNAS

Ant.	Frequency (MHz)	Antenna Type	Antenna Gain (dBi)
1	2400-2483.5	PCB Antenna	3.0
		External Dipole Antenna	3.4

Note: This data is provided by customer and our lab isn't responsible for this data.

Test Mode	Transmit and Receive Mode	Description
GFSK	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.
8DPSK	☒1TX, 1RX	Antenna 1 can be used as transmitting/receiving antenna.

5.9. TEST ENVIRONMENT

Environment Parameter	Selected Values During Tests	
Relative Humidity	55 ~ 65%	
Atmospheric Pressure:	101kPa	
Temperature	TN	23 ~ 28°C
Voltage:	VL	N/A
	VN	DC 3.3V
	VH	N/A

Note: VL= Lower Extreme Test Voltage
VN= Nominal Voltage
VH= Upper Extreme Test Voltage
TN= Normal Temperature

5.10. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Item	Equipment	Brand Name	Model Name	Description
1	Laptop	ThinkPad	E590	/
2	DC Power Supply	Tektronix	PWS2326	INPUT: AC 230V OUTPUT: 0-32V, 6A

I/O PORT

Cable No	Port	Connector Type	Cable Type	Cable Length(m)	Remarks
1	RJ45	RJ45	LAN	100cm Length	/

ACCESSORY

Item	Accessory	Brand Name	Model Name	Description
1	/	/	/	/

TEST SETUP

The EUT can work in an engineer mode with a software through a table PC.

SETUP DIAGRAM FOR TESTS

5.11. MEASURING INSTRUMENT AND SOFTWARE USED

Conducted Emissions (Instrument)							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	EMI Test Receiver	R&S	ESR3	126700	2020-12-05	2021-12-04	2022-12-03
☑	Two-Line V-Network	R&S	ENV216	126701	2020-12-05	2021-12-04	2022-12-03
☑	Artificial Mains Networks	R&S	ENY81	126711	2020-10-13	2021-10-12	2022-10-11

Software					
Used	Description	Manufacturer	Name	Version	
☑	Test Software for Conducted disturbance	R&S	EMC32	Ver. 9.25	

Radiated Emissions (Instrument)							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	155727	2021-05-09	2022-04-09	2023-04-08
☑	EMI test receiver	R&S	ESR26	126703	2020-12-05	2021-12-04	2022-12-03
☑	Receiver Antenna (9kHz-30MHz)	Schwarzbeck	FMZB 1513	155456	2018-06-15	2021-06-03	2024-06-02
☑	Receiver Antenna (30MHz-1GHz)	SunAR RF Motion	JB1	177821	2019-01-19	2022-01-18	2025-01-17
☑	Receiver Antenna (1GHz-18GHz)	R&S	HF907	126705	2019-01-27	2022-02-28	2025-02-27
☑	Receiver Antenna (18GHz-26.5GHz)	Schwarzbeck	BBHA9170	126706	2019-02-29	2022-02-28	2025-02-27
☑	Pre-amplification (To 18GHz)	Compliance Direction System Inc.	PAP-1G18-50	178825	2021-03-26	2022-03-01	2023-02-28
☑	Pre-amplification (To 26.5GHz)	R&S	SCU-26D	135391	2020-12-05	2021-12-04	2022-12-03
☑	Band Reject Filter	Wainwright	WRCJV8-2350-2400-2483.5-2533.5-40SS	1	2021-05-09	2022-05-08	2023-05-07
☑	Highpass Filter	Wainwright	WHKX10-2700-3000-18000-40SS	2	2021-05-09	2022-05-08	2023-05-07

Software					
Used	Description	Manufacturer	Name	Version	
☑	Test Software for Radiated disturbance	Tonscend	TS+	Ver. 2.5	

Other instruments							
Used	Equipment	Manufacturer	Model No.	Serial No.	Upper Last Cal.	Last Cal.	Next Cal.
☑	Spectrum Analyzer	Keysight	N9010B	155368	2021-05-09	2022-05-08	2023-05-07
☑	Power Meter	Keysight	U2021XA	155370	2021-05-09	2022-05-08	2023-05-07

6. ANTENNA PORT TEST RESULTS

6.1. CONDUCTED OUTPUT POWER

LIMITS

FCC Part15 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
CFR 47 FCC 15.247 (b) (1) ISED RSS-247 Clause 5.4 (b)	Output Power	Hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel: 1 watt or 30 dBm; Hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel: 125 mW or 21 dBm	2400-2483.5

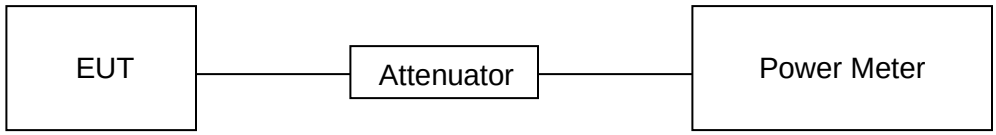
TEST PROCEDURE

Place the EUT on the table and set it in the transmitting mode.
Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the Power sensor.
Measure the power of each channel.
PK Detector used for PK result.

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

TEST SETUP



TEST RESULTS

SPOT CHECK VERIFICATION SUMMERY

Test Mode	Test Channel	Maximum Conducted Output Power (PK)		Delta
		Original Model	Spot Check Model	
		dBm	dBm	dBm
DH5	LCH	5.20	5.27	0.07
	MCH	5.77	5.74	-0.03
	HCH	6.77	6.71	-0.06
2DH5	LCH	3.25	3.15	-0.10
	MCH	3.81	3.83	0.02
	HCH	4.29	4.27	-0.02
3DH5	LCH	3.10	3.21	0.11
	MCH	3.76	3.79	0.03
	HCH	4.25	4.29	0.04

Conclusion:
The spot check test result show that the new devices still comply with the standard and the new test result was close to the original test result, so it can demonstrate that the referenced test data remains valid for the new device.

6.2. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

LIMITS

FCC Part15 (15.247), Subpart C		
Section	Test Item	Limit
CFR 47 FCC §15.247 (d) ISED RSS-247 5.5	Conducted Bandedge and Spurious Emissions	20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power

TEST PROCEDURE

Refer to FCC KDB 558074, connect the UUT to the spectrum analyser and use the following settings:

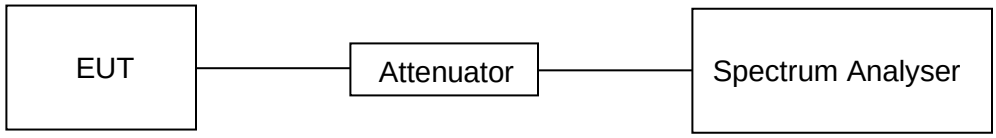
Center Frequency	The centre frequency of the channel under test
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
Span	1.5 x DTS bandwidth
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum PSD level.

Span	Set the center frequency and span to encompass frequency range to be measured
Detector	Peak
RBW	100 kHz
VBW	≥3 × RBW
measurement points	≥span/RBW
Trace	Max hold
Sweep time	Auto couple.

Use the peak marker function to determine the maximum amplitude level**.**

TEST SETUP



TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

TEST RESULT

SPOT CHECK VERIFICATION SUMMERY

Test Item	Test Mode	Test Channel	Worst Case Test Result		Delta
			Original Model	Spot Check Model	
		MHz	dBm	dBm	dBm
Conducted Bandedge	2DH5	2402	-56.89	-55.33	1.56
Spurious Emission	2DH5	2402	-52.78	-53.18	-0.40

Conclusion:
The spot check test result show that the new devices still comply with the standard and the new test result was close to the original test result, so it can demonstrate that the referenced test data remains valid for the new device.

PART 1: REFERENCE LEVEL MEASUREMENT

TEST RESULTS TABLE

Test Mode	Test Channel	Result[dBm]
2DH5	LCH	0.24

TEST GRAPHS

Test Mode	Channel
2DH5	LCH

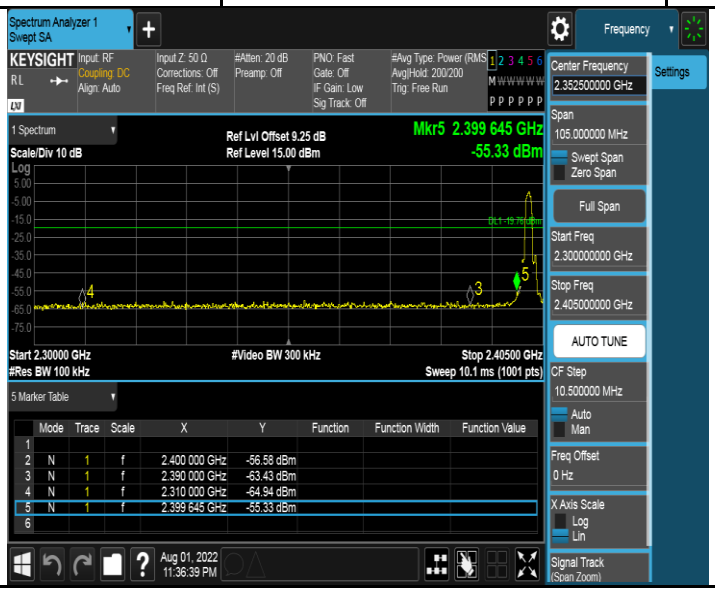
PART 2: CONDUCTED BANDEDGE

TEST RESULTS TABLE

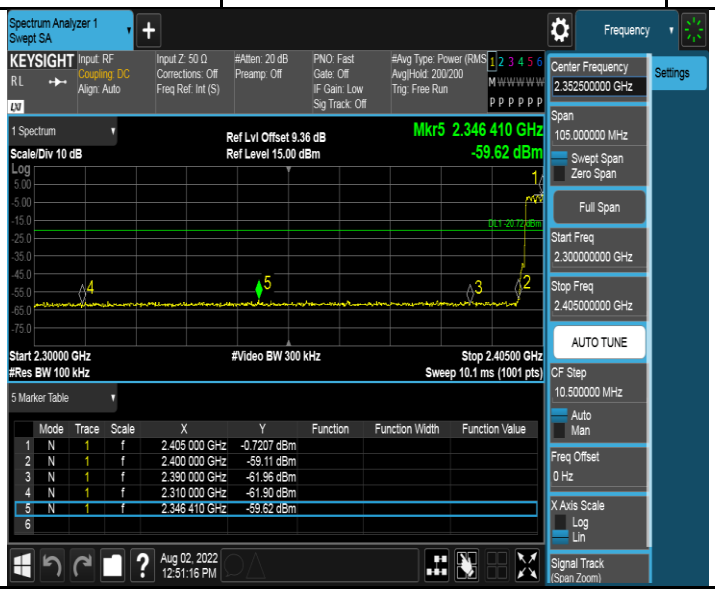
Test Mode	Test Channel	Result	Verdict
2DH5	LCH	Refer to the Test Graph	PASS

TEST GRAPHS

Test Mode	Test Channel	Verdict
2DH5	LCH	PASS



Test Mode	Test Channel	Verdict
2DH5	Hop_LCH	PASS



PART 3: CONDUCTED SPURIOUS EMISSION

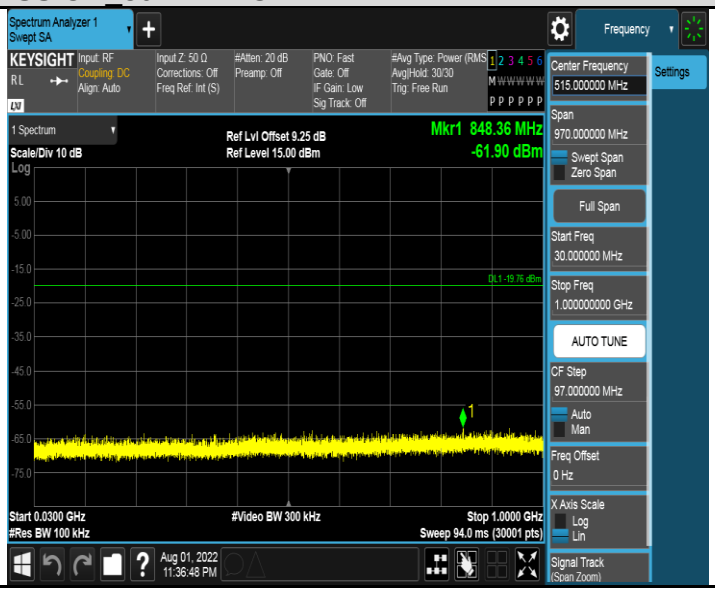
TEST RESULTS TABLE

Test Mode	Test Channel	Result	Verdict
2DH5	LCH	Refer to the Test Graph	PASS

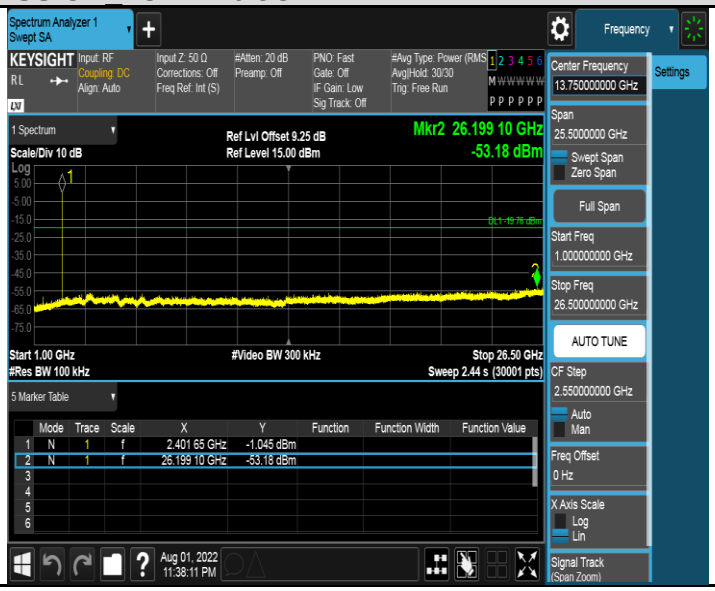
TEST GRAPHS

Test Mode	Channel	Verdict
2DH5	LCH	PASS

LCH SPURIOUS EMISSION_30MHz~1GHz



LCH SPURIOUS EMISSION_1GHz~26.5GHz



6.3. RADIATED TEST RESULTS

6.3.1. LIMITS AND PROCEDURE

LIMITS

Please refer to FCC §15.205 and §15.209, ISED RSS-247 Clause 5.5, ISED RSS-GEN Clause 8.9&6.13 (Transmitter)
Radiation Disturbance Test Limit for ISED (9kHz-1GHz)

Except where otherwise indicated in the applicable RSS, radiated emissions shall comply with the field strength limits shown in table 5 and table 6. Additionally, the level of any transmitter unwanted emission shall not exceed the level of the transmitter's fundamental emission.

Table 5 – General field strength limits at frequencies above 30 MHz

Frequency (MHz)	Field strength (μV/m at 3 m)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 6 – General field strength limits at frequencies below 30 MHz

Frequency	Magnetic field strength (H-Field) (μA/m)	Measurement distance (m)
9 - 490 kHz[Note 1]	6.37/F (F in kHz)	300
490 - 1705 kHz	63.7/F (F in kHz)	30
1.705 - 30 MHz	0.08	30

Note 1: The emission limits for the ranges 9-90 kHz and 110-490 kHz are based on measurements employing a linear average detector.

Please refer to FCC KDB 558074

Radiation Disturbance Test Limit for FCC (Class B) (9kHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.

Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

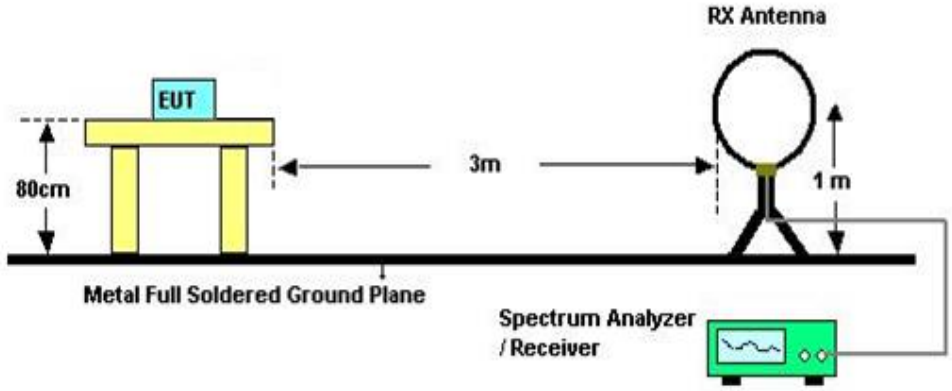
Restricted bands of operation

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
[1]0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	([2])
13.36-13.41			

Note: [1]Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2]Above 38.6c

TEST SETUP AND PROCEDURE

Below 30MHz



The setting of the spectrum analyser

RBW	200 Hz (From 9kHz to 0.15MHz) / 9KHz (From 0.15MHz to 30MHz)
VBW	200 Hz (From 9kHz to 0.15MHz) / 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a 1m height antenna tower.

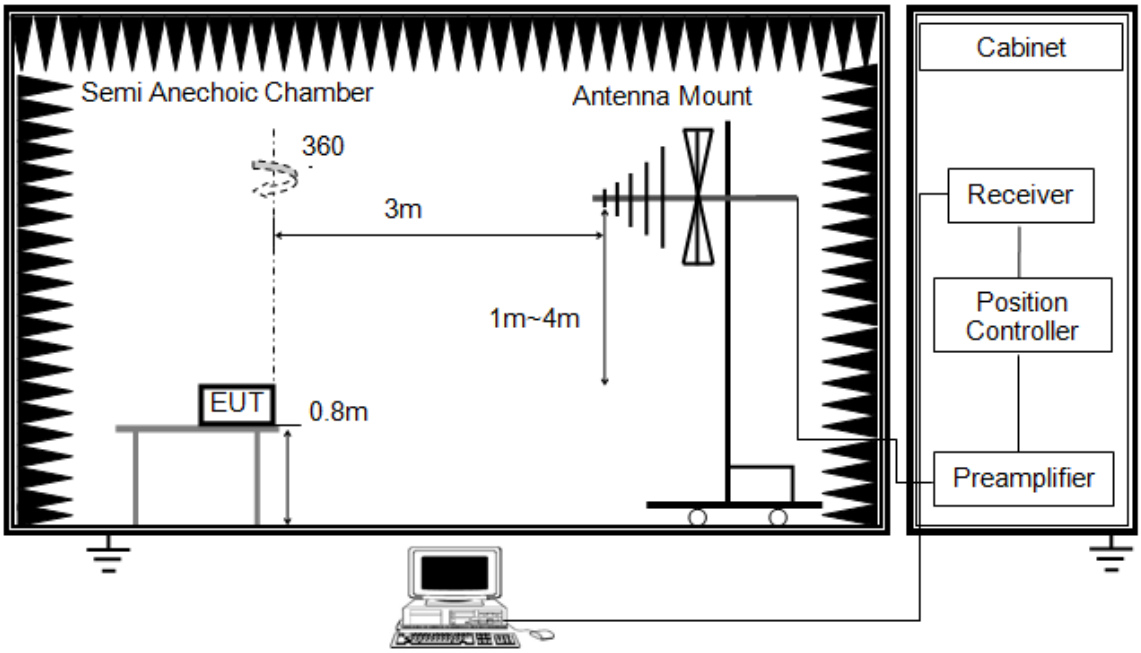
5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector

6. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

8. The limits in CFR 47, Part 15, Subpart C, paragraph 15.209 (a), are identical to those in RSS-GEN Section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ω. For example, the measurement frequency X kHz resulted in a level of Y dBuV/m, which is equivalent to Y-51.5 = Z dBuA/m, which has the same margin, W dB, to the corresponding RSS-GEN Table 6 limit as it has to be 15.209(a) limit.

Below 1G



The setting of the spectrum analyser

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

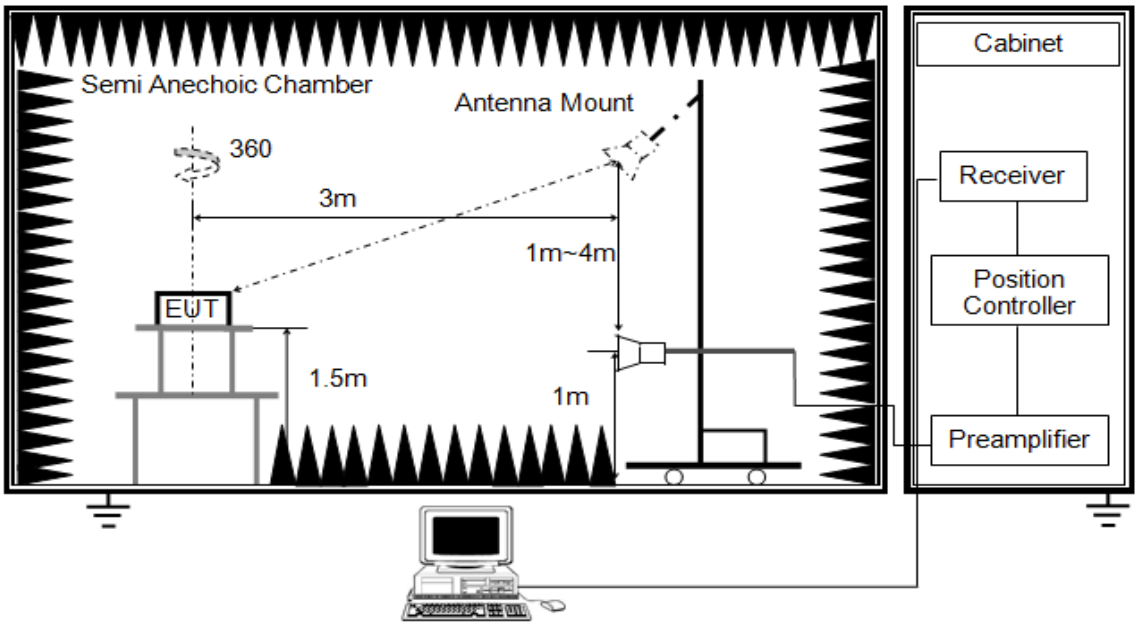
3. The EUT was placed on a turntable with 0.8 meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

6. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

Above 1G



The setting of the spectrum analyser

RBW	1 MHz
VBW	PEAK:3 MHz AVG: See note6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

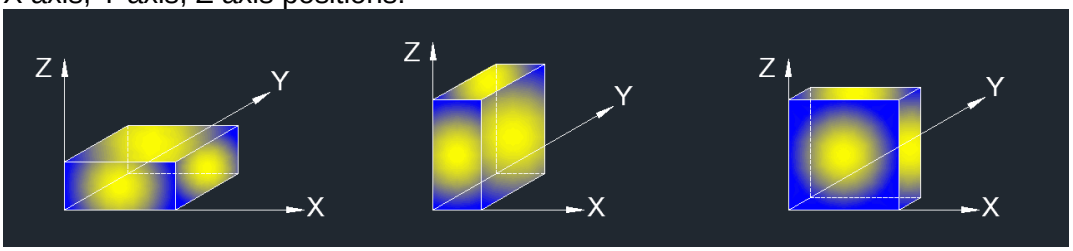
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements; and 1 MHz resolution bandwidth with video bandwidth $\geqslant$1/T but not less than the setting list in section 7.1 when use peak detector, max hold to be run for at least [50*(1/Duty Cycle)] traces for average measurements. For the Duty Cycle need to refer the results in section 7.1.

7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



Note: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worse case (X axis) data recorded in the report.

6.3.2. TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V

RESULTS

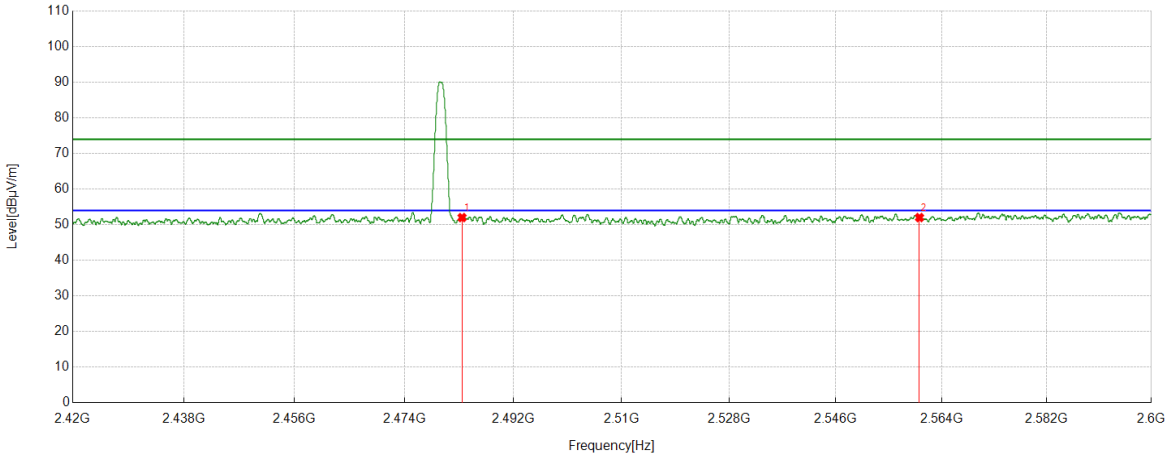
6.3.3. WORST CASE VERIFICATION SUMMERY

Antenna Type	Test Item	Test Mode	Test Channel	Frequency	Worst Case Test Result		Delta
					Original Model	Spot CheckModel	
			MHz	MHz	dBuV/m	dBuV/m	dB
External Dipole Antenna	Restricted Bandedge	2DH5	2480	2560.2150	53.21	52.01	-1.20
	Spurious Emission	DH5	2402	16944.2430	56.23	55.07	-1.16

Conclusion:
The worst case test result show that the new devices still comply with the standard and the new test result was close to the original test result, so it can demonstrate that the referenced test data remains valid for the new device.

6.3.4. RESTRICTED BANDEDGE

Test Mode	Channel	Polarization	Verdict
2DH5	HCH	Horizontal	PASS

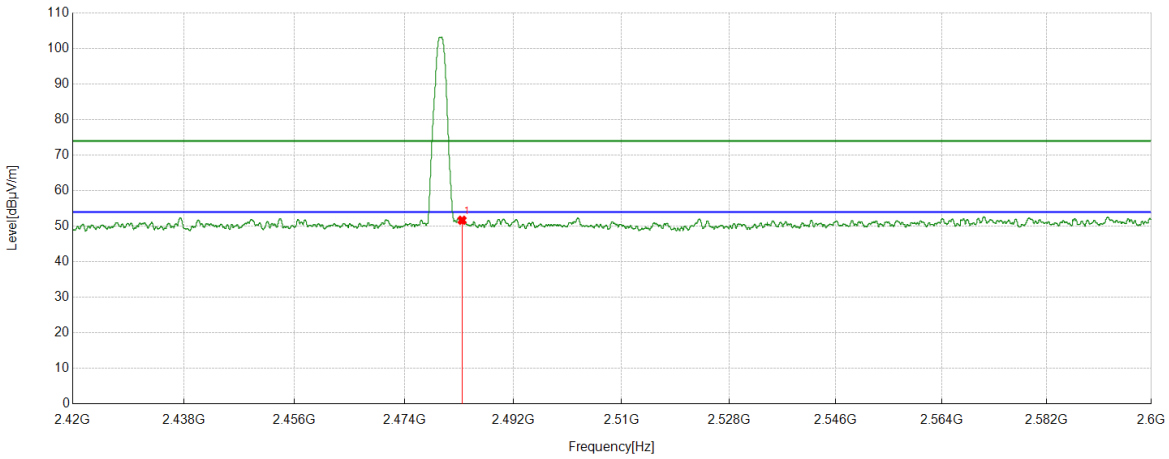


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	40.73	11.28	52.01	74.00	-21.99	Horizontal
2	2560.215	40.10	11.91	52.01	74.00	-21.99	Horizontal

Note: 1. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.
2. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz (refer to clause 7.1.).
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
2DH5	HCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	2483.5	40.40	11.28	51.68	74.00	-22.32	Vertical

Note: 1. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.
2. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz (refer to clause 7.1.).
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

6.3.5. SPURIOUS EMISSIONS

TEST RESULTS TABLE

1) For 1GHz~18GHz

Antenna Type	Test Mode	Channel	Puw(dBm)	Verdict
External Dipole Antenna	DH5	LCH	<Limit	PASS

2) For 9kHz~30MHz

Antenna Type	Test Mode	Channel	Puw(dBm)	Verdict
External Dipole Antenna	DH5	HCH	<Limit	PASS

3) For 30MHz~1GHz

Antenna Type	Test Mode	Channel	Puw(dBm)	Verdict
External Dipole Antenna	DH5	HCH	<Limit	PASS

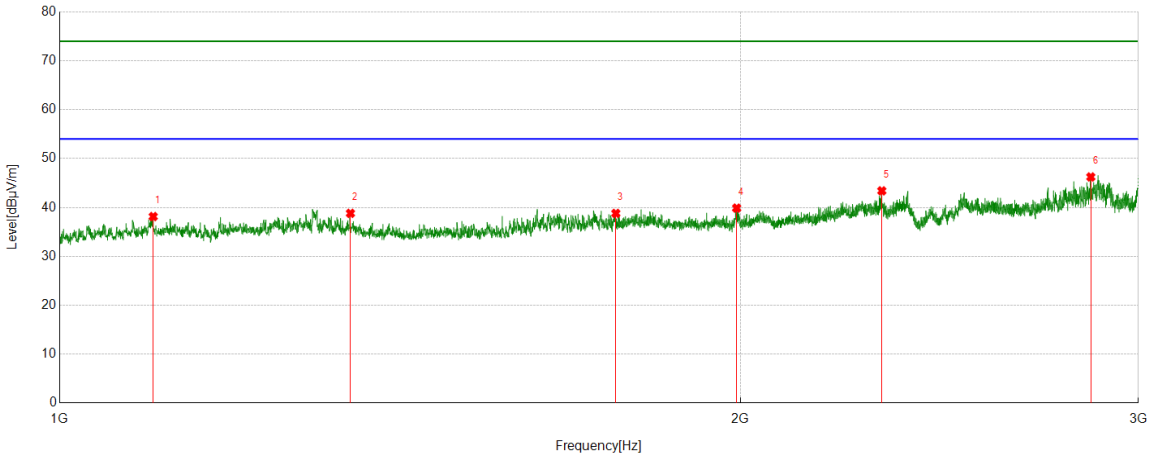
4) For 18GHz~26.5GHz

Antenna Type	Test Mode	Channel	Puw(dBm)	Verdict
External Dipole Antenna	DH5	HCH	<Limit	PASS

Part 1: 1GHz~3GHz

HARMONICS AND SPURIOUS EMISSIONS

Test Mode	Channel	Polarization	Verdict
DH5	LCH	Horizontal	PASS

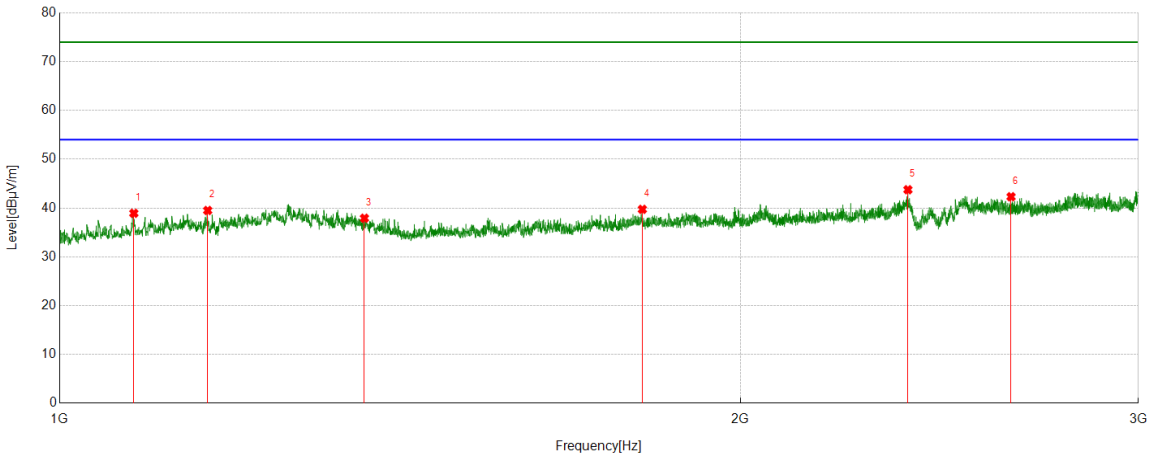


PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1100.0012	43.72	-5.58	38.14	74.00	-35.86	Horizontal
2	1344.1237	44.31	-5.51	38.80	74.00	-35.20	Horizontal
3	1762.0387	42.89	-4.10	38.79	74.00	-35.21	Horizontal
4	1992.2145	42.93	-3.06	39.87	74.00	-34.13	Horizontal
5	2310.0109	45.05	-1.65	43.40	74.00	-30.60	Horizontal
6	2858.1088	46.11	0.13	46.24	74.00	-27.76	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
DH5	LCH	Vertical	PASS



PK Result:

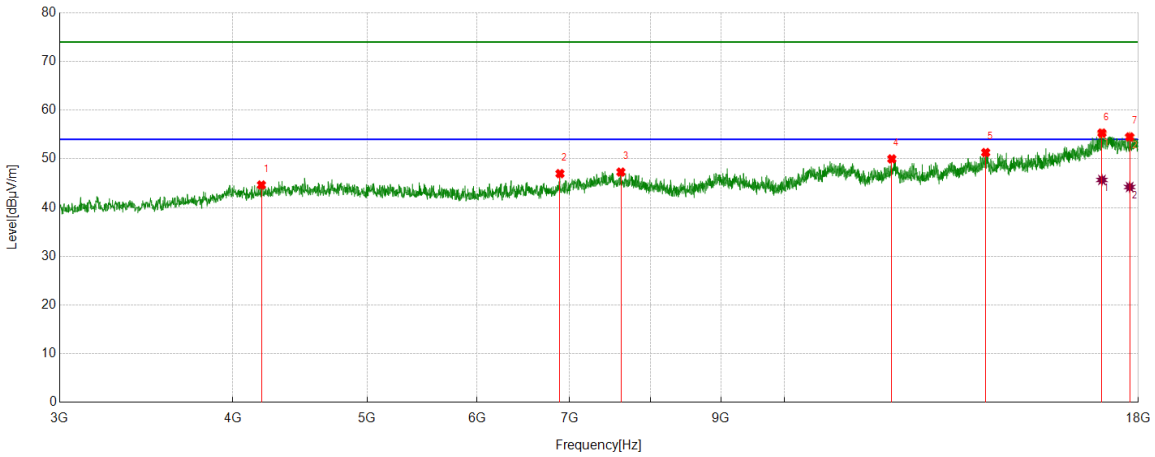
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	1078.6682	44.34	-5.42	38.92	74.00	-35.08	Vertical
2	1162.5372	45.01	-5.51	39.50	74.00	-34.50	Vertical
3	1364.01283	43.62	-5.71	37.91	74.00	-36.09	Vertical
4	1810.0120	43.81	-4.08	39.73	74.00	-34.27	Vertical
5	2372.1022	44.87	-1.12	43.75	74.00	-30.25	Vertical
6	2635.1213	43.11	-0.80	42.31	74.00	-31.69	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
4. Peak: Peak detector.
5. For below 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for Band Reject Filter losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Part 2: 3GHz~18GHz

HARMONICS AND SPURIOUS EMISSIONS

Test Mode	Channel	Polarization	Verdict
DH5	LCH	Horizontal	PASS



PK Result:

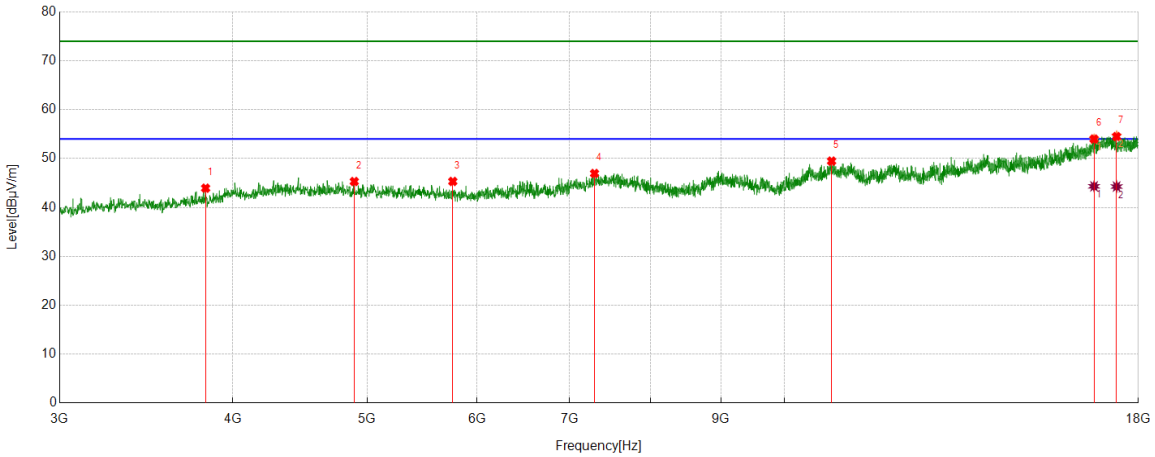
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	4194.5243	39.99	4.65	44.64	74.00	-29.36	Horizontal
2	6887.3609	38.78	8.19	46.97	74.00	-27.03	Horizontal
3	7620.5776	38.85	8.44	47.29	74.00	-25.71	Horizontal
4	11952.369	37.33	12.66	49.99	74.00	-24.01	Horizontal
5	13968.246	37.46	13.84	51.30	74.00	-22.70	Horizontal
6	16944.243	36.66	18.41	55.07	74.00	-18.93	Horizontal
7	17743.0929	36.54	17.94	54.48	74.00	-19.52	Horizontal

AV Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	16944.243	27.27	18.41	45.68	54.00	-8.32	Horizontal
2	17743.0929	26.28	17.94	44.22	54.00	-9.78	Horizontal

Note: 1. Measurement = Reading Level + Correct Factor.
2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.
4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
DH5	LCH	Vertical	PASS



PK Result:

No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	3823.2279	40.19	3.75	43.94	74.00	-30.06	Vertical
2	4893.9867	39.97	5.34	45.31	74.00	-28.69	Vertical
3	5764.0955	39.98	5.34	45.32	74.00	-28.68	Vertical
4	7294.2868	38.32	8.63	46.95	74.00	-27.05	Vertical
5	10814.1018	37.27	12.21	49.48	74.00	-24.52	Vertical
6	16722.9654	37.01	16.96	53.97	74.00	-20.03	Vertical
7	17362.4203	36.53	18.12	54.65	74.00	-19.35	Vertical

AV Result:

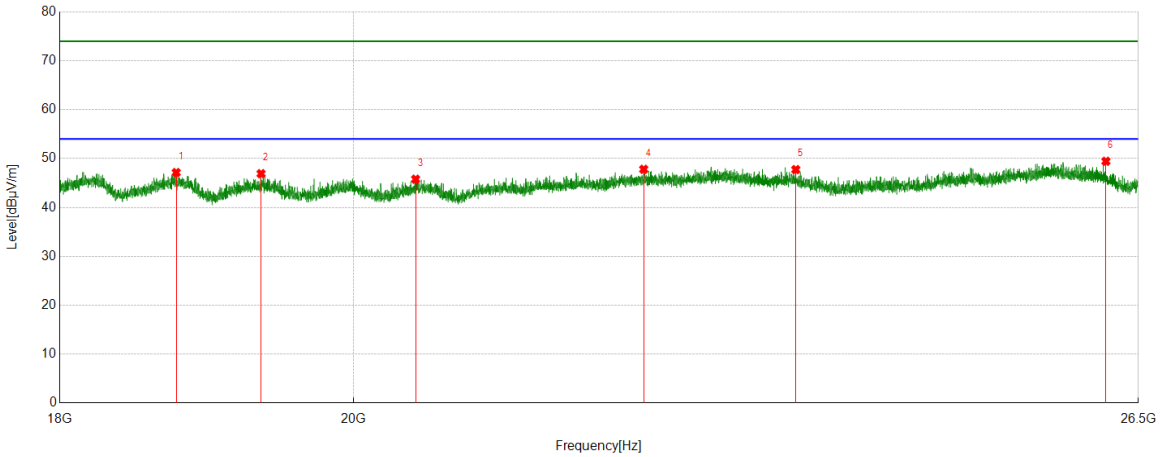
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	16722.9654	27.36	16.96	44.32	54.00	-9.68	Vertical
2	17362.4203	26.15	18.12	44.27	54.00	-9.73	Vertical

Note: 1. Measurement = Reading Level + Correct Factor.
2. If peak result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Peak result: Peak detector, RBW: 1 MHz, VBW: 3 MHz.
4. Average result: Peak detector, RBW: 1 MHz, VBW: 1/T MHz(refer to clause 7.1.).
5. For above 3GHz part, filter losses were only considered in the spurious frequency bands and the authorized band was not corrected for HPF losses.
6. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Part 3: 18GHz~26.5GHz

SPURIOUS EMISSIONS 18GHz TO 26.5GHz (WORST-CASE CONFIGURATION)

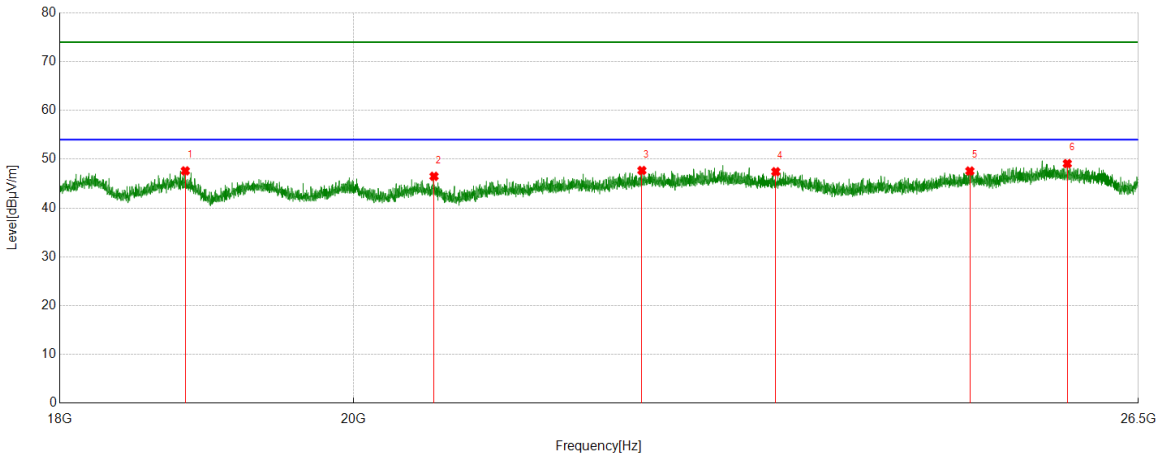
Test Mode	Channel	Polarization	Verdict
DH5	HCH	Horizontal	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	18768.4768	48.57	-1.43	47.14	74.00	-26.86	Peak
2	19348.2348	48.22	-1.31	46.91	74.00	-27.09	Peak
3	20450.7951	46.76	-0.98	45.78	74.00	-28.22	Peak
4	22193.4693	47.89	-0.09	47.80	74.00	-26.20	Peak
5	23437.1437	47.91	-0.17	47.74	74.00	-26.26	Peak
6	26193.9694	48.78	0.66	49.44	74.00	-24.56	Peak

Note: 1. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Test Mode	Channel	Polarization	Verdict
DH5	HCH	Vertical	PASS



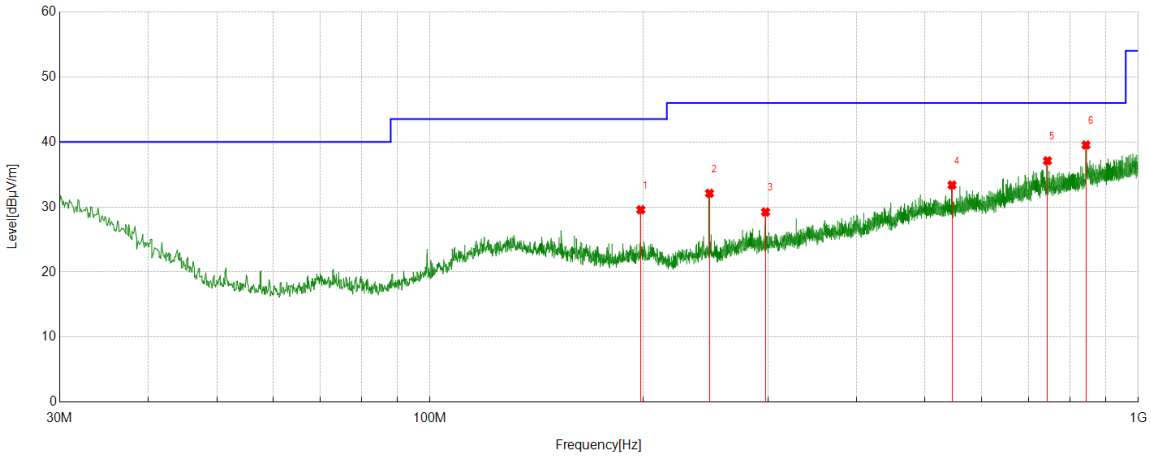
No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	18829.6830	49.08	-1.47	47.61	74.00	-26.39	Peak
2	20585.9586	47.52	-1.03	46.49	74.00	-27.51	Peak
3	22179.0179	47.80	-0.11	47.69	74.00	-26.31	Peak
4	23269.6770	47.21	0.23	47.44	74.00	-26.56	Peak
5	24946.8947	48.12	-0.54	47.58	74.00	-26.42	Peak
6	25833.5334	48.27	0.83	49.10	74.00	-24.90	Peak

Note: 1. If Peak Result complies with AV limit, AV Result is deemed to comply with AV limit.
2. Test setup: RBW: 1 MHz, VBW: 3 MHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.
4. Only the worst case emission was recorded, if it complies with the limit, the other emissions deemed to comply with the limit.

Part 4: 30MHz~1GHz

SPURIOUS EMISSIONS 30M TO 1GHz (WORST-CASE CONFIGURATION)

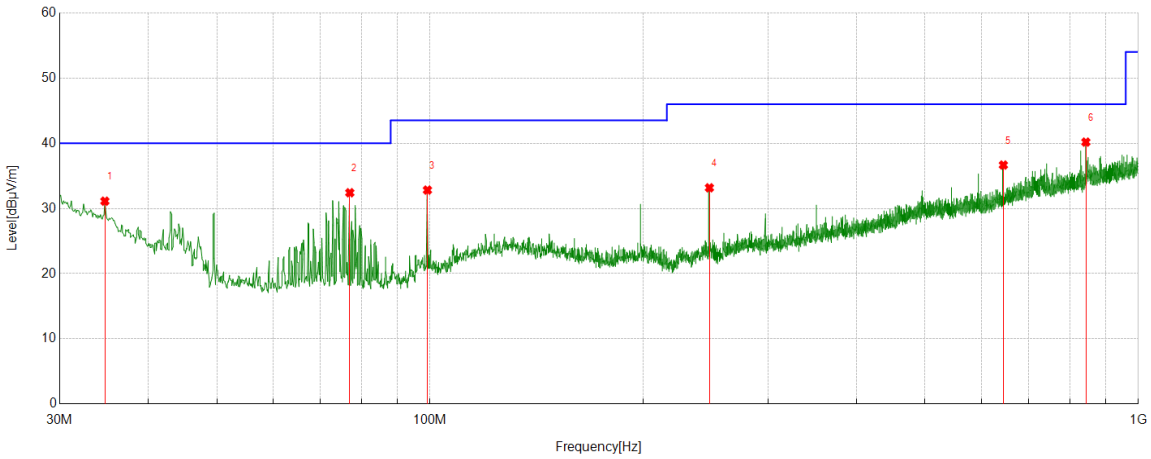
Test Mode	Channel	Polarization	Verdict
DH5	HCH	Horizontal	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	198.4088	10.51	19.07	29.58	43.50	-13.92	Peak
2	248.0778	13.15	18.96	32.11	46.00	-13.89	Peak
3	297.6498	8.75	20.48	29.23	46.00	-16.77	Peak
4	545.8006	7.29	26.09	33.38	46.00	-12.62	Peak
5	744.1854	8.04	29.06	37.10	46.00	-8.90	Peak
6	843.4263	9.17	30.36	39.53	46.00	-6.47	Peak

Note: 1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.

Test Mode	Channel	Polarization	Verdict
DH5	HCH	Vertical	PASS



No.	Frequency	Reading Level	Correct Factor	Result	Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	
1	34.7535	7.09	24.03	31.12	40.00	-8.88	Peak
2	77.0497	17.93	14.48	32.41	40.00	-7.59	Peak
3	99.1679	16.15	16.67	32.82	43.50	-10.68	Peak
4	247.9808	14.21	18.96	33.17	46.00	-12.83	Peak
5	644.8475	9.20	27.46	36.66	46.00	-9.34	Peak
6	843.1353	9.83	30.35	40.18	46.00	-5.82	Peak

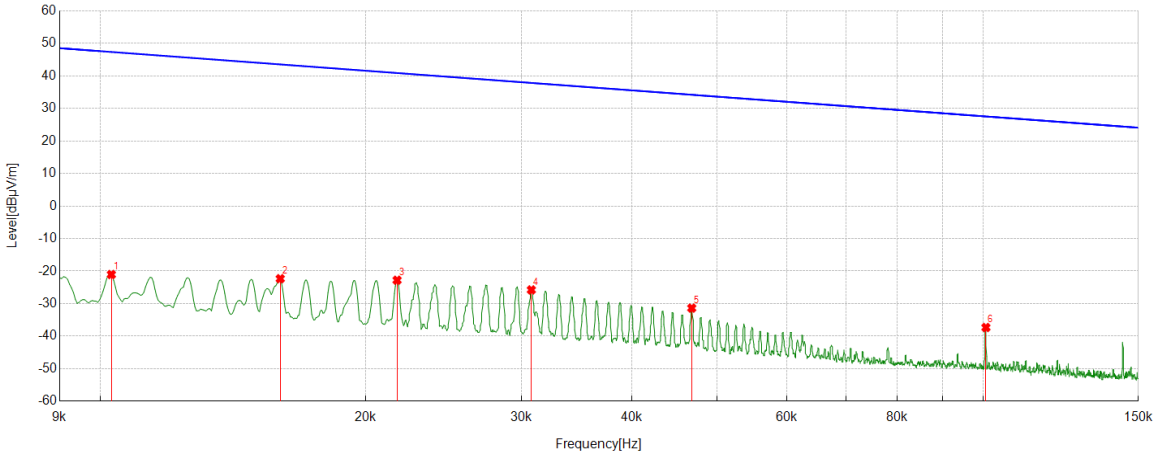
Note: 1. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
2. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.
3. Measurement = Reading Level + Correct Factor.

Part 5: 9kHz~30MHz

Antenna Type 2: External Dipole Antenna

SPURIOUS EMISSIONS Below 30MHz (WORST CASE CONFIGURATION-FACE ON)

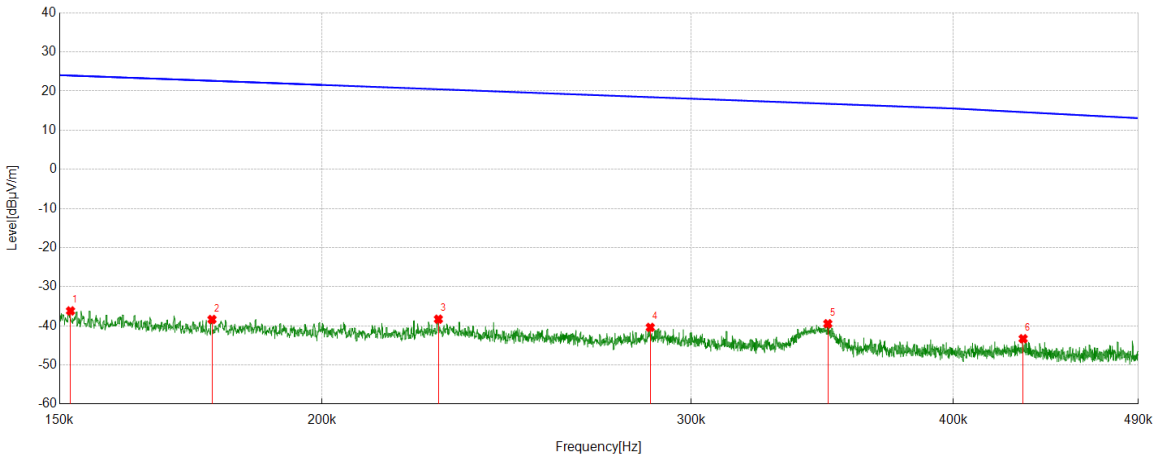
Test Mode	Channel	Frequency Range	Verdict
DH5	HCH	9kHz~150kHz	PASS



No.	Frequency	Reading Level	Correct Factor	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dBuA/m]	[dBuA/m]	[dB]	
1	0.0103	40.09	-61.14	-21.05	47.37	-72.55	-4.13	-68.42	Peak
2	0.0160	38.64	-60.97	-22.33	43.54	-73.83	-7.96	-65.87	Peak
3	0.0217	38.07	-60.86	-22.79	40.87	-74.29	-10.63	-63.66	Peak
4	0.0308	35.14	-60.92	-25.78	37.83	-77.28	-13.67	-63.61	Peak
5	0.0468	29.65	-61.02	-31.37	34.19	-82.87	-17.31	-65.56	Peak
6	0.1008	23.40	-60.73	-37.33	27.53	-88.83	-23.97	-64.86	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

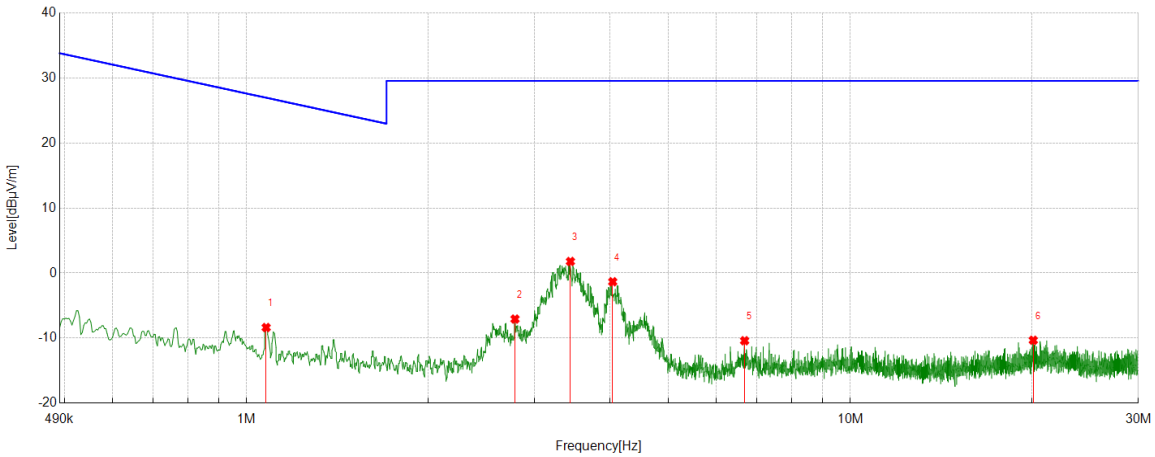
Test Mode	Channel	Frequency Range	Verdict
DH5	HCH	150kHz~490kHz	PASS



No.	Frequency	Reading Level	Correct Factor	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dBuA/m]	[dBuA/m]	[dB]	
1	0.1518	25.12	-61.31	-36.19	23.98	-87.69	-27.52	-60.17	Peak
2	0.1773	22.80	-61.18	-38.38	22.63	-89.88	-28.87	-61.01	Peak
3	0.2273	22.62	-60.92	-38.30	20.47	-89.8	-31.03	-58.77	Peak
4	0.2868	20.37	-60.77	-40.40	18.45	-91.9	-33.05	-58.85	Peak
5	0.3485	21.25	-60.72	-39.47	16.76	-90.97	-34.74	-56.23	Peak
6	0.4318	17.35	-60.65	-43.30	14.62	-94.8	-36.88	-57.92	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

Test Mode	Channel	Frequency Range	Verdict
DH5	HCH	490kHz~30MHz	PASS



No.	Frequency	Reading Level	Correct Factor	FCC Result	FCC Limit	ISED Result	ISED Limit	Margin	Remark
	[MHz]	[dBuV/m]	[dB]	[dBuV/m]	[dBuV/m]	[dBuA/m]	[dBuA/m]	[dB]	
1	1.0773	11.99	-20.35	-8.36	26.96	-59.86	-24.54	-35.32	Peak
2	2.7832	13.35	-20.41	-7.06	29.54	-58.56	-21.96	-36.60	Peak
3	3.4383	22.07	-20.28	1.79	29.54	-49.71	-21.96	-27.75	Peak
4	4.0404	18.72	-20.05	-1.33	29.54	-52.83	-21.96	-30.87	Peak
5	6.6818	9.37	-19.76	-10.39	29.54	-61.89	-21.96	-39.93	Peak
6	20.0925	7.02	-17.34	-10.32	29.54	-61.82	-21.96	39.86	Peak

Note: 1. Measurement = Reading Level + Correct Factor.
2. If Peak Result complies with AV and QP limit, AV and QP Result are deemed to comply with AV limit.
3. All 3 polarizations(Horizontal, Face-on and Face-off) of the loop antenna had been tested, but only the worst data recorded in the report.

7. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

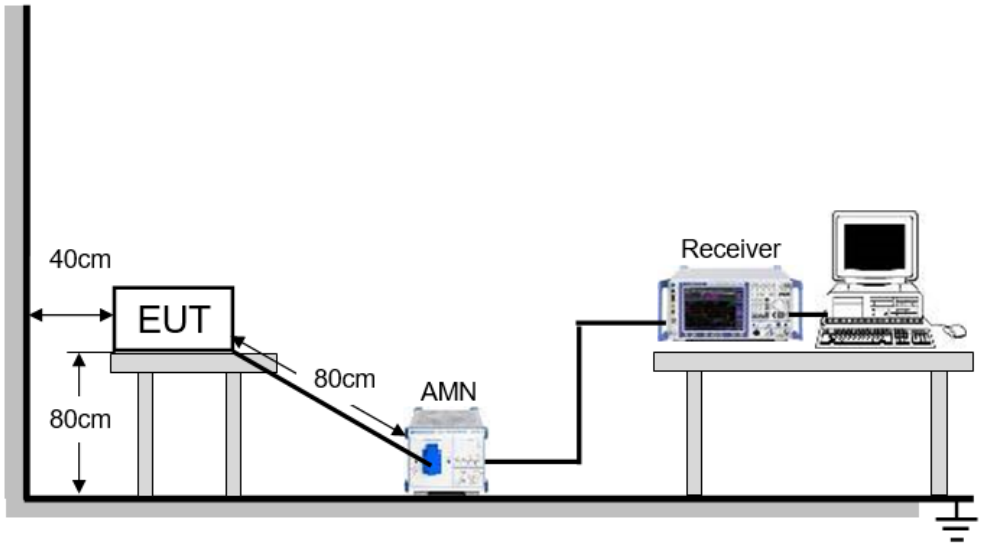
Please refer to FCC §15.207 (a)

FREQUENCY (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

TEST ENVIRONMENT

Temperature	22°C	Relative Humidity	56%
Atmosphere Pressure	101kPa	Test Voltage	AC 120V

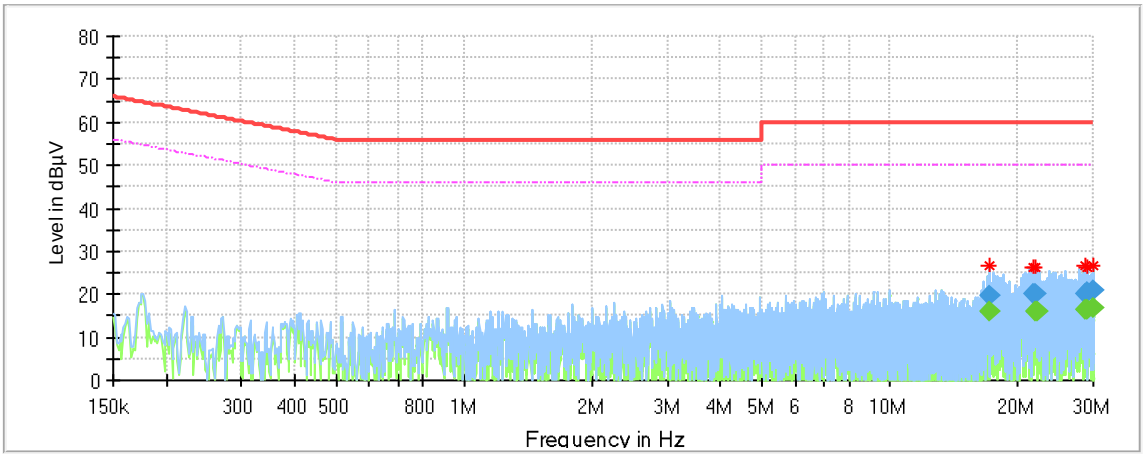
TEST SETUP AND PROCEDURE



The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through an Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 6.2 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

LINE L RESULTS (WORST-CASE CONFIGURATION)

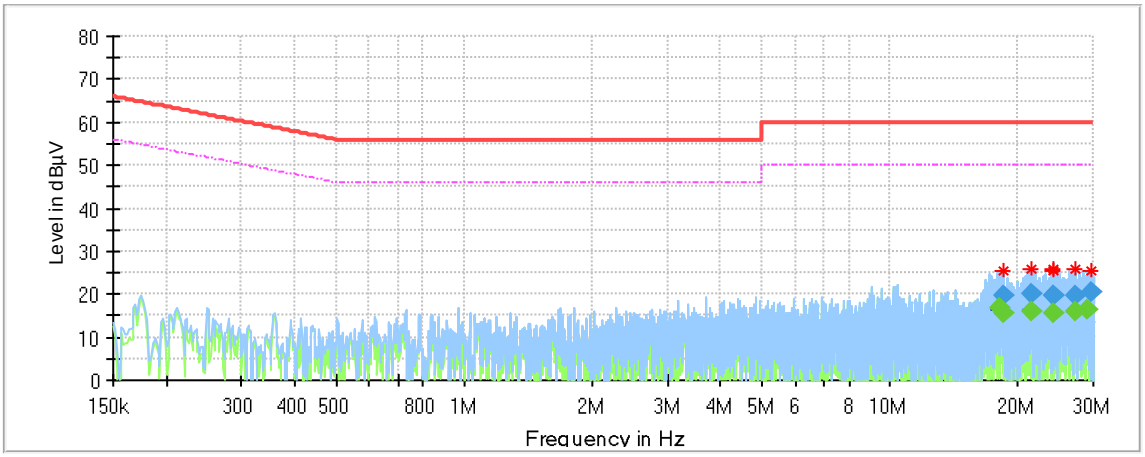


Final_Result

Frequency [MHz]	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Line	Filter	Corr. [dB]
17.030175	---	15.83	50.00	34.17	1000.0	9.000	L1	OFF	9.6
17.030175	19.77	---	60.00	40.23	1000.0	9.000	L1	OFF	9.6
21.674835	20.04	---	60.00	39.96	1000.0	9.000	L1	OFF	9.8
21.822593	---	16.09	50.00	33.91	1000.0	9.000	L1	OFF	9.8
21.822593	20.26	---	60.00	39.74	1000.0	9.000	L1	OFF	9.8
22.231538	---	16.15	50.00	33.85	1000.0	9.000	L1	OFF	9.8
28.579140	20.21	---	60.00	39.79	1000.0	9.000	L1	OFF	9.8
28.579140	---	16.37	50.00	33.63	1000.0	9.000	L1	OFF	9.8
29.037338	20.44	---	60.00	39.56	1000.0	9.000	L1	OFF	9.8
29.037338	---	16.50	50.00	33.50	1000.0	9.000	L1	OFF	9.8
29.853735	---	16.82	50.00	33.18	1000.0	9.000	L1	OFF	9.8
29.853735	20.75	---	60.00	39.25	1000.0	9.000	L1	OFF	9.8

Note: 1. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
2. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
3. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.
4. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.
5. The EUT was test with two type antennas, the result of the EUT with type 2 antenna was worse case and recorded in this report.
6. Pre-testing all test modes and channels and find the HCH of DH5 which is the worst case, so only the worst case is included in this test report.

LINE N RESULTS (WORST-CASE CONFIGURATION)



Final_Result

Frequency [MHz]	QuasiPeak [dBµV]	Average [dBµV]	Limit [dBµV]	Margin [dB]	Meas. Time [ms]	Bandwidth [kHz]	Line	Filter	Corr. [dB]
17.985375	---	16.79	50.00	33.21	1000.0	9.000	N	OFF	9.9
18.406260	---	15.77	50.00	34.23	1000.0	9.000	N	OFF	9.9
18.406260	19.79	---	60.00	40.21	1000.0	9.000	N	OFF	9.9
21.583793	---	16.14	50.00	33.86	1000.0	9.000	N	OFF	10.0
21.583793	20.23	---	60.00	39.77	1000.0	9.000	N	OFF	10.0
24.276263	19.57	---	60.00	40.43	1000.0	9.000	N	OFF	9.9
24.277755	---	15.60	50.00	34.40	1000.0	9.000	N	OFF	9.9
24.295665	19.50	---	60.00	40.50	1000.0	9.000	N	OFF	9.9
27.255293	19.77	---	60.00	40.23	1000.0	9.000	N	OFF	9.8
27.255293	---	15.95	50.00	34.05	1000.0	9.000	N	OFF	9.8
28.962713	---	16.38	50.00	33.62	1000.0	9.000	N	OFF	9.7
29.700008	20.62	---	60.00	39.38	1000.0	9.000	N	OFF	9.7

Note: 1. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
2. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
3. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.
4. The extension cord/outlet strip was calibrated with the LISN as required by ANSI C63.10:2013 Clause 6.2.2.
5. The EUT was test with two type antennas, the result of the EUT with type 2 antenna was worse case and recorded in this report.
6. Pre-testing all test modes and channels and find the HCH of DH5 which is the worst case, so only the worst case is included in this test report.

8. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203
An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)
The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi

END OF REPORT