

Prüfbericht-Nr.: Test report no.:	CN21WVI2 002	Auftrags-Nr.: Order no.:	168339184	Seite 1 von 33 Page 1 of 33										
Kunden-Referenz-Nr.: Client reference no.:	N/A	Auftragsdatum: Order date:	2021-10-15											
Auftraggeber: Client:	SZ DJI TECHNOLOGY CO., LTD 14th Floor, West Wing, Skyworth Semiconductor Design Building No.18 Gaoxin South 4th Ave Nanshan District, Shenzhen, P.R. China													
Prüfgegenstand: Test item:	DJI RC Plus													
Bezeichnung / Typ-Nr.: Identification / Type no.:	RM700, RM700B													
Auftrags-Inhalt: Order content:	Test Report													
Prüfgrundlage: Test specification:	CFR47 FCC Part 15: Subpart C Section 15.247 CFR47 FCC Part 15: Subpart C Section 15.207 CFR47 FCC Part 15: Subpart C Section 15.209													
Wareneingangsdatum: Date of sample receipt:	2021-10-28	Please refer to photo documents												
Prüfmuster-Nr.: Test sample no.:	A003151089-003-004													
Prüfzeitraum: Testing period:	2021-11-09 to 2022-01-06													
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:	Tim Zhang X <i>Tim Zhang</i>		genehmigt von: authorized by:	Hardy Suo X <i>Hardy Suo</i>										
Datum: Date:	2022-01-18		Ausstellungsdatum: Issue date:	2022-01-18										
Stellung / Position:	Sachverständige(r) / Expert		Stellung / Position:	Sachverständige(r) / Expert										
Sonstiges / Other:	FCC ID: SS3-RM7002110 This report is for Bluetooth, Bluetooth BLE, 2.4GHz SDR and 2.4GHz Wi-Fi. Applicant & Manufacturer: SZ DJI TECHNOLOGY CO., LTD , 14th Floor, West Wing, Skyworth Semiconductor Design Building No.18 Gaoxin South 4th Ave Nanshan District, Shenzhen, P.R. China													
Zustand des Prüfgegenstandes bei Anlieferung: Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged													
* Legende:	<table border="0"> <tr> <td>1 = sehr gut</td> <td>2 = gut</td> <td>3 = befriedigend</td> <td>4 = ausreichend</td> <td>5 = mangelhaft</td> </tr> <tr> <td>P(ass) = entspricht o.g. Prüfgrundlage(n)</td> <td>F(ail) = entspricht nicht o.g. Prüfgrundlage(n)</td> <td>N/A = nicht anwendbar</td> <td>N/T = nicht getestet</td> <td></td> </tr> </table>				1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet	
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* Legend:	<table border="0"> <tr> <td>1 = very good</td> <td>2 = good</td> <td>3 = satisfactory</td> <td>4 = sufficient</td> <td>5 = poor</td> </tr> <tr> <td>P(ass) = passed a.m. test specification(s)</td> <td>F(ail) = failed a.m. test specification(s)</td> <td>N/A = not applicable</td> <td>N/T = not tested</td> <td></td> </tr> </table>				1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor	P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested	
1 = very good	2 = good	3 = satisfactory	4 = sufficient	5 = poor										
P(ass) = passed a.m. test specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested											
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>														

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 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH

RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.8 CARRIER FREQUENCY SEPARATION

RESULT: Pass

5.1.9 NUMBER OF HOPPING FREQUENCY

RESULT: Pass

5.1.10 TIME OF OCCUPANCY

RESULT: Pass

5.1.11 CONDUCTED EMISSION ON AC MAINS

RESULT: Pass

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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

Appendix B: Test Results of Bluetooth BLE

Appendix C: Test Results of 2.4GHz SDR

Appendix D: Test Results of 2.4GHz Wi-Fi

Appendix E: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

362 Huanguan Road Middle Longhua District, Shenzhen 518110 People's Republic of China

FCC Registration No.: 694916

ISED wireless device testing laboratory: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

TÜV Rheinland (Shenzhen) Co., Ltd.

Equip. No.	Description	Manufacturer	Model	Serial No.	Calibrated until (DD.MM.YYYY)
9039436	EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	28.09.2022
9039437	MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	28.09.2022
9039438	EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	28.09.2022
9039439	DC Power Supply	Keysight	E3642A	MY61276100	28.09.2022
9039440	Wireless Connectivity Tester	R&S	CMW270	102505	28.09.2022
9039441	Power Control Unit	Tonscend	JS0806-4ADC	N/A	28.09.2022
9039442	Automation Control Unit	Tonscend	JS0806-2	21C8060396	28.09.2022
9039443	Test Software	Tonscend	JS1120-3	N/A	N/A
9039444	Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Equip. No.	Description	Manufacturer	Model	Serial No.	Calibrated until (DD.MM.YYYY)
G1826021	EMI Test Receiver	R&S	ESR 7	102021	10.08.2022
G1826023	Signal Analyzer	R&S	FSV 40	101439	09.08.2022
G1826024	System Controller Interface	R&S	SCI-100	S10010038	N/A
G1826025	Filterbank	R&S	Wlan	100759	09.08.2022
G1826026	OSP	R&S	OSP 120	102040	N/A
G1826028	Pre-amplifier	R&S	SCU08F1	08320031	09.08.2022
G1826029	Amplifier	R&S	SCU-18F	180070	09.08.2022
G1826030	Amplifier	R&S	SCU40A	100475	09.08.2022

G1826031	Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	08.08.2022
G1826032	Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	08.08.2022
G1826033	Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	08.08.2022
G1826034	Active Loop Antenna	Schwarzbeck	FMZB 1513	302	13.09.2022
G1826036	Test software	R&S	EMC32 (V10.60.10)	N/A	N/A
G1826037	Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
G1826433	3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC1715 1-SAC	22.06.2024

Conducted Emission				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
EMI Test Receiver	R&S	ESR3	102428	2022-08-10
Artificial Mains Network	R&S	ENV216	102333	2022-08-10
EMC32 test software	R&S	EMC32(Ver.10.50.00)	N/A	N/A

2.3 Traceability

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

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basis 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.

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-7}$
RF Power (conducted)	± 2.5 dB
Radiated Emission of Transmitter, valid up to 26.5 GHz	± 6 dB
Radiated Emission of Receiver, valid up to 26.5 GHz	± 6 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB
Radiated Emission (3m SAC), 30MHz to 1000MHz	± 4.52 dB
Radiated Emission (3m SAC), above 1000MHz	± 4.37 dB

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Temperature	±1 °C
Humidity	±5 %
Voltage (DC)	±1 %
Voltage (AC, <10kHz)	±2 %

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 & E of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

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

3 General Product Information

3.1 Product Function and Intended Use

The EUT (Equipment Under Test) is a DJI RC Plus. It supports Bluetooth, 2.4GHz SDR, 2.4GHz Wi-Fi, 5.2/5.8GHz Wi-Fi, 5.8GHz SDR and GNSS functions.

According to the declaration of the applicant, the electrical circuit design and PCB layout are identical, only the model no. is different for market strategy.

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

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	DJI RC Plus
Type Designation	RM700, RM700B
Operating Voltage	AC 100-240V, 50/60Hz input via AC/DC adapter or Li-ion Battery operated (DC 7.2V@6500mAh)
Extreme Temperature Range	-20 °C ~ 50 °C
Radiofrequency operating mode	1) Bluetooth: operating within 2400-2483.5MHz, supports Bluetooth Classic and BT 5.1@BLE, 1Mbps&2Mbps 2) 2.4GHz SDR: operating within 2400-2483.5MHz, supports 1.4MHz/3MHz/10MHz/20MHz/40MHz Bandwidth 3) 2.4GHz Wi-Fi: operating within 2400-2483.5MHz, supports 20MHz/40MHz Bandwidth and IEEE 802.11 b/g/n20/n40/ax20/ax40 4) 5.2GHz W-Fi: operating with 5150-5250MHz, supports 20MHz/40MHz/80MHz Bandwidth and IEEE 802.11 a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80 5) 5.8GHz SDR: operating within 5725-5850MHz, supports 1.4MHz/3MHz/10MHz/20MHz/40MHz Bandwidth 6) 5.8GHz Wi-Fi: operating within 5725-5850MHz, supports 20MHz/40MHz/80MHz Bandwidth and IEEE 802.11 a/n20/n40/ac20/ac40/ac80/ax20/ax40/ax80 7) GPS & BDS & Galileo (receiver): operating within 1559-1610MHz
Technical Specification of Bluetooth	
Operating Frequency	2402-2480MHz
Type of Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK
Data Rate	1Mbps, 2Mbps
Channel Number	79 channels for Bluetooth Classic 40 channels for Bluetooth BLE
Channel Separation	1MHz and 2MHz
Antenna Type	Integral Antenna
Antenna Number	1 (ANT0)
Antenna Gain	3 dBi
The type of wideband data	FHSS for Bluetooth Classic

transmission equipment	DTS Bluetooth BLE
Technical Specification of 2.4GHz SDR	
Operating Frequency	2409.5-2463.5MHz for 1.4MHz Bandwidth 2411.12-2465.12MHz for 1.4MHz Bandwidth (CA mode) 2410.5-2461.5MHz for 3MHz Bandwidth 2413.5-2464.5MHz for 3MHz Bandwidth (CA mode) 2405.5-2476.5MHz for 10MHz Bandwidth 2410.5-2472.5MHz for 20MHz Bandwidth 2422.5-2452.5MHz for 40MHz Bandwidth
Type of Modulation	OFDM (QPSK, 16QAM, 64QAM)
Channel Number	28 channels for 1.4MHz Bandwidth 28 channels for 1.4MHz Bandwidth (CA mode) 18 channels for 3MHz Bandwidth 18 channels for 3MHz Bandwidth (CA mode) 72 channels for 10MHz Bandwidth 63 channels for 20MHz Bandwidth 31 channels for 40MHz Bandwidth
Channel Separation	2MHz for 1.4MHz Bandwidth 2MHz for 1.4MHz Bandwidth (CA mode) 3MHz for 3MHz Bandwidth 3MHz for 3MHz Bandwidth (CA mode) 1MHz for 10MHz Bandwidth 1MHz for 20MHz Bandwidth 1MHz for 40MHz Bandwidth
Antenna Type	Two Integral Antennas, and Two External Antennas
Antenna Number	1Tx4Rx for SISO mode (ANT0 or ANT1 or ANT2 or ANT3) 2Tx4Rx for MIMO mode (ANT0+ANT1, or ANT0+ANT3, or ANT2+ANT1, or ANT2+ANT3)
Antenna Gain	3dBi for ANT0 3dBi for ANT1 2.5dBi for ANT2 2.5dBi for ANT3
The type of wideband data transmission equipment	DTS
Technical Specification of 2.4GHz Wi-Fi	
Operating Frequency	2412 - 2462MHz for 802.11b/g/n(HT20)/ax20 2422 - 2452MHz for 802.11n(HT40)/ax40
Type of Modulation	DSSS(DBPSK/DQPSK/CCK) OFDM(BPSK/QPSK/16QAM/64QAM) OFDMA(BPSK/QPSK/16QAM/64QAM/256QAM)
Data Rate	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS15 for 802.11n MCS0 ~ MCS9 for 802.11ax
Multi-RU	No, full RU
Channel Number	11 channels for 802.11b/g/n(HT20)/ax20 7 channels for 802.11n(HT40)/ax40
Channel Separation	5 MHz
Antenna Type	Integral Antenna
Antenna Number	1Tx1Rx for SISO mode (ANT0 or ANT1)

	2Tx2Rx for MIMO mode (ANT0+ANT1)
Antenna Gain	2.5dBi for ANT0 3dBi for ANT1
The type of wideband data transmission equipment	DTS

Table 3: RF Channel and Frequency of Bluetooth Classic

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		

Table 4: RF Channel and Frequency of BLE

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

Table 5: RF Channel and Frequency of 2.4GHz SDR

2.4GHz 1.4MHz Bandwidth (2409.5MHz-2463.5MHz)			
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	2409.5	15	2437.5
2	2411.5	16	2439.5
3	2413.5	17	2441.5
4	2415.5	18	2443.5
5	2417.5	19	2445.5
6	2419.5	20	2447.5
7	2421.5	21	2449.5
8	2423.5	22	2451.5
9	2425.5	23	2453.5
10	2427.5	24	2455.5
11	2429.5	25	2457.5
12	2431.5	26	2459.5
13	2433.5	27	2461.5
14	2435.5	28	2463.5

2.4GHz 1.4MHz Bandwidth (CA Mode) (2411.12MHz-2465.12MHz)			
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	2411.12	15	2439.12
2	2413.12	16	2441.12
3	2415.12	17	2443.12
4	2417.12	18	2445.12
5	2419.12	19	2447.12
6	2421.12	20	2449.12
7	2423.12	21	2451.12
8	2425.12	22	2453.12
9	2427.12	23	2455.12
10	2429.12	24	2457.12
11	2431.12	25	2459.12
12	2433.12	26	2461.12
13	2435.12	27	2463.12
14	2437.12	28	2465.12

2.4GHz 3MHz Bandwidth (2410.5MHz-2461.5MHz)			
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	2410.5	10	2437.5
2	2413.5	11	2440.5
3	2416.5	12	2443.5
4	2419.5	13	2446.5

5	2422.5	14	2449.5
6	2425.5	15	2452.5
7	2428.5	16	2455.5
8	2431.5	17	2458.5
9	2434.5	18	2461.5

2.4GHz 3MHz Bandwidth (CA mode) (2413.5MHz-2464.5MHz)			
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	2413.5	10	2440.5
2	2416.5	11	2443.5
3	2419.5	12	2446.5
4	2422.5	13	2449.5
5	2425.5	14	2452.5
6	2428.5	15	2455.5
7	2431.5	16	2458.5
8	2434.5	17	2461.5
9	2437.5	18	2464.5

2.4GHz 10MHz Bandwidth (2405.5MHz-2476.5MHz)							
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	2405.5	19	2423.5	37	2441.5	55	2459.5
2	2406.5	20	2424.5	38	2442.5	56	2460.5
3	2407.5	21	2425.5	39	2443.5	57	2461.5
4	2408.5	22	2426.5	40	2444.5	58	2462.5
5	2409.5	23	2427.5	41	2445.5	59	2463.5
6	2410.5	24	2428.5	42	2446.5	60	2464.5
7	2411.5	25	2429.5	43	2447.5	61	2465.5
8	2412.5	26	2430.5	44	2448.5	62	2466.5
9	2413.5	27	2431.5	45	2449.5	63	2467.5
10	2414.5	28	2432.5	46	2450.5	64	2468.5
11	2415.5	29	2433.5	47	2451.5	65	2469.5
12	2416.5	30	2434.5	48	2452.5	66	2470.5
13	2417.5	31	2435.5	49	2453.5	67	2471.5
14	2418.5	32	2436.5	50	2454.5	68	2472.5
15	2419.5	33	2437.5	51	2455.5	69	2473.5
16	2420.5	34	2438.5	52	2456.5	70	2474.5
17	2421.5	35	2439.5	53	2457.5	71	2475.5
18	2422.5	36	2440.5	54	2458.5	72	2476.5

2.4GHz 20MHz Bandwidth (2410.5MHz-2472.5MHz)					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)

1	2410.5	22	2431.5	43	2452.5
2	2411.5	23	2432.5	44	2453.5
3	2412.5	24	2433.5	45	2454.5
4	2413.5	25	2434.5	46	2455.5
5	2414.5	26	2435.5	47	2456.5
6	2415.5	27	2436.5	48	2457.5
7	2416.5	28	2437.5	49	2458.5
8	2417.5	29	2438.5	50	2459.5
9	2418.5	30	2439.5	51	2460.5
10	2419.5	31	2440.5	52	2461.5
11	2420.5	32	2441.5	53	2462.5
12	2421.5	33	2442.5	54	2463.5
13	2422.5	34	2443.5	55	2464.5
14	2423.5	35	2444.5	56	2465.5
15	2424.5	36	2445.5	57	2466.5
16	2425.5	37	2446.5	58	2467.5
17	2426.5	38	2447.5	59	2468.5
18	2427.5	39	2448.5	60	2469.5
19	2428.5	40	2449.5	61	2470.5
20	2429.5	41	2450.5	62	2471.5
21	2430.5	42	2451.5	63	2472.5

2.4GHz 40MHz Bandwidth (2422.5MHz-2452.5MHz)					
RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
1	2422.5	12	2433.5	23	2444.5
2	2423.5	13	2434.5	24	2445.5
3	2424.5	14	2435.5	25	2446.5
4	2425.5	15	2436.5	26	2447.5
5	2426.5	16	2437.5	27	2448.5
6	2427.5	17	2438.5	28	2449.5
7	2428.5	18	2439.5	29	2450.5
8	2429.5	19	2440.5	30	2451.5
9	2430.5	20	2441.5	31	2452.5
10	2431.5	21	2442.5		
11	2432.5	22	2443.5		

Table 6: RF Channel and Frequency of 2.4GHz Wi-Fi 802.11 b/g/n/ax

RF Channel	802.11 b/g/n(HT20)/ax20	802.11 n(HT40)/ax40
	Frequency (MHz)	Frequency (MHz)
01	2412	
02	2417	
03	2422	
04	2427	2427
05	2432	2432
06	2437	2437

07	2442	2442
08	2447	2447
09	2452	2452
10	2457	
11	2462	

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, Bluetooth wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- B. On, Bluetooth BLE wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- C. On, 2.4GHz SDR wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- D. On, Wi-Fi 802.11 b/g/n/ax wireless transmitting mode
 - 1) Low Channel
 - 2) Middle Channel
 - 3) High Channel
- E. On, Normal Operation
- F. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form

-

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 and ANSI C63.4: 2014.

According to clause 3.1, all tests were performed on model RM700 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 7: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N	Rating
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)

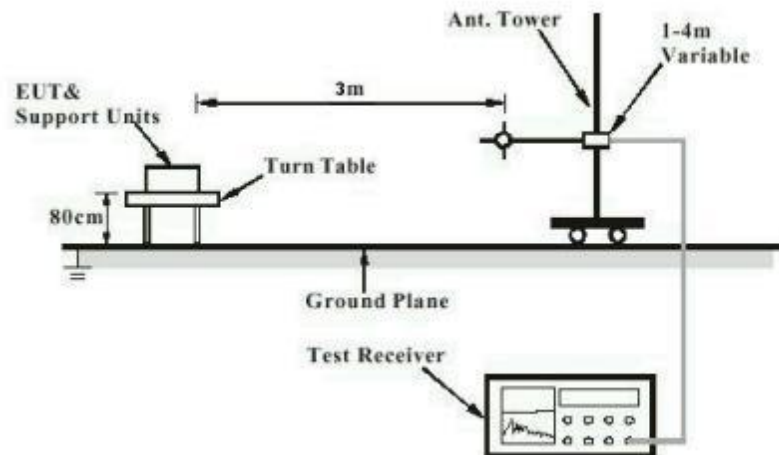


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

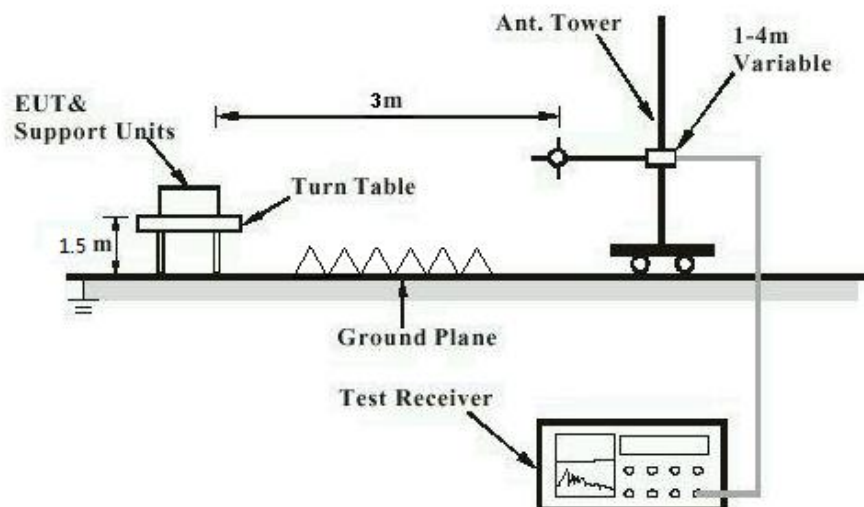


Diagram of Measurement Configuration for Mains Conduction Measurement

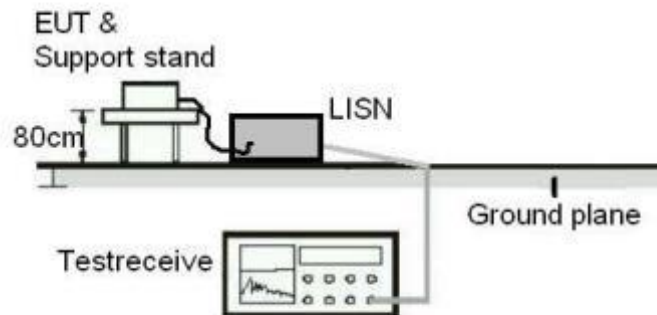
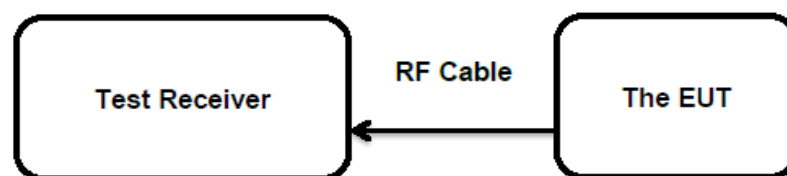


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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 internal antennas, the max. uncorrelated antenna gain antenna is 3dBi for Bluetooth and Bluetooth BLE, 2.8dBi for 2.4GHz Wi-Fi, 3dBi for 2.4GHz SDR, permanent attachment and no consideration of replacement. Therefore the EUT is considered sufficient to comply with the provision.

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)(3)

Basic standard : ANSI C63.10: 2013

Limits : 0.125W, 1.0 Watts

Kind of test site : Shielded Room

Test Setup

Date of testing : 29.05.2020

Input voltage : Full Battery

Operation mode : A, B, C, D

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

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

Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
GFSK (BDR)	2402.0	4.5	0.0028	< 0.125
	2441.0	5.1	0.0032	
	2480.0	5.2	0.0033	
Maximum Measured Value		5.2	0.0033	
Test Mode	Test Channel (MHz)	Measured Peak Power		Limit (W)
		(dBm)	(W)	
8DPSK (EDR)	2402.0	4.4	0.0028	< 0.125
	2441.0	5.1	0.0032	
	2480.0	5.1	0.0032	
Maximum Measured Value		5.1	0.0032	
Max. e.i.r.p.=5.2dBm+3dBi=8.2dBm, which is less than 26.9dBm (=0.125W+6dBi).				

Table 9: Test Result of Maximum Conducted Output Power, BLE

Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
GFSK (BLE)	1 Mbps	2402	2.7	0.0019	< 1.0
		2440	3.4	0.0022	
		2480	3.4	0.0022	
Maximum Measured Value			3.4	0.0022	
Test Mode	Data Rate	Test Channel (MHz)	Measured Peak Power		Limit (W)
			(dBm)	(W)	
GFSK (BLE)	2 Mbps	2402	2.8	0.0019	< 1.0
		2440	3.5	0.0022	
		2480	3.6	0.0023	

Maximum Measured Value	3.6	0.0023	
Max. e.i.r.p.=3.4dBm+3dBi=6.4dBm, which is less than 36dBm=4W.			

Table 10: Test Result of Maximum Conducted Output Power, Wi-Fi 802.11 b/g/n

Worst case for SISO mode

Test Mode	Data Rate	Test Channel	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps	1	17.6	0.0575	< 1.0
		6	20.7	0.1175	
		11	19.5	0.0891	
802.11g	6 Mbps	1	15.7	0.0372	
		6	19.8	0.0955	
		11	17.5	0.0562	
802.11n (HT20)	MCS0	1	14.7	0.0295	
		6	19.6	0.0912	
		11	17.4	0.0550	
802.11n (HT40)	MCS0	3	14.4	0.0275	
		6	18.4	0.0692	
		9	14.3	0.0269	
802.11ax (HT20)	MCS0	1	13.8	0.0240	
		6	18.9	0.0776	
		11	16.8	0.0479	
802.11ax (HT40)	MCS0	3	14.6	0.0288	
		6	18.0	0.0631	
		9	14.6	0.0288	
Max. e.i.r.p.=20.7dBm+2.8dBi=23.5dBm, which is less than 36dBm=4W.					

Worst case for MIMO mode

Test Mode	Data Rate	Test Channel	Measured Peak Power		Limit (W)
			(dBm)	(W)	
802.11b	1 Mbps				< 1.0
802.11g	6 Mbps				
802.11n (HT20)	MCS0	1	17.56	0.0570	
		6	22.41	0.1742	
		11	20.26	0.1062	
802.11n (HT40)	MCS0	3	17.26	0.0532	
		6	21.22	0.1324	
		9	17.26	0.0532	
802.11ax (HT20)	MCS0	1	16.81	0.0480	
		6	21.76	0.1500	
		11	19.71	0.0935	
802.11ax (HT40)	MCS0	3	17.37	0.0546	
		6	21.32	0.1355	
		9	17.66	0.0583	
Max. e.i.r.p.=22.41dBm+2.8dBi=25.21dBm, which is less than 36dBm=4W.					

Table 11: Test Result of Maximum Conducted Output Power, 2.4GHz SDR

Worst case for SISO mode

Test Mode	Test Channel (MHz)	Measured Average Power		Limit (W)
		(dBm)	(W)	
1.4MHz BW	2409.5	25.0	0.3162	< 1.0
	2437.5	25.2	0.3311	
	2463.5	24.6	0.2884	
1.4MHz BW CA	2411.12	26.1	0.4074	
	2439.12	26.1	0.4074	
	2465.12	25.8	0.3802	
3MHz BW	2410.5	26.9	0.4898	
	2437.5	27.0	0.5012	
	2461.5	26.9	0.4898	
3MHz BW CA	2413.2	26.8	0.4786	
	2437.2	27.0	0.5012	
	2464.2	27.0	0.5012	
10MHz BW	2405.5	15.3	0.0339	
	2441.5	15.8	0.0380	
	2470.5	13.22	0.0210	
	2471.5	11.27	0.0134	
	2472.5	10.32	0.0108	
	2473.5	12.20	0.0166	
	2474.5	10.66	0.0116	
	2475.5	10.56	0.0114	
20MHz BW	2476.5	10.40	0.0110	
	2410.5	10.07	0.0102	
	2411.5	10.11	0.0103	
	2412.5	11.54	0.0143	
	2413.5	11.50	0.0141	
	2414.5	12.39	0.0173	
	2415.5	12.35	0.0172	
	2416.5	13.23	0.0210	
	2441.5	14.6	0.0288	
	2456.5	13.31	0.0214	
	2460.5	9.75	0.0094	
	2461.5	9.78	0.0095	
	2462.5	8.31	0.0068	
	2463.5	5.44	0.0035	
	2464.5	2.98	0.0020	
	2465.5	0.55	0.0011	
	2468.5	-0.37	0.0009	
	2469.5	-0.38	0.0009	
40MHz BW	2470.5	-0.38	0.0009	
	2471.5	-0.38	0.0009	
	2472.5	-0.42	0.0009	
	2422.5	9.10	0.0081	
	2423.5	9.22	0.0084	
	2424.5	8.32	0.0068	
	2425.5	9.37	0.0086	
	2426.5	11.32	0.0136	
	2437.5	14.4	0.0275	
	2445.5	12.10	0.0162	
	2446.5	10.68	0.0117	

	2447.5	6.89	0.0049	
	2448.5	5.95	0.0039	
	2449.5	5.46	0.0035	
	2450.5	6.43	0.0044	
	2451.5	5.45	0.0035	
	2452.5	5.93	0.0039	
Max. e.i.r.p.=27.0dBm+3dBi=30.0dBm, which is less than 36dBm=4W.				

Worst case for MIMO mode

Test Mode	Test Channel (MHz)	Measured Average Power		Limit (W)
		(dBm)	(W)	
1.4MHz BW	2409.5	26.4	0.4365	< 1.0
	2437.5	26.1	0.4074	
	2463.5	26.6	0.4571	
1.4MHz BW CA	2411.12	26.4	0.4365	
	2439.12	26.0	0.3981	
	2465.12	26.4	0.4365	
3MHz BW	2410.5	27.2	0.5248	
	2437.5	26.9	0.4898	
	2461.5	28.0	0.6310	
3MHz BW CA	2413.2	27.3	0.5370	
	2437.2	27.1	0.5129	
	2464.2	27.7	0.5888	
10MHz BW	2405.5	15.7	0.0372	
	2441.5	16.7	0.0468	
	2470.5	15.06	0.0321	
	2471.5	12.63	0.0183	
	2472.5	11.65	0.0146	
	2473.5	9.62	0.0092	
	2474.5	9.12	0.0082	
	2475.5	9.09	0.0081	
20MHz BW	2476.5	7.30	0.0054	
	2410.5	11.86	0.0153	
	2411.5	12.30	0.0170	
	2412.5	13.55	0.0226	
	2413.5	13.83	0.0242	
	2414.5	14.81	0.0303	
	2415.5	14.82	0.0303	
	2416.5	15.98	0.0396	
	2441.5	16.5	0.0447	
	2456.5	16.03	0.0401	
	2460.5	12.19	0.0166	
	2461.5	12.15	0.0164	
	2462.5	10.92	0.0124	
	2463.5	7.62	0.0058	
	2464.5	5.09	0.0032	
	2465.5	2.58	0.0018	
	2468.5	-0.82	0.0008	
	2469.5	-1.07	0.0008	
	2470.5	-1.79	0.0007	
	2471.5	-1.62	0.0007	
40MHz BW	2472.5	-1.65	0.0007	
	2422.5	11.68	0.0147	
	2423.5	11.93	0.0156	

	2424.5	10.98	0.0125	
	2425.5	11.98	0.0158	
	2426.5	13.91	0.0246	
	2437.5	16.8	0.0479	
	2445.5	14.24	0.0265	
	2446.5	12.53	0.0179	
	2447.5	8.68	0.0074	
	2448.5	7.96	0.0063	
	2449.5	7.21	0.0053	
	2450.5	8.18	0.0066	
	2451.5	7.42	0.0055	
	2452.5	7.64	0.0058	
Max. e.i.r.p.=28.0dBm+3dBi=31.0dBm, which is less than 36dBm=4W.				

Note:

- 1) The cable loss is taken into account in results.
- 2) Antenna gain(G) of Bluetooth: 3dBi
 Antenna gain(G) of Bluetooth BLE: 3dBi
 Antenna gain(G) of 2.4GHz SDR: 3dBi (uncorrelated antenna gain)
 Antenna gain(G) of 2.4GHz Wi-Fi: 2.8dBi (uncorrelated antenna gain)
 e.i.r.p.=P_(Peak power)+ G, which is far below the 4 W

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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	: Refer to test result
Input voltage	: Full Battery
Operation mode	: B, C, D
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

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

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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 : Refer to test result

Input voltage : Full Battery

Operation mode : B, C, D

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

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

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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 : Refer to test result

Input voltage : Full Battery

Operation mode : B, C, D

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

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

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5.1.6 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	: Refer to test result
Input voltage	: Full Battery
Operation mode	: A, B, C, D
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
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, D.

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5.1.7 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	: Refer to test result
Input voltage	: Full Battery
Operation mode	: A, B, C, D
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, D.

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5.1.8 Carrier Frequency Separation

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(a)(1)
Basic standard	: ANSI C63.10: 2013
Limits	: $\geq 25\text{kHz}$ or 2/3 of 20dB bandwidth, whichever is greater
Kind of test site	: Shielded Room

Test Setup

Date of testing	: Refer to test result
Input voltage	: Full Battery
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix A.

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5.1.9 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 : Refer to test result

Input voltage : Full Battery

Operation mode : A

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

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5.1.10 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 : Refer to test result

Input voltage : Full Battery

Operation mode : A

Test channel : Low / Middle / High

Ambient temperature : 25 °C

Relative humidity : 56 %

Atmospheric pressure : 101 kPa

For the measurement records, refer to the appendix A.

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5.1.11 Conducted Emission on AC Mains**RESULT:****Pass****Test Specification**

Test standard : FCC Part 15.207(a)

Basic standard : ANSI C63.10: 2013

Frequency range : 0.15 – 30MHz

Limits : FCC Part 15.207(a)

Kind of test site : Shielded Room

Test Setup

Date of testing : Refer to test result

Input voltage : AC 120V, 60Hz

Operation mode : A

Earthing : Not connected

Ambient temperature : 22 °C

Relative humidity : 64 %

Atmospheric pressure : 101 kPa

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

6 Photographs of the Test Set-Up

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

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