Test Report No.: W7L-P22090015-5RF02

VARIANT FCC TEST REPORT

(Part 15, Subpart C)

Applicant:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland

Manufacturer or Supplier:	HMD Global Oy
Address:	Bertel Jungin aukio 9, 02600 Espoo, Finland
Product:	Multi-band GSM/WCDMA/LTE phone with Bluetooth&WLAN
Brand Name:	NOKIA
Model Name:	TA-1412
FCC ID:	2AJOTTA-1412
Date of tests:	Nov. 25, 2021 ~ Oct. 10, 2022

The tests have been carried out according to the requirements of the following standard:

☒ **FCC Part 15, Subpart C, Section 15.247**

☒ **ANSI C63.10-2013**

CONCLUSION: The submitted sample was found to COMPLY with the test requirement

Prepared by Simon Wang Engineer / Mobile Department	Approved by Luke Lu Manager / Mobile Department
Simon Wang Date: Oct. 10, 2022	Luke Lu Date: Oct. 10, 2022

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
W7L-P21100018-1RF02	Original release	Dec. 13, 2021
W7L-P21100018-2RF02	The model name is revised based on the W7L-P21100018-1RF02 report. The two models are only the difference between single SIM and double SIM, and the data reflects the original report data.	Dec. 25, 2021
W7L-P22090015-5RF02	Based on the original product changing the packaging factory of the chip and software version, removed Aohai_A829US adapter ,BRL_ CB - 36A USB cable, Saibao_ CB - 12A USB cable, LEADER_ HS-34 earphone, added Saibao_AC-2A USB cable. The new sample verify CE, Power(Only verify) and RSE worst case (802.11n (40MHz) CH9), other test data is copied from the original test report W7L-P21100018-2RF02.	Oct. 10, 2022

1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)		
STANDARD SECTION	TEST TYPE AND LIMIT	RESULT
15.207	AC Power Conducted Emission	Compliance
15.205 15.209	Radiated Emissions	Compliance
15.247(d)	Out of band Emission Measurement	Compliance
15.247(a)(2)	6dB bandwidth	Compliance
15.247(b)	Conducted Output power	Compliance
15.247(e)	Power Spectral Density	Compliance
15.203	Antenna Requirement	Compliance

Note：1.Except RSE，other data please refer to Appendix 1 (for BLE) and Appendix 2 (for WIFI-2.4G)

2.The power table are not updated,Because the same as for original case power in Verified power.

1.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

MEASUREMENT	UNCERTAINTY
AC Power Conducted emissions	±2.70dB
Radiated emissions (30MHz~1GMHz)	±4.98dB
Radiated emissions (1GMHz ~6GMHz)	±4.70dB
Radiated emissions (6GMHz ~18GMHz)	±4.60dB
Radiated emissions (18GMHz ~40GMHz)	±4.12dB
Conducted emissions	±4.01dB
Occupied Channel Bandwidth	±43.58KHz
Conducted Output power	±2.06dB
Power Spectral Density	±0.85 dB

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

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Multi-band GSM/WCDMA/LTE phone with Bluetooth&WLAN
BRAND NAME	NOKIA
MODEL NAME	TA-1412
NOMINAL VOLTAGE	5.0Vdc(adapter or host equipment) 3.85Vdc (Li-ion, battery)
MODULATION	DSSS, OFDM, GFSK
TRANSMISSION RATE	802.11b: 11/ 5.5/ 2.0 / 1.0 Mbps 802.11g: 54/ 48/ 36 / 24 / 18 / 9/ 6 Mbps 802.11n20: up to 65 Mbps 802.11n40: up to 135 Mbps BT_LE: 0.125 Mbps /0.5 Mbps /1 Mbps/2 Mbps
OPERATING FREQUENCY	2412-2462MHz for 11b/g/n(HT20/ HT40) 2402-2480MHz for BT-LE(GFSK)
MAX. OUTPUT POWER	WLAN: 184.93mW (Maximum) BT-LE: 1.49mW (Maximum)
ANTENNA TYPE	Fixed Internal Antenna with 1.19dBi gain
HW VERSION	19655-1-11M12
SW VERSION	00WW_1_520
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	USB1 cable: unshielded without ferrite, 1.0meter USB2 cable: unshielded without ferrite, 1.0meter Earphone1: non-shielded cable, with w/o ferrite core, 1.2 meter

NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

2. The EUT incorporates a SISO function. Physically, the EUT provides one transmitter and one receiver.

MODULATION MODE	TX/RX FUNCTION
802.11b	1TX /1RX
802.11g	1TX /1RX
802.11n (20MHz)	1TX /1RX
802.11n (40MHz)	1TX /1RX
BT_LE(1MHz)	1TX /1RX
BT_LE(2MHz)	1TX /1RX
BT_LE(S2)	1TX /1RX
BT_LE(S8)	1TX /1RX

3. For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.

List of Accessory:

ACCESSORIES	BRAND	MANUFACTURER	MODEL	SPECIFICATION
Battery	Nokia	Hunan Gaoyuan Battery Co., Ltd.	WT341	Capacity：3.85 Vdc, 4900mAh
AC Adapter 1	Nokia	ShenZhenBaiJunDa ElectronicCO.,LTD.	AD-010U	I/P: 100-240Vac, 0.35A, O/P: 5.0Vdc, 2.0A
AC Adapter 2	Nokia	SHENZHEN TIANYIN ELECTRONICS CO., LTD.	CH-21U	I/P: 100-240Vac, 0.3A, O/P: 5.0Vdc, 2.0A
AC Adapter 3	Nokia	YuTong Electronics(HuiZhou) Co.,Ltd	PA-US5V2A-03 6	I/P: 100-240Vac, 0.5A, O/P: 5.0Vdc, 2.0A
Earphone 1	Nokia	Guangdong Wivtak Technology Co., Ltd.	HS-34	Signal Line, 1.2meter
USB Cable 1	Nokia	HUIZHOU WASHIN ELECTRONICS CO.,LTD	CB-36A	Signal Line, 1.0meter
USB Cable 2	Nokia	Saibao(Jiangi) Communication Industial Co.,Ltd	AC-2A	Signal Line, 1.0meter

NOTE：

BLE&WIFI test in the engineer mode,power setting at “ MAXIMUM CONDUCTED OUTPUT POWER”, the steps for entering engineering mode are as follows:

1. In the finger plate, dial the code for entering Engineer mode: *#*#83781#*#*
2. EngineerMode->CONNECTIVITY->Wifi->Tx

2.2 DESCRIPTION OF TEST MODES

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

7 channels are provided for 802.11n (HT40):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
3	2422MHz	7	2442MHz
4	2427MHz	8	2447MHz
5	2432MHz	9	2452MHz
6	2437MHz		

40 channels are provided for BT-LE (GFSK):

CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (MHZ)	CHANNEL	FREQ. (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

2.2.1 CONFIGURATION OF SYSTEM UNDER TEST

Please see section 5 photographs of the test configuration for reference.

2.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates, XYZ axis and antenna ports.
The worst case was found when positioned on Y axis for radiated emission. Following test modes were selected for the final test, and the final worst case is marked in boldface and recorded in the report:

EUT CONFIGURE MODE	APPLICABLE TO				MODE
	RE<1G	RE≥1G	PLC	APCM	
-	√	√	√	√	-

Where **RE<1G:** Radiated Emission below 1GHz **RE≥1G:** Radiated Emission above 1GHz
PLC: Power Line Conducted Emission **APCM:** Antenna Port Conducted Measurement

NOTE: No need to concern of Conducted Emission due to the EUT is powered by battery.

RADIATED EMISSION TEST (BELOW 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11n HT40	3 to 9	9	OFDM	MCS0
BT-LE	0 to 39	39	GFSK	2.0

RADIATED EMISSION TEST (ABOVE 1GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	0.125&0.5&1&2

POWER LINE CONDUCTED EMISSION TEST

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11n HT20	1 to 11	11	OFDM	MCS0

BANDEDGE MEASUREMENT:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 11	DSSS	1.0
802.11g	1 to 11	1, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0, 39	GFSK	0.125&0.5&1&2

ANTENNA PORT CONDUCTED MEASUREMENT:

☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
☒ Following channel(s) was (were) selected for the final test as listed below.

MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION	DATA RATE (Mbps)
802.11b	1 to 11	1, 6, 11	CCK	1.0
802.11g	1 to 11	1, 6, 11	OFDM	6.0
802.11n HT20	1 to 11	1, 6, 11	OFDM	MCS0
802.11n HT40	3 to 9	3, 6, 9	OFDM	MCS0
BT-LE	0 to 39	0,19, 39	GFSK	0.125&0.5&1&2

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	TEST VOLTAGE	TESTED BY
RE<1G	23deg. C, 70%RH	DC 5V By Adapter	Star Le
RE≥1G	23deg. C, 70%RH	DC5V By Adapter	Star Le
PLC	25deg. C, 52%RH	DC5V By Adapter	Carl xie
APCM	25deg. C, 60%RH	DC 3.85V By Battery	Carl xie

2.3 Duty Cycle of Test Signal

Please Refer to Appendix1/2 Of this test report.

WORST-CASE DATA:

Measured Duty Cycle		
Mode		Duty Cycle [%]
		ANT1
WIFI 2.4GHz	11B	98.14
	11G	90.32
	11N20	88.06
	11N40	78.38
BT LE	BT4.0	87.23
	BT5.0	66.40
	BTS2	81.28
	BTS8	94.77

Note:

Duty cycle of test signal is < 98%, duty factor shall be considered.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

FCC Part 15, Subpart C, Section 15.247

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2013

Note：

1. All test items have been performed and recorded as per the above standards.
2. The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Certification). The test report has been issued separately.

2.5 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Desktop	Lenovo	M73 SFF	PC04GRQV	N/A
2	Desktop	Lenovo	M73 SFF	PC06CS27	N/A
3	Laptop	Lenovo	Thnikpad T450	PC-049PT1	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Line: Unshielded, Detachable 1.5m
2	AC Line: Unshielded, Detachable 1.5m
3	AC Line: Unshielded, Detachable 1.5m

3 TEST TYPES AND RESULTS

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

NOTE: 1.The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

3.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 03,21	Mar. 02,22
EMI Test Receiver	Rohde&Schwarz	ESR3	101900	Mar. 02,22	Mar. 01,23
EMC32 test software	Rohde&Schwarz	EMC32	NA	NA	NA
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 25,21	Feb. 24,22
LISN network	Rohde&Schwarz	ENV216	101922	Feb. 24,22	Feb. 23,23

NOTE:

1. The test was performed in CE shielded room.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

3.1.3 TEST PROCEDURES

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

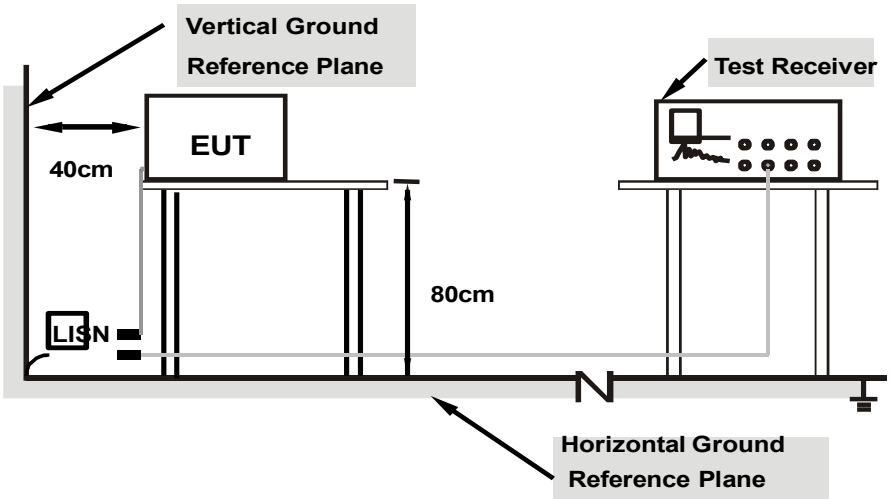
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: All modes of operation were investigated and the worst-case emissions are reported.

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.1.6 EUT OPERATING CONDITIONS

a. Turned on the power and connected of all equipment.
b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

3.1.7 TEST RESULTS

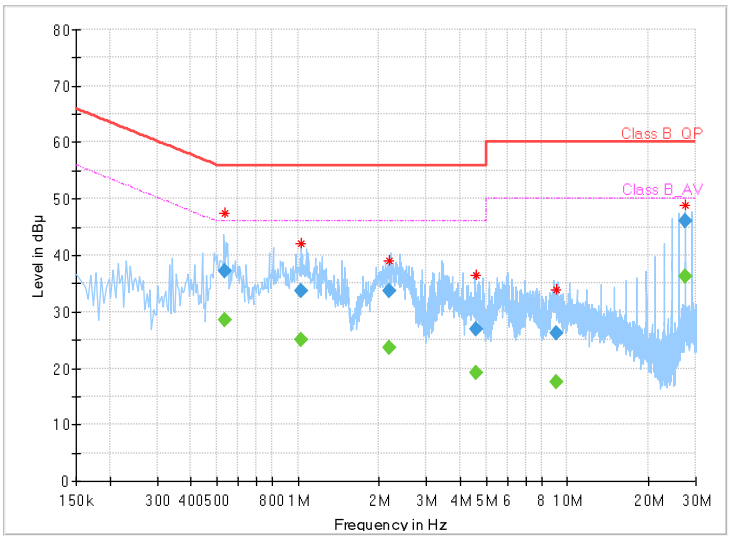
CONDUCTED WORST-CASE DATA:

Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	26deg. C, 51%RH
Tested By	Carl xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.536000	---	28.58	46.00	17.42	L1	ON	9.7
0.536000	37.28	---	56.00	18.72	L1	ON	9.7
1.024000	---	24.93	46.00	21.07	L1	ON	9.7
1.024000	33.58	---	56.00	22.42	L1	ON	9.7
2.188000	---	23.58	46.00	22.42	L1	ON	9.7
2.188000	33.75	---	56.00	22.25	L1	ON	9.7
4.568000	---	19.16	46.00	26.84	L1	ON	9.7
4.568000	26.86	---	56.00	29.14	L1	ON	9.7
9.136000	---	17.62	50.00	32.38	L1	ON	9.7
9.136000	26.19	---	60.00	33.81	L1	ON	9.7
27.544000	---	36.36	50.00	13.64	L1	ON	9.8
27.544000	46.19	---	60.00	13.81	L1	ON	9.8

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

Full Spectrum

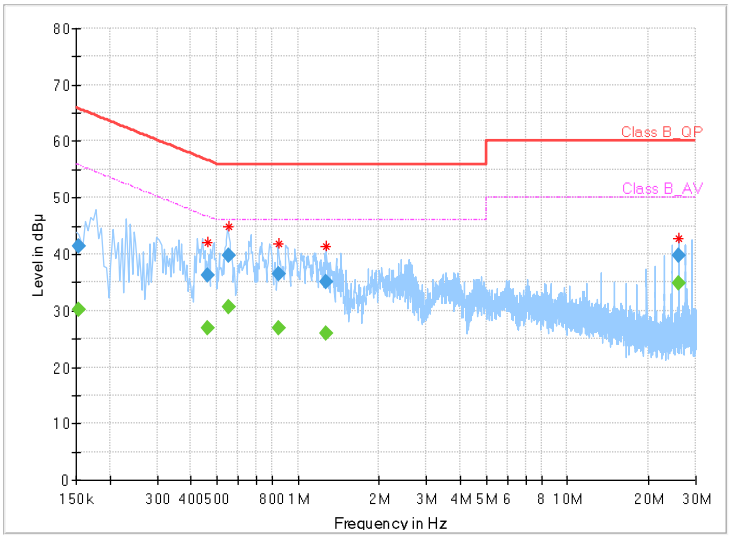


Frequency Range	150KHz ~ 30MHz	**Detector Function & Resolution Bandwidth**	Quasi-Peak (QP) / Average (AV), 9 kHz
Input Power	120Vac, 60Hz	**Environmental Conditions**	26deg. C, 51%RH
Tested By	Carl xie		

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154000	---	30.18	55.78	25.60	N	ON	9.7
0.154000	41.51	---	65.78	24.27	N	ON	9.7
0.464000	---	26.85	46.62	19.77	N	ON	9.7
0.464000	36.35	---	56.62	20.27	N	ON	9.7
0.552000	---	30.64	46.00	15.36	N	ON	9.7
0.552000	39.73	---	56.00	16.27	N	ON	9.7
0.848000	---	26.83	46.00	19.17	N	ON	9.7
0.848000	36.59	---	56.00	19.41	N	ON	9.7
1.276000	---	25.89	46.00	20.11	N	ON	9.8
1.276000	35.01	---	56.00	20.99	N	ON	9.8
25.960000	---	34.79	50.00	15.21	N	ON	9.9
25.960000	39.78	---	60.00	20.22	N	ON	9.9

REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Limit value - Emission level
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.

Full Spectrum



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

FREQUENCIES (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
Above 960	500	3

NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	Euroshieldpn-CT0001143-1216	May. 19,20	May. 18,23
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 05,21	Mar. 04,22
Bilog Antenna	ETS-LINDGREN	3143B	00161965	Mar. 04,22	Mar. 03,23
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 02, 21	Apr. 01, 22
Horn Antenna	ETS-LINDGREN	3117	00168728	Apr. 01, 22	Mar. 31, 23
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 25, 21	Aug. 24, 22
Horn Antenna (18GHz-40GHz)	N/A	QWH-SL-18-40-K-SG/QMS-00361	15433	Aug. 24, 22	Aug. 23, 23
Test Software	E3	V 9.160323	N/A	N/A	N/A
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A	N/A
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 03,21	Jun. 02,22
10dB Attenuator	JFW/USA	50HF-010-SMA	1505	Jun. 02,22	Jun. 01,23
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 27,21	Apr. 26,22
MXE EMI Receiver	KEYSIGHT	N9038A-544	MY54450026	Apr. 26,22	Apr. 25,23
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 9135	980249	Jun. 01,22	May. 31,23
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 02,21	Jun. 01,22
Signal Pre-Amplifier	EMSI	EMC 012645B	980257	Jun. 01,22	May. 31,23
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 30,21	Apr. 29,22
Signal Pre-Amplifier	EMSI	EMC 184045B	980259	Apr. 29,22	Apr. 28,23
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 25,21	Aug. 24,22
DC Source	Kikusui/JP	PMX18-5A	0000001	Aug. 24,22	Aug. 23,23
Power Meter	Anritsu	ML2495A	1506002	Feb. 25,21	Feb. 24,22
Power Meter	Anritsu	ML2495A	1506002	Feb. 24,22	Feb. 23,23
Power Sensor	Anritsu	MA2411B	1339352	Feb. 25,21	Feb. 24,22
Power Sensor	Anritsu	MA2411B	1339352	Feb. 24,22	Feb. 23,23
Loop Antenna	Schwarzbeck	FMZB 1519B	1519B-051	Feb 14,20	Feb. 13,23

NOTE: 1. The calibration interval of the above test instruments is 12 months or 3 months and the calibrations are traceable to CEPREI/CHINA, GRGT/CHINA and NIM/CHINA.

2. The test was performed in 3m Chamber.

3. The FCC Site Registration No. is 525120; The Designation No. is CN1171.

3.2.3 TEST PROCEDURES

a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using fresh batteries. The turntable was rotated to maximize the emission level.

Note:

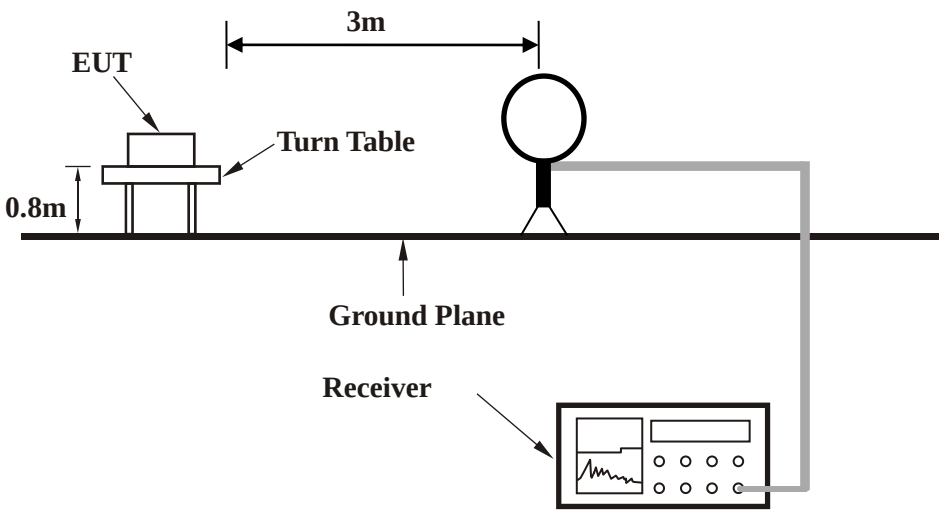
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor (10 log(1/duty cycle)).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

3.2.4 DEVIATION FROM TEST STANDARD

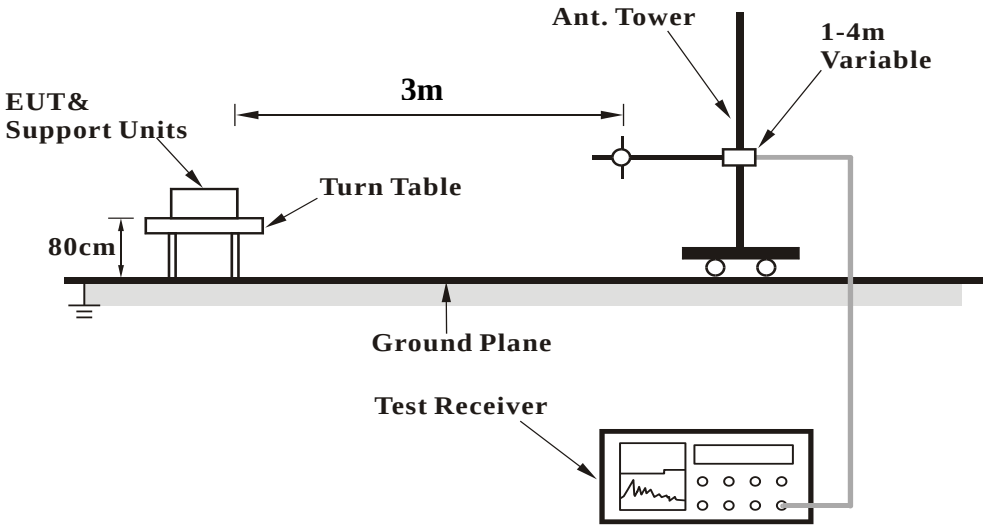
No deviation

3.2.5 TEST SETUP

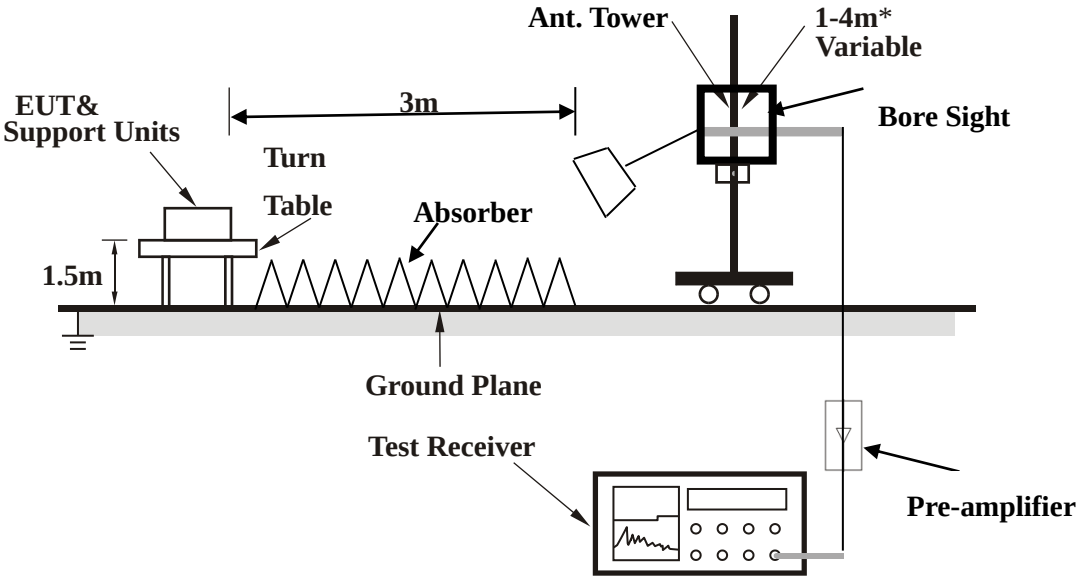
<Frequency Range 9KHz~30MHz >



< Frequency Range 30MHz~1GHz >



<Frequency Range above 1GHz>



Note: Above 1G is a directional antenna

Depends on the EUT height and the antenna 3dB beamwidth both, refer to section 7.3 of CISPR 16-2-3.

For the actual test configuration, please refer to the attached file (Test Setup Photo).

3.2.6 EUT OPERATING CONDITIONS

a. Set the EUT under full load condition and placed them on a testing table.

b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.

c. The necessary accessories enable the EUT in full functions.

3.2.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA:

Note: For frequency below 30MHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

30 MHz – 1GHz data:

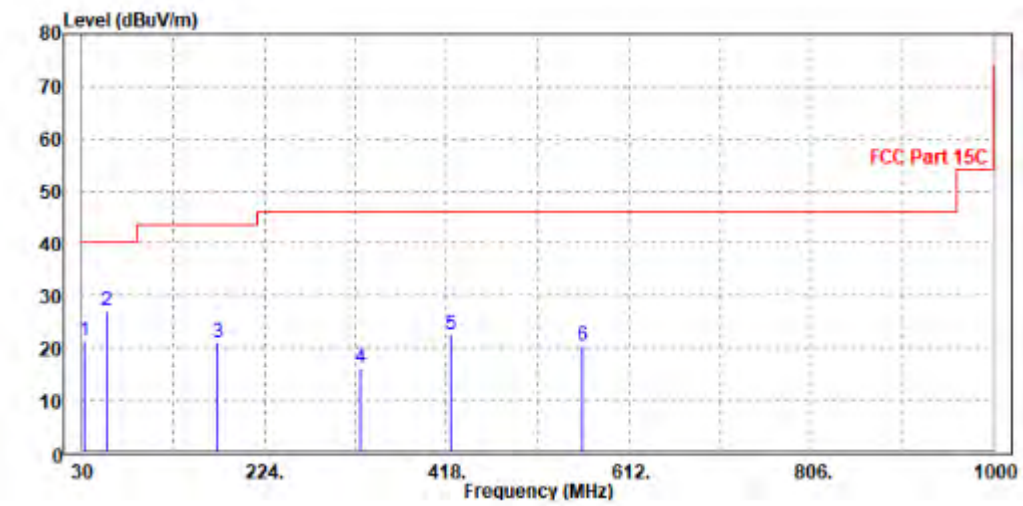
802.11n (40MHz)

CHANNEL	TX Channel 9	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
31.94	21.3	38.52	40	-18.7	19.89	0.32	37.43	163	332	QP
56.19	27.06	54.01	40	-12.94	9.58	0.43	36.96	177	293	QP
174.53	21.08	45.55	43.5	-22.42	11.26	0.7	36.43	146	259	QP
326.82	16.1	36.86	46	-29.9	14.59	0.95	36.3	111	181	QP
422.85	22.51	41.24	46	-23.49	16.63	1.11	36.47	144	343	QP
562.53	20.24	36.59	46	-25.76	19.1	1.31	36.76	128	152	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.

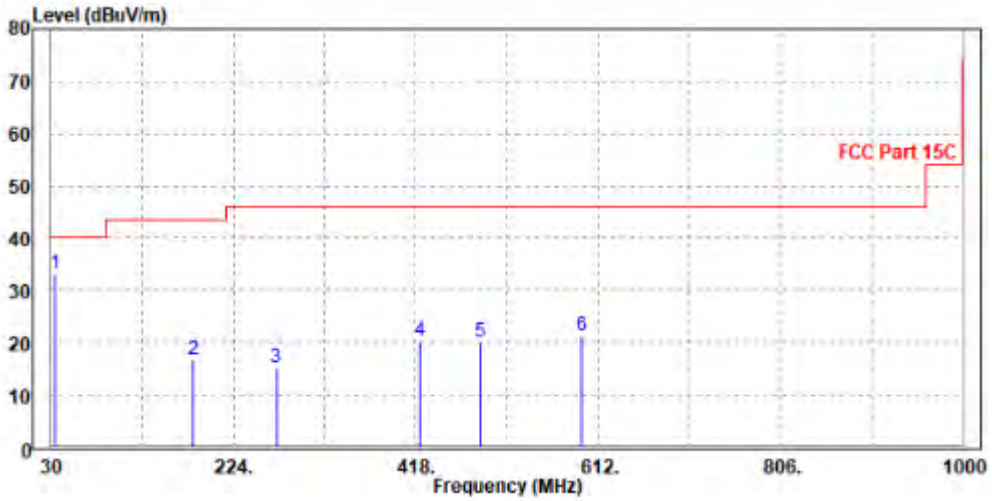


CHANNEL	TX Channel 9	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
34.85	33.1	52.24	40	-6.9	17.88	0.33	37.35	184	158	QP
181.32	16.75	41.21	43.5	-26.75	11.22	0.71	36.39	186	141	QP
269.59	15.23	37.49	46	-30.77	13.15	0.86	36.27	158	32	QP
422.85	20.32	39.08	46	-25.68	16.6	1.11	36.47	199	175	QP
486.87	20.07	38.03	46	-25.93	17.43	1.2	36.59	156	118	QP
594.54	21.24	37.24	46	-24.76	19.49	1.35	36.84	182	186	QP

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.



ABOVE 1GHz WORST-CASE DATA:

Note: For higher frequency, the emission is too low to be detected.

802.11b:

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	45.03	27.38	4.08	35.68	40.81	74.00	-33.19	Peak
2390.000	52.15	27.56	4.16	35.88	47.99	74.00	-26.01	Peak
2413.500	107.27	27.61	4.17	35.93	103.12	74.00	29.12	Peak
2310.000	31.61	27.38	4.08	35.68	27.39	54.00	-26.61	Average
2389.375	36.51	27.56	4.16	35.87	32.36	54.00	-21.64	Average
2390.000	35.89	27.56	4.16	35.88	31.73	54.00	-22.27	Average
2412.750	102.86	27.61	4.17	35.93	98.71	54.00	44.71	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	42.38	27.38	4.08	35.68	38.16	74.00	-35.84	Peak
2390.000	51.51	27.56	4.16	35.88	47.35	74.00	-26.65	Peak
2413.500	108.78	27.61	4.17	35.93	104.63	74.00	30.63	Peak
2310.000	31.57	27.38	4.08	35.68	27.35	54.00	-26.65	Average
2389.375	36.57	27.56	4.16	35.87	32.42	54.00	-21.58	Average
2390.000	36.01	27.56	4.16	35.88	31.85	54.00	-22.15	Average
2412.750	104.07	27.61	4.17	35.93	99.92	54.00	45.92	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.63	31.02	6.97	34.04	31.58	54.00	-22.42	Average
4874.000	40.59	31.02	6.97	34.04	44.54	74.00	-29.46	Peak
7311.000	27.01	35.65	8.95	34.48	37.13	54.00	-16.87	Average
7311.000	41.97	35.65	8.95	34.48	52.09	74.00	-21.91	Peak
9748.000	26.32	38.50	11.20	34.20	41.82	54.00	-12.18	Average
9748.000	39.33	38.50	11.20	34.20	54.83	74.00	-19.17	Peak
2437.000	106.00	27.66	4.18	35.99	101.85	74.00	27.85	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	28.32	31.02	6.97	34.04	32.27	54.00	-21.73	Average
4874.000	40.98	31.02	6.97	34.04	44.93	74.00	-29.07	Peak
7311.000	34.77	35.65	8.95	34.48	44.89	54.00	-9.11	Average
7311.000	42.85	35.65	8.95	34.48	52.97	74.00	-21.03	Peak
9748.000	26.59	38.50	11.20	34.20	42.09	54.00	-11.91	Average
9748.000	39.34	38.50	11.20	34.20	54.84	74.00	-19.16	Peak
2437.000	106.10	27.66	4.18	35.99	101.95	74.00	27.95	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
   2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2460.620	109.24	27.71	4.19	36.05	105.09	74.00	31.09	Peak
2483.500	51.92	27.76	4.19	36.11	47.76	74.00	-26.24	Peak
2483.660	52.75	27.76	4.19	36.11	48.59	74.00	-25.41	Peak
2500.000	44.83	27.80	4.19	36.15	40.67	74.00	-33.33	Peak
2461.220	105.05	27.71	4.19	36.05	100.90	54.00	46.90	Average
2483.500	40.78	27.76	4.19	36.11	36.62	54.00	-17.38	Average
2486.060	41.16	27.77	4.19	36.12	37.00	54.00	-17.00	Average
2500.000	31.54	27.80	4.19	36.15	27.38	54.00	-26.62	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2460.560	109.50	27.71	4.19	36.05	105.35	74.00	31.35	Peak
2483.500	52.55	27.76	4.19	36.11	48.39	74.00	-25.61	Peak
2483.660	52.93	27.76	4.19	36.11	48.77	74.00	-25.23	Peak
2500.000	44.67	27.80	4.19	36.15	40.51	74.00	-33.49	Peak
2461.220	105.05	27.71	4.19	36.05	100.90	54.00	46.90	Average
2483.500	41.40	27.76	4.19	36.11	37.24	54.00	-16.76	Average
2486.060	41.73	27.77	4.19	36.12	37.57	54.00	-16.43	Average
2500.000	31.54	27.80	4.19	36.15	27.38	54.00	-26.62	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.

802.11g

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	44.59	27.38	4.08	35.68	40.37	74.00	-33.63	Peak
2390.000	66.26	27.56	4.16	35.88	62.10	74.00	-11.90	Peak
2415.875	109.56	27.61	4.17	35.94	105.40	74.00	31.40	Peak
2310.000	31.64	27.38	4.08	35.68	27.42	54.00	-26.58	Average
2390.000	45.04	27.56	4.16	35.88	40.88	54.00	-13.12	Average
2415.750	95.12	27.61	4.17	35.94	90.96	54.00	36.96	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	43.80	27.38	4.08	35.68	39.58	74.00	-34.42	Peak
2390.000	65.47	27.56	4.16	35.88	61.31	74.00	-12.69	Peak
2415.750	110.77	27.61	4.17	35.94	106.61	74.00	32.61	Peak
2310.000	31.60	27.38	4.08	35.68	27.38	54.00	-26.62	Average
2390.000	45.92	27.56	4.16	35.88	41.76	54.00	-12.24	Average
2415.500	96.18	27.61	4.17	35.94	92.02	54.00	38.02	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.60	31.02	6.97	34.04	31.55	54.00	-22.45	Average
4874.000	40.53	31.02	6.97	34.04	44.48	74.00	-29.52	Peak
7311.000	26.37	35.65	8.95	34.48	36.49	54.00	-17.51	Average
7311.000	41.06	35.65	8.95	34.48	51.18	74.00	-22.82	Peak
9748.000	26.97	38.50	11.20	34.20	42.47	54.00	-11.53	Average
9748.000	39.06	38.50	11.20	34.20	54.56	74.00	-19.44	Peak
2437.000	108.39	27.66	4.18	35.99	104.24	74.00	30.24	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.68	31.02	6.97	34.04	31.63	54.00	-22.37	Average
4874.000	41.46	31.02	6.97	34.04	45.41	74.00	-28.59	Peak
7311.000	30.02	35.65	8.95	34.48	40.14	54.00	-13.86	Average
7311.000	44.03	35.65	8.95	34.48	54.15	74.00	-19.85	Peak
9748.000	27.01	38.50	11.20	34.20	42.51	54.00	-11.49	Average
9748.000	39.26	38.50	11.20	34.20	54.76	74.00	-19.24	Peak
2437.000	108.31	27.66	4.18	35.99	104.16	74.00	30.16	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2458.220	109.18	27.71	4.18	36.05	105.02	74.00	31.02	Peak
2483.500	73.28	27.76	4.19	36.11	69.12	74.00	-4.88	Peak
2500.000	45.20	27.80	4.19	36.15	41.04	74.00	-32.96	Peak
2459.720	95.08	27.71	4.18	36.05	90.92	54.00	36.92	Average
2483.500	46.81	27.76	4.19	36.11	42.65	54.00	-11.35	Average
2500.000	31.51	27.80	4.19	36.15	27.35	54.00	-26.65	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2459.600	109.72	27.71	4.18	36.05	105.56	74.00	31.56	Peak
2483.500	73.73	27.76	4.19	36.11	69.57	74.00	-4.43	Peak
2500.000	44.53	27.80	4.19	36.15	40.37	74.00	-33.63	Peak
2459.540	95.87	27.71	4.18	36.05	91.71	54.00	37.71	Average
2483.500	47.62	27.76	4.19	36.11	43.46	54.00	-10.54	Average
2500.000	31.52	27.80	4.19	36.15	27.36	54.00	-26.64	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.

802.11n (20MHz)

CHANNEL	TX Channel 1	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	44.04	27.38	4.08	35.68	39.82	74.00	-34.18	Peak
2390.000	68.71	27.56	4.16	35.88	64.55	74.00	-9.45	Peak
2416.500	108.65	27.62	4.17	35.94	104.50	74.00	30.50	Peak
2310.000	31.63	27.38	4.08	35.68	27.41	54.00	-26.59	Average
2390.000	45.00	27.56	4.16	35.88	40.84	54.00	-13.16	Average
2415.250	96.21	27.61	4.17	35.94	92.05	54.00	38.05	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	44.42	27.38	4.08	35.68	40.20	74.00	-33.80	Peak
2390.000	69.46	27.56	4.16	35.88	65.30	74.00	-8.70	Peak
2417.875	110.66	27.62	4.17	35.94	106.51	74.00	32.51	Peak
2310.000	31.63	27.38	4.08	35.68	27.41	54.00	-26.59	Average
2390.000	45.99	27.56	4.16	35.88	41.83	54.00	-12.17	Average
2415.250	97.65	27.61	4.17	35.94	93.49	54.00	39.49	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2412MHz: Fundamental frequency.

CHANNEL	TX Channel 6	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.56	31.02	6.97	34.04	31.51	54.00	-22.49	Average
4874.000	41.33	31.02	6.97	34.04	45.28	74.00	-28.72	Peak
7311.000	26.30	35.65	8.95	34.48	36.42	54.00	-17.58	Average
7311.000	40.99	35.65	8.95	34.48	51.11	74.00	-22.89	Peak
9748.000	26.93	38.50	11.20	34.20	42.43	54.00	-11.57	Average
9748.000	39.08	38.50	11.20	34.20	54.58	74.00	-19.42	Peak
2437.000	108.44	27.66	4.18	35.99	104.29	74.00	30.29	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.56	31.02	6.97	34.04	31.51	54.00	-22.49	Average
4874.000	40.56	31.02	6.97	34.04	44.51	74.00	-29.49	Peak
7311.000	26.95	35.65	8.95	34.48	37.07	54.00	-16.93	Average
7311.000	42.68	35.65	8.95	34.48	52.80	74.00	-21.20	Peak
9748.000	26.96	38.50	11.20	34.20	42.46	54.00	-11.54	Average
9748.000	40.04	38.50	11.20	34.20	55.54	74.00	-18.46	Peak
2437.000	109.20	27.66	4.18	35.99	105.05	74.00	31.05	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 11	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2460.560	108.68	27.71	4.19	36.05	104.53	74.00	30.53	Peak
2483.500	74.17	27.76	4.19	36.11	70.01	74.00	-3.99	Peak
2500.000	45.23	27.80	4.19	36.15	41.07	74.00	-32.93	Peak
2460.140	95.45	27.71	4.19	36.05	91.30	54.00	37.30	Average
2483.500	44.22	27.76	4.19	36.11	40.06	54.00	-13.94	Average
2500.000	31.56	27.80	4.19	36.15	27.40	54.00	-26.60	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2460.560	108.66	27.71	4.19	36.05	104.51	74.00	30.51	Peak
2483.500	74.50	27.76	4.19	36.11	70.34	74.00	-3.66	Peak
2500.000	45.03	27.80	4.19	36.15	40.87	74.00	-33.13	Peak
2460.500	94.91	27.71	4.19	36.05	90.76	54.00	36.76	Average
2483.500	44.64	27.76	4.19	36.11	40.48	54.00	-13.52	Average
2500.000	31.51	27.80	4.19	36.15	27.35	54.00	-26.65	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2462MHz: Fundamental frequency.

802.11n (40MHz)

CHANNEL	TX Channel 3	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	44.50	27.38	4.08	35.68	40.28	74.00	-33.72	Peak
2390.000	71.46	27.56	4.16	35.88	67.30	74.00	-6.70	Peak
2427.350	107.80	27.64	4.18	35.97	103.65	74.00	29.65	Peak
2310.000	31.69	27.38	4.08	35.68	27.47	54.00	-26.53	Average
2390.000	49.57	27.56	4.16	35.88	45.41	54.00	-8.59	Average
2425.550	93.98	27.64	4.18	35.96	89.84	54.00	35.84	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	45.10	27.38	4.08	35.68	40.88	74.00	-33.12	Peak
2390.000	68.27	27.56	4.16	35.88	64.11	74.00	-9.89	Peak
2425.100	106.96	27.64	4.18	35.96	102.82	74.00	28.82	Peak
2310.000	32.31	27.38	4.08	35.68	28.09	54.00	-25.91	Average
2390.000	48.65	27.56	4.16	35.88	44.49	54.00	-9.51	Average
2426.000	94.84	27.64	4.18	35.97	90.69	54.00	36.69	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2422MHz: Fundamental frequency.

CHANNEL	TX Channel 6	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.59	31.02	6.97	34.04	31.54	54.00	-22.46	Average
4874.000	41.01	31.02	6.97	34.04	44.96	74.00	-29.04	Peak
7311.000	26.73	35.65	8.95	34.48	36.85	54.00	-17.15	Average
7311.000	40.99	35.65	8.95	34.48	51.11	74.00	-22.89	Peak
9748.000	26.94	38.50	11.20	34.20	42.44	54.00	-11.56	Average
9748.000	39.54	38.50	11.20	34.20	55.04	74.00	-18.96	Peak
2437.000	105.95	27.66	4.18	35.99	101.80	74.00	27.80	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
4874.000	27.52	31.02	6.97	34.04	31.47	54.00	-22.53	Average
4874.000	40.39	31.02	6.97	34.04	44.34	74.00	-29.66	Peak
7311.000	28.67	35.65	8.95	34.48	38.79	54.00	-15.21	Average
7311.000	41.72	35.65	8.95	34.48	51.84	74.00	-22.16	Peak
9748.000	26.90	38.50	11.20	34.20	42.40	54.00	-11.60	Average
9748.000	38.79	38.50	11.20	34.20	54.29	74.00	-19.71	Peak
2437.000	106.28	27.66	4.18	35.99	102.13	74.00	28.13	Peak

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
   2. 2437MHz: Fundamental frequency.

CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	49.87	58.63	74	-24.13	31.75	5.86	46.37	100	190	Peak
2390	42.3	51.06	54	-11.7	31.75	5.86	46.37	100	190	Average
2452	99.69	108.16	/	/	31.95	5.95	46.37	100	190	Peak
2452	92.8	101.27	/	/	31.95	5.95	46.37	100	190	Average
2483.5	62.81	71.14	74	-11.19	32.05	5.99	46.37	100	190	Peak
2483.5	52.89	61.22	54	-1.11	32.05	5.99	46.37	100	190	Average
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M										
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB /m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
2390	52.1	60.47	74	-21.9	32.14	5.86	46.37	100	140	Peak
2390	42.49	50.86	54	-11.51	32.14	5.86	46.37	100	140	Average
2452	96.85	104.99	/	/	32.28	5.95	46.37	100	140	Peak
2452	87.73	95.87	/	/	32.28	5.95	46.37	100	140	Average
2483.5	59.42	67.44	74	-14.58	32.36	5.99	46.37	100	140	Peak
2483.5	49.01	57.03	54	-4.99	32.36	5.99	46.37	100	140	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2452MHz: Fundamental frequency.

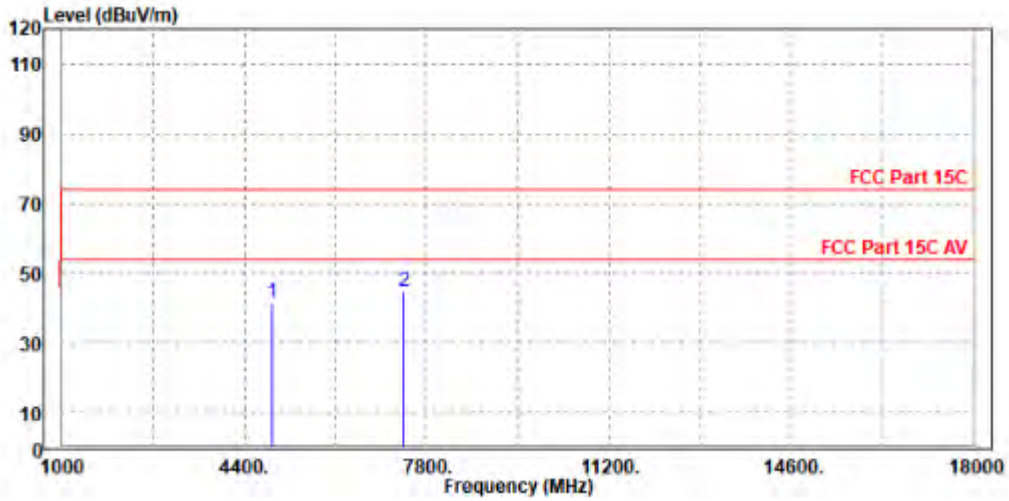
Worst case harmonic:

802.11n (40MHz)

CHANNEL	TX Channel 9	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

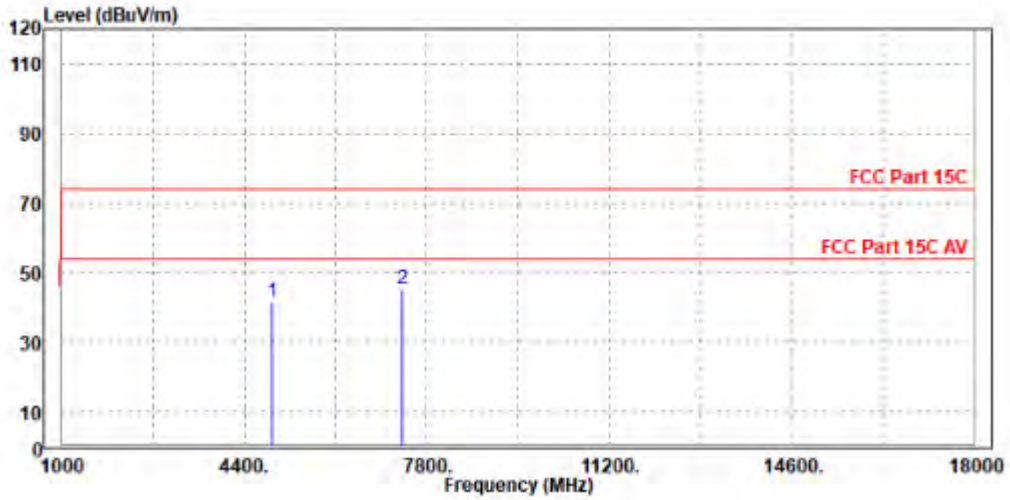
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

		Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
		MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1		4904.000	41.67	44.75	74.00	-32.33	-3.08	Peak	Horizontal
2	PP	7358.000	44.68	42.58	74.00	-29.32	2.10	Peak	Horizontal



ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

	Freq	Level	Read Level	Limit Line	Over Limit	Factor	Remark	Pol/Phase
	MHz	dBuV/m	dBuV	dBuV/m	dB	dB/m		
1	4910.000	41.67	44.53	74.00	-32.33	-2.86	Peak	Vertical
2 PP	7356.000	45.33	43.17	74.00	-28.67	2.16	Peak	Vertical



REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. For frequency above 18GHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

BELOW 1GHz WORST-CASE DATA:

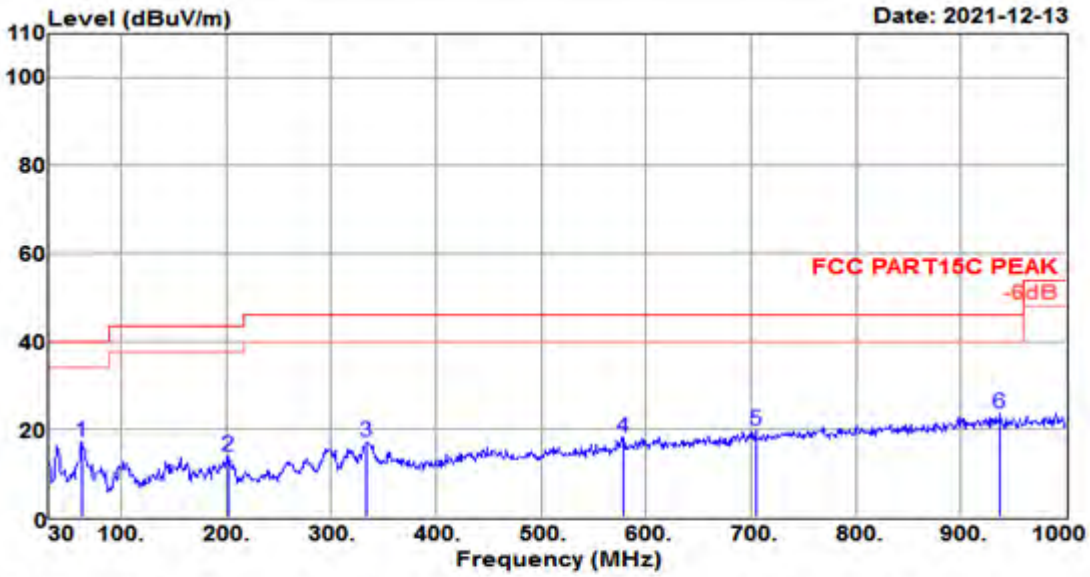
Note: For frequency below 30MHz, the emission was tested 20db below the limit so the data not recorded in the sheet.

30 MHz – 1GHz data:

BT-LE (S2)

CHANNEL	TX Channel 19	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

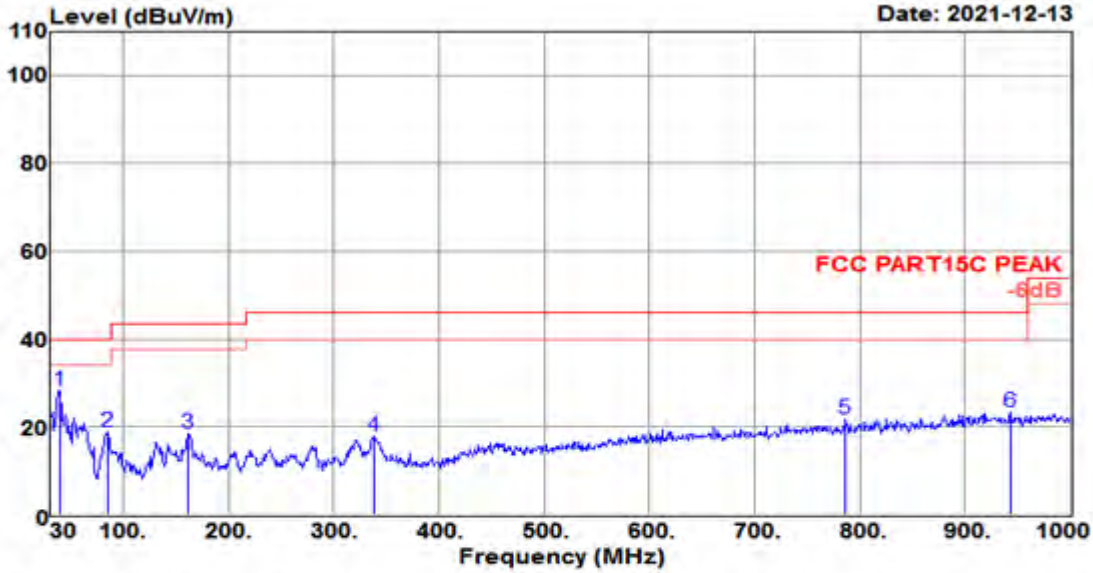
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
62.010	34.03	14.31	1.31	32.58	17.07	40.00	-22.93	QP
202.660	34.13	10.01	2.45	32.60	13.99	43.50	-29.51	QP
333.610	32.87	13.74	3.18	32.63	17.16	46.00	-28.84	QP
578.050	28.51	18.22	4.32	32.72	18.33	46.00	-27.67	QP
704.150	27.54	19.90	4.84	32.60	19.68	46.00	-26.32	QP
936.950	27.02	22.40	5.75	31.47	23.70	46.00	-22.30	QP

CHANNEL	TX Channel 19	**DETECTOR FUNCTION**	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M



Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
39.700	45.64	14.33	1.00	32.60	28.37	40.00	-11.63	QP
84.320	41.01	8.90	1.51	32.53	18.89	40.00	-21.11	QP
161.920	35.02	13.86	2.18	32.56	18.50	43.50	-25.00	QP
338.460	33.39	13.84	3.21	32.64	17.80	46.00	-28.20	QP
786.600	28.29	20.91	5.13	32.51	21.82	46.00	-24.18	QP
942.770	26.58	22.40	5.76	31.43	23.31	46.00	-22.69	QP

ABOVE 1GHz TEST DATA

Note: For higher frequency, the emission is too low to be detected.

BT-LE _1M

CHANNEL	TX Channel 0	**DETECTOR FUNCTION**	Peak (PK) Average (AV)
FREQUENCY RANGE	1GHz ~ 25GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	41.67	27.38	4.08	35.68	37.45	74.00	-36.55	Peak
2338.535	44.50	27.44	4.11	35.75	40.30	74.00	-33.70	Peak
2390.000	42.17	27.56	4.16	35.88	38.01	74.00	-35.99	Peak
2402.375	96.66	27.59	4.17	35.91	92.51	74.00	18.51	Peak
2310.000	30.24	27.38	4.08	35.68	26.02	54.00	-27.98	Average
2390.000	30.89	27.56	4.16	35.88	26.73	54.00	-27.27	Average
2402.060	96.25	27.58	4.17	35.91	92.09	54.00	38.09	Average

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
2310.000	41.86	27.38	4.08	35.68	37.64	74.00	-36.36	Peak
2370.770	44.33	27.52	4.14	35.83	40.16	74.00	-33.84	Peak
2390.000	42.72	27.56	4.16	35.88	38.56	74.00	-35.44	Peak
2402.270	96.57	27.58	4.17	35.91	92.41	74.00	18.41	Peak
2310.000	30.35	27.38	4.08	35.68	26.13	54.00	-27.87	Average
2390.000	30.75	27.56	4.16	35.88	26.59	54.00	-27.41	Average
2402.060	95.83	27.58	4.17	35.91	91.67	54.00	37.67	Average

REMARKS:

1. Emission Level = Read Level+ Antenna Factor + Cable Loss- Preamp Factor
   Margin value = Emission level – Limit value.
2. 2402MHz: Fundamental frequency.