

TEST REPORT

Applicant	Linkplay Technology Inc.
Address	8F-8036, Qianren Building, No. 7, Yingcui Road, Jiangning District, Nanjing, China

Manufacturer or Supplier	N/A
Address	N/A
Product	Radio Module
Brand Name	Linkplay
Model	A98
Additional Model & Model Difference	N/A
Date of tests	Jul. 24, 2020 ~ Mar. 09, 2021

The submitted sample of the above equipment has been tested partially for according to the requirements of the following standards:

- ☒ **FCC Part 15, Subpart C, Section 15.247**
For Radiated Emission, Out of band Emission Measurement and Conducted Output power test items

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

Tested by Lucas Chen Project Engineer / EMC Department	Approved by Glyn He Assistant Manager / EMC Department
	

Date: Mar. 11, 2021

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**BUREAU
VERITAS**

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Test Report No.: RF200910N001-2

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF200910N001-2	Original release	Mar. 11, 2021

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	REMARK
15.207	AC Power Conducted Emission	N/A	Powered by DC 5V
15.205 15.209	Radiated Emission	PASS	Meet the requirement of limit.
15.247(d)	Out of band Emission Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	N/A	No Test
15.247(b)	Conducted Output power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	N/A	No Test
15.203	Antenna Requirement	PASS	Antenna connector is i-pex not a standard connector.

Note: The test items were required by client.

2 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	FREQUENCY	UNCERTAINTY
Conducted emissions	0.15MHz ~ 30MHz	2.70dB
Radiated emissions	9KHz ~ 30MHz	2.16dB
	30MHz ~ 1GMHz	3.60dB
	1GHz ~ 18GHz	4.82dB
	18GHz ~ 40GHz	5.00dB

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

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Radio Module
BRAND	Linkplay
MODEL NO.	A98
ADDITIONAL MODEL	N/A
FCC ID	2ANOG-A98XX
NOMINAL VOLTAGE	DC 5V
MODULATION TECHNOLOGY	DTS
MODULATION TYPE	BT-LE(GFSK)
OPERATING FREQUENCY	2402MHz ~ 2480MHz
PEAK OUTPUT POWER	2.014mW (Measured Maximum)
ANTENNA TYPE	Home Antenna: FPCB Antenna, 3.18dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTES:

1. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.
2. Please refer to the EUT photo document (Reference No.: 200910N001-1) for detailed product photo.

3.2 DESCRIPTION OF TEST MODES

40 channels are provided for BT-LE:

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

3.2.1. CONFIGURATION OF SYSTEM UNDER TEST

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

3.2.2. 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 X 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				DESCRIPTION
	RE<1G	RE≥1G	PLC	APCM	
A	√	√	-	√	Powered By DC 5V

Where

RE<1G: Radiated Emission below 1GHz
PLC: Power Line Conducted Emission

RE≥1G: Radiated Emission above 1GHz
APCM: Antenna Port Conducted Measurement

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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channels were selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	0 to 39	39	DTS	GFSK	1

For the test results, only the worst case was shown in test report.

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, XYZ axis and antenna ports (if EUT with antenna diversity architecture).

- ☒ Following channels were selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	0 to 39	0,19, 39	DTS	GFSK	1

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 channels were selected for the final test as listed below.

EUT CONFIGURE MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	0 to 39	0, 19, 39	DTS	GFSK	1

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	23deg. C, 59%RH	DC 5V from base support	Bryant
RE≥1G	30deg. C, 58%RH	DC 5V from base support	Jelly
PLC	-	-	-
APCM	25deg. C, 60%RH	DC 5V from base support	Daniel

3.3 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

558074 D01 15.247 Meas Guidance v05r02

ANSI C63.10-2013

Note: All test items have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as a dependent 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	Base support	N/A	N/A	N/A	N/A

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	AC Cable: Unshielded, Detachable, 1.2m

4 TEST TYPES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 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

NOTES:

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.

4.1.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 17,22
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV7	102331	May 13, 21
Active Loop Antenna (9KHz -30MHz)	SCHWARZBECK	FMZB 1519B	1519B-045	May 29,21
Amplifier (9KHz -1GHz)	Burgeon	BPA-530	100210	Mar. 14,22
Bilog Antenna (20MHz -2GHz)	Teseq	CBL 6111D	30643	May 29,21
Horn Antenna (1GHz -18GHz)	ETS -Lindgren	3117	00062558	May 29,21
Horn Antenna (18GHz -40GHz)	SCHWARZBECK	BBHA 9170	BBHA9170147	May 09, 21
3m Semi-anechoic Chamber	ETS-LINDGREN	9m*6m*6m	NSEMC003	May 22,21
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A
Broadband Preamplifier (1GHz~18GHz)	SCHWARZBECK	BBV9718	305	May 08,21
Pre-Amplifier (18GHz-40GHz)	EMCI	EMC 184045	980102	Mar. 03,22
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	N/A
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	N/A

NOTES:

1. The test was performed in 966 Chamber.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA, GREGT/CHINA and NIM/CHINA.
3. The horn antenna is used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 749762.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 1.5 meters (above 1GHz) and 0.8 meters (below 1GHz) above the ground at a 3 meters semi-anechoic chamber. 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. For below 30MHz, a loop antenna with its vertical plane is place 3m from the EUT and rotated about its vertical axis for maximum response at each azimuth about the EUT. And the centre of the loop shall be 1m above the ground.
- g. 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.

NOTES:

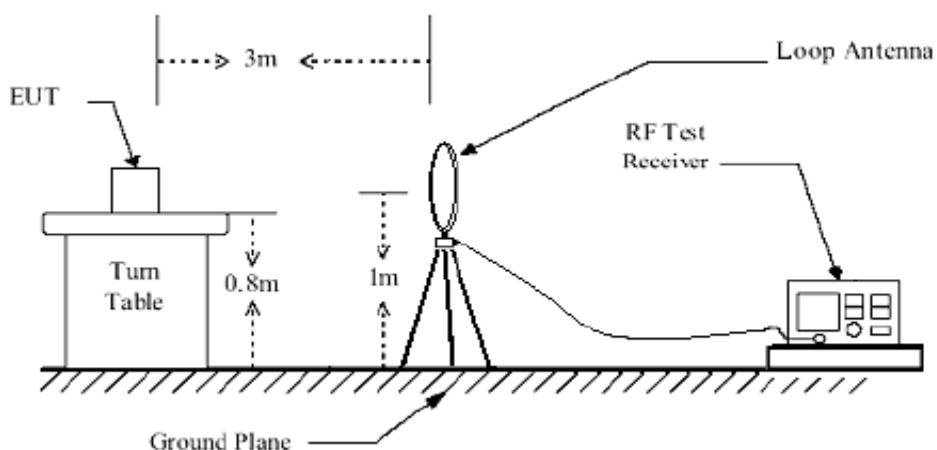
1. The resolution bandwidth of test receiver/spectrum analyzer is 200Hz for Quasi-peak detection (QP) at radiated spurious emission frequency below 0.15MHz; The resolution bandwidth of test receiver/spectrum analyzer is 9KHz for Quasi-peak detection (QP) at radiated spurious emission frequency below 30MHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at radiated spurious emission frequency below 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or 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.
6. The testing of the EUT was performed on all 3 orthogonal axes; the worst-case test configuration was reported on the file test setup photo.

4.1.4 DEVIATION FROM TEST STANDARD

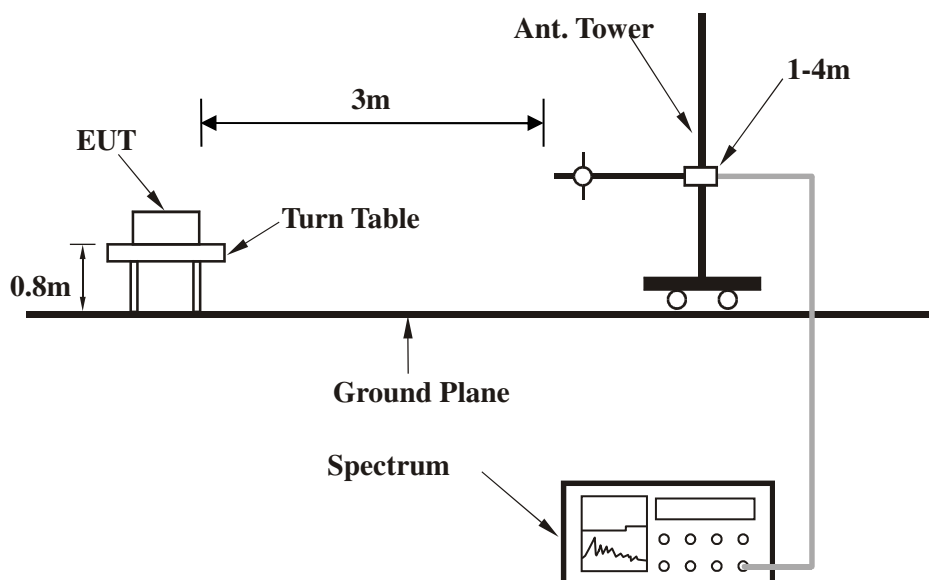
No deviation.

4.1.5 TEST SETUP

Below 30MHz test setup

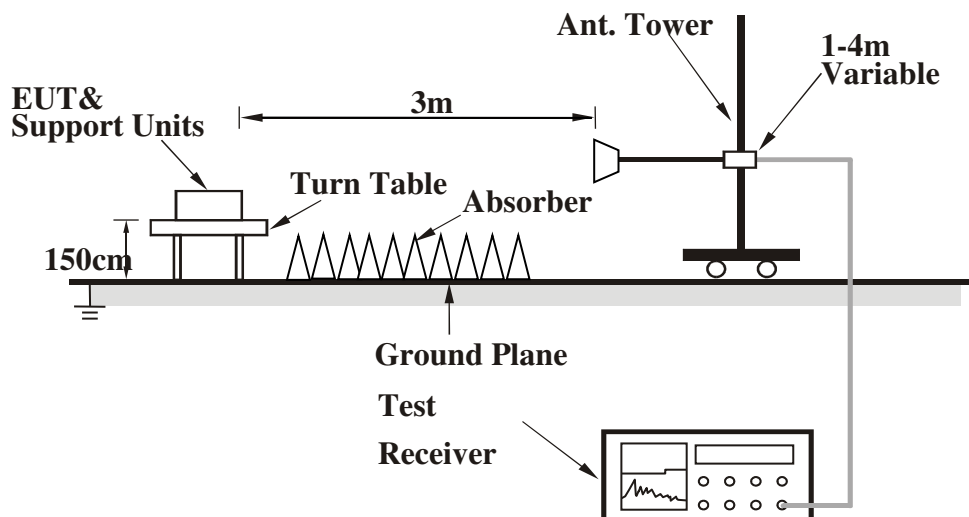


Below 1GHz test setup



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

Above 1GHz test setup



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

4.1.6 EUT OPERATING CONDITIONS

- Set the EUT under full load condition and placed them on a testing table.
- Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- The necessary accessories enable the EUT in full functions.

4.1.7 TEST RESULTS

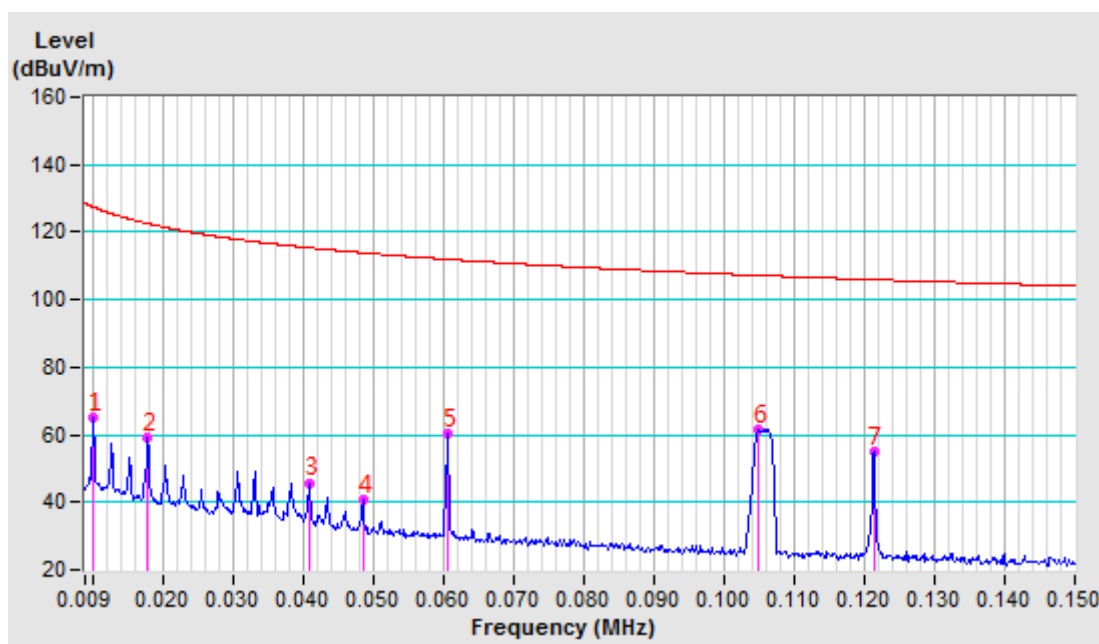
BELOW 30MHz WORST-CASE DATA:

BT-LE GFSK (1Mbps)

CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak, 200Hz
FREQUENCY RANGE	9 -150KHz		

ANTENNA POLARITY & TEST DISTANCE: PARALLEL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.01020	-10.05	75.00	64.95	127.42	-62.47	100	243
2	0.01790	-10.51	69.47	58.96	122.55	-63.59	100	224
3	0.04090	-11.42	57.11	45.69	115.37	-69.68	100	232
4	0.04860	-11.54	52.22	40.68	113.87	-73.19	100	230
5	0.06070	-11.59	71.71	60.12	111.95	-51.83	100	259
6	0.10500	-11.79	73.07	61.28	107.18	-45.90	100	234
7	0.12130	-11.82	66.85	55.03	105.92	-50.89	100	249

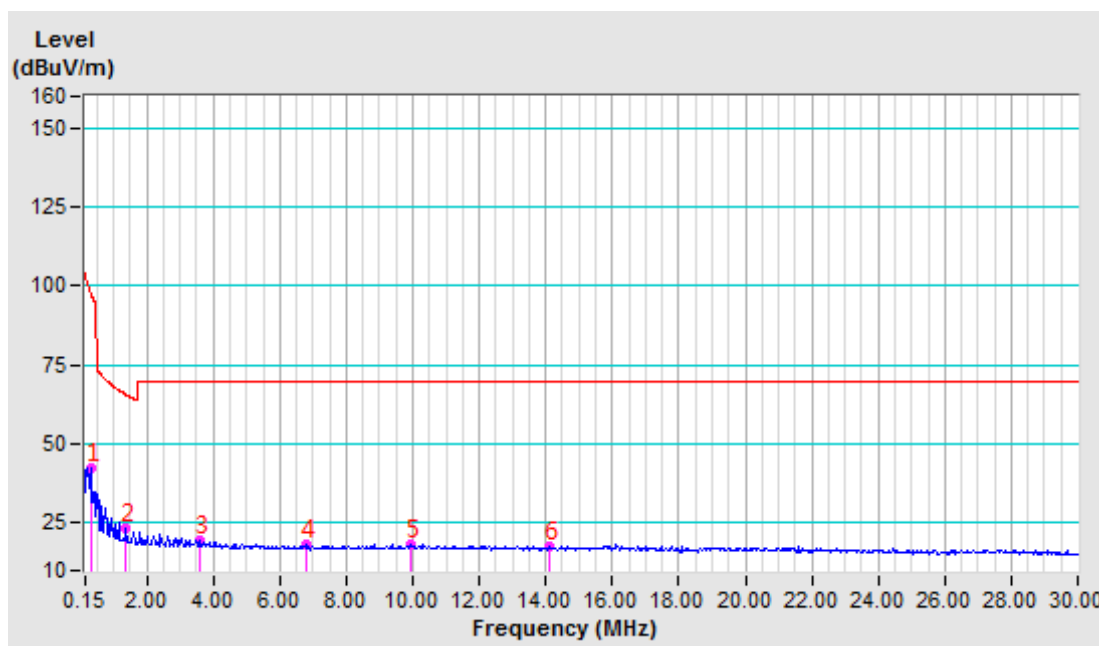
- REMARKS:** 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 0.009-0.15MHz.
4. Only emissions significantly above equipment noise floor are reported.



CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak, 200Hz
FREQUENCY RANGE	150KHz-30MHz		

ANTENNA POLARITY & TEST DISTANCE: PARALLEL AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.31720	-12.15	54.42	42.27	97.58	-55.31	100	181
2	1.36050	-12.03	35.51	23.48	65.75	-42.27	100	30
3	3.58440	-11.97	31.56	19.59	69.54	-49.95	100	196
4	6.76810	-11.93	30.00	18.07	69.54	-51.47	100	127
5	9.96220	-11.75	30.02	18.27	69.54	-51.27	100	24
6	14.13690	-11.54	29.19	17.65	69.54	-51.89	100	45

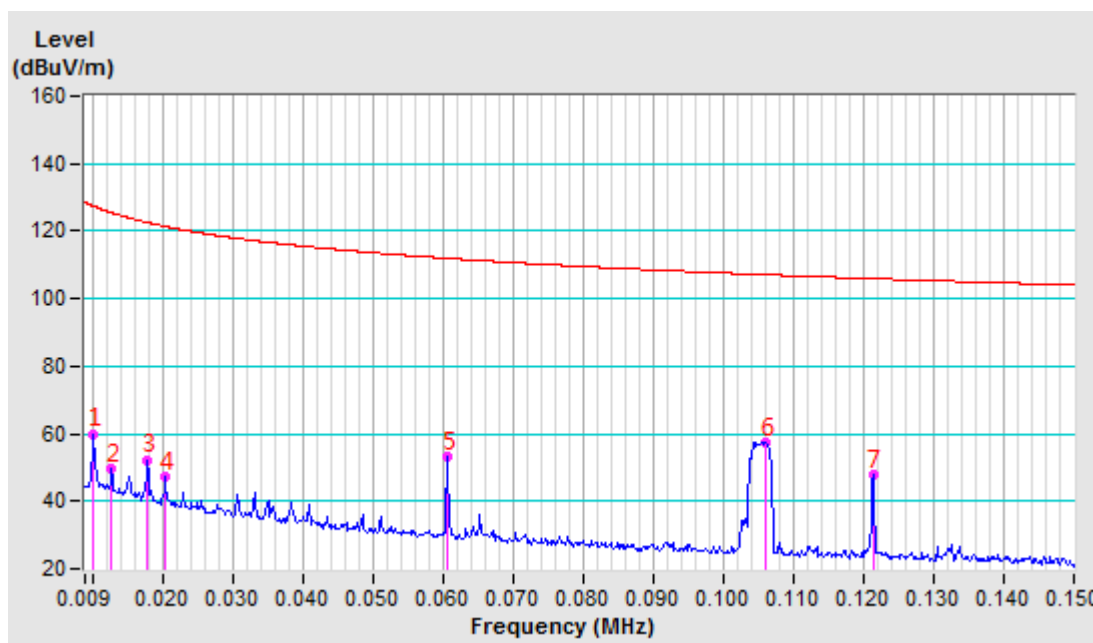
REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 0.15-30MHz.
4. Only emissions significantly above equipment noise floor are reported.



CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak, 200Hz
FREQUENCY RANGE	9 -150KHz		

ANTENNA POLARITY & TEST DISTANCE: PERPENDICULAR AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.01020	-10.05	69.94	59.89	127.40	-67.51	100	163
2	0.01280	-10.21	59.79	49.58	125.45	-75.87	100	337
3	0.01790	-10.51	62.61	52.10	122.55	-70.45	100	360
4	0.02050	-10.67	57.76	47.09	121.37	-74.28	100	114
5	0.06070	-11.59	64.55	52.96	111.94	-58.98	100	188
6	0.10610	-11.79	69.07	57.28	107.09	-49.81	100	168
7	0.12130	-11.82	59.44	47.62	105.92	-58.30	100	193

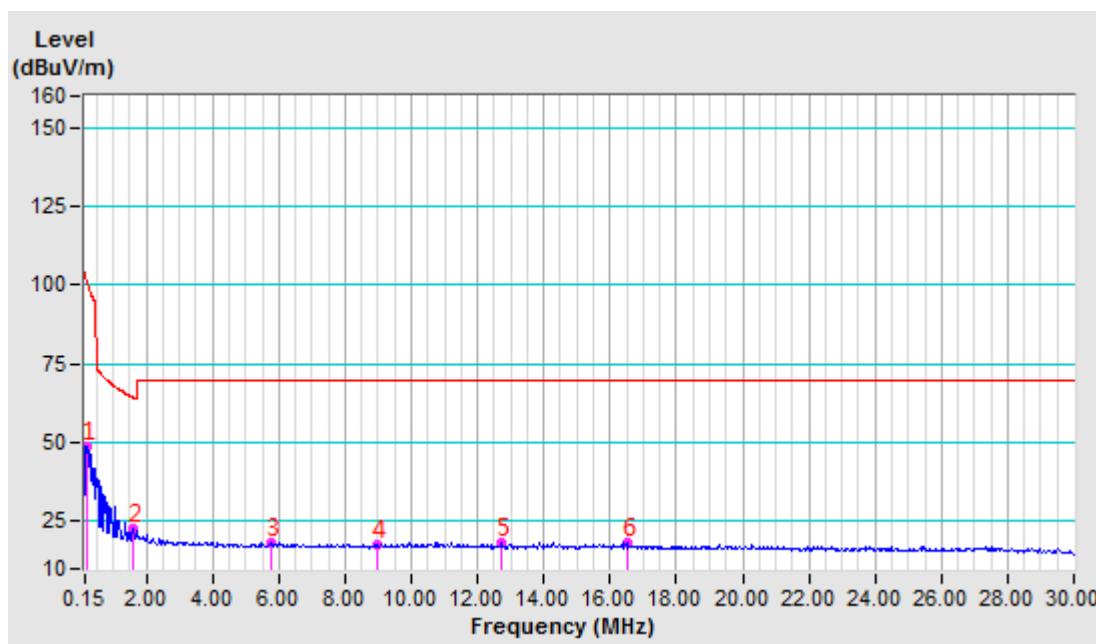
REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 0.009-0.15MHz.
4. Only emissions significantly above equipment noise floor are reported.



CHANNEL	Channel 39	DETECTOR FUNCTION	Quasi-Peak, 200Hz
FREQUENCY RANGE	150KHz-30MHz		

ANTENNA POLARITY & TEST DISTANCE: PERPENDICULAR AT 3M								
No.	Freq. (MHz)	Correction Factor (dB/m)	Raw Value (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)
1	0.18130	-11.94	61.01	49.07	102.43	-53.36	100	266
2	1.57390	-12.04	34.82	22.78	64.60	-41.82	100	252
3	5.76360	-11.97	30.17	18.20	69.54	-51.34	100	77
4	8.96070	-11.81	29.63	17.82	69.54	-51.72	100	297
5	12.74430	-11.68	29.87	18.19	69.54	-51.35	100	63
6	16.55490	-11.55	29.61	18.06	69.54	-51.48	100	42

REMARKS: 1. Peak detector quick scan is showed on the graph and final quasi-peak detector data is measured corresponding to relevant limit and recorded in the data table.
2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 0.15-30MHz
4. Only emissions significantly above equipment noise floor are reported.



BELOW 1GHz WORST-CASE DATA:

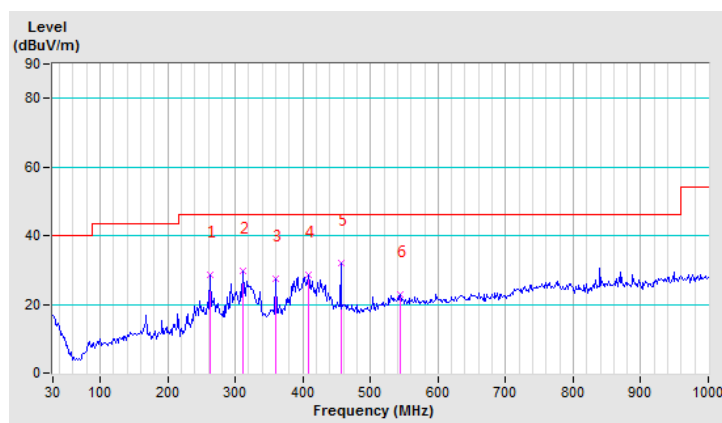
BT-LE GFSK (1Mbps)

CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTIO N FACTOR (dB/m)
1	263.17	28.65 QP	46.00	-17.35	1.00 H	252	44.39	-15.74
2	311.36	29.58 QP	46.00	-16.42	1.00 H	238	43.51	-13.93
3	359.55	27.48 QP	46.00	-18.52	1.00 H	265	39.89	-12.41
4	407.74	28.59 QP	46.00	-17.41	1.00 H	222	39.96	-11.37
5	455.93	31.86 QP	46.00	-14.14	1.00 H	206	42.24	-10.38
6	544.54	22.90 QP	46.00	-23.10	1.00 H	280	30.87	-7.97

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.

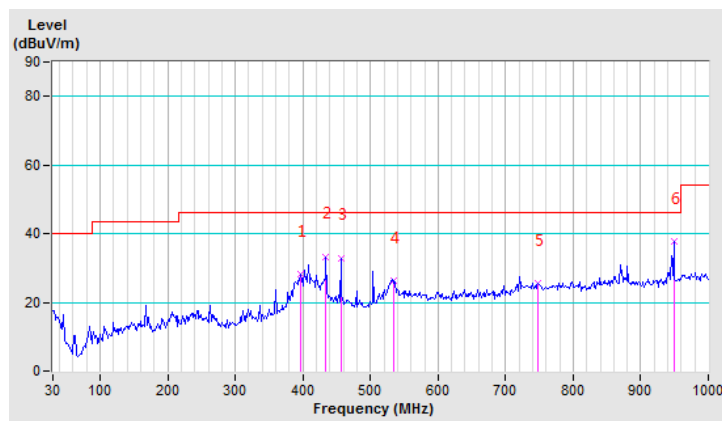


CHANNEL	TX Channel 39	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	30MHz ~ 1GHz		

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTIO N FACTOR (dB/m)
1	396.86	28.28 QP	46.00	-17.72	1.00 V	96	39.93	-11.65
2	434.17	33.34 QP	46.00	-12.66	1.00 V	84	44.29	-10.95
3	455.93	32.99 QP	46.00	-13.01	1.00 V	64	43.37	-10.38
4	535.21	26.33 QP	46.00	-19.67	1.00 V	40	34.66	-8.33
5	748.17	25.66 QP	46.00	-20.34	1.00 V	28	29.26	-3.60
6	948.70	37.88 QP	46.00	-8.12	1.00 V	17	39.46	-1.58

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.



ABOVE 1GHz TEST DATA:

BT-LE GFSK

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

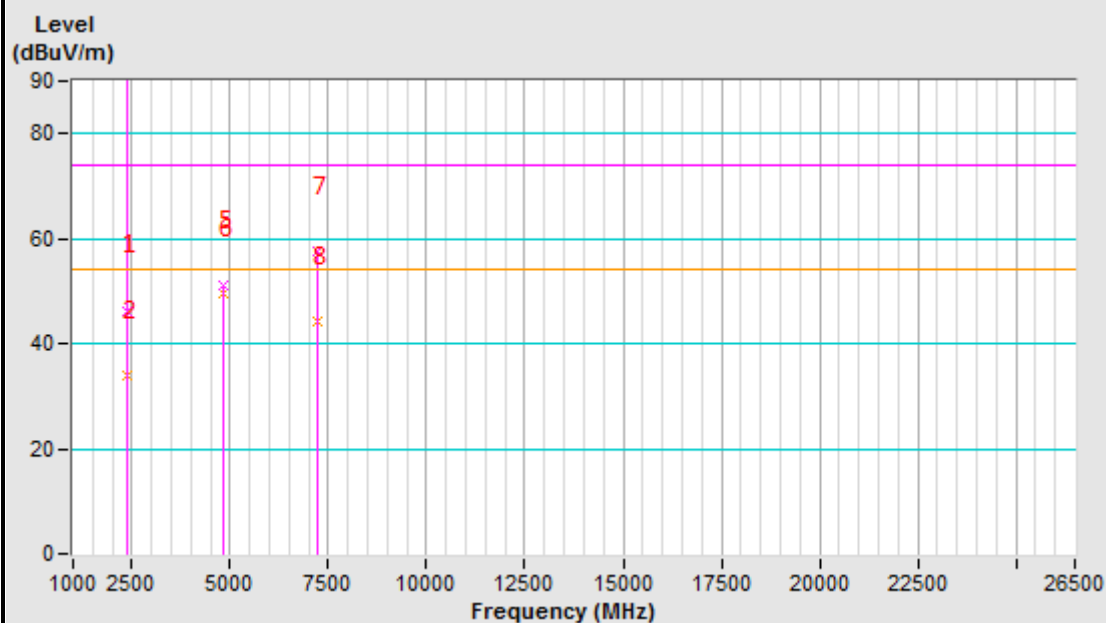
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	46.31 PK	74.00	-27.69	1.00 H	253	41.25	5.06
2	2390.00	34.02 AV	54.00	-19.98	1.00 H	253	28.96	5.06
3	*2402.00	98.63 PK			1.00 H	253	93.50	5.13
4	*2402.00	97.26 AV			1.00 H	253	92.13	5.13
5	4804.00	51.09 PK	74.00	-22.91	1.00 H	189	40.48	10.61
6	4804.00	49.55 AV	54.00	-4.45	1.00 H	189	38.94	10.61
7	#7206.00	57.45 PK	74.00	-16.55	1.00 H	189	40.58	16.87
8	#7206.00	44.18 AV	54.00	-9.82	1.00 H	189	27.31	16.87
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	44.26 PK	74.00	-29.74	1.00 V	182	39.20	5.06
2	2390.00	33.06 AV	54.00	-20.94	1.00 V	182	28.00	5.06
3	*2402.00	95.14 PK			1.00 V	182	90.01	5.13
4	*2402.00	94.03 AV			1.00 V	182	88.90	5.13
5	4804.00	50.03 PK	74.00	-23.97	1.00 V	78	39.42	10.61
6	4804.00	42.06 AV	54.00	-11.94	1.00 V	78	31.45	10.61
7	#7206.00	55.02 PK	74.00	-18.98	1.00 V	78	38.15	16.87
8	#7206.00	40.19 AV	54.00	-13.81	1.00 V	78	23.32	16.87

REMARKS:

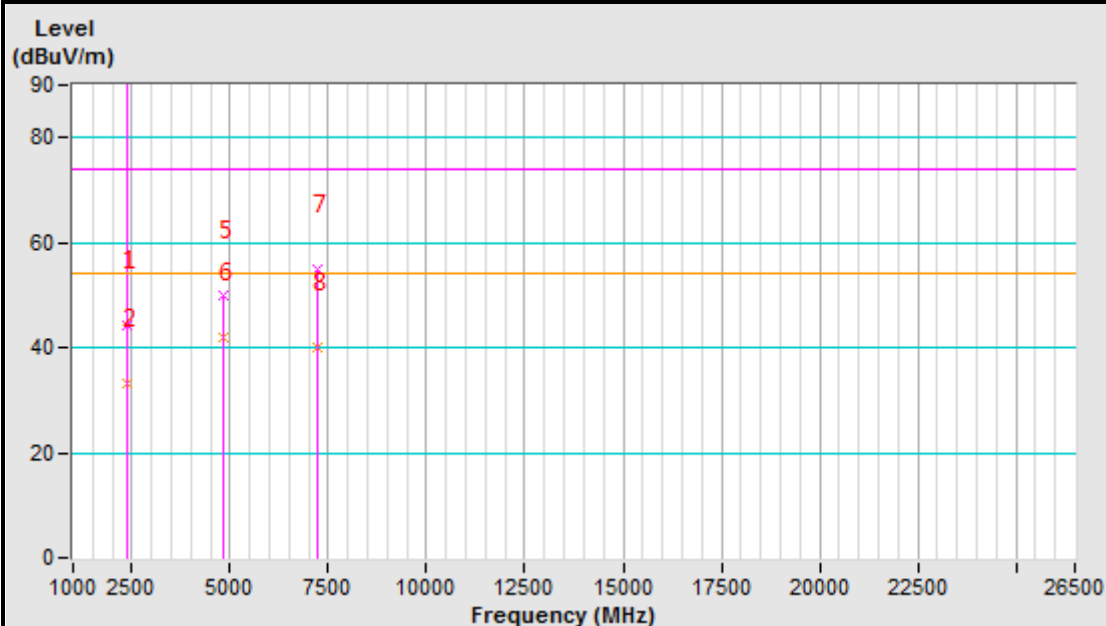
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

Test Plot

2402MHz Horizontal



2402MHz Vertical



CHANNEL	TX Channel 19	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

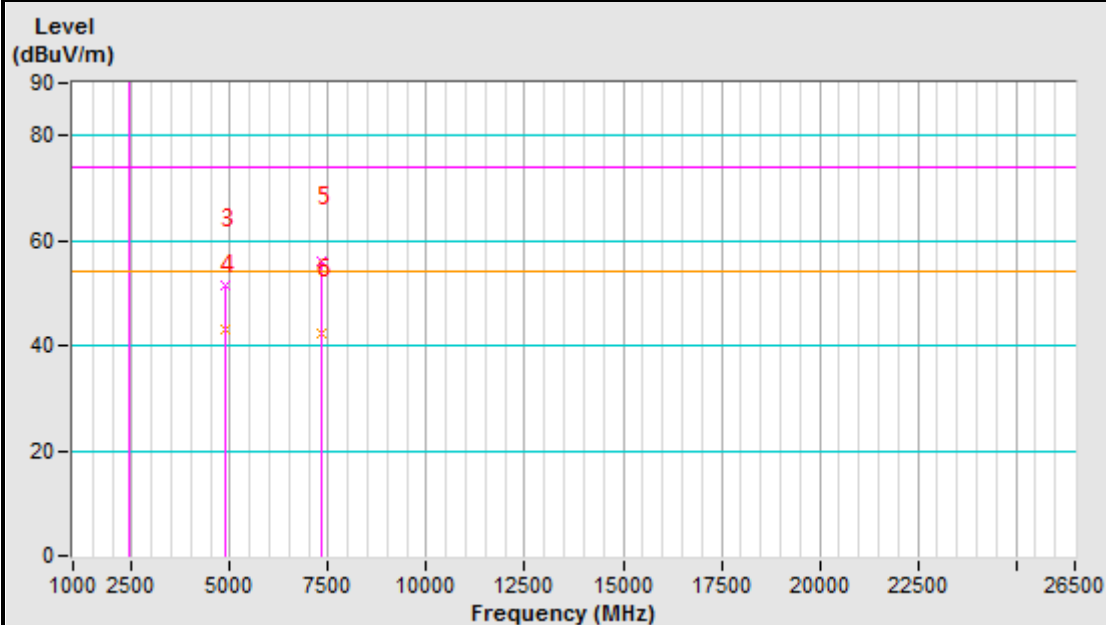
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	92.47 PK			1.00 H	25	87.13	5.34
2	*2441.00	91.82 AV			1.00 H	25	86.48	5.34
3	4882.00	51.67 PK	74.00	-22.33	1.00 H	100	40.75	10.92
4	4882.00	43.15 AV	54.00	-10.85	1.00 H	100	32.23	10.92
5	7323.00	56.14 PK	74.00	-17.86	1.00 H	250	38.95	17.19
6	7323.00	42.18 AV	54.00	-11.82	1.00 H	250	24.99	17.19
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2441.00	90.02 PK			1.00 V	130	84.68	5.34
2	*2441.00	89.02 AV			1.00 V	130	83.68	5.34
3	4882.00	48.26 PK	74.00	-25.74	1.00 V	180	37.34	10.92
4	4882.00	38.45 AV	54.00	-15.55	1.00 V	180	27.53	10.92
5	7323.00	54.04 PK	74.00	-19.96	1.00 V	20	36.85	17.19
6	7323.00	39.88 AV	54.00	-14.12	1.00 V	20	22.69	17.19

REMARKS:

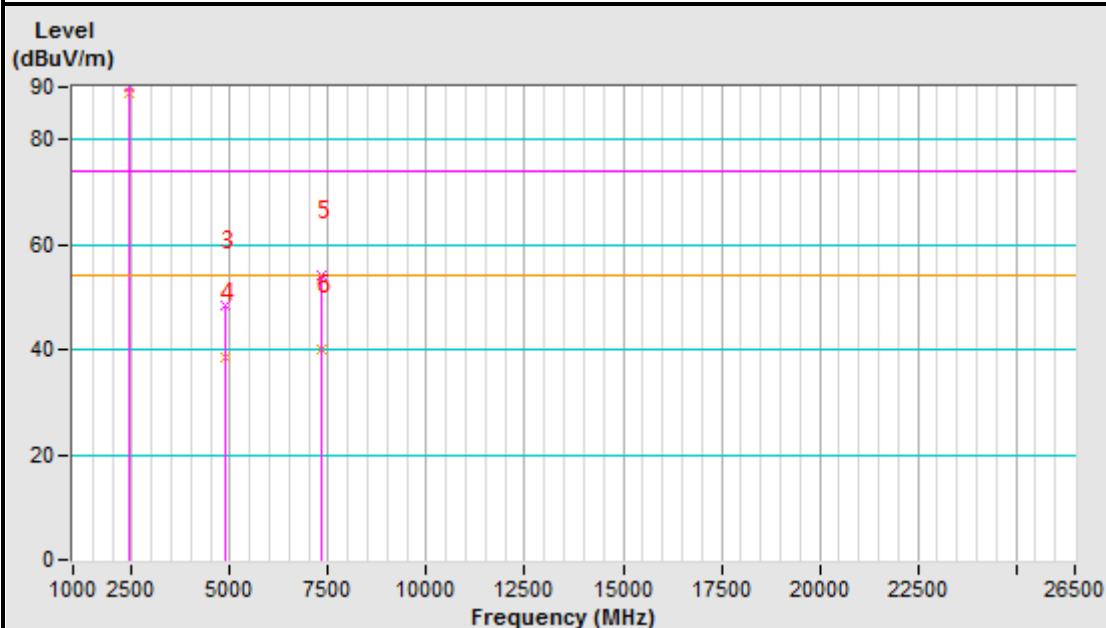
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

Test Plot

2440MHz Horizontal



2440MHz Vertical





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CHANNEL	TX Channel 39	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 25GHz		Average (AV)

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	91.36 PK			1.00 H	125	85.81	5.55
2	*2480.00	90.14 AV			1.00 H	125	84.59	5.55
3	2483.50	46.26 PK	74.00	-27.74	1.00 H	125	40.69	5.57
4	2483.50	35.01 AV	54.00	-18.99	1.00 H	125	29.44	5.57
5	4960.00	55.03 PK	74.00	-18.97	1.00 H	156	43.79	11.24
6	4960.00	37.03 AV	54.00	-16.97	1.00 H	156	25.79	11.24
7	7440.00	56.36 PK	74.00	-17.64	1.00 H	156	38.84	17.52
8	7440.00	42.61 AV	54.00	-11.39	1.00 H	156	25.09	17.52
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2480.00	88.26 PK			1.00 V	53	82.71	5.55
2	*2480.00	87.19 AV			1.00 V	53	81.64	5.55
3	2483.50	44.16 PK	74.00	-29.84	1.00 V	53	38.59	5.57
4	2483.50	34.28 AV	54.00	-19.72	1.00 V	53	28.71	5.57
5	4960.00	54.17 PK	74.00	-19.83	1.00 V	85	42.93	11.24
6	4960.00	36.54 AV	54.00	-17.46	1.00 V	85	25.30	11.24
7	7440.00	53.75 PK	74.00	-20.25	1.00 V	85	36.23	17.52
8	7440.00	41.96 AV	54.00	-12.04	1.00 V	85	24.44	17.52

REMARKS:

1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.

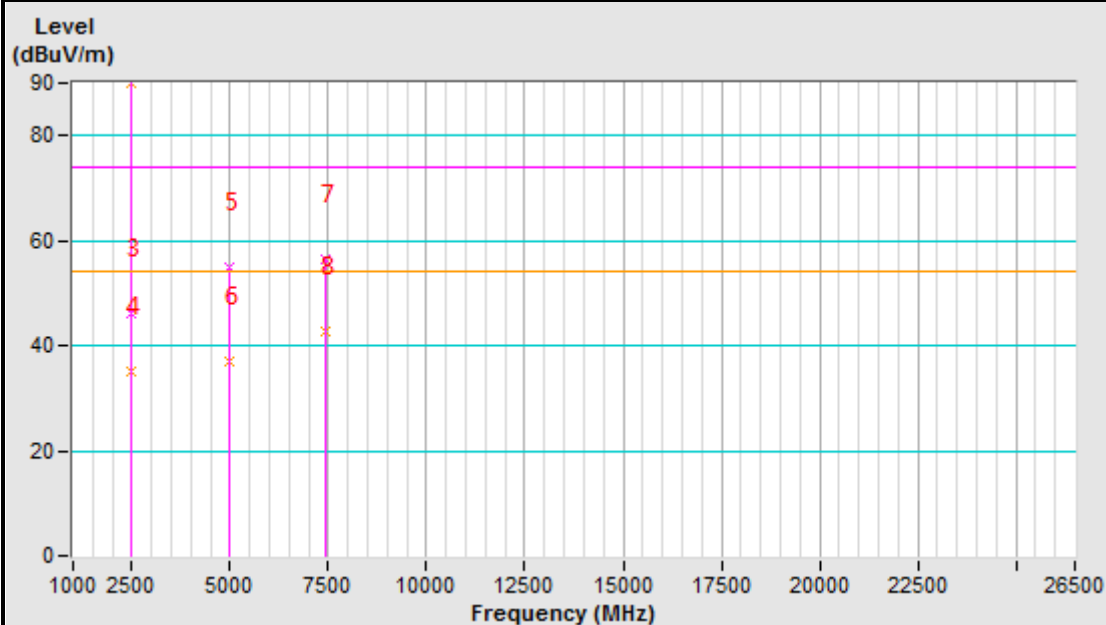
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No. 96, Guantai Road (Houjie Section), Houjie
Town, Dongguan City, Guangdong Province.
523942. People's Republic of China.

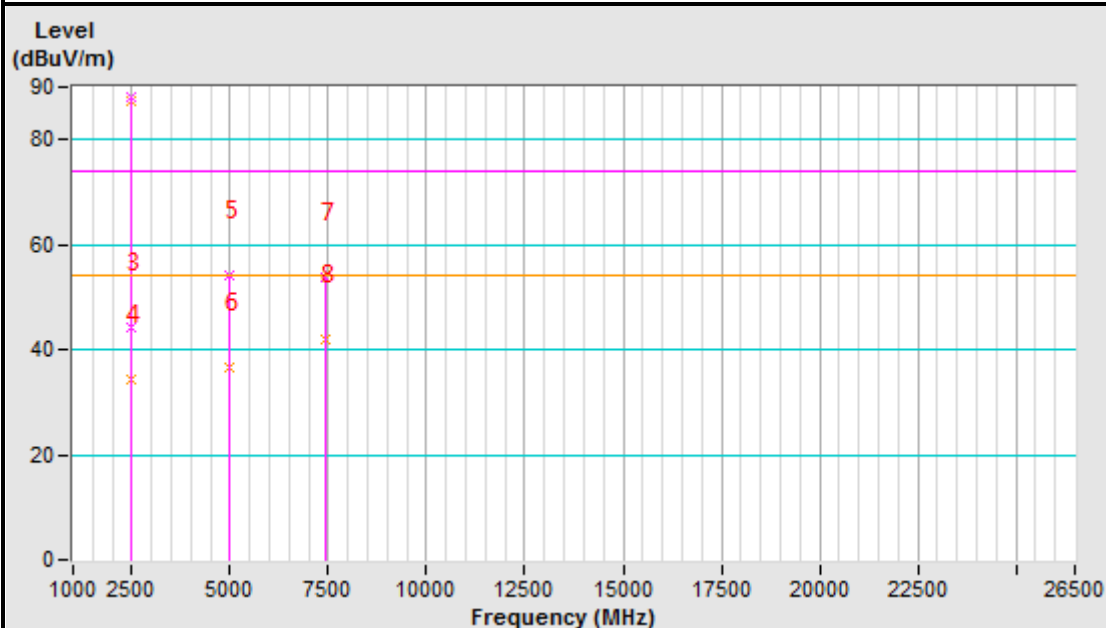
Tel: +86 769 8998 2098
Fax: +86 769 8593 1080
Email: customerservice.dg@cn.bureauveritas.com

Test Plot

2480MHz Horizontal



2480MHz Vertical

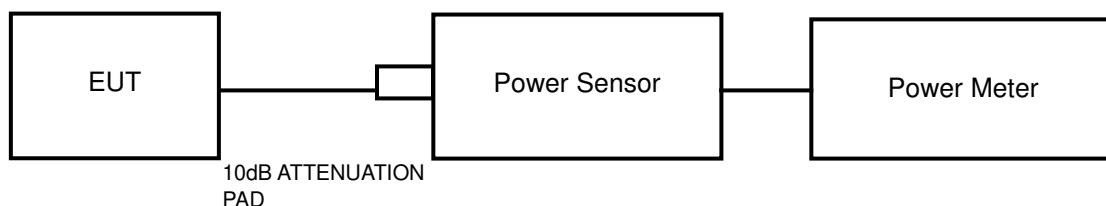


4.2 CONDUCTED OUTPUT POWER

4.2.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz band: 1 Watt (30dBm)

4.2.2 TEST SETUP



4.2.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060018	Jun. 03,21
Power Meter	Anritsu	ML2495A	1139001	Mar. 17,21
Power Sensor	Anritsu	MA2411B	1531155	Mar. 17,21
Digital Multimeter	FLUKE	15B	A1220010DG	N/A
Humid & Temp Programmable Tester	Haida	HD-225T	110807201	Oct. 30,21
Oscilloscope	Agilent	DSO9254A	MY51260160	Sep. 17,21
Signal and Spectrum Analyzer	Rohde&Schwarz	FSV40	101094	Mar. 17,21
Signal Generator	Agilent	N5183A	MY50140980	Sep. 18,21
MXG-B RF Vector Signal Generator	Keysight	N5182B	MY56200288	Sep. 11,21
BLUETOOTH TESTER	Rohde&Schwarz	CBT32	100811	N/A
Attenuator	MINI	BW-S10W2+	S130129FGE2	N/A
DC Source	Keysight	E3642A	MY56146098	N/A

NOTES:

1. The test was performed in RF Oven 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.

4.2.4 TEST PROCEDURES

A peak sensor was used on the output port of the EUT. A peak power meter was used to read the response of the peak power sensor. Record the peak power level.

4.2.5 DEVIATION FROM TEST STANDARD

No deviation.

4.2.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

4.2.7 TEST RESULTS

MAXIMUM PEAK OUTPUT POWER

BT-LE GFSK

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (dBm)	PEAK POWER (mW)	PEAK POWER LIMIT (W)	PASS/FAIL
0	2402	3.01	2.000	1	PASS
19	2440	3.04	2.014	1	PASS
39	2480	1.91	1.552	1	PASS

AVERAGE OUTPUT POWER (FOR REFERENCE)

The average power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the power level.

BT-LE GFSK

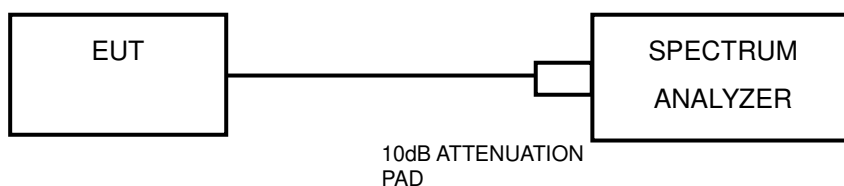
CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (dBm)	AVERAGE POWER (mW)
0	2402	1.36	1.368
19	2440	1.32	1.355
39	2480	0.17	1.040

4.3 OUT OF BAND EMISSION MEASUREMENT

4.3.1 LIMITS OF OUT OF BAND EMISSION MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

4.3.2 TEST SETUP



4.3.3 TEST INSTRUMENTS

Refer to section 4.2.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW $\geq$ 300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW $\geq$ 300 kHz.
3. Set span to encompass the spectrum to be examined
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

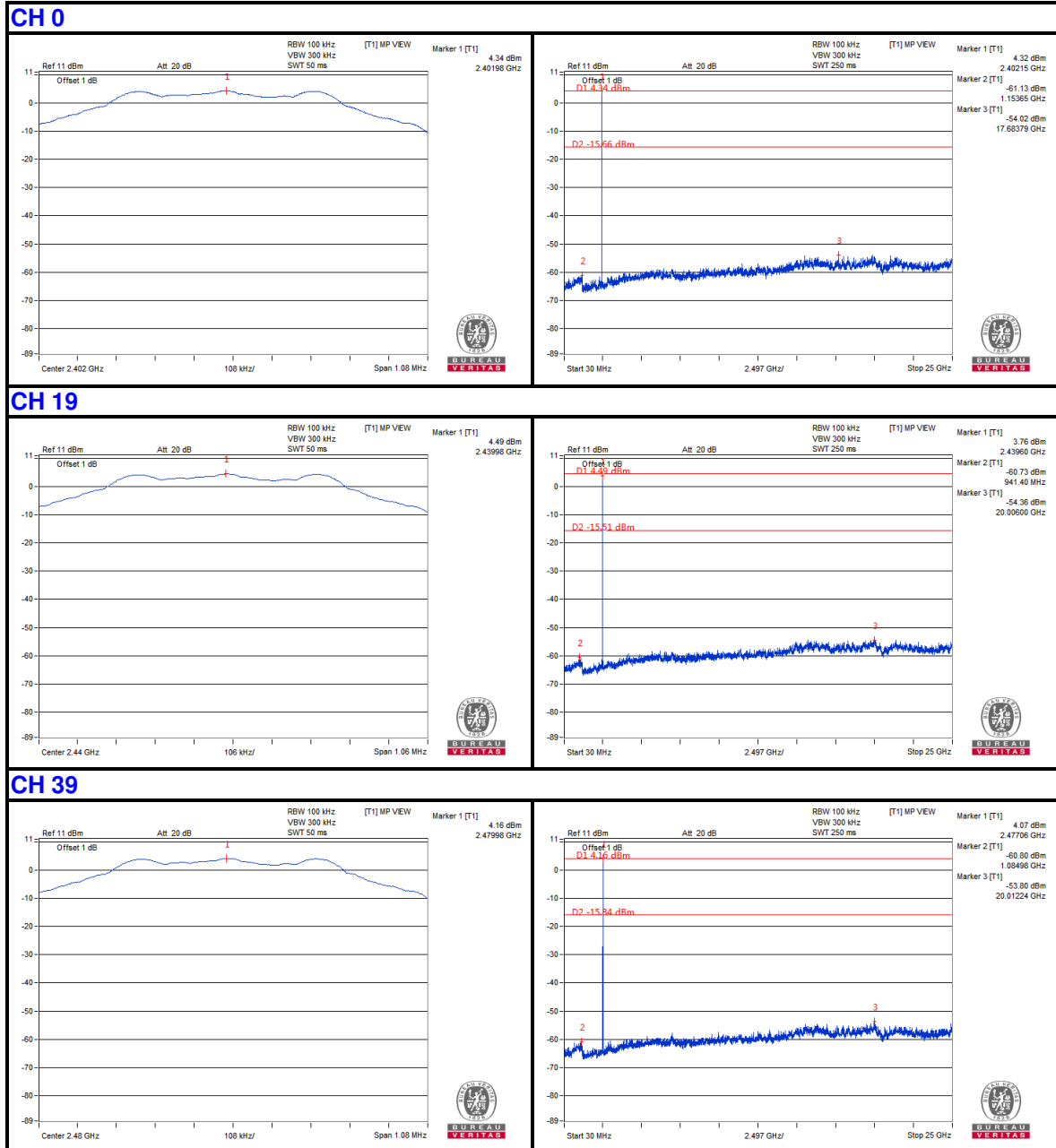


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4.3.7 TEST RESULTS

BT-LE GFSK

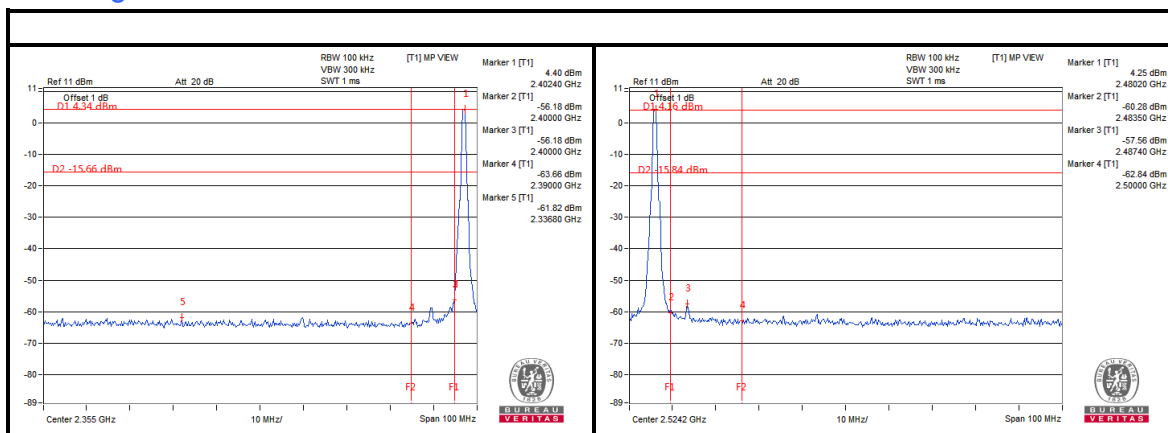


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Band Edge:





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5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



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6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

---END---