



FCC TEST REPORT

Report No: STS1908239W01

Issued for

Shenzhen Zhongke Xunlian Technology Co.,Ltd.

Rm.1407, Fuguang Business Bldg, No.1 Tangling Rd.,
Taoyuan St., Nanshan Dist., Shenzhen, China.

Product Name:	ZL-HT46 Student Response System
Brand Name:	N/A
Model Name:	ZL-HT46
Series Model:	N/A
FCC ID:	2AUFC-HT46
Test Standard:	FCC Part 15.249

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**TEST RESULT CERTIFICATION**

Applicant's Name: Shenzhen Zhongke Xunlian Technology Co.,Ltd.

Address.....: Rm.1407, Fuguang Business Bldg, No.1 Tangling Rd., Taoyuan St., Nanshan Dist., Shenzhen, China.

Manufacture's Name: Shenzhen Zhongke Xunlian Technology Co.,Ltd.

Address.....: Rm.1407, Fuguang Business Bldg, No.1 Tangling Rd., Taoyuan St., Nanshan Dist., Shenzhen, China.

Product Description

Product Name: ZL-HT46 Student Response System

Brand Name: N/A

Model Name.....: ZL-HT46

Series Model: N/A

Test Standards.....: FCC Part15.249

Test Procedure.....: ANSI C63.10-2013

This device described above has been tested by STS, the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Date of Test.....:

Date of performance of tests ...: 22 Aug. 2019 ~ 02 Sept. 2019

Date of Issue.....: 02 Sept. 2019

Test Result: **Pass**

Testing Engineer :

(Chris Chen)

Technical Manager :

(Sunday Hu)

Authorized Signatory :

(Vita Li)





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**Revision History**

Rev.	Issue Date	Report NO.	Effect Page	Contents
00	02 Sept. 2019	STS1908239W01	ALL	Initial Issue





1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part 15.249 , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207	Conducted Emission	N/A	
15.203	Antenna Requirement	Pass	
15.249	Radiated Spurious Emission	Pass	
15.205	Radiated Band Edge Emission	Pass	
15.249	20dB Bandwidth	Pass	

NOTE:

(1) "N/A" denotes test is not applicable in this Test Report

(2) All tests are according to ANSI C63.10-2013



1.1 TEST FACTORY

SHENZHEN STS TEST SERVICES CO., LTD

Add. : A 1/F, Building B, Zhuoke Science Park, No.190 Chongqing Road, HepingShequ, Fuyong Sub-District, Bao'an District, Shenzhen, Guang Dong, China

FCC test Firm Registration Number: 625569

IC test Firm Registration Number: 12108A

A2LA Certificate No.: 4338.01

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately **95 %**.

No.	Item	Uncertainty
1	RF output power,conducted	$\pm 0.71\text{dB}$
2	Unwanted Emissions,conducted	$\pm 0.63\text{dB}$
3	All emissions,radiated 30-200MHz	$\pm 3.43\text{dB}$
4	All emissions,radiated 200MHz-1GHz	$\pm 3.57\text{dB}$
5	All emissions,radiated>1G	$\pm 4.13\text{dB}$
6	Conducted Emission(9KHz-150KHz)	$\pm 3.18\text{dB}$
7	Conducted Emission(150KHz-30MHz)	$\pm 2.70\text{dB}$



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	ZL-HT46 Student Response System	
Trade Name	N/A	
Model Name	ZL-HT46	
Series Model	N/A	
Model Difference	N/A	
Product Description	The EUT is a ZL-HT46 Student Response System	
	Operation Frequency:	2403MHz-2477MHz
	Modulation Type:	GFSK
	Antenna Designation:	PCB Antenna
	Antenna Gain(Peak):	2.4 dBi
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as an ITE/Computing Device. More details of EUT technical specification, please refer to the User's Manual.	
Channel List	Please refer to the Note 2.	
Battery	Rated Voltage: 3.7V Charge Limit: 4.2V Capacity: 1200mAh	
Hardware version number	HT46A-MAIN-VE	
Software version number	108	

Note:

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



2.

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2403	10	2415	19	2439	28	2460
2	2404	11	2419	20	2440	29	2464
3	2405	12	2420	21	2444	30	2465
4	2406	13	2424	22	2445	31	2469
5	2407	14	2425	23	2449	32	2470
6	2408	15	2429	24	2450	33	2474
7	2409	16	2430	25	2454	34	2475
8	2410	17	2434	26	2455	35	2476
9	2414	18	2435	27	2459	36	2477

3. Table for Filed Antenna

Ant	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	ZL-HT46	PCB	NA	2.4	Antenna

2.2 DESCRIPTION OF THE TEST MODES

For conducted test items and radiated spurious emissions

Each of these EUT operation mode(s) or test configuration mode(s) mentioned below was evaluated respectively..

Pretest Mode	Description	Data/Modulation
Mode 1	TX CH01	GFSK
Mode 2	TX CH19	GFSK
Mode 3	TX CH36	GFSK

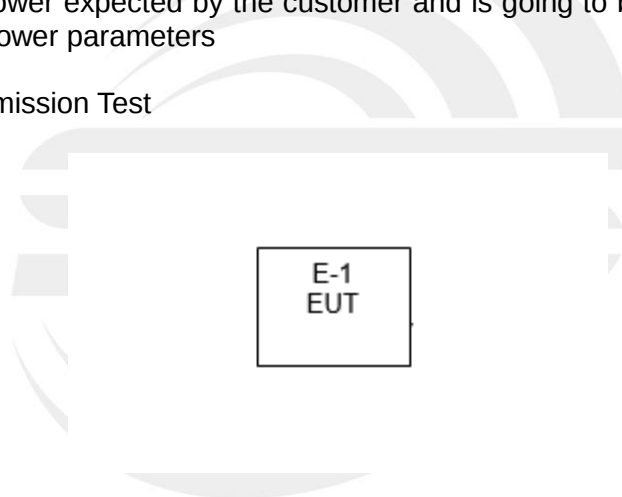
Note:

All above mode have been measurement, only worst data was reported.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Radiated Spurious Emission Test





2.4 DESCRIPTION OF NECESSARY ACCESSORIES AND 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.

Necessary accessories

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Support units

Item	Equipment	Mfr/Brand	Model/Type No.	Serial No.	Note
N/A	N/A	N/A	N/A	N/A	N/A

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



2.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
Test Receiver	R&S	ESCI	101427	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY51110105	2019.03.02	2020.03.01
Active loop Antenna	ZHINAN	ZN30900C	16035	2018.03.11	2021.03.10
Bilog Antenna	TESEQ	CBL6111D	34678	2017.11.02	2020.11.1
Horn Antenna	SCHWARZBECK	BBHA 9120D(1201)	9120D-1343	2018.10.19	2021.10.18
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	J211020657	2018.03.11	2021.03.10
Pre-Amplifier(0.1M-3G Hz)	EM	EM330	060665	2018.10.13	2019.10.12
Pre-Amplifier (1G-18GHz)	SKET	LNPA-01018G-45	SK201808090 1	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10
turn table	EM	SC100_1	60531	N/A	N/A
Antenna mast	EM	SC100	N/A	N/A	N/A
Test SW	FARAD	EZ-EMC(Ver.STSLAB-03A1 RE)			

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
USB RF power sensor	DARE	RPR3006W	15I00041SNO03	2018.10.13	2019.10.12
Signal Analyzer	Agilent	N9020A	MY49100060	2018.10.13	2019.10.12
Temperature & Humidity	HH660	Mieo	N/A	2018.10.11	2019.10.10
Test SW	FARAD	LZ-RF /LzRf-3A3			



3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 limit in the table below has to be followed.

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

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

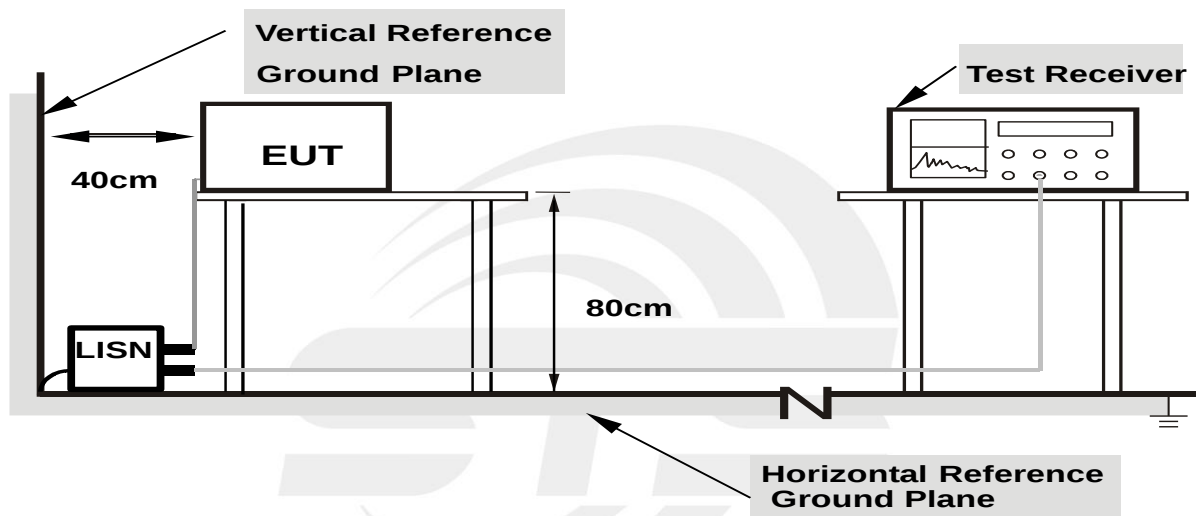
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

3.1.2 TEST PROCEDURE

- The EUT was 0.8 meters from the horizontal ground plane and 0.4 meters from the vertical ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 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

3.1.4 TEST RESULTS

Temperature:	25.3 °C	Relative Humidity:	62%
Test Voltage:	N/A	Phase:	L/N
Test Mode:	N/A		

Note: The EUT not transmitting when the EUT is charging, the test is not available.



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15.249 and the Part 15.209(a) limit in the table below has to be followed.

Standard FCC 15.209

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
960~1000	500	3
Above 1000	Other:74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	3

Standard FCC 15.249

Frequency of Emission (MHz)	Field Strength of fundamental (millivolts /meter)	Field Strength of Harmonics (microvolts/meter)
900~928	50	500
2400~2483.5	50	500
5725~5875	50	500
24000~242500	250	2500

Notes:

- (1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Spectrum Parameter	Setting
Detector	Peak/AV
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB (emission in restricted band)	>20BW
VB (emission in restricted band)	=3xRB

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~90kHz / RB 200Hz for PK & AV
	90kHz~110kHz / RB 200Hz for QP
	110kHz~490kHz / RB 200Hz for PK & AV
	490kHz~30MHz / RB 9kHz for QP
	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

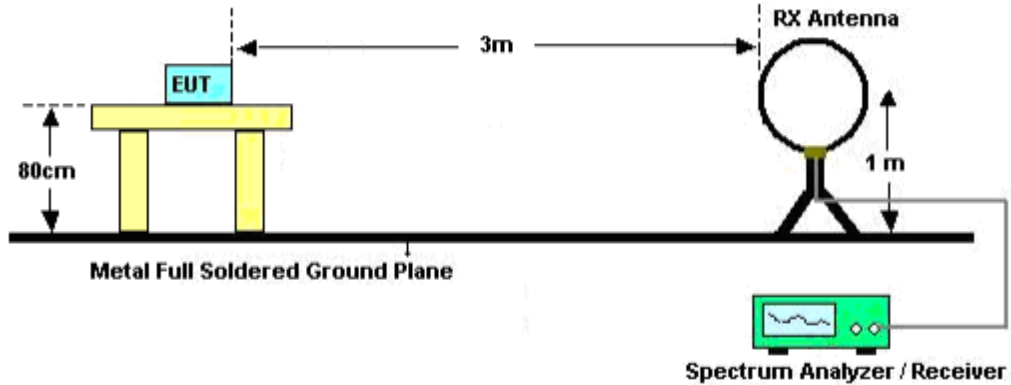
- The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 0.8 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Below 1GHz)
- The measuring distance of 3m shall be used for measurements. The EUT was placed on the top of a rotating table 1.5 meter above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation(Above 1GHz)
- The height of the test antenna shall vary between 1m to 4m.Both horizontal and vertical polarization Of the antenna are set to make the measurement.
- The initial step in collecting radiated emission data is a receive peak detector mode. Pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- All readings are peak unless otherwise stated QP in column of Note. Peak denoted that the Peak reading compliance with the QP limits and then QP Mode measurement didn't perform (Below 1GHz)
- All readings are Peak mode value unless otherwise stated AVG in column of Note. If the Peak mode measured value compliance with the Peak limits and lower than AVG Limits, the EUT shall be deemed to meet Peak & AVG limits and then only Peak mode was measured, but AVG mode didn't perform.(Above 1GHz)
- For the actual test configuration, please refer to the related Item –EUT Test Photos.
Note: Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

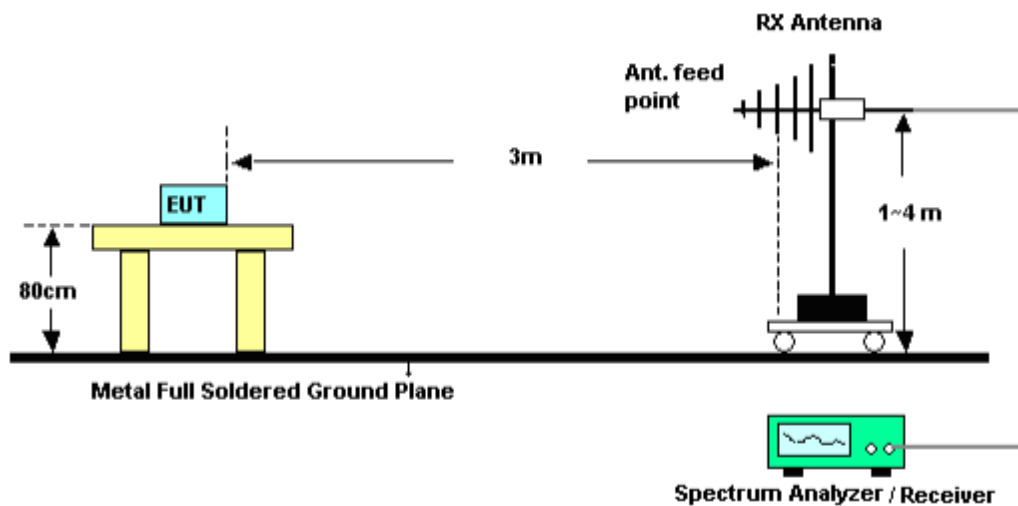
No deviation

3.2.4 TEST SETUP

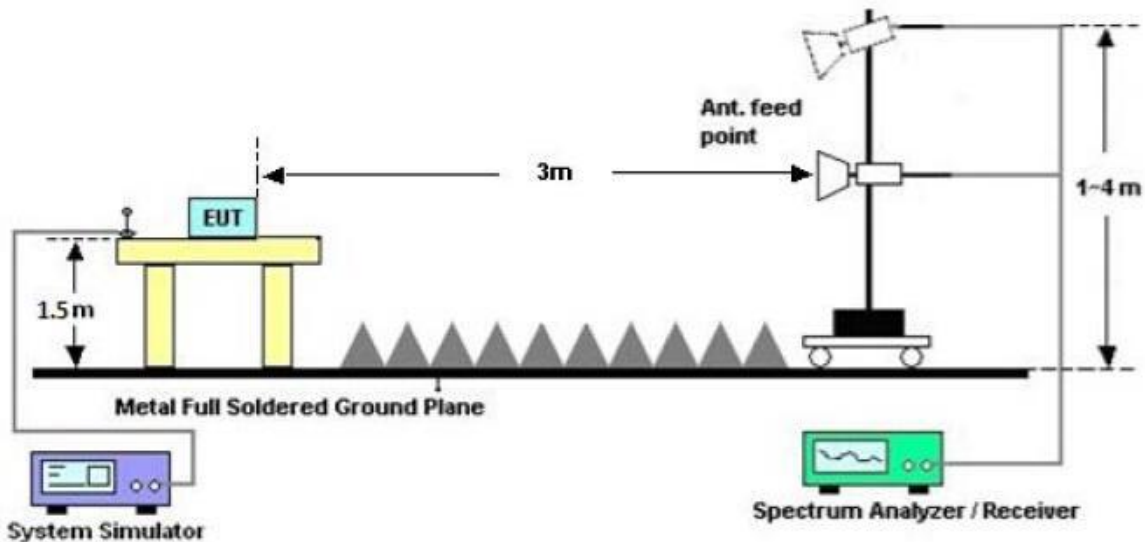
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz





3.2.5 FIELD STRENGTH CALCULATION

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

Margin=PL-PK L or AL- AV L; Margin only shown the worst case.

Where

PR = Peak Reading

AR = Average Reading

PL = Peak Level

AL = Average Level

AF = Antenna Factor

PK L = Peak Limit

AV L = AV Limit

For example

Frequency	PR	AR	AF	PL	AL	PK L	AV L	Margin
(MHz)	(dBμV/m)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)	(dB)
2178	40.23	30.31	9.83	50.06	40.14	74.00	54.00	-13.86



3.2.6 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

Below 30 MHz

Temperature:	25.7 °C	Relative Humidity:	67%
Test Voltage:	DC 3.7V from battery	Polarization:	---
Test Mode:	TX Mode		

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.



Between 30MHz – 1000 MHz Radiation Spurious

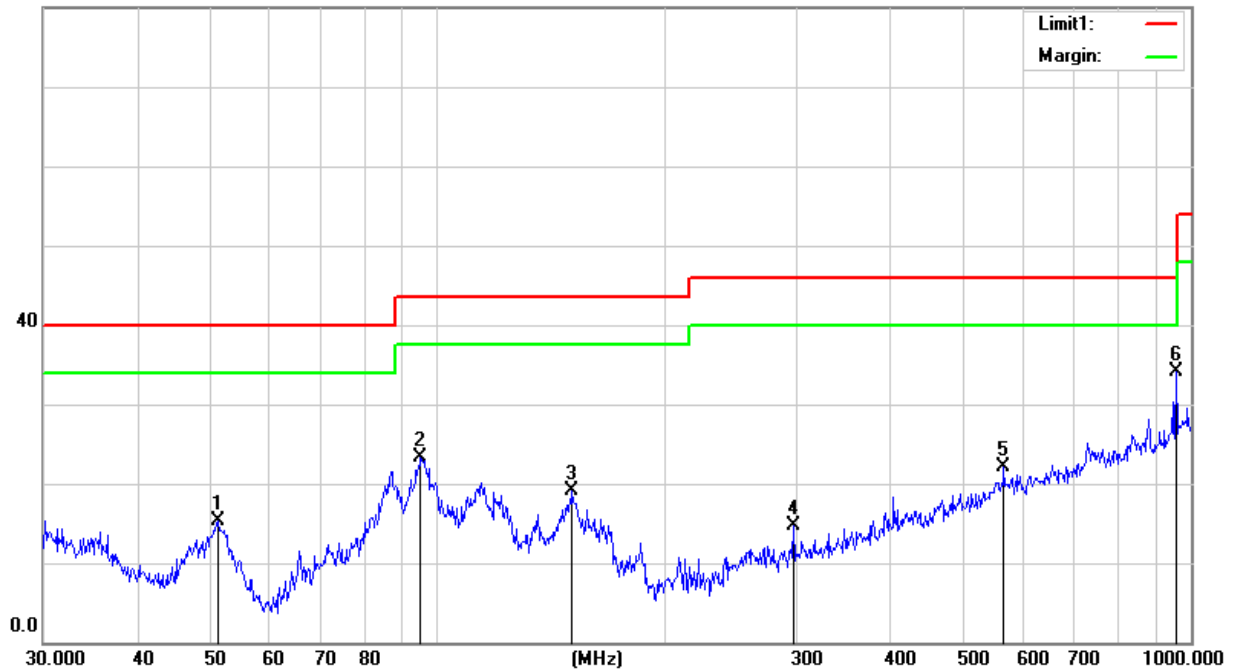
Temperature:	25.7 °C	Relative Humidity:	67%
Test Voltage:	DC 3.7V from batery	Phase:	Horizontal
Test Mode:	Mode 1/2/3(Model 1 worst)		

Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
51.3005	39.07	-23.80	15.27	40.00	-24.73	QP
95.0930	44.16	-20.77	23.39	43.50	-20.11	QP
151.0666	37.69	-18.54	19.15	43.50	-24.35	QP
297.2241	29.54	-14.91	14.63	46.00	-31.37	QP
564.6390	27.69	-5.54	22.15	46.00	-23.85	QP
955.4381	32.41	1.68	34.09	46.00	-11.91	QP

Remark:

1. All readings are Quasi-Peak .
2. Margin = Result (Result =Reading + Factor)–Limit

80.0 dBuV/m





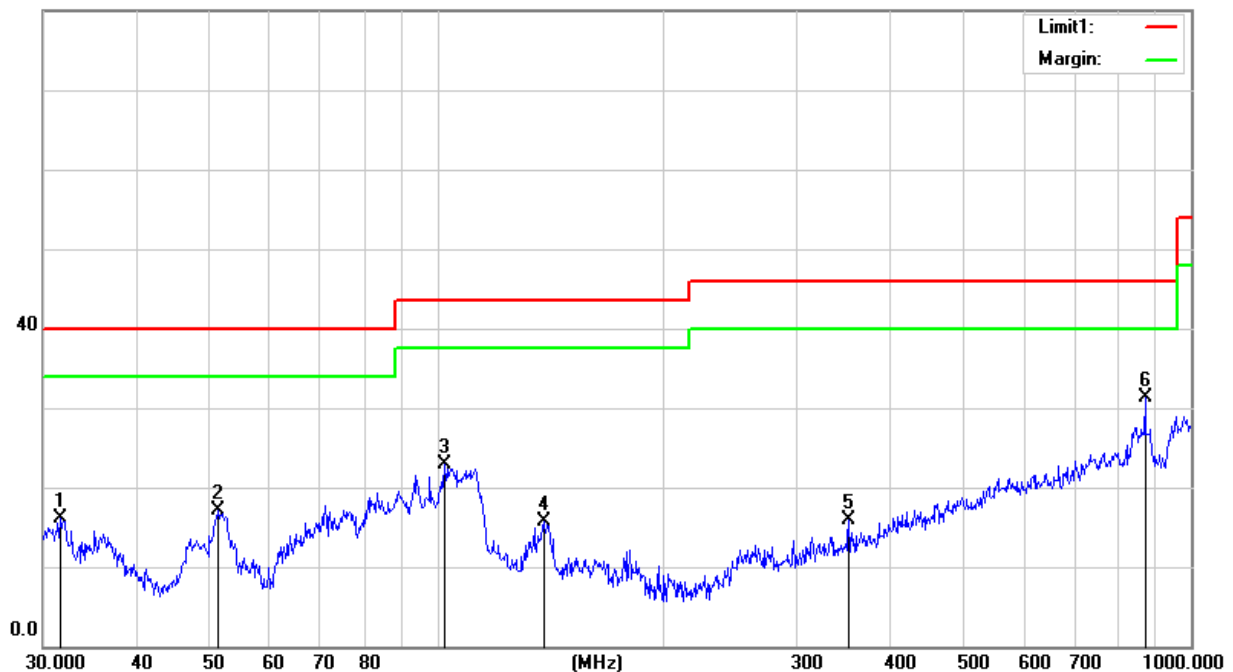
Temperature:	25.7 °C	Relative Humidity:	67%
Test Voltage:	DC 3.7V from battery	Phase:	Vertical
Test Mode:	Mode 1/2/3(Model 1 worst)		

Frequency	Reading	Correct	Result	Limit	Margin	Remark
(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
31.6202	29.83	-13.69	16.14	40.00	-23.86	QP
51.3005	40.94	-23.80	17.14	40.00	-22.86	QP
102.3597	42.69	-19.88	22.81	43.50	-20.69	QP
138.3873	33.72	-18.05	15.67	43.50	-27.83	QP
351.7080	28.94	-13.03	15.91	46.00	-30.09	QP
869.1302	31.91	-0.52	31.39	46.00	-14.61	QP

Remark:

1. All readings are Quasi-Peak.
2. Margin = Result (Result = Reading + Factor) – Limit

80.0 dBuV/m





Above 1G Radiation Spurious

GFSK

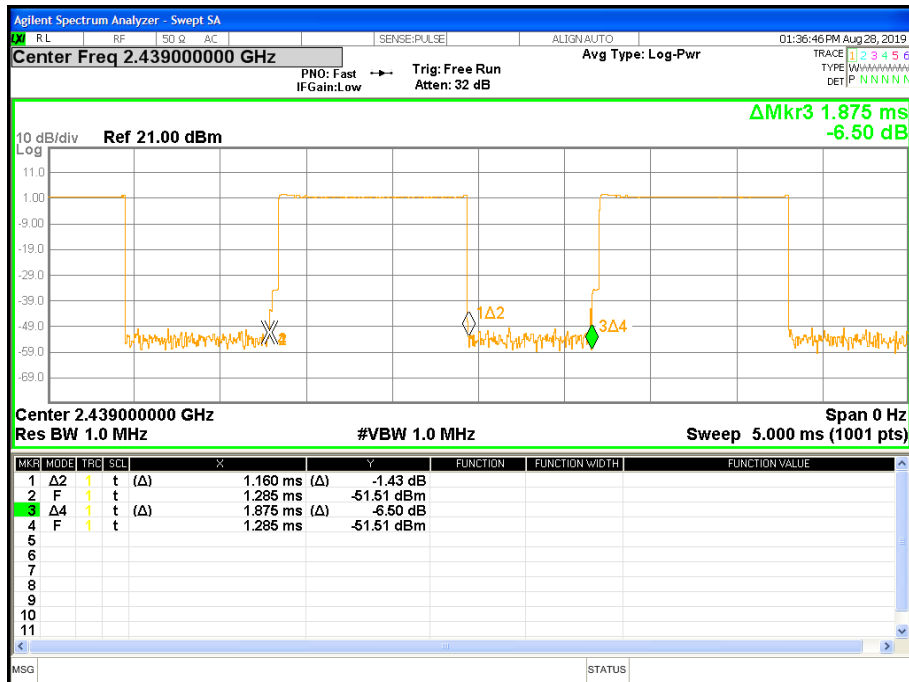
Frequency (MHz)	Meter Reading (dBμV)	Amplifier (dB)	Loss (dB)	Antenna Factor (dB/m)	Corrected Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Detector Type	Comment
Low Channel (2403 MHz)										
3264.84	49.05	44.70	6.70	28.20	-9.80	39.25	74.00	-34.75	PK	Vertical
3264.84	39.53	44.70	6.70	28.20	-9.80	29.73	54.00	-24.27	AV	Vertical
3264.82	47.88	44.70	6.70	28.20	-9.80	38.08	74.00	-35.92	PK	Horizontal
3264.82	37.89	44.70	6.70	28.20	-9.80	28.09	54.00	-25.91	AV	Horizontal
4816.45	59.21	44.20	9.04	31.60	-3.56	55.65	74.00	-18.35	PK	Vertical
4816.45	38.60	44.20	9.04	31.60	-3.56	35.04	54.00	-18.96	AV	Vertical
4816.59	58.86	44.20	9.04	31.60	-3.56	55.30	74.00	-18.70	PK	Horizontal
4816.59	39.27	44.20	9.04	31.60	-3.56	35.71	54.00	-18.29	AV	Horizontal
5359.89	45.44	44.20	9.86	32.00	-2.34	43.10	74.00	-30.90	PK	Vertical
5359.89	37.87	44.20	9.86	32.00	-2.34	35.53	54.00	-18.47	AV	Vertical
5359.83	46.14	44.20	9.86	32.00	-2.34	43.80	74.00	-30.20	PK	Horizontal
5359.83	38.08	44.20	9.86	32.00	-2.34	35.74	54.00	-18.26	AV	Horizontal
7223.83	51.17	43.50	11.40	35.50	3.40	54.57	74.00	-19.43	PK	Vertical
7223.83	32.75	43.50	11.40	35.50	3.40	36.15	54.00	-17.85	AV	Vertical
7223.95	51.67	43.50	11.40	35.50	3.40	55.07	74.00	-18.93	PK	Horizontal
7223.95	32.83	43.50	11.40	35.50	3.40	36.23	54.00	-17.77	AV	Horizontal
Middle Channel (2439 MHz)										
3264.76	48.90	44.70	6.70	28.20	-9.80	39.10	74.00	-34.90	PK	Vertical
3264.76	38.65	44.70	6.70	28.20	-9.80	28.85	54.00	-25.15	AV	Vertical
3264.60	48.96	44.70	6.70	28.20	-9.80	39.16	74.00	-34.84	PK	Horizontal
3264.60	38.85	44.70	6.70	28.20	-9.80	29.05	54.00	-24.95	AV	Horizontal
4880.51	59.49	44.20	9.04	31.60	-3.56	55.93	74.00	-18.07	PK	Vertical
4880.51	39.20	44.20	9.04	31.60	-3.56	35.64	54.00	-18.36	AV	Vertical
4880.55	59.01	44.20	9.04	31.60	-3.56	55.45	74.00	-18.55	PK	Horizontal
4880.55	39.60	44.20	9.04	31.60	-3.56	36.04	54.00	-17.96	AV	Horizontal
5359.71	45.20	44.20	9.86	32.00	-2.34	42.86	74.00	-31.14	PK	Vertical
5359.71	37.11	44.20	9.86	32.00	-2.34	34.77	54.00	-19.23	AV	Vertical
5359.69	45.16	44.20	9.86	32.00	-2.34	42.82	74.00	-31.18	PK	Horizontal
5359.69	37.79	44.20	9.86	32.00	-2.34	35.45	54.00	-18.55	AV	Horizontal
7320.73	51.84	43.50	11.40	35.50	3.40	55.24	74.00	-18.76	PK	Vertical
7320.73	33.68	43.50	11.40	35.50	3.40	37.08	54.00	-16.92	AV	Vertical
7320.77	50.87	43.50	11.40	35.50	3.40	54.27	74.00	-19.73	PK	Horizontal
7320.77	33.75	43.50	11.40	35.50	3.40	37.15	54.00	-16.85	AV	Horizontal



High Channel (2477 MHz)										
3264.69	49.13	44.70	6.70	28.20	-9.80	39.33	74.00	-34.67	PK	Vertical
3264.69	37.95	44.70	6.70	28.20	-9.80	28.15	54.00	-25.85	AV	Vertical
3264.76	49.04	44.70	6.70	28.20	-9.80	39.24	74.00	-34.76	PK	Horizontal
3264.76	38.04	44.70	6.70	28.20	-9.80	28.24	54.00	-25.76	AV	Horizontal
4948.34	59.04	44.20	9.04	31.60	-3.56	55.48	74.00	-18.52	PK	Vertical
4948.34	38.57	44.20	9.04	31.60	-3.56	35.01	54.00	-18.99	AV	Vertical
4948.61	59.53	44.20	9.04	31.60	-3.56	55.97	74.00	-18.03	PK	Horizontal
4948.61	39.19	44.20	9.04	31.60	-3.56	35.63	54.00	-18.37	AV	Horizontal
5359.76	45.83	44.20	9.86	32.00	-2.34	43.49	74.00	-30.51	PK	Vertical
5359.76	38.32	44.20	9.86	32.00	-2.34	35.98	54.00	-18.02	AV	Vertical
5359.72	46.17	44.20	9.86	32.00	-2.34	43.83	74.00	-30.17	PK	Horizontal
5359.72	38.46	44.20	9.86	32.00	-2.34	36.12	54.00	-17.88	AV	Horizontal
7421.84	50.78	43.50	11.40	35.50	3.40	54.18	74.00	-19.82	PK	Vertical
7421.84	32.79	43.50	11.40	35.50	3.40	36.19	54.00	-17.81	AV	Vertical
7421.82	51.77	43.50	11.40	35.50	3.40	55.17	74.00	-18.83	PK	Horizontal
7421.82	32.82	43.50	11.40	35.50	3.40	36.22	54.00	-17.78	AV	Horizontal



Duty cycle

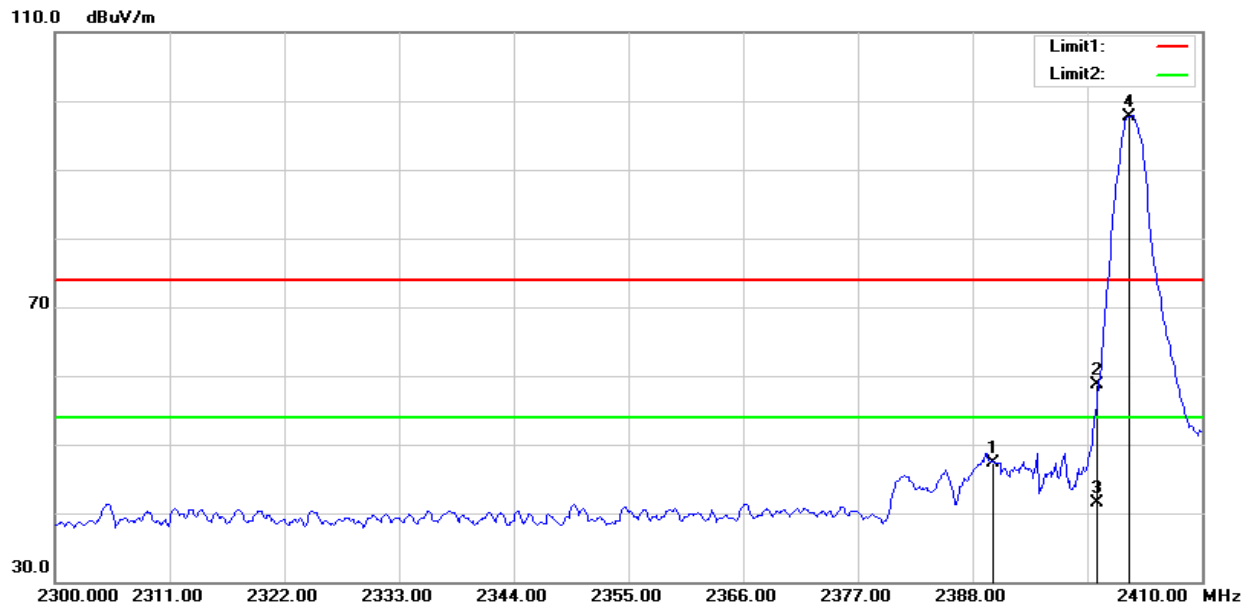


Ton (μs)	Tp (μs)	Duty Factor
1160	1875	4.17

Note: Duty Factor=20*LOG10(1/(Ton/Tp))



(Radiation Band edge)

**GFSK-Low
Horizontal**

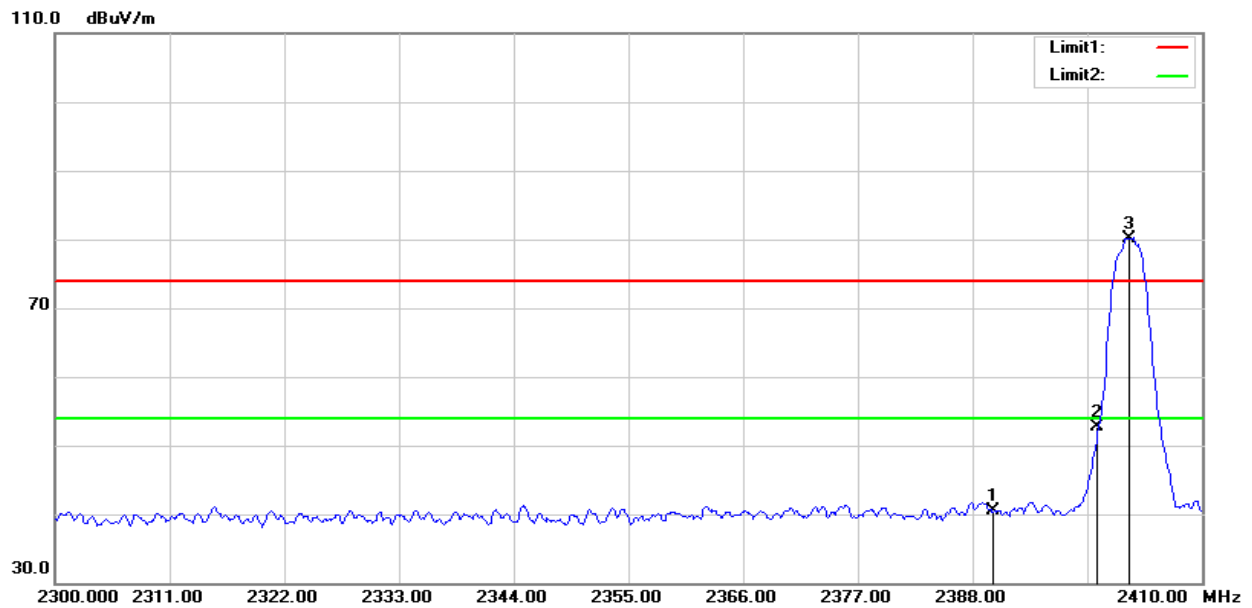
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	42.91	4.34	47.25	74.00	-26.75	peak
2	2400.000	54.23	4.49	58.72	74.00	-15.28	peak
3	2400.000	37.09	4.49	41.58	54.00	-12.42	AVG

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4	2403.000	93.30	4.49	-	97.79	114.00	-16.21	peak
3	2403.000	93.30	4.49	-4.17	93.62	94.00	-0.38	AV



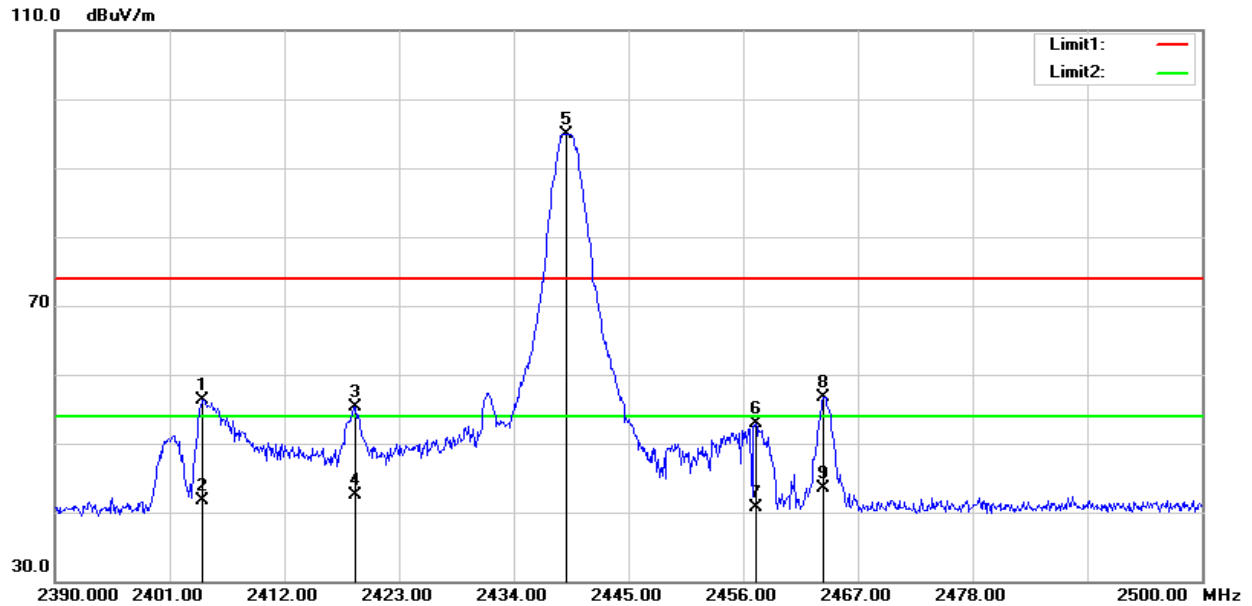
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2390.000	36.07	4.34	40.41	74.00	-33.59	peak
2	2400.000	48.16	4.49	52.65	74.00	-21.35	peak

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
3	2403.000	75.70	4.49	-	80.19	114.00	-33.81	peak
3	2403.000	75.70	4.49	-4.17	76.02	94.00	-17.98	AV

**GFSK-Mid**
Horizontal

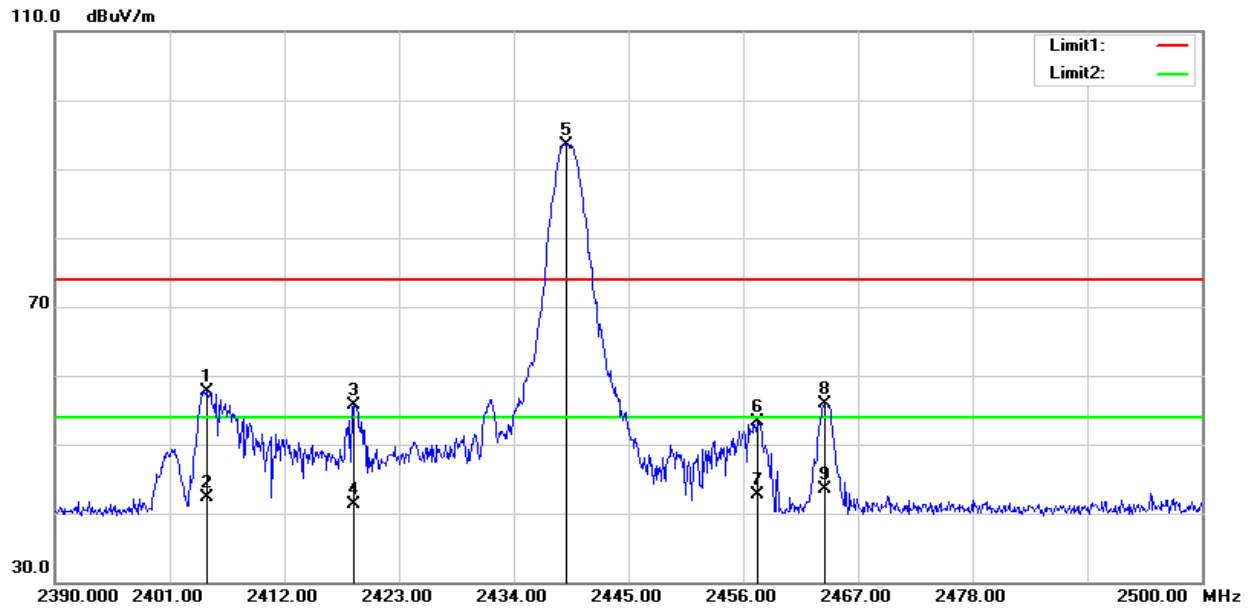
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2404.190	51.79	4.49	56.28	74.00	-17.72	peak
2	2404.190	37.27	4.49	41.76	54.00	-12.24	AVG
3	2418.820	50.87	4.50	55.37	74.00	-18.63	peak
4	2418.820	38.07	4.50	42.57	54.00	-11.43	AVG
6	2457.210	48.36	4.53	52.89	74.00	-21.11	peak
7	2457.210	36.25	4.53	40.78	54.00	-13.22	AVG
8	2463.700	52.10	4.56	56.66	74.00	-17.34	peak
9	2463.700	39.01	4.56	43.57	54.00	-10.43	AVG

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5	2439.000	90.44	4.51	-	94.95	114.00	-19.05	peak
10	2439.000	90.44	4.51	-4.17	90.78	94.00	-3.22	AV



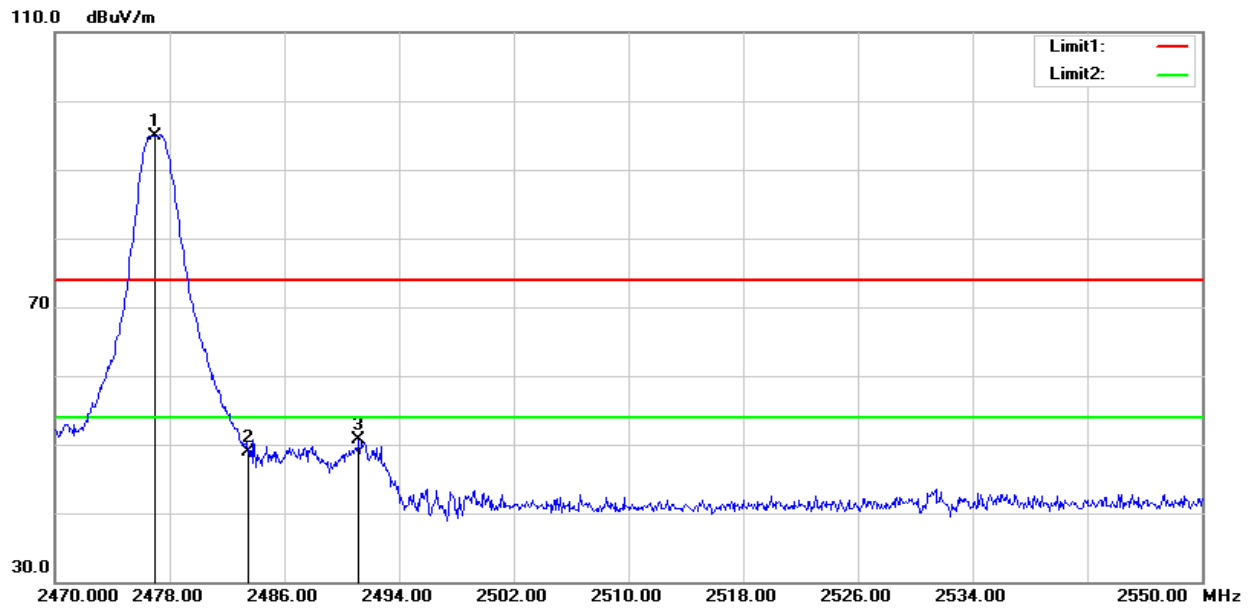
Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2404.520	53.28	4.50	57.78	74.00	-16.22	peak
2	2404.520	37.81	4.50	42.31	54.00	-11.69	AVG
3	2418.710	51.28	4.50	55.78	74.00	-18.22	peak
4	2418.710	36.73	4.50	41.23	54.00	-12.77	AVG
6	2457.320	48.74	4.53	53.27	74.00	-20.73	peak
7	2457.320	38.13	4.53	42.66	54.00	-11.34	AVG
8	2463.810	51.39	4.56	55.95	74.00	-18.05	peak
9	2463.810	38.86	4.56	43.42	54.00	-10.58	AVG

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
5	2439.000	89.06	4.51	-	93.57	114.00	-20.43	peak
10	2439.000	89.06	4.51	-4.17	89.40	94.00	-4.60	AV

**GFSK-High**
Horizontal

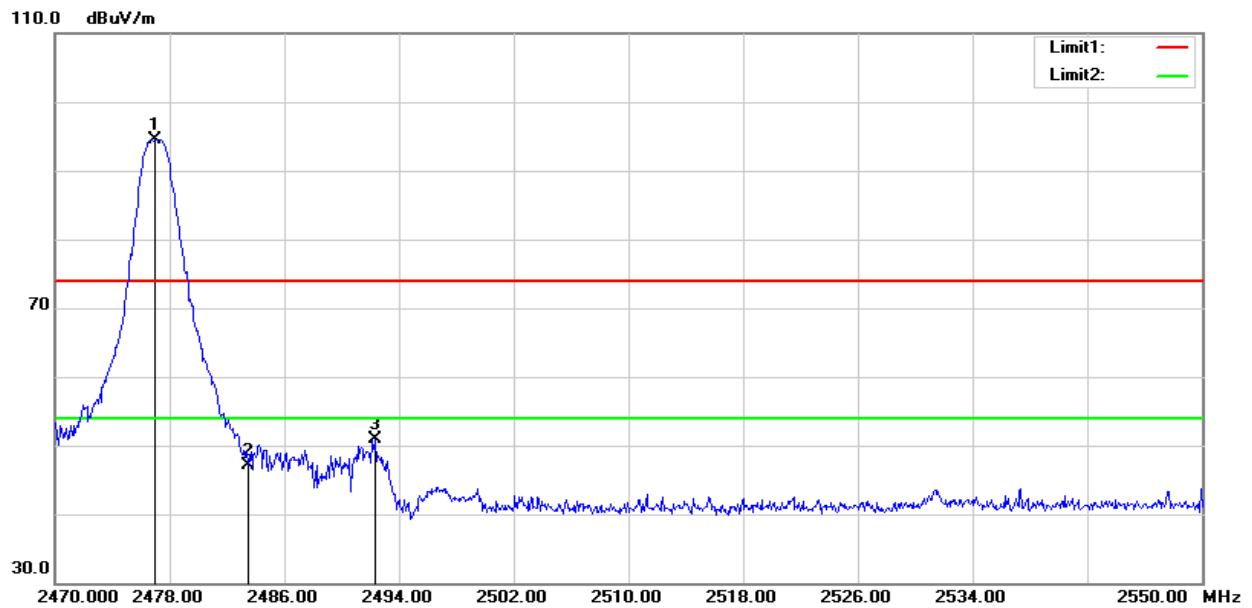
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	2483.500	44.40	4.60	49.00	74.00	-25.00	peak
3	2491.200	46.09	4.63	50.72	74.00	-23.28	peak

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2477.000	90.39	4.59	-	94.98	114.00	-19.02	peak
4	2477.000	90.39	4.59	-4.17	90.81	94.00	-3.19	AV



Vertical



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
2	2483.500	42.55	4.60	47.15	74.00	-26.85	peak
3	2492.320	46.24	4.63	50.87	74.00	-23.13	peak

Fundamental Frequency

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Duty cycle Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2477.000	89.84	4.59	-	94.43	114.00	-19.57	peak
4	2477.000	89.84	4.59	-4.17	90.26	94.00	-3.74	AV

4. BANDWIDTH TEST

4.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : $RBW = 30\text{KHz}$, $VBW \geq RBW$, Sweep time = Auto.

4.2 TEST SETUP



4.3 EUT OPERATION CONDITIONS

TX mode.



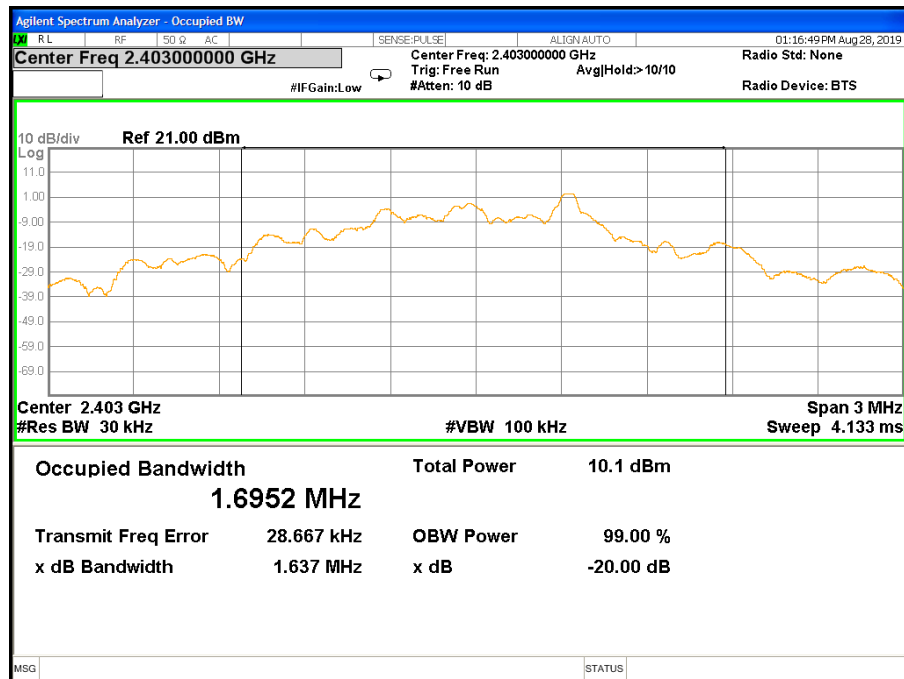


4.4 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	50%
Test Voltage:	DC 3.7V from battery		

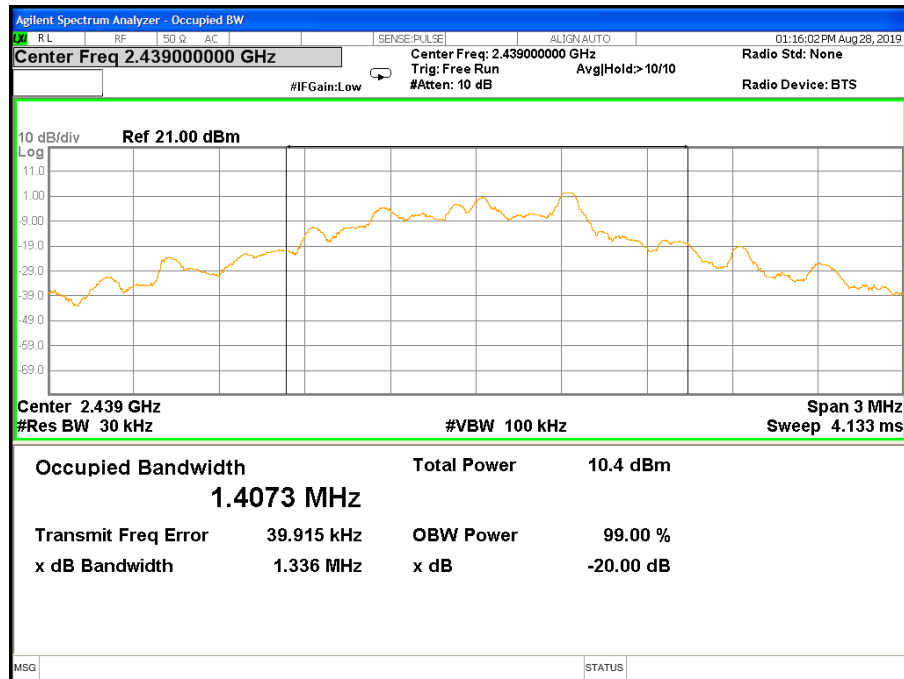
Test Channel	Frequency (MHz)	20 dBc Bandwidth (MHz)	99% Bandwidth (MHz)
CH01	2403	1.637	1.6952
CH19	2439	1.336	1.4073
CH36	2477	1.293	1.3152

The Lowest Channel:2403MHz

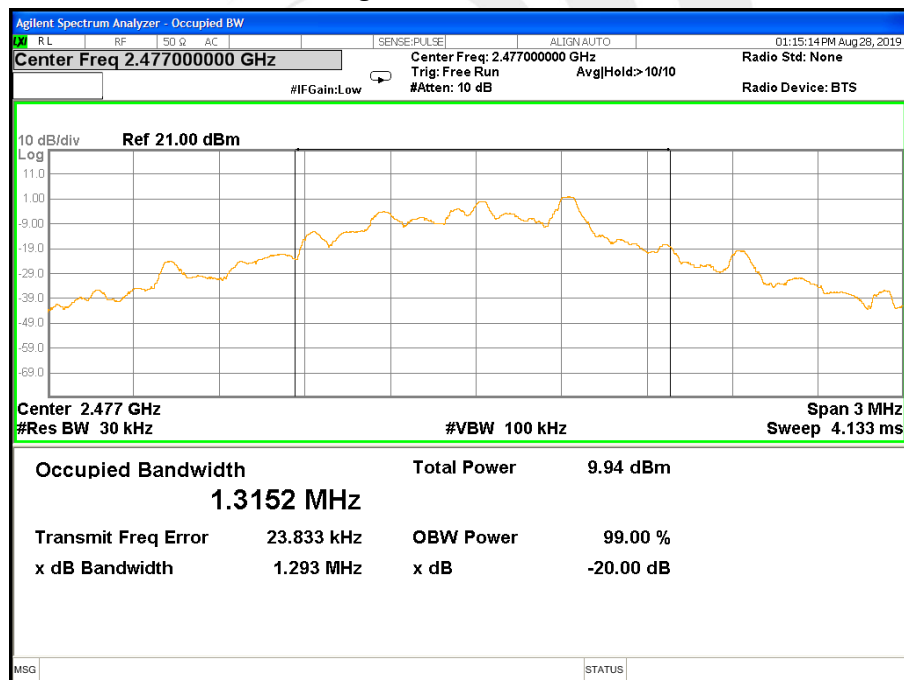




The Middle Channel: 2439MHz



The High Channel: 2477MHz





5. ANTENNA REQUIREMENT

5.1 STANDARD REQUIREMENT

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

5.2 EUT ANTENNA

The EUT antenna is PCB Antenna. It conforms to the standard requirements.





APPENDIX- PHOTOS OF TEST SETUP

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

*****END OF THE REPORT*****

