



Test Report No.: RF2009WDG0048



TEST REPORT

Applicant	DEI Sales Inc., dba Polk Audio
Address	5541 Fermi Court Carlsbad CA 92008 United States Of America

Manufacturer or Supplier	DEI Sales Inc., dba Polk Audio
Address	5541 Fermi Court Carlsbad CA 92008 United States Of America
Product Name	WIRELESS SURROUNDS
Brand Name	Polk
Model	SR2 WIRELESS SURROUNDS
Additional Model & Model Difference	N/A
Date of tests	Sep. 03, 2020 ~ Nov. 27, 2020

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

☒ **FCC Part 15, Subpart E, Section 15.407**

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: Dec. 07, 2020

This report is governed by, and incorporates by reference, CPS Conditions of Service as posted at the date of issuance of this report at <http://www.bureauveritas.com/home/about-us/our-business/cps/about-us/terms-conditions> and is intended for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. Measurement uncertainty is only provided upon request for accredited tests. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence or if you require measurement uncertainty; provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents.

Bureau Veritas Shenzhen Co., Ltd.
Dongguan Branch

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

TABLE OF CONTENTS

RELEASE CONTROL RECORD	4
1. SUMMARY OF TEST RESULTS.....	5
1.1 MEASUREMENT UNCERTAINTY	5
2. GENERAL INFORMATION	6
2.1 GENERAL DESCRIPTION OF EUT	6
2.2 DESCRIPTION OF TEST MODES	7
2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL	8
2.3 DUTY CYCLE OF TEST SIGNAL	10
2.4 DESCRIPTION OF SUPPORT UNITS	10
2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS	10
3. TEST TYPES AND RESULTS.....	11
3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT	11
3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT	11
3.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS	12
3.1.3 TEST INSTRUMENTS	13
3.1.4 TEST PROCEDURES	14
3.1.5 DEVIATION FROM TEST STANDARD	14
3.1.6 TEST SETUP	15
3.1.7 EUT OPERATING CONDITION	16
3.1.8 TEST RESULTS	17
3.2 CONDUCTED EMISSION MEASUREMENT	30
3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT	30
3.2.2 TEST INSTRUMENTS	30
3.2.3 TEST PROCEDURES	31
3.2.4 DEVIATION FROM TEST STANDARD	31
3.2.5 TEST SETUP	31
3.2.6 EUT OPERATING CONDITIONS	31
3.2.7 TEST RESULTS	32
3.3 TRANSMIT POWER MEASUREMENT	34

3.3.1	LIMITS OF TRANSMIT POWER MEASUREMENT	34
3.3.2	TEST SETUP	34
3.3.3	TEST INSTRUMENTS	35
3.3.4	TEST PROCEDURE	35
3.3.5	DEVIATION FROM TEST STANDARD	36
3.3.6	EUT OPERATING CONDITIONS	36
3.3.7	TEST RESULTS	37
3.4	PEAK POWER SPECTRAL DENSITY MEASUREMENT	41
3.4.1	LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT	41
3.4.2	TEST SETUP	41
3.4.3	TEST INSTRUMENTS	41
3.4.4	TEST PROCEDURES	41
3.4.5	DEVIATION FROM TEST STANDARD	42
3.4.6	EUT OPERATING CONDITIONS	42
3.4.7	TEST RESULTS	43
3.5	FREQUENCY STABILITY	45
3.5.1	LIMITS OF FREQUENCY STABILITY MEASUREMENT	45
3.5.2	TEST SETUP	45
3.5.3	TEST INSTRUMENTS	45
3.5.4	TEST PROCEDURE	46
3.5.5	DEVIATION FROM TEST STANDARD	46
3.5.6	EUT OPERATING CONDITION	46
3.5.7	TEST RESULTS	47
4.	PHOTOGRAPHS OF THE TEST CONFIGURATION	48
5.	APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB	49



Test Report No.: RF2009WDG0048

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF2009WDG0048	Original release.	Dec. 07, 2020

1. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407 UNDER NEW RULE)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emissions	PASS	Meet the requirement of limit.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is i-pex not a standard connector.

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	FREQUENCY	UNCERTAINTY
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 $k = 2$.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT NAME	WIRELESS SURROUNDS
MODEL NO.	SR2 WIRELESS SURROUNDS
FCC ID	WLQSR2
POWER SUPPLY	DC 15V from Adapter
MODULATION TYPE	GFSK
OPERATING FREQUENCY	5160~5240MHz 5735~5840MHz
NUMBER OF CHANNEL	Refer to 2.2 section
CONDUCTED OUTPUT POWER	15.488mW (Avg.)
ANTENNA TYPE	Chain 0: FPCB Antenna, 2dBi Gain Chain 1: FPCB Antenna, 2dBi Gain
I/O PORTS	Refer to user's manual
CABLE SUPPLIED	N/A

NOTES:

- For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.
- For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.
- Please refer to the EUT photo document (Reference No.: 2009WDG0048) for detailed product photo.
- This product has two RF modules (distribute left speakers and right speakers), they are identical in RF circuitry and antenna, but only the worst case (right speakers) was shown in test report.
- The EUT were powered by the following adapters:

ADAPTER*2	
BRAND:	polk
MODEL:	S018-1A150120D5
INPUT:	AC 100-240V, 50/60HZ 0.6A
OUTPUT:	DC 15V/1.2A, 18.0W
DC LINE:	Unshielded, Non-detachable, 300cm

Two identical adapters powered the left and right speakers, respectively

- The working status of the two antennas is as follows.

MODULATION MODE	FUNCTION
GFSK	2 Chains(SISO)

* It is provided a SISO function, all test items are carried out on the maximum power "chain 1" antenna except Max Average Transmit Power test.

2.2 DESCRIPTION OF TEST MODES

FOR 5160 ~ 5240MHz

17 channels are provided for GFSK:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	5160	7	5190	13	5220
2	5165	8	5195	14	5225
3	5170	9	5200	15	5230
4	5175	10	5205	16	5235
5	5180	11	5210	17	5240
6	5185	12	5215		

FOR 5725 ~ 5850MHz

22 channels are provided for GFSK:

Channel	Freq. (MHz)	Channel	Freq. (MHz)	Channel	Freq. (MHz)
1	5735	9	5775	17	5815
2	5740	10	5780	18	5820
3	5745	11	5785	19	5825
4	5750	12	5790	20	5830
5	5755	13	5795	21	5835
6	5760	14	5800	22	5840
7	5765	15	5805		
8	5770	16	5810		

2.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE \geq 1G	RE<1G	PLC	APCM	
-	√	√	√	√	DC 15V from Adapter

Where **RE \geq 1G**: Radiated Emission above 1GHz

RE<1G: Radiated Emission below 1GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE: “-” means no effect.

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, power supply voltage range and antenna ports (if EUT with antenna diversity architecture).

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

EUT CONFIGURE MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TYPE
-	5160-5240	1, 9, 17	GFSK
-	5735-5840	1, 10, 22	GFSK

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.

EUT CONFIGURE MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TYPE
-	5735-5840	1	GFSK

POWER LINE CONDUCTED EMISSION TEST:

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

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

EUT CONFIGURE MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TYPE
-	5735-5840	1	GFSK

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.

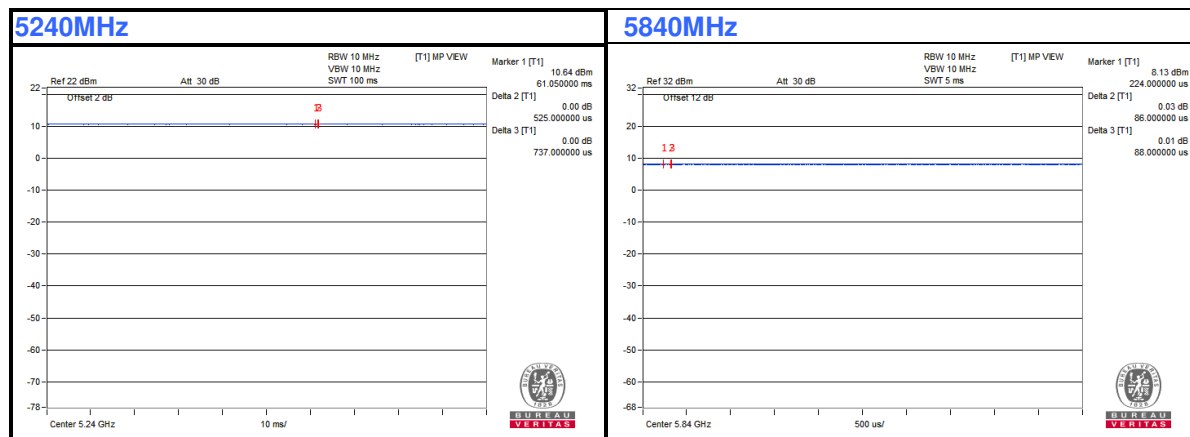
EUT CONFIGURE MODE	FREQ. BAND (MHz)	TESTED CHANNEL	MODULATION TYPE
-	5160-5240	1, 9, 17	GFSK
-	5735-5840	1, 10, 22	GFSK

TEST CONDITION:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE<1G	25deg. C, 51%RH	DC 15V from Adapter	Jelly
RE≥1G	25deg. C, 51%RH	DC 15V from Adapter	Jelly
PLC	25deg. C, 51%RH	DC 15V from Adapter	Ming Bai
APCM	20deg. C, 55%RH	DC 15V from Adapter	Daniel

2.3 DUTY CYCLE OF TEST SIGNAL

GFSK: 100%



2.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together without any other necessary accessories or support units.

2.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v02r01

ANSI C63.10-2013

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

3. TEST TYPES AND RESULTS

3.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

3.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

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. 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 30dB under any condition of modulation.

3.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

APPLICABLE TO	LIMIT	
789033 D02 General UNII Test Procedures New Rules v01r03	FIELD STRENGTH AT 3m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	Note	Note

NOTE: For transmitters operating in the 5.725-5.85 GHz band:

Section 15.407(b)(4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b)(4)(i). An alternative to the band emissions mask is specified in Section 15.407(b)(4)(ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the alternative limit.

15.407(b)(4)(i) All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \quad \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$

3.1.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESU40	100449	Mar. 17,21
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. 14,21
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. 03,21
Test Software	ADT	ADT_Radiated_V7.6.15.9.2	N/A	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, GRGT/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.

3.1.4 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. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTES:

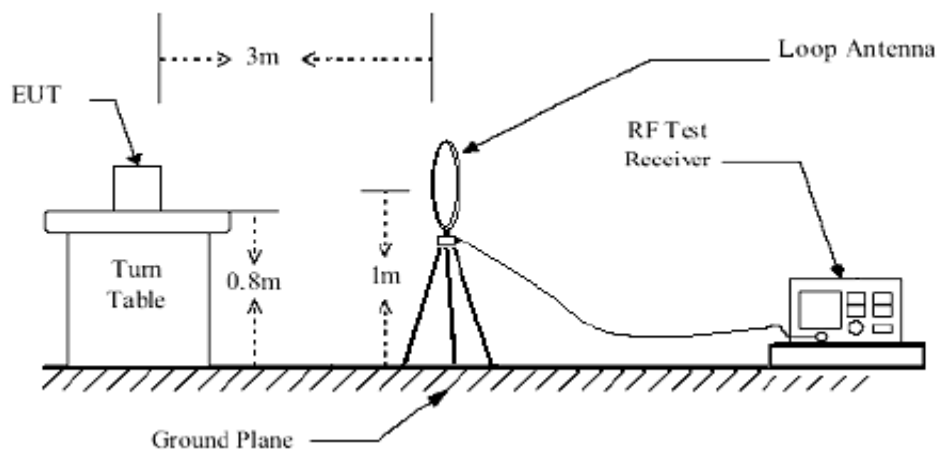
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution 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.
4. All modes of operation were investigated and the worst-case emissions are reported.

3.1.5 DEVIATION FROM TEST STANDARD

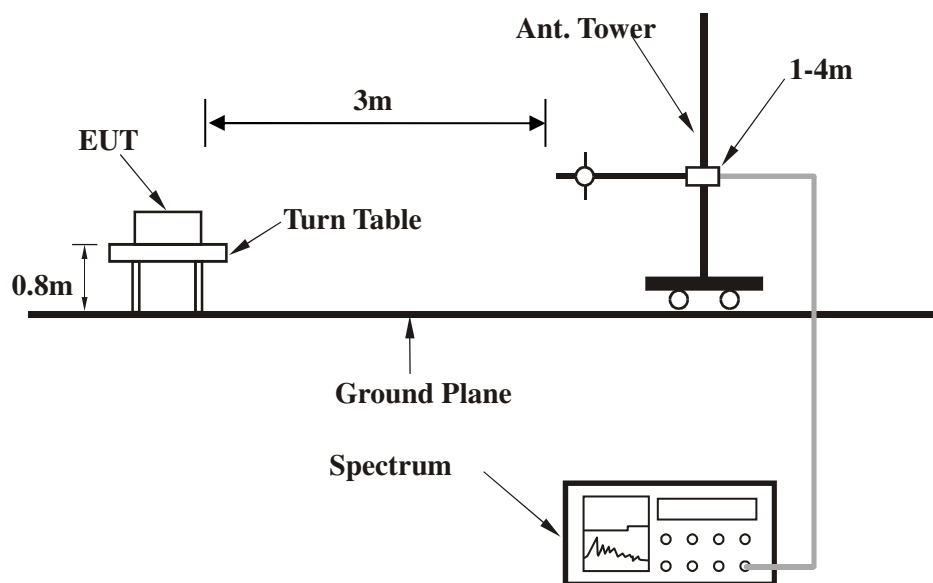
No deviation.

3.1.6 TEST SETUP

Below 30MHz test setup

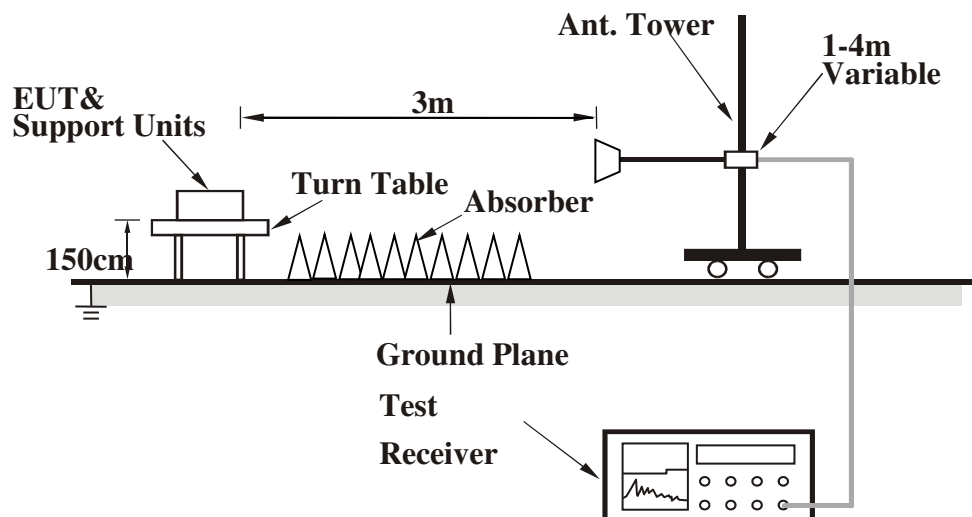


Below 1GHz test setup



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).

3.1.7 EUT OPERATING CONDITION

- 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.

3.1.8 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

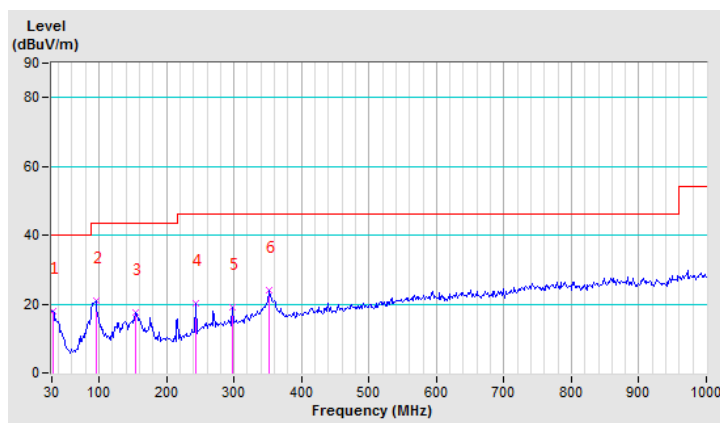
GFSK 5735-5840MHz

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 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)	CORRECTION FACTOR (dB/m)
1	31.55	17.97 QP	40.00	-22.03	1.00 H	142	30.69	-12.72
2	95.29	21.12 QP	43.50	-22.38	1.00 H	153	41.71	-20.59
3	154.36	17.64 QP	43.50	-25.86	1.00 H	163	35.06	-17.42
4	242.96	20.24 QP	46.00	-25.76	1.00 H	130	37.46	-17.22
5	297.37	19.02 QP	46.00	-26.98	1.00 H	113	33.42	-14.40
6	351.78	23.94 QP	46.00	-22.06	1.00 H	102	36.68	-12.74

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. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value

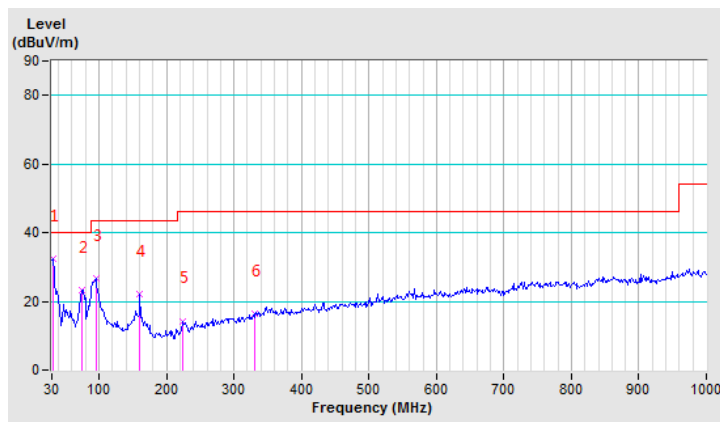


CHANNEL	TX Channel 1	DETECTOR FUNCTION	Quasi-Peak (QP)
FREQUENCY RANGE	9KHz ~ 1GHz		

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)	CORRECTION FACTOR (dB/m)
1	31.55	32.42 QP	40.00	-7.58	1.00 V	220	45.14	-12.72
2	75.08	23.19 QP	40.00	-16.81	1.00 V	356	46.56	-23.37
3	95.29	26.79 QP	43.50	-16.71	1.00 V	330	47.38	-20.59
4	160.58	22.03 QP	43.50	-21.47	1.00 V	344	39.11	-17.08
5	224.31	14.28 QP	46.00	-31.72	1.00 V	333	33.65	-19.37
6	330.02	16.22 QP	46.00	-29.78	1.00 V	322	29.66	-13.44

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. 9KHz~30MHz have been test and test data more than 20dB margin.
5. Margin value = Emission level – Limit value



ABOVE 1GHz DATA

GFSK: 5160~5240MHz

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

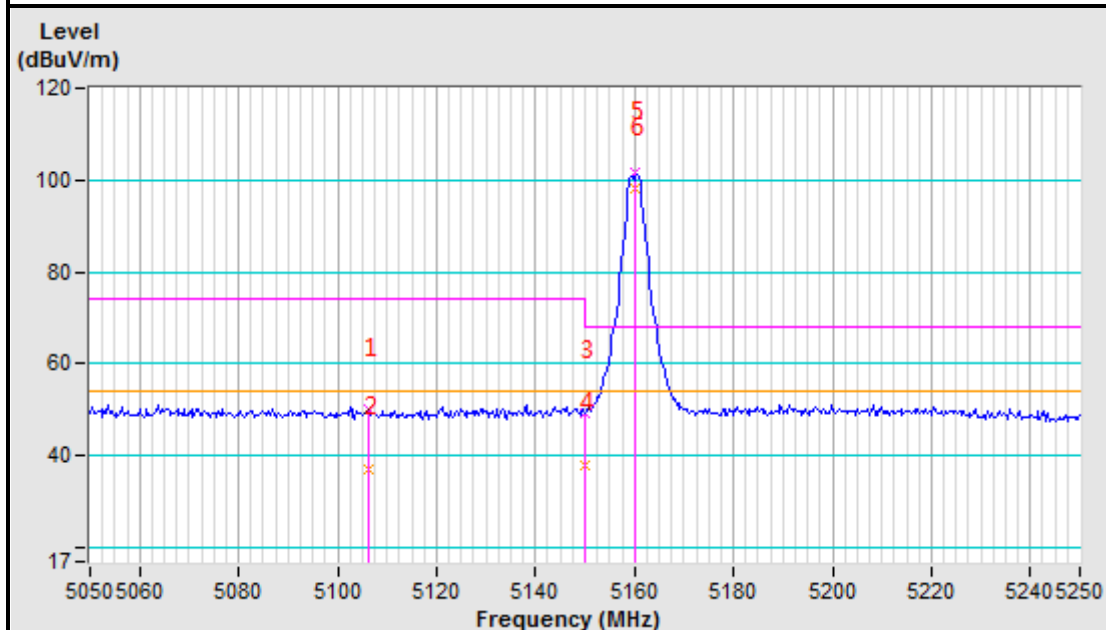
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5106.41	50.11 PK	74.00	-23.89	1.18 H	267	41.35	8.76
2	5106.41	37.18 AV	54.00	-16.82	1.18 H	267	28.42	8.76
3	5150.00	49.41 PK	74.00	-24.59	1.18 H	267	40.61	8.80
4	5150.00	38.05 AV	54.00	-15.95	1.18 H	267	29.25	8.80
5	*5160.00	101.62 PK			1.18 H	267	92.82	8.80
6	*5160.00	97.96 AV			1.18 H	267	89.16	8.80
7	#10320.00	64.60 PK	68.20	-3.60	1.00 H	250	46.98	17.62
8	15480.00	64.35 PK	74.00	-9.65	1.00 H	250	40.36	23.99
9	15480.00	48.15 AV	54.00	-5.85	1.00 H	250	24.16	23.99
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	5095.51	50.95 PK	74.00	-23.05	1.00 V	31	42.21	8.74
2	5095.51	39.19 AV	54.00	-14.81	1.00 V	31	30.45	8.74
3	5150.00	51.36 PK	74.00	-22.64	1.00 V	31	42.56	8.80
4	5150.00	40.03 AV	54.00	-13.97	1.00 V	31	31.23	8.80
5	*5160.00	107.39 PK			1.00 V	31	98.59	8.80
6	*5160.00	104.33 AV			1.00 V	31	95.53	8.80
7	#10320.00	64.98 PK	68.20	-3.22	1.00 V	110	47.36	17.62
8	15480.00	54.34 PK	74.00	-19.66	1.00 V	110	30.35	23.99
9	15480.00	49.51 AV	54.00	-4.49	1.00 V	110	25.52	23.99

REMARKS:

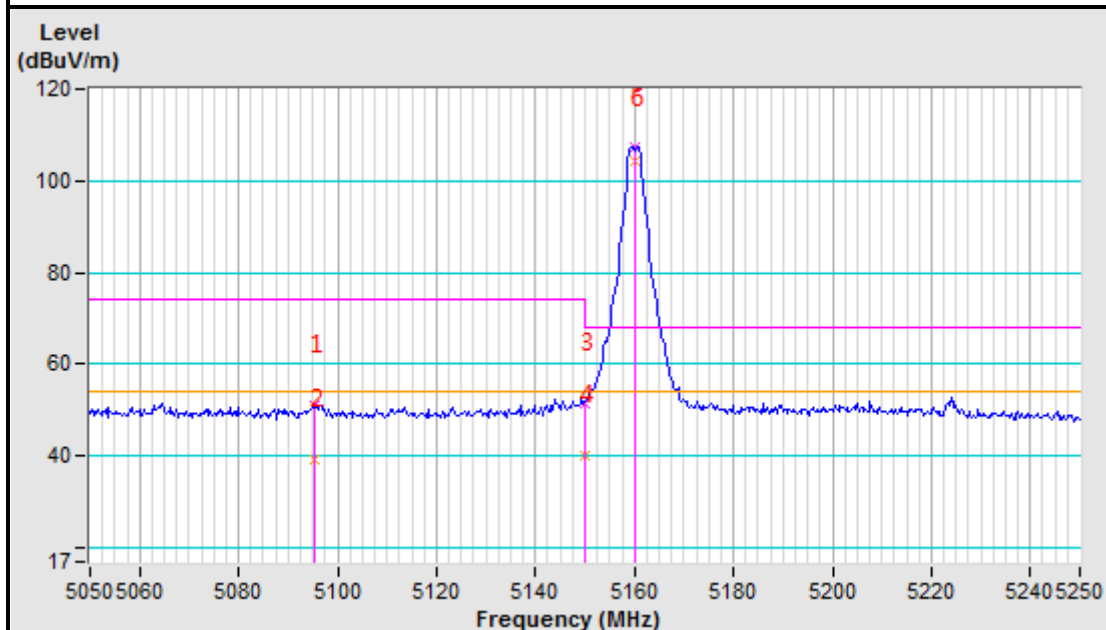
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental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

Band edge Plot

5160MHz Horizontal



5160MHz Vertical



CHANNEL	TX Channel 9	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		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	5130.44	51.47 PK	74.00	-22.53	1.08 H	12	42.69	8.78
2	5130.44	37.38 AV	54.00	-16.62	1.08 H	12	28.60	8.78
3	5150.00	49.60 PK	74.00	-24.40	1.08 H	12	40.80	8.80
4	5150.00	37.51 AV	54.00	-16.49	1.08 H	252	28.71	8.80
5	*5200.00	101.55 PK			1.08 H	252	92.70	8.85
6	*5200.00	88.80 AV			1.08 H	252	79.95	8.85
7	#10400.00	64.21 PK	68.20	-3.99	1.00 H	252	46.21	18.00
8	15600.00	64.15 PK	74.00	-9.85	1.00 H	252	39.94	24.21
9	15600.00	49.25 AV	54.00	-4.75	1.00 H	252	25.04	24.21
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	5136.53	52.02 PK	74.00	-21.98	1.20 V	35	43.23	8.79
2	5136.53	39.64 AV	54.00	-14.36	1.20 V	35	30.85	8.79
3	5150.00	49.37 PK	74.00	-24.63	1.20 V	35	40.57	8.80
4	5150.00	37.69 AV	54.00	-16.31	1.20 V	35	28.89	8.80
5	*5200.00	107.32 PK			1.20 V	100	98.47	8.85
6	*5200.00	104.02 AV			1.20 V	100	95.17	8.85
7	#10400.00	64.35 PK	68.20	-3.85	1.00 V	100	46.35	18.00
8	15600.00	63.54 PK	74.00	-10.46	1.00 V	100	39.33	24.21
9	15600.00	48.26 AV	54.00	-5.74	1.00 V	100	24.05	24.21

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 less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

CHANNEL	TX Channel 17	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

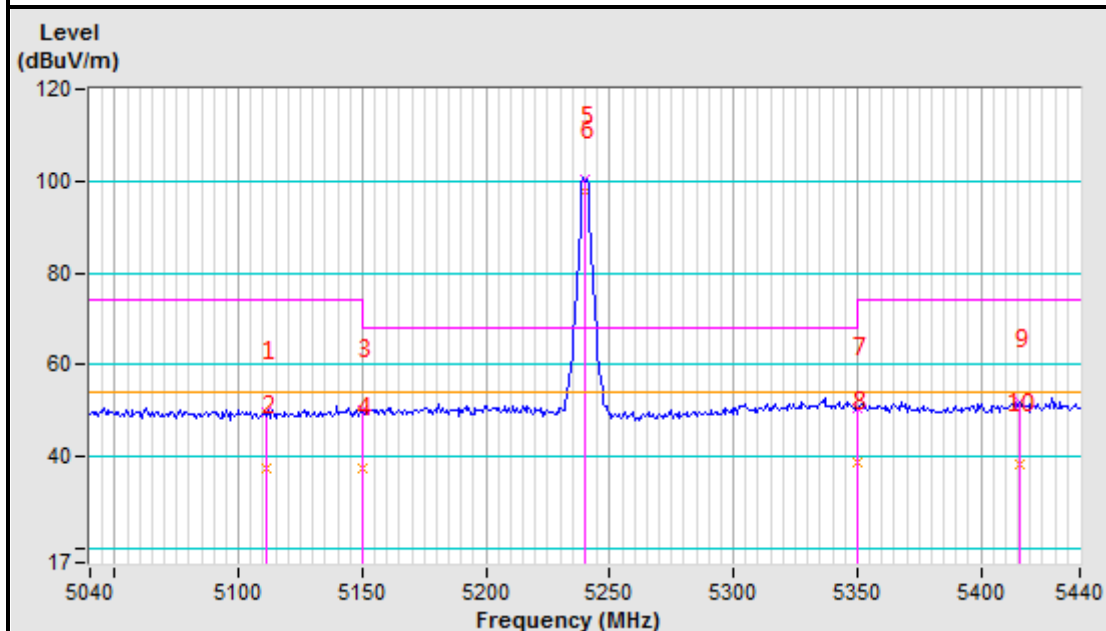
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5111.53	49.71 PK	74.00	-24.29	1.02 H	265	40.95	8.76
2	5111.53	37.54 AV	54.00	-16.46	1.02 H	265	28.78	8.76
3	5150.00	50.15 PK	74.00	-23.85	1.02 H	265	41.35	8.80
4	5150.00	37.43 AV	54.00	-16.57	1.02 H	265	28.63	8.80
5	*5240.00	100.57 PK			1.02 H	265	91.69	8.88
6	*5240.00	97.57 AV			1.02 H	265	88.69	8.88
7	5350.00	50.58 PK	74.00	-23.42	1.02 H	265	41.60	8.98
8	5350.00	38.65 AV	54.00	-15.35	1.02 H	240	29.67	8.98
9	5415.38	52.02 PK	74.00	-21.98	1.02 H	240	42.98	9.04
10	5415.38	38.23 AV	54.00	-15.77	1.02 H	240	29.19	9.04
11	#10480.00	63.56 PK	68.20	-4.64	1.00 H	240	45.19	18.37
12	15720.00	64.26 PK	74.00	-9.74	1.00 H	240	39.83	24.43
13	15720.00	49.25 AV	54.00	-4.75	1.00 H	240	24.82	24.43
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	5142.94	50.62 PK	74.00	-23.38	1.07 V	199	41.83	8.79
2	5142.94	39.17 AV	54.00	-14.83	1.07 V	199	30.38	8.79
3	5150.00	48.56 PK	74.00	-25.44	1.07 V	199	39.76	8.80
4	5150.00	37.25 AV	54.00	-16.75	1.07 V	199	28.45	8.80
5	*5240.00	104.93 PK			1.07 V	199	96.05	8.88
6	*5240.00	101.83 AV			1.07 V	199	92.95	8.88
7	5350.00	50.37 PK	74.00	-23.63	1.07 V	332	41.39	8.98
8	5350.00	38.28 AV	54.00	-15.72	1.07 V	332	29.30	8.98
9	5387.20	51.76 PK	74.00	-22.24	1.07 V	332	42.74	9.02
10	5387.20	38.34 AV	54.00	-15.66	1.07 V	332	29.32	9.02
11	#10480.00	64.15 PK	68.20	-4.05	1.00 V	332	45.78	18.37
12	15720.00	64.16 PK	74.00	-9.84	1.00 V	332	39.73	24.43
13	15720.00	48.26 AV	54.00	-5.74	1.00 V	332	23.83	24.43

REMARKS:

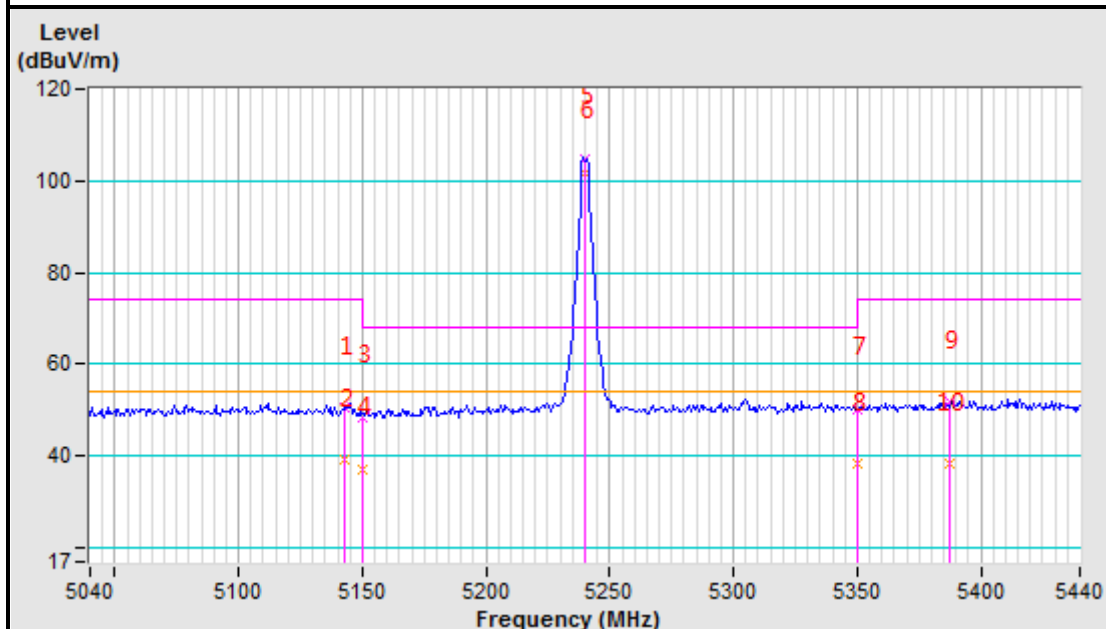
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were less than 20dB margin against the limit.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental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

Band edge Plot

5240MHz Horizontal



5240MHz Vertical



ABOVE 1GHz DATA

GFSK: 5835~5840MHz

CHANNEL	TX Channel 1	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

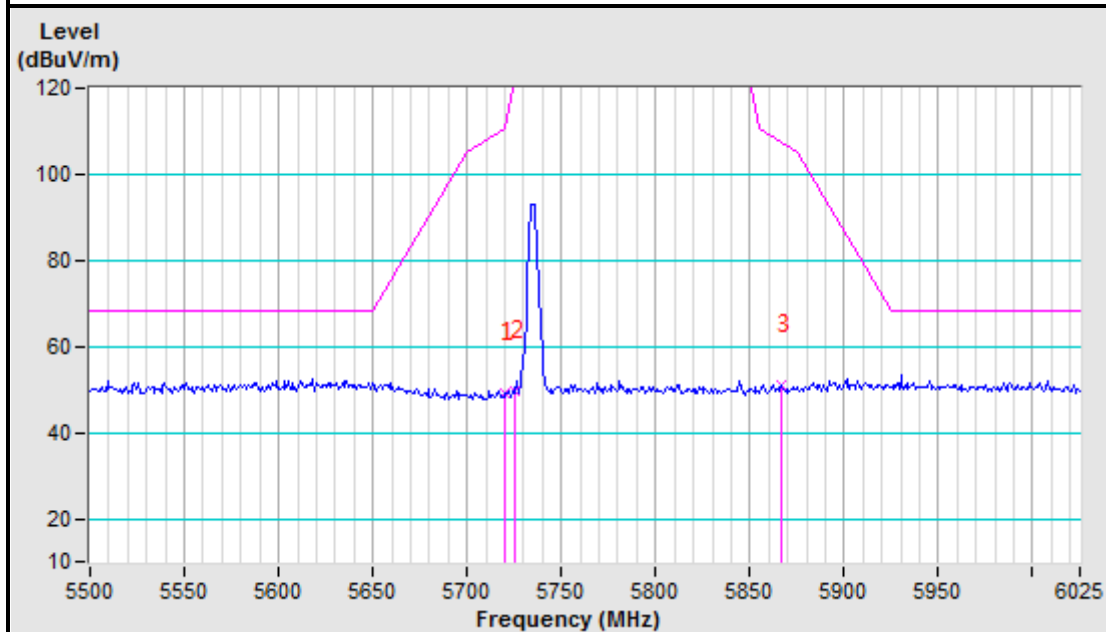
ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	#5719.95	49.20 PK	110.79	-61.59	1.00 H	238	39.26	9.94
2	#5725.00	49.70 PK	122.20	-72.50	1.00 H	238	39.74	9.96
3	*5735.00	93.05 PK			1.00 H	354	83.05	10.00
4	*5735.00	86.55 AV			1.00 H	354	76.55	10.00
5	#5866.83	51.21 PK	107.49	-56.28	1.00 H	238	40.72	10.49
6	11470.00	58.62 PK	74.00	-15.38	1.00 H	178	38.16	20.46
7	11470.00	47.11 AV	54.00	-6.89	1.00 H	178	26.65	20.46
8	#17205.00	62.81 PK	68.20	-5.39	1.00 H	75	35.54	27.27
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	#5721.63	49.68 PK	114.53	-64.85	1.03 V	354	39.74	9.94
2	#5725.00	50.60 PK	122.20	-71.60	1.03 V	354	40.64	9.96
3	*5735.00	101.45 PK			1.00 V	354	91.45	10.00
4	*5735.00	98.42 AV			1.00 V	54	88.42	10.00
5	#5993.03	57.74 PK	68.20	-10.46	1.03 V	54	46.79	10.95
6	11470.00	58.85 PK	74.00	-15.15	1.00 V	105	38.39	20.46
7	11470.00	46.21 AV	54.00	-7.79	1.00 V	105	25.75	20.46
8	#17205.00	63.21 PK	68.20	-4.99	1.00 V	105	35.94	27.27

REMARKS:

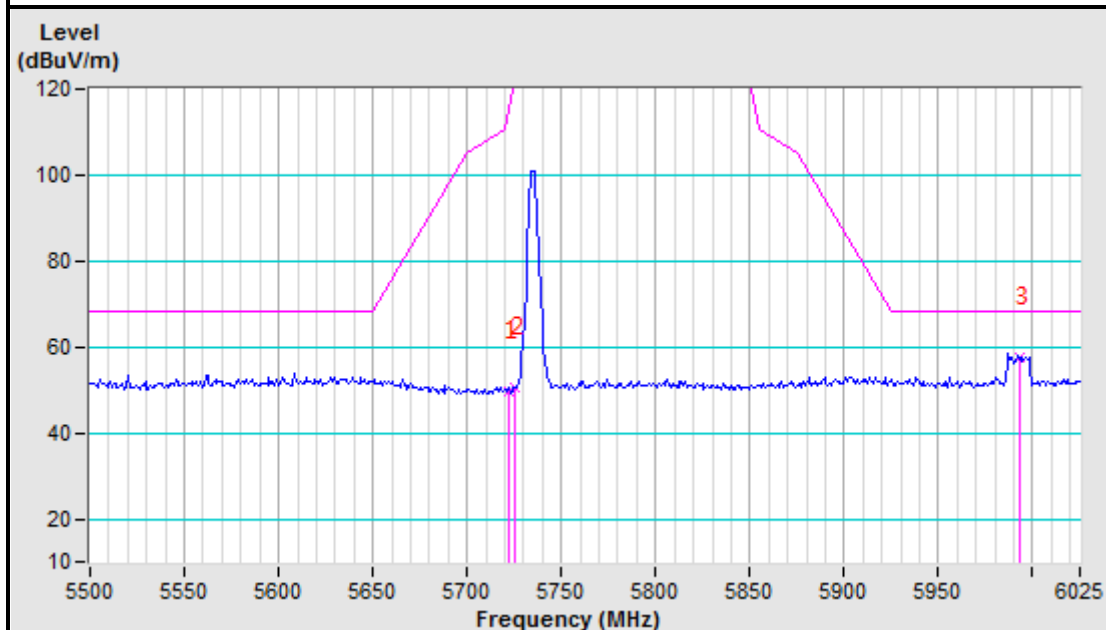
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
3. The emission levels of other frequencies were greater than 20dB margin.
4. Margin value = Emission level – Limit value.
5. " * ": Fundamental frequency.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

Band edge Plot

5735MHz Horizontal



5735MHz Vertical



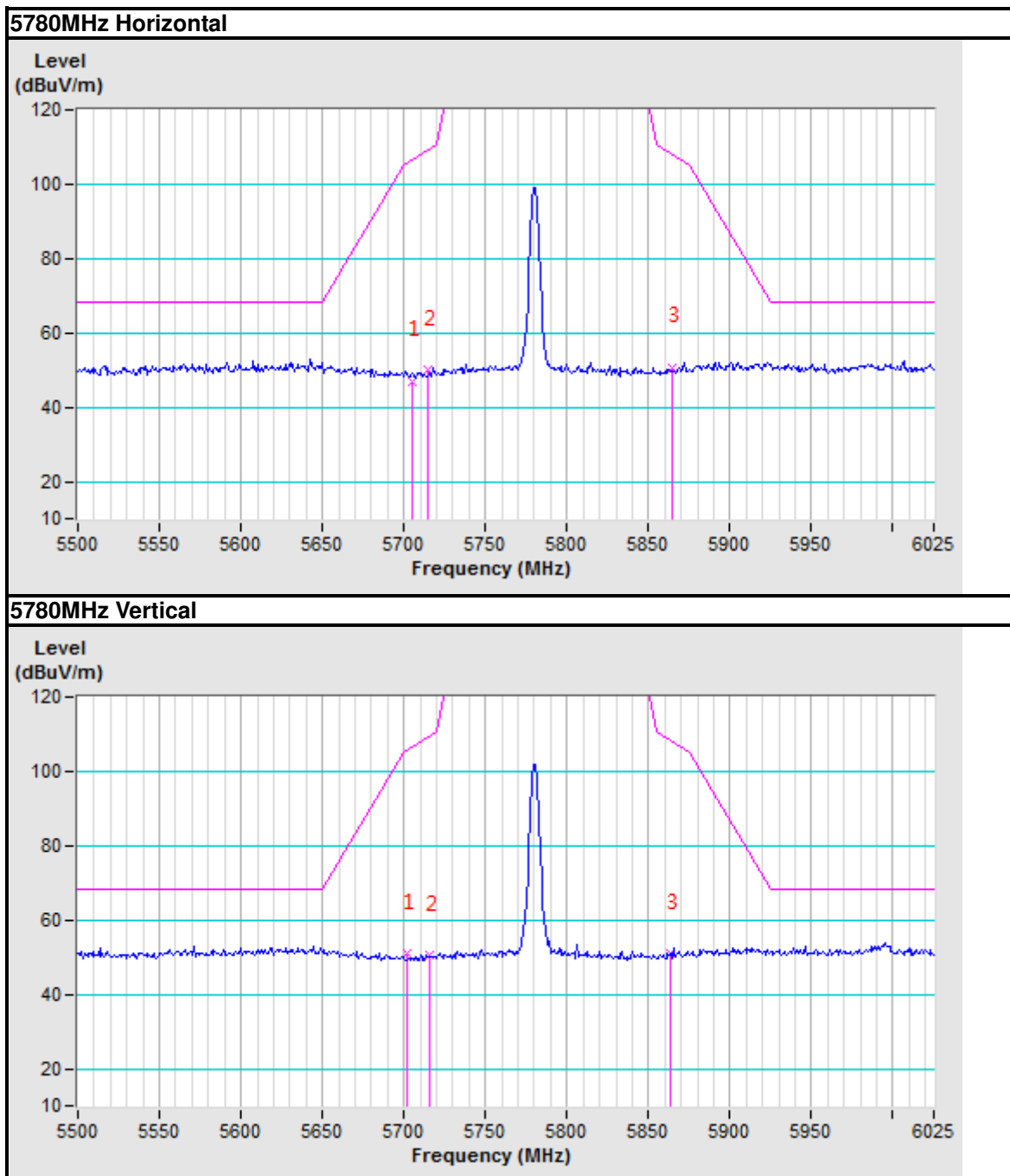
CHANNEL	TX Channel 10	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5704.81	46.74 PK	106.55	-59.81	1.00 H	233	36.86	9.88
2	#5714.90	49.89 PK	109.37	-59.48	1.00 H	233	39.98	9.91
3	*5780.00	98.97 PK			1.00 H	360	88.81	10.16
4	*5780.00	95.71 AV			1.00 H	360	85.55	10.16
5	#5864.30	50.70 PK	108.19	-57.49	1.00 H	233	40.22	10.48
6	11560.00	58.41 PK	74.00	-15.59	1.00 H	24	37.77	20.64
7	11560.00	46.14 AV	54.00	-7.86	1.00 H	24	25.50	20.64
8	#17340.00	63.12 PK	68.20	-5.08	1.00 H	24	35.68	27.44
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	#5702.28	50.85 PK	105.84	-54.99	1.00 V	335	40.98	9.87
2	#5715.75	50.37 PK	109.61	-59.24	1.00 V	3	40.44	9.93
3	*5780.00	101.74 PK			1.00 V	3	91.58	10.16
4	*5780.00	98.45 AV			1.00 V	335	88.29	10.16
5	#5863.46	50.83 PK	108.43	-57.60	1.00 V	335	40.36	10.47
6	11560.00	59.03 PK	74.00	-14.97	1.00 V	311	38.39	20.64
7	11560.00	46.33 AV	54.00	-7.67	1.00 V	122	25.69	20.64
8	#17340.00	63.05 PK	68.20	-5.15	1.00 V	122	35.61	27.44

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.

Band edge Plot



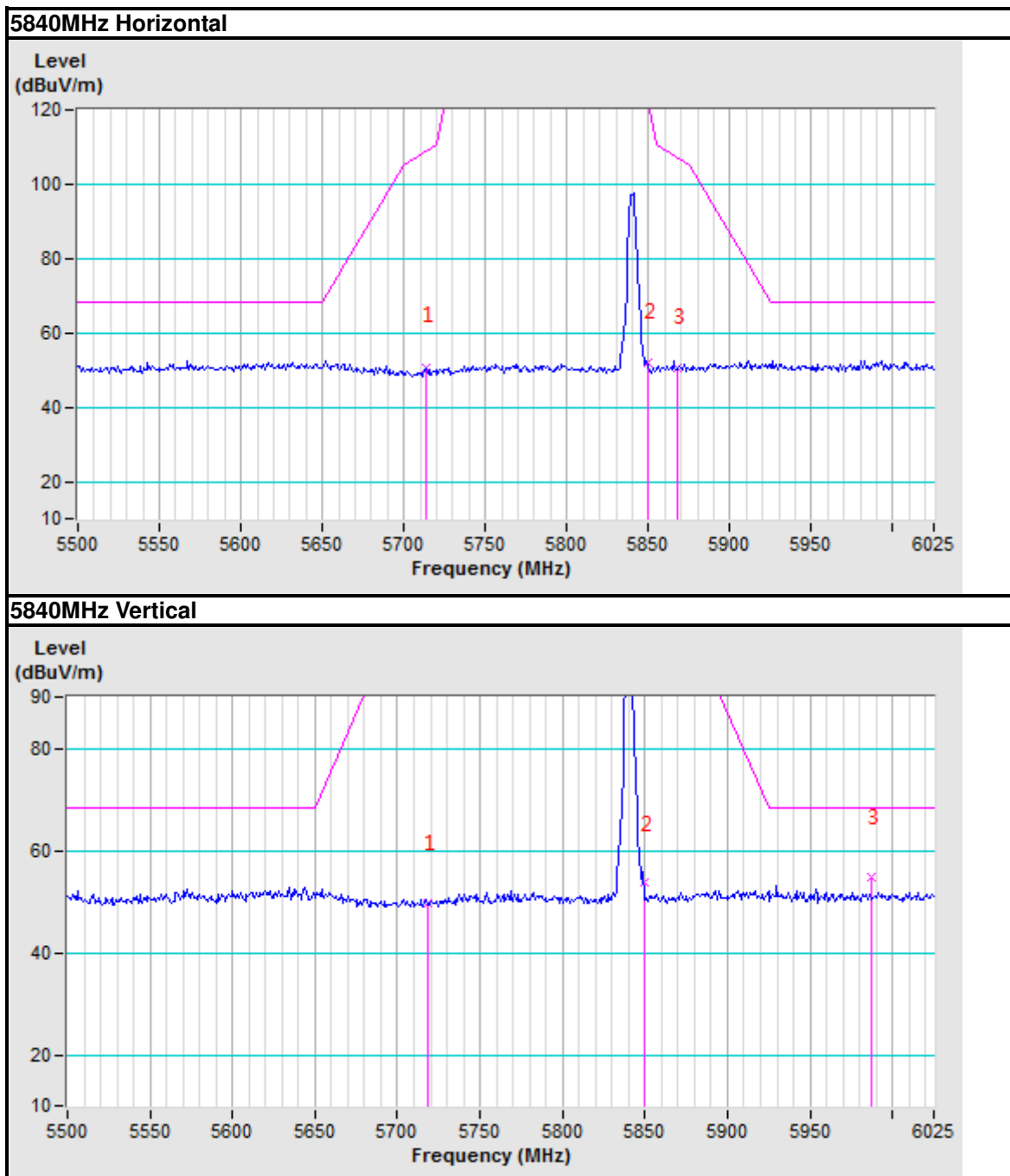
CHANNEL	TX Channel 22	DETECTOR FUNCTION	Peak (PK)
FREQUENCY RANGE	1GHz ~ 40GHz		Average (AV)

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	#5714.06	50.54 PK	109.14	-58.60	1.37 H	44	40.63	9.91
2	*5840.00	97.32 PK			1.00 H	44	86.93	10.39
3	*5840.00	90.02 AV			1.00 H	44	79.63	10.39
4	#5850.00	51.81 PK	122.20	-70.39	1.37 H	27	41.39	10.42
5	#5867.67	50.39 PK	107.25	-56.86	1.37 H	296	39.90	10.49
6	11680.00	58.56 PK	74.00	-15.44	1.00 H	296	37.66	20.90
7	11680.00	46.36 AV	54.00	-7.64	1.00 H	27	25.46	20.90
8	#17520.00	63.37 PK	68.20	-4.83	1.00 H	27	35.69	27.68
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	#5718.27	49.60 PK	110.32	-60.72	1.00 V	333	39.67	9.93
2	*5840.00	102.07 PK			1.00 V	305	91.68	10.39
3	*5840.00	95.01 AV			1.00 V	305	84.62	10.39
4	#5850.00	53.59 PK	122.20	-68.61	1.00 V	143	43.17	10.42
5	#5987.14	54.89 PK	68.20	-13.31	1.00 V	143	43.95	10.94
6	11680.00	59.22 PK	74.00	-14.78	1.00 V	184	38.32	20.90
7	11680.00	46.28 AV	54.00	-7.72	1.00 V	184	25.38	20.90
8	#17520.00	62.83 PK	68.20	-5.37	1.00 V	143	35.15	27.68

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.

Band edge Plot



3.2 CONDUCTED EMISSION MEASUREMENT

3.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

- NOTES:**
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.

3.2.2 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
EMI Test Receiver	Rohde&Schwarz	ESR7	101494	Mar. 17,21
Artificial Mains Network	Rohde&Schwarz	ENV216	101173	Mar. 17,21
Artificial Mains Network	Rohde&Schwarz	ESH3-Z5	100317	Mar. 17,21
Voltage probe	SCHWARZBECK	TK 9421	TK 9421-176	Sep. 23,21
Test software	ADT	ADT_Cond_V7.3 .7	N/A	N/A

- NOTES:**
1. The test was performed in shielded room 553.
 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.

3.2.3 TEST PROCEDURES

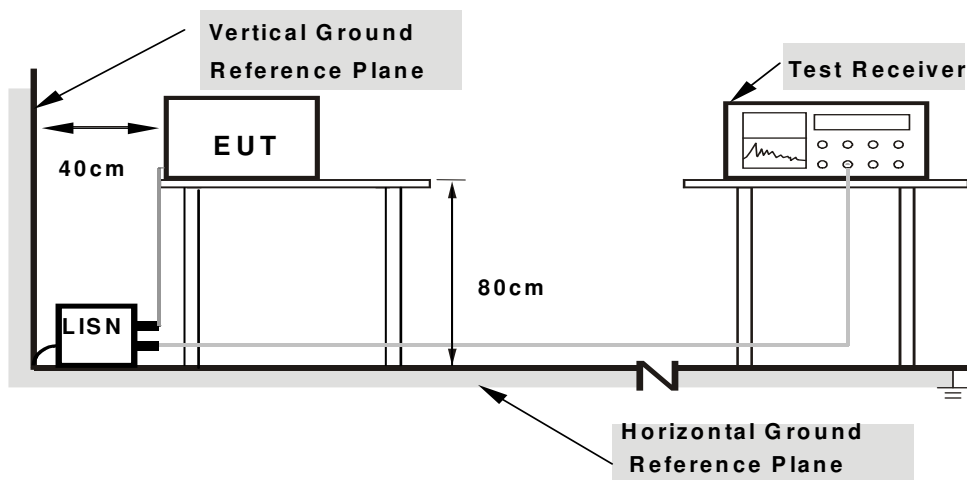
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

NOTE: 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



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).

3.2.6 EUT OPERATING CONDITIONS

Same as 3.1.7

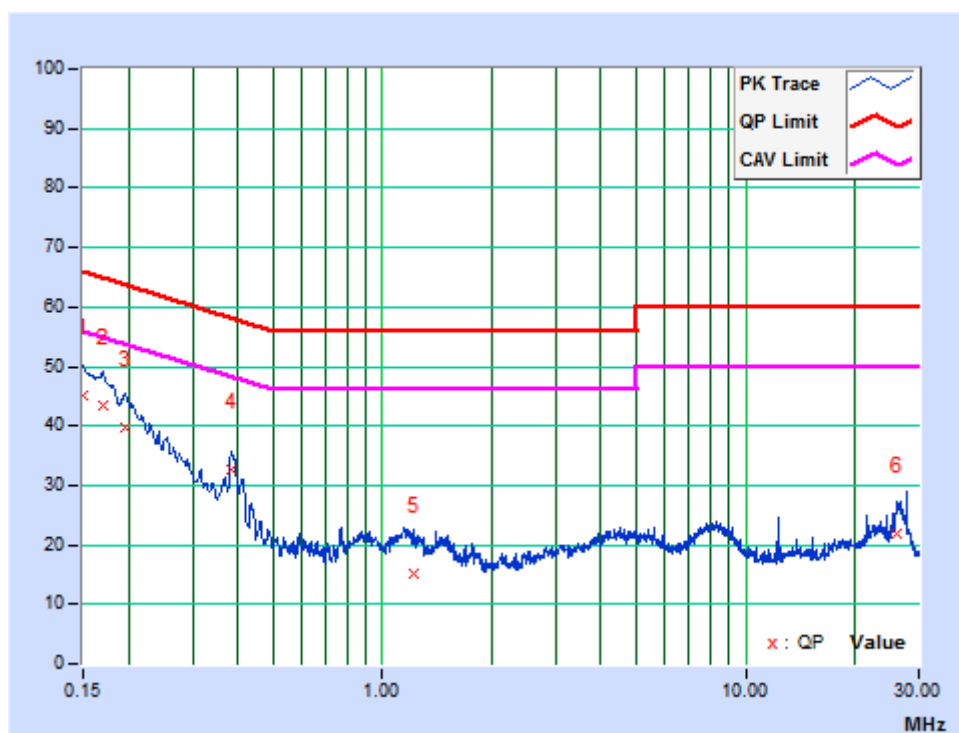
3.2.7 TEST RESULTS

CONDUCTED WORST-CASE DATA: GFSK: 5735-5840MHz CH 1

PHASE	Line	6dB BANDWIDTH	9kHz
-------	------	---------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.77	35.49	19.58	45.26	29.35	66.00	56.00	-20.74	-26.65
2	0.17011	9.77	33.56	19.37	43.33	29.14	64.96	54.96	-21.63	-25.82
3	0.19514	9.78	29.82	15.11	39.60	24.89	63.81	53.81	-24.22	-28.93
4	0.38463	9.85	22.82	19.49	32.67	29.34	58.18	48.18	-25.51	-18.84
5	1.22261	9.83	5.42	-0.08	15.25	9.75	56.00	46.00	-40.75	-36.25
6	26.18250	10.45	11.38	2.76	21.83	13.21	60.00	50.00	-38.17	-36.79

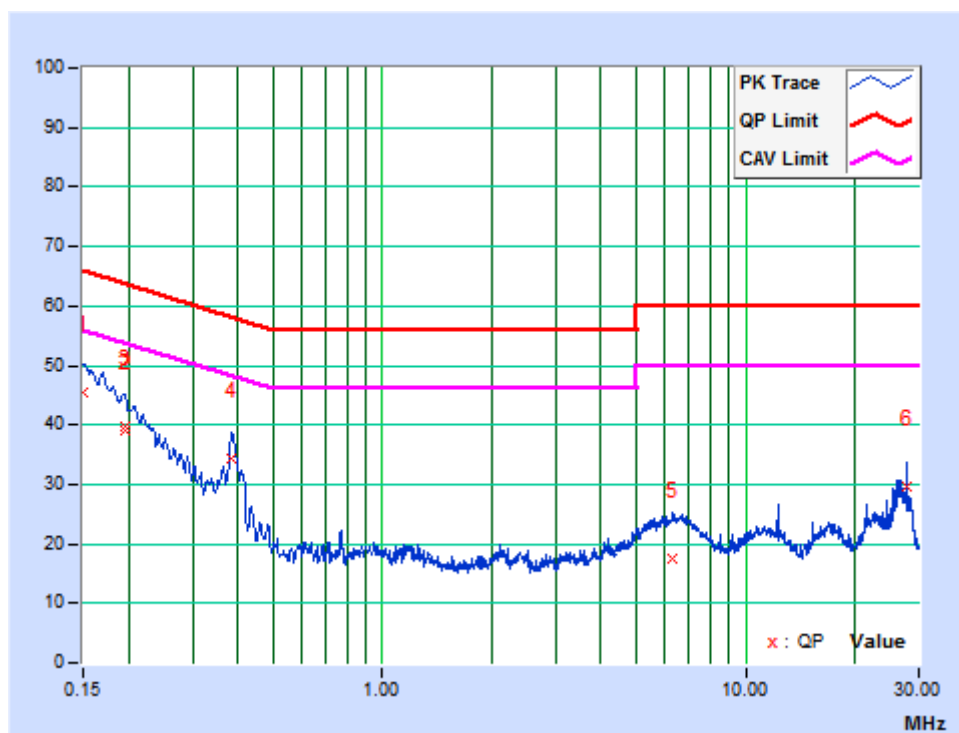
REMARKS: 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level - Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading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



PHASE	Neutral	6dB BANDWIDTH	9kHz
-------	---------	---------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	9.70	35.62	20.05	45.32	29.75	66.00	56.00	-20.68	-26.25
2	0.19500	9.71	29.46	15.92	39.17	25.63	63.82	53.82	-24.65	-28.19
3	0.19500	9.71	30.02	15.87	39.73	25.58	63.82	53.82	-24.09	-28.24
4	0.38463	9.79	24.43	20.02	34.22	29.81	58.18	48.18	-23.96	-18.37
5	6.28350	9.87	7.66	2.25	17.53	12.12	60.00	50.00	-42.47	-37.88
6	27.64950	10.73	18.93	14.79	29.66	25.52	60.00	50.00	-30.34	-24.48

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



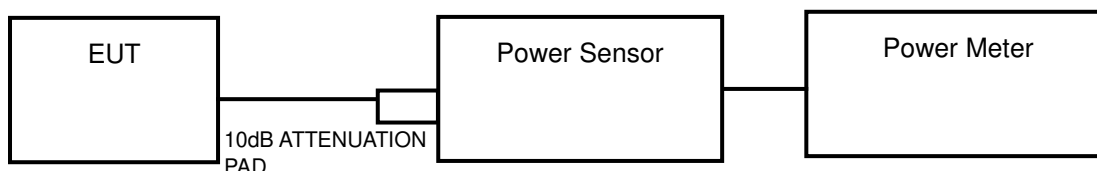
3.3 TRANSMIT POWER MEASUREMENT

3.3.1 LIMITS OF TRANSMIT POWER MEASUREMENT

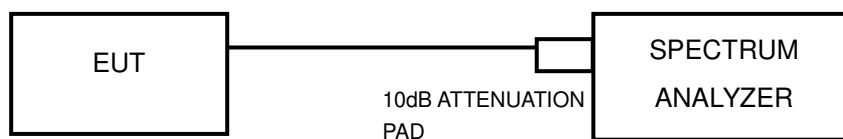
Operation Band	EUT Category		LIMIT
U-NII-1	-	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p \leq 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
	-	Fixed point-to-point Access Point	1 Watt (30 dBm)
	-	Indoor Access Point	1 Watt (30 dBm)
	√	Mobile and Portable client device	250mW (24 dBm)
U-NII-2A	-		250mW(24dBm) or 11 dBm+10LogB*
U-NII-2C	-		250mW(24dBm) or 11 dBm+10LogB*
U-NII-3	√		1 Watt (30 dBm)

NOTE: 1. Where B is the 26dB emission bandwidth in MHz.

3.3.2 TEST SETUP



FOR 6/26dB BANDWIDTH



3.3.3 TEST INSTRUMENTS

Equipment	Manufacturer	Model No.	Serial No.	Next Cal.
Power Sensor	Keysight	U2021XA	MY55060016	N/A
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
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, GREGT/CHINA and NIM/CHINA.

3.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = RMS.
- 4) Trace mode = max hold.
- 5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

FOR 6dB BANDWIDTH

- 1) Set RBW = 100 kHz.
- 2) Set the video bandwidth (VBW) ≥ 3 RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) Sweep = auto couple.
- 6) Allow the trace to stabilize.
- 7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

3.3.5 DEVIATION FROM TEST STANDARD

No deviation.

3.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

3.3.7 TEST RESULTS

OUTPUT POWER:

GFSK: 5160~5240MHz

CHAIN 0

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
1	5160	11.14	24.00	PASS
9	5200	11.43	24.00	PASS
17	5240	10.93	24.00	PASS

CHAIN 1

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
1	5160	10.57	24.00	PASS
9	5200	11.41	24.00	PASS
17	5240	11.90	24.00	PASS

GFSK: 5735~5840MHz

CHAIN 0

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
1	5735	9.41	30.00	PASS
10	5780	9.53	30.00	PASS
22	5840	9.13	30.00	PASS

CHAIN 1

Channel Number	FREQ. (MHz)	AVG. CONDUCTED POWER (dBm)	LIMIT (dBm)	PASS /FAIL
1	5735	9.72	30.00	PASS
10	5780	8.51	30.00	PASS
22	5840	6.99	30.00	PASS

26dB BANDWIDTH:

GFSK : 5160~5240MHz

Channel Number	Freq. (MHz)	26dB DOWN BANDWIDTH (MHz)	PASS /FAIL
1	5160	4.53	PASS
9	5200	4.53	PASS
17	5240	4.53	PASS

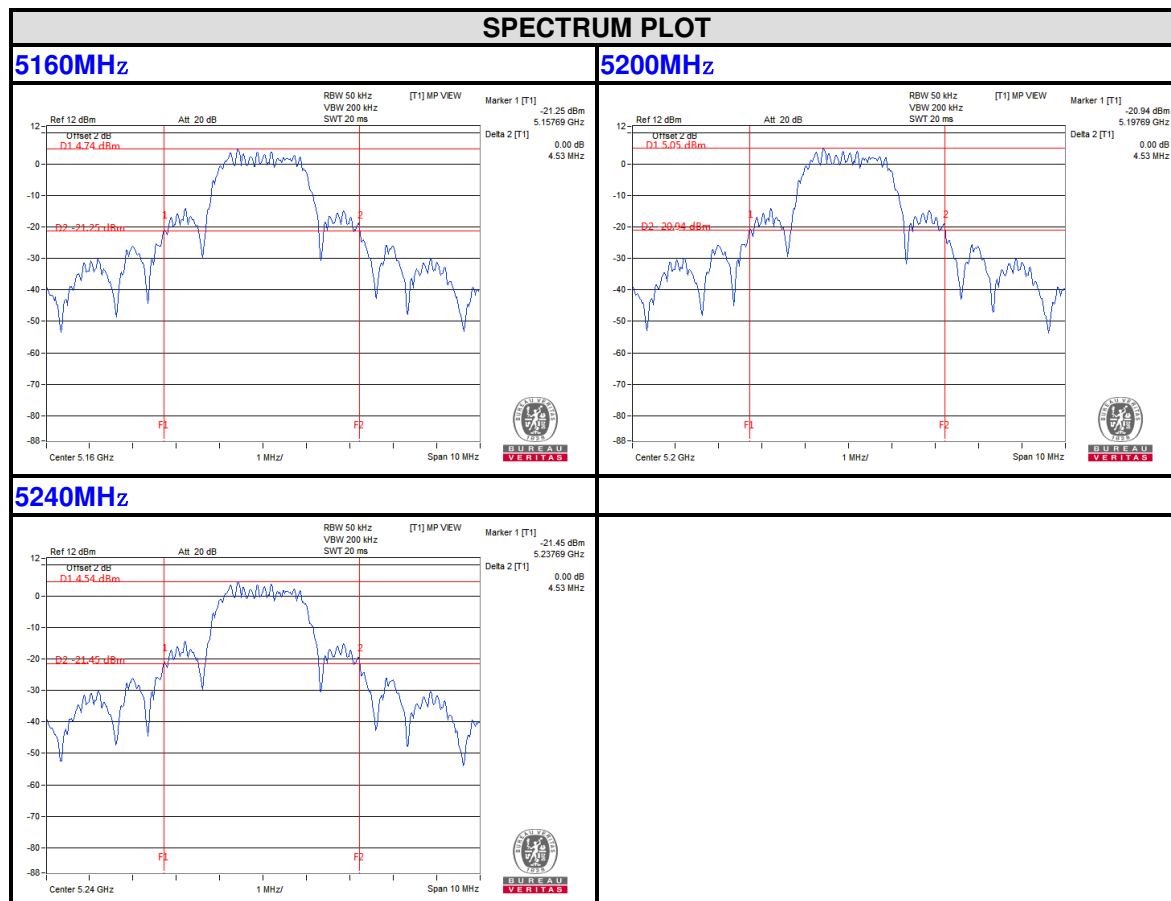
6dB BANDWIDTH

GFSK : 5735~5840MHz

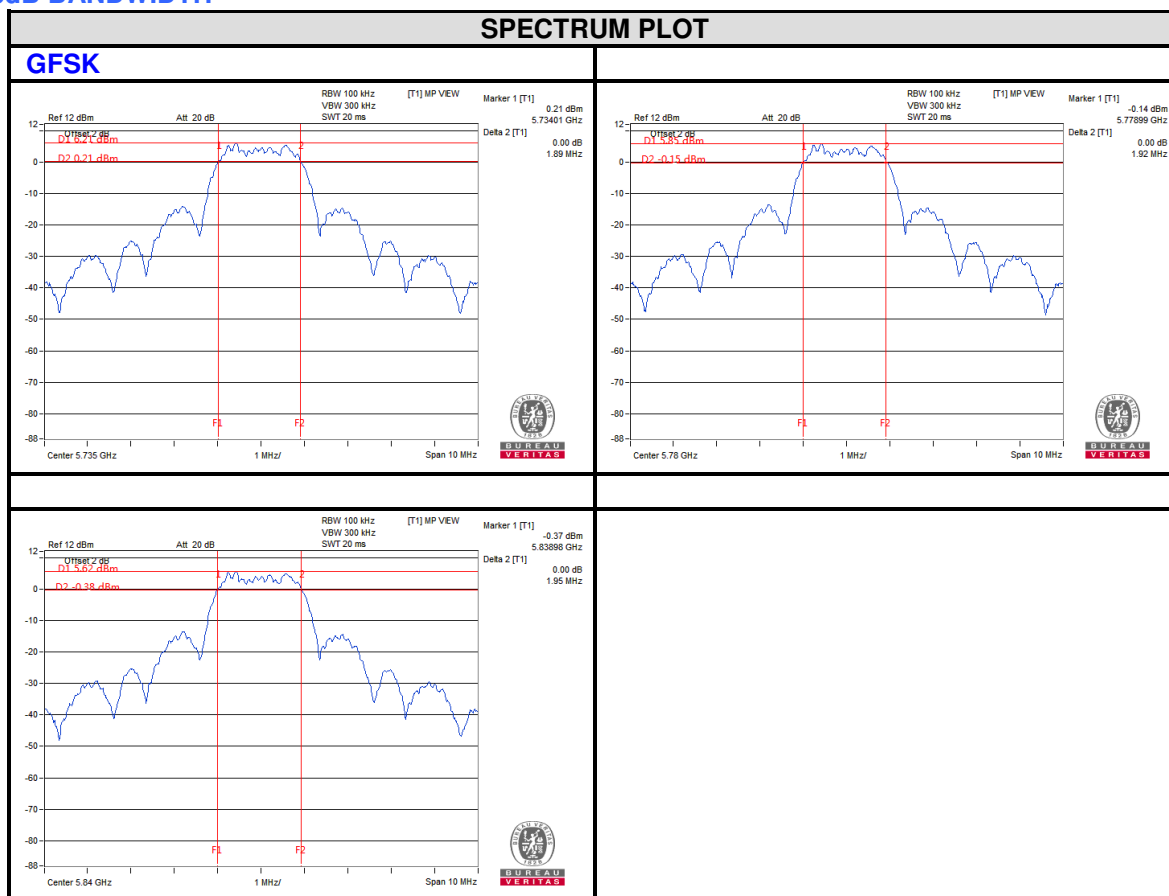
Channel Number	Freq. (MHz)	6dB DOWN BANDWIDTH (MHz)	PASS /FAIL
1	5735	1.89	PASS
10	5780	1.92	PASS
22	5840	1.95	PASS

26dB bandwidth Test Plot

GFSK : 5160~5240MHz



6dB BANDWIDTH

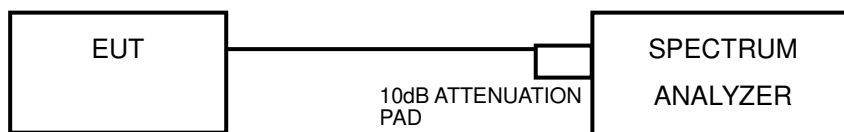


3.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

3.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Operation Band	EUT Category		LIMIT
U-NII-1	-	Outdoor Access Point	17dBm/ MHz
	-	Fixed point-to-point Access Point	
	-	Indoor Access Point	
	√	Mobile and Portable client device	11dBm/ MHz
U-NII-2A	-		11dBm/ MHz
U-NII-2C	-		11dBm/ MHz
U-NII-3	√		30dBm/ 500kHz

3.4.2 TEST SETUP



3.4.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.4.4 TEST PROCEDURES

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1MHz, Set VBW = 3 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)



Test Report No.: RF2009WDG0048

For U-NII-3 band:

Using method SA-2

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 300 kHz, Set VBW = 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value and add 10 log (1/duty cycle)

3.4.5 DEVIATION FROM TEST STANDARD

No deviation.

3.4.6 EUT OPERATING CONDITIONS

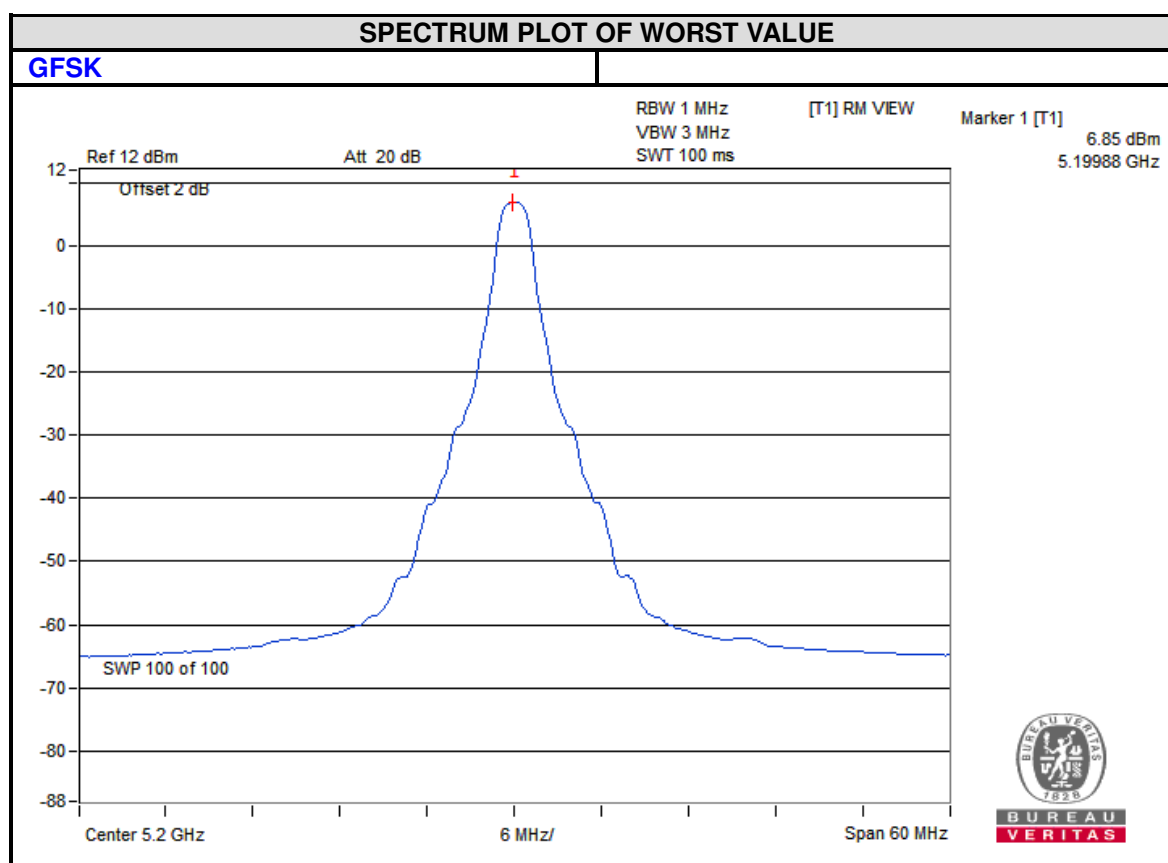
Same as 3.3.6

3.4.7 TEST RESULTS

GFSK: 5160~5240MHz

Channel	Frequency (MHz)	PSD (dBm/MHz)	MAX. Limit (dBm)	PASS / FAIL
1	5160	6.63	11.00	PASS
9	5200	6.85	11.00	PASS
17	5240	6.37	11.00	PASS

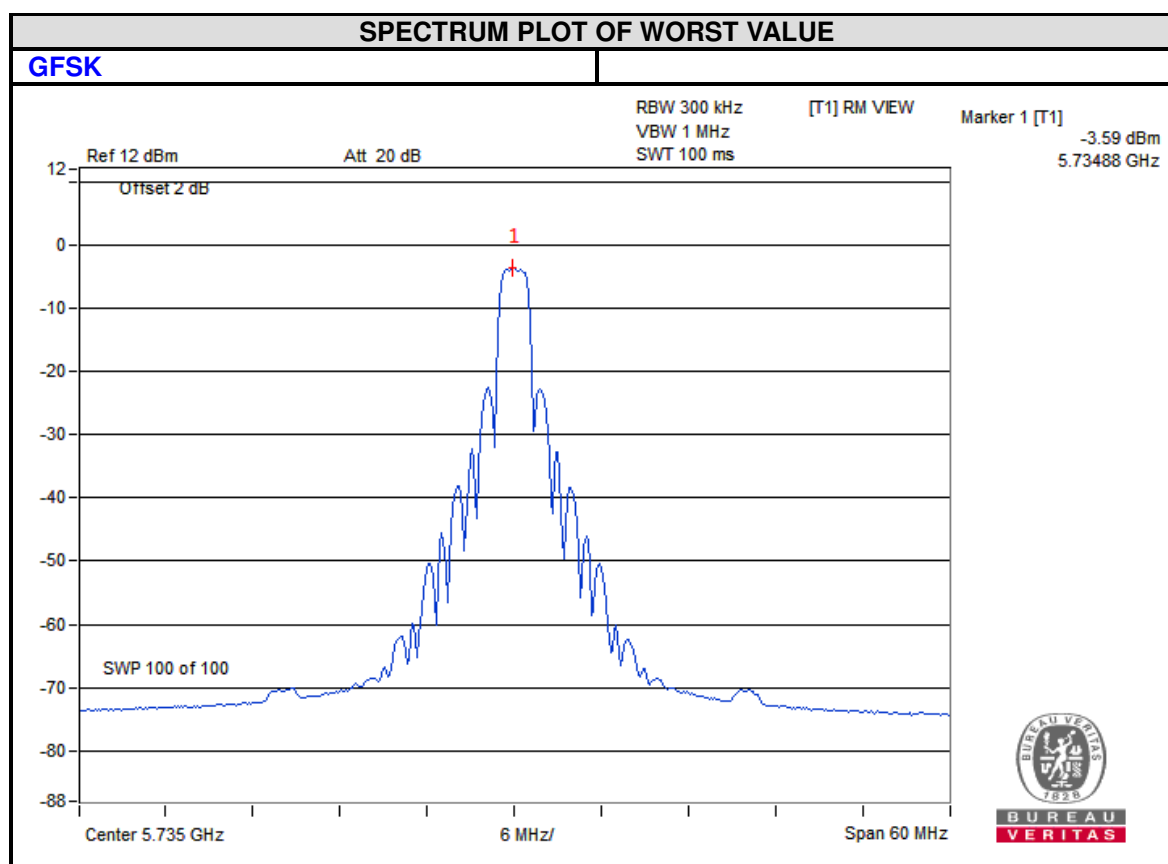
PSD Test Plot



GFSK: 5730~5840MHz

Channel Number	Frequency (MHz)	RF Power Level in 300kHz BW (dBm)	RF Power Level in 500kHz BW (dBm)	MAX. Limit (dBm/500k)	PASS / FAIL
1	5735	-3.59	-1.37	30.00	PASS
10	5780	-5.07	-2.85	30.00	PASS
22	5840	-6.19	-3.97	30.00	PASS

PSD Test Plot

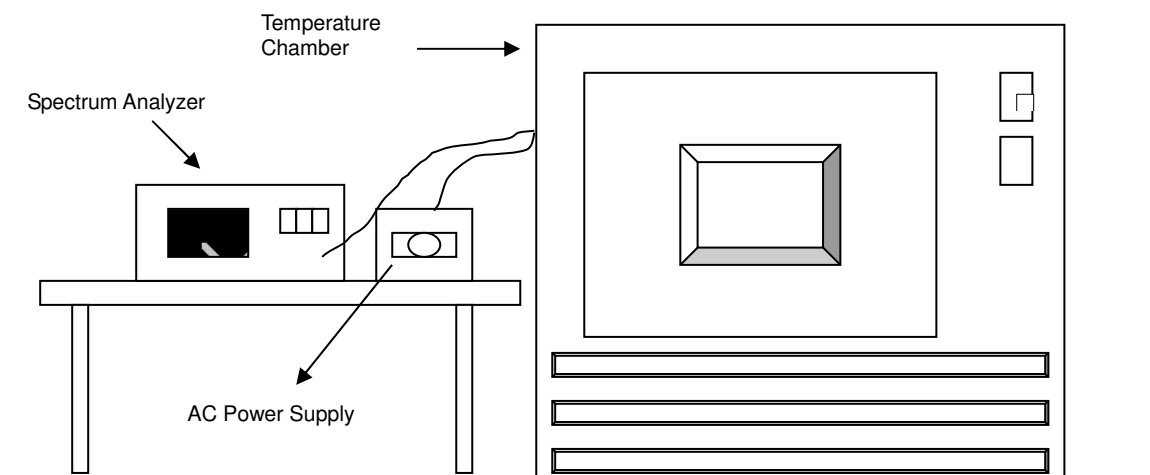


3.5 FREQUENCY STABILITY

3.5.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency of the carrier signal shall be maintained within band of operation.

3.5.2 TEST SETUP



3.5.3 TEST INSTRUMENTS

Refer to section 3.3.3 to get information of above instrument.

3.5.4 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

3.5.5 DEVIATION FROM TEST STANDARD

No deviation.

3.5.6 EUT OPERATING CONDITION

Set the EUT transmit at un-modulation mode to test frequency stability.

3.5.7 TEST RESULTS

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5160MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift
50	120	5160.0116	0.00022	5160.0126	0.00024	5160.0098	0.00019	5160.0109	0.00021
40	120	5160.0238	0.00046	5160.0201	0.00039	5160.0246	0.00048	5160.0251	0.00049
30	120	5160.0079	0.00015	5160.0117	0.00023	5160.0105	0.00020	5160.0103	0.00020
20	120	5159.9854	-0.00028	5159.9857	-0.00028	5159.9867	-0.00026	5159.9852	-0.00029
10	120	5159.9779	-0.00043	5159.9788	-0.00041	5159.9791	-0.00041	5159.9779	-0.00043
0	120	5159.9834	-0.00032	5159.9859	-0.00027	5159.9841	-0.00031	5159.9822	-0.00034
-10	120	5160.0179	0.00035	5160.0151	0.00029	5160.015	0.00029	5160.0157	0.00030
-20	120	5159.9838	-0.00031	5159.9835	-0.00032	5159.9848	-0.00029	5159.9824	-0.00034
-30	120	5159.9933	-0.00013	5159.9926	-0.00014	5159.9925	-0.00015	5159.9929	-0.00014

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5743MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift	Measured Frequency (MHz)	Frequency Drift
20	138	5159.9852	-0.00029	5159.985	-0.00029	5159.9863	-0.00027	5159.9845	-0.00030
	120	5159.9854	-0.00028	5159.9857	-0.00028	5159.9867	-0.00026	5159.9852	-0.00029
	102	5159.9863	-0.00027	5159.9858	-0.00028	5159.9865	-0.00026	5159.9854	-0.00028



Test Report No.: RF2009WDG0048

4. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



Test Report No.: RF2009WDG0048

5. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---