



FCC Test Report

Report No: FCS202208016W01

Issued for

Applicant:	Shanghai Hansa Intelligent Technology Co., Ltd.
Address:	2355 Jingao Road, Pudong New Area, Shanghai, China
Product Name:	ZigBee switch panel
Brand Name:	HANSA INTELLIGENT
Model Name:	HS-T9Z-AC
Series Model:	HS-T6Z-AC1, HS-T6Z-AC2, HS-T6Z-AC3, HS-T6Z-AC4 HS-T6Z-AC6, HS-T8Z-AC1, HS-T8Z-AC2, HS-T8Z-AC3 HS-T8Z-AC4, HS-T9SZ-AC
FCC ID:	2A8DR-HS-T9Z-AC
Issued By: Flux Compliance Service Laboratory Add: Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan Tel: 769-27280901 Fax:769-27280901 http://www.FCS-lab.com	

TEST RESULT CERTIFICATION

Applicant's Name.....: Shanghai Hansa Intelligent Technology Co., Ltd.

Address.....: 2355 Jingao Road, Pudong New Area, Shanghai, China

Manufacture's Name.....: Shanghai Hansa Intelligent Technology Co., Ltd.

Address.....: 2355 Jingao Road, Pudong New Area, Shanghai, China

Product Description

Product Name.....: ZigBee switch panel

Model Name.....: HANSA INTELLIGENT

Brand Name: HS-T9Z-AC

Series Model.....: HS-T6Z-AC1, HS-T6Z-AC2, HS-T6Z-AC3, HS-T6Z-AC4
HS-T6Z-AC6, HS-T8Z-AC1, HS-T8Z-AC2, HS-T8Z-AC3
HS-T8Z-AC4, HS-T9SZ-AC

Test Standards.....: FCC Part15.247

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

This device described above has been tested by Flux Compliance Service Laboratory, 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 (s) of performance of tests.: August 5, 2022 ~ August 9, 2022

Date of Issue.....: August 10, 2022

Test Result.....: Pass

Tested by : Scott Shen
(Scott Shen)

Reviewed by : Duke Qian
(Duke Qian)

Approved by : Jack Wang
(Jack Wang)



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Revision History

Rev.	Issue Date	Effect Page	Contents
00	August 9, 2022	N/A	Initial Issue

1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:
KDB 558074 D01 15.247 Meas Guidance v05r02

FCC Part 15.247, Subpart C			
Standard Section	Test Item	Judgment	Remark
FCC 15.247 (a) (2)	6dB Bandwidth	PASS	--
FCC 15.247 (b) (3)	Conducted Output Power	PASS	--
FCC 15.247 (e)	Power Spectral Density	PASS	--
FCC 15.247 (d)	Band-edge and Spurious Emissions (Conducted)	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Spurious Emissions	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Band Edge Compliance	PASS	--
FCC 15.207	Power Line Conducted Emission	PASS	--
FCC 15.203	Antenna requirement	PASS	--
15.205	Restricted Band Edge Emission	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

Company Name:	Flux Compliance Service Laboratory
Address:	Room 105 Floor Bao hao Technology Building 1 NO.15 Gong ye West Road Hi-Tech Industrial, Song shan lake Dongguan
Telephone:	+86-769-27280901
Fax:	+86-769-27280901
Laboray Accreditations:	
FCC Test Firm Registration Number:	514908
CNAS Number:	L15566
Designation number:	CN0127
A2LA accreditation number:	5545.01
ISED Number:	25801
CAB ID:	CN0097

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended 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	$\pm 2.988\text{ dB}$
3	Conducted Emission (9KHz-150KHz)	$\pm 4.13\text{ dB}$
4	Conducted Emission (150KHz-30MHz)	$\pm 4.74\text{ dB}$
5	All emissions radiated (9KHz -30MHz)	$\pm 3.1\text{ dB}$
6	All emissions,radiated(<1G) 30MHz-1000MHz	$\pm 5.2\text{ dB}$
7	All emissions,radiated 1GHz -18GHz	$\pm 4.66\text{ dB}$
8	All emissions,radiated 18GHz -40GHz	$\pm 4.31\text{ dB}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	ZigBee switch panel
Trade Name	HANSA INTELLIGENT
Model Name	HS-T9Z-AC
Series Model	HS-T6Z-AC1, HS-T6Z-AC2, HS-T6Z-AC3, HS-T6Z-AC4 HS-T6Z-AC6, HS-T8Z-AC1, HS-T8Z-AC2, HS-T8Z-AC3 HS-T8Z-AC4, HS-T9SZ-AC
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, the materials of decorative accessories is same, For the product appearance difference, the size is the same, but the color of the product is different
Channel List	16 CH
Operation frequency	2405-2480MHz
Modulation:	☒ GFSK
Power supply	AC 90-300V
Battery	N/A
Hardware version number	V1.0
Software version number	V1.0
Number of samples	FCS202208016W01
S/N	N/A
Connecting I/O Port(s)	Please refer to the User's Manual

Note:

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

2.

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
11	2405MHz	15	2425MHz	19	2445MHz	23	2465MHz
12	2410MHz	16	2430MHz	20	2450MHz	24	2470MHz
13	2415MHz	17	2435MHz	21	2455MHz	25	2475MHz
14	2420MHz	18	2440MHz	22	2460MHz	26	2480MHz

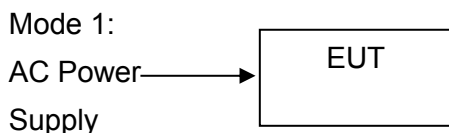
3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	N/A	N/A	PCB Antenna	N/A	1.11 dBi	Antenna

2.2 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.

Block diagram of EUT configuration for test



2.3 Test software: the SecureCRT

The test software was used to control EUT work in continuous TX mode, and select test channel, Wireless mode as below table

Thested mode,channel,and data rate information		
Mode	Chanenl	Frequency (MHZ)
GFSK	CH11	2405
GFSK	CH18	2440
GFSK	CH26	2480

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels.
- (2) Fully-charged battery is used during the test

2.3 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.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

2.4 EQUIPMENTS LIST

Radiation Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESRP 3	FCS-E001	2022. 02.10	2023. 02.09
Signal Analyzer	R&S	FSV40-N	FCS-E012	2022. 02.10	2023. 02.09
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2022. 02.10	2023. 02.09
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2022. 02.10	2023. 02.09
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2022. 02.10	2023. 02.09
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2022. 02.10	2023. 02.09
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2022. 02.10	2023. 02.09
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2022. 02.10	2023. 02.09
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2022. 02.10	2023. 02.09
Temperature & Humidity	HTC-1	victor	FCS-E005	2022. 02.10	2023. 02.09

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2022. 02.10	2023. 02.09
LISN	R&S	ENV216	FCS-E007	2022. 02.10	2023. 02.09
LISN	ETS	3810/2NM	FCS-E009	2022. 02.10	2023. 02.09
Temperature & Humidity	HTC-1	victor	FCS-E008	2022. 02.10	2023. 02.09

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2022. 02.10	2023. 02.09
Spectrum Analyzer	Agilent	E4447A	MY50180039	2022. 02.10	2023. 02.09
Spectrum Analyzer	R&S	FSV-40	101499	2022. 02.10	2023. 02.09
Power Sensor	Agilent	UX2021XA	FCS-E021	2022. 02.10	2023. 02.09

3. 6DB BANDWIDTH

3.1 Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz

3.2 Test Procedure

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows

RBW: 100kHz

VBW: 300kHz

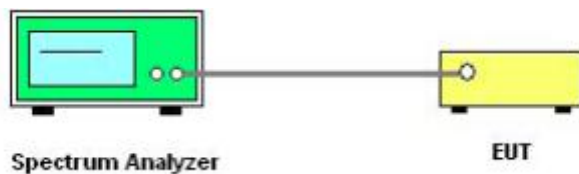
Detector Mode: Peak

Sweep time: auto

Trace mode Max hold

(3) Allow the trace to stabilize, 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 Test setup

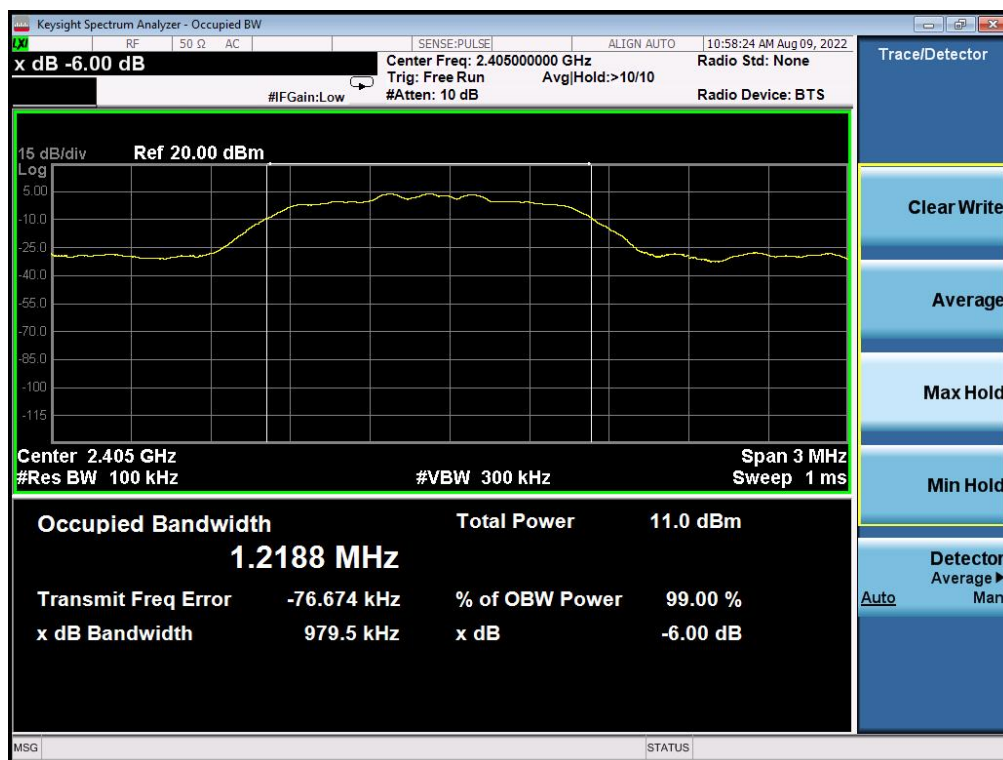


3.4 Test results

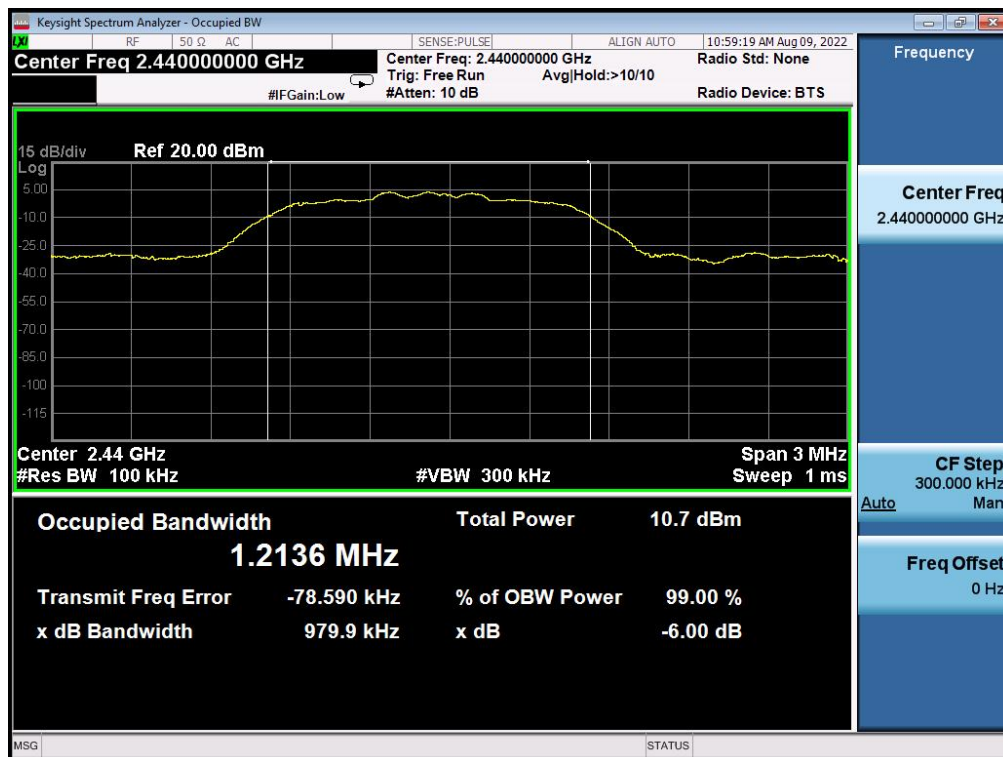
TestMode	Channel (MHz)	6dB Bandwidth (KHz)	Limit [MHz]	Verdict
GFSK	2405MHz	979.5	0.5	Pass
GFSK	2440MHz	979.9	0.5	Pass
GFSK	2480MHz	922.3	0.5	Pass

3.5 Original Test Data

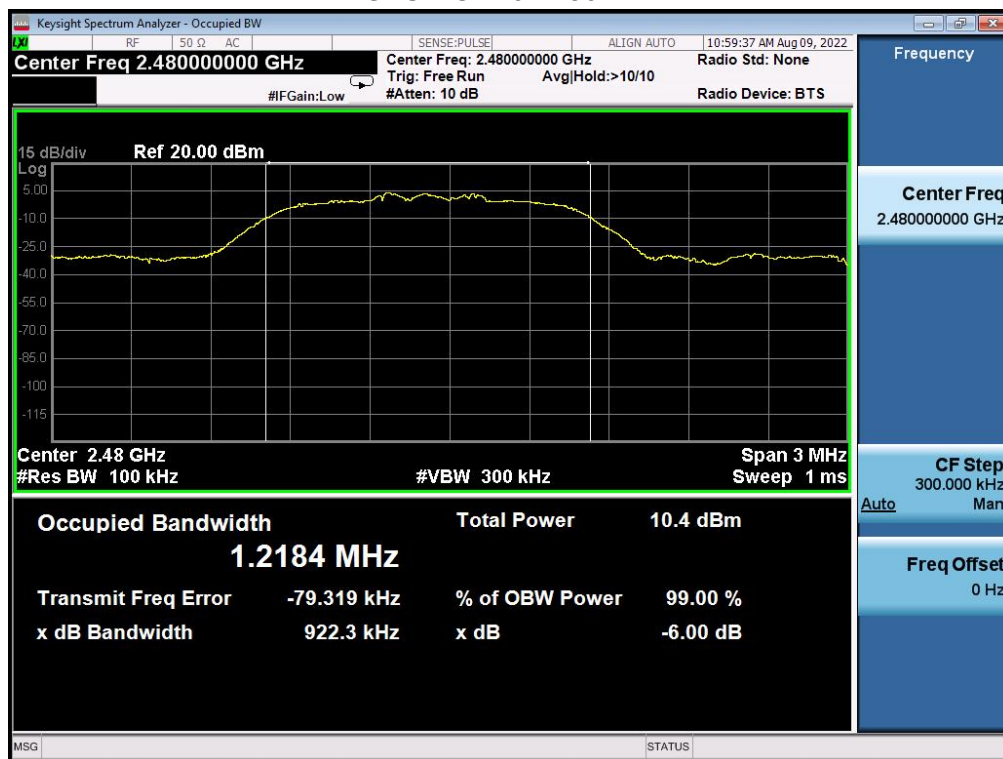
GFSK-CH1 2405MHZ



GFSK-CH18 2440MHZ



GFSK-CH26 2480MHZ



4 CONDUCTED OUTPUT POWER

4.1 limit

For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

4.2 test procedure

- Connect each EUT's antenna output to power sensor by RF cable and attenuator
- Measure the PK output power of each antenna port by power sensor.

4.3 TEST SETUP



4.5 test results

TestMode	Channel (MHz)	Result (dBm)	Limit (dBm)	Verdict
GFSK	2405MHz	5.89	30	Pass
GFSK	2440MHz	5.92	30	Pass
GFSK	2480MHz	5.95	30	Pass

5. POWER SPECTRAL DENSITY

5.1 LIMIT

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3 kHz band during any time interval of continuous transmission.

5.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Set the spectrum analyzer as follows:

Center frequency	DTS Channel center frequency
RBW:	$3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$
VBW:	$\geq 3\text{RBW}$
Span	1.5 times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(3) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude level within the RBW

(4) If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

5.3 TEST SETUP

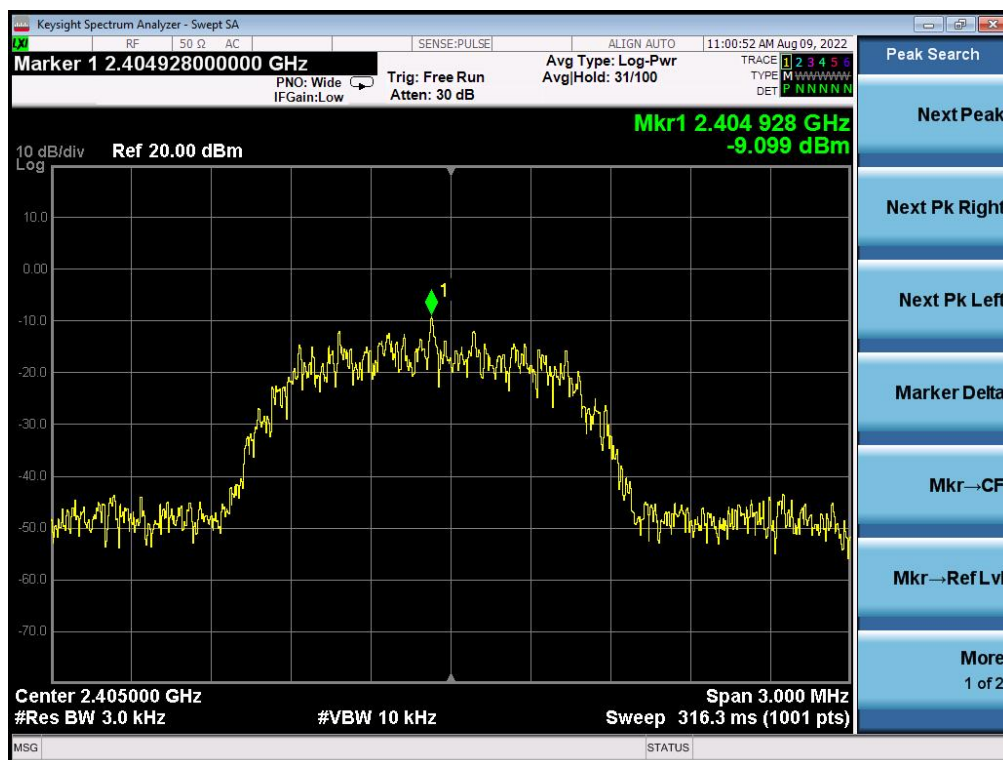


5.4 TEST RESULTS

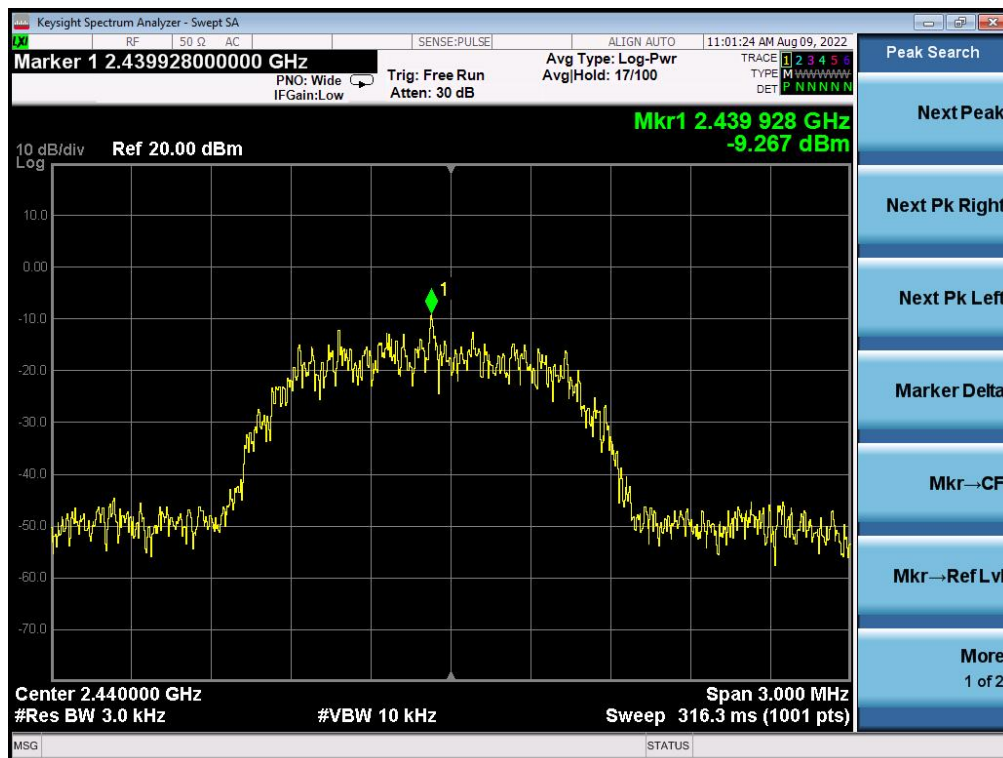
TestMode	Channel (MHz)	Result (dBm/3KHz)	Limit (dBm/3KHz)	Verdict
GFSK	2405MHz	-9.099	8	Pass
GFSK	2440MHz	-9.267	8	Pass
GFSK	2480MHz	-9.339	8	Pass

5.5 original test data

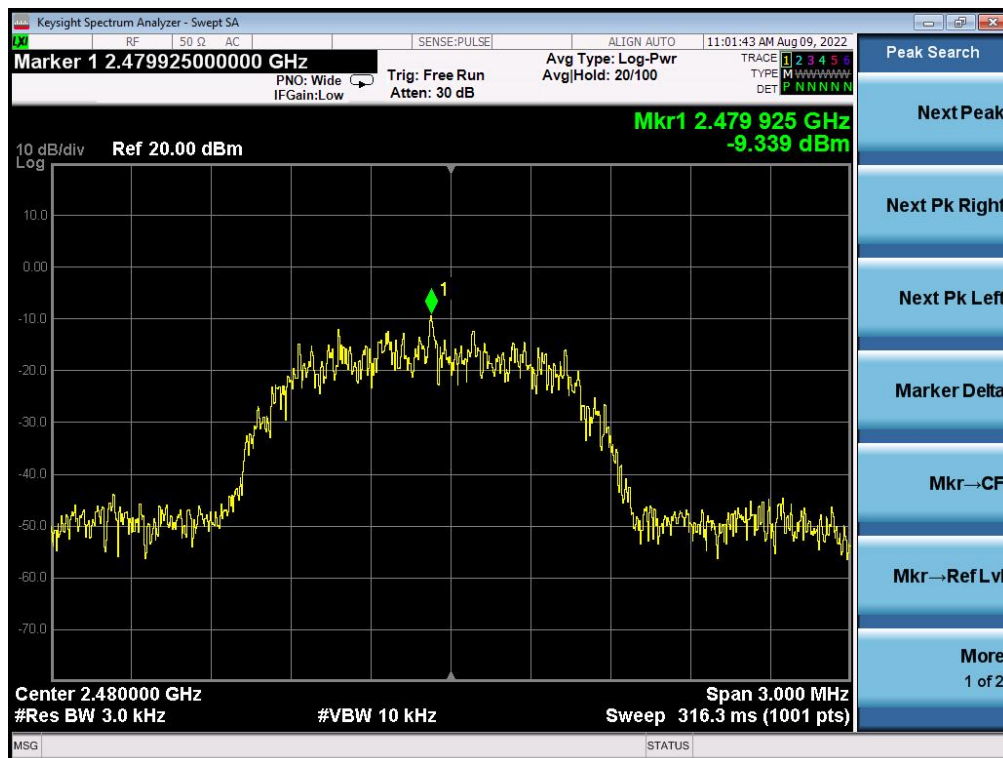
GFSK-2405MHz



GFSK-2440MHz



GFSK-2477MHz



6. Band edge and spurious(conducted)

6.1 LIMIT

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

6.2 TEST PROCEDURE

(1) Connect EUT's antenna output to spectrum analyzer by RF cable.

(2) Establish a reference level by using the following procedure:

Center frequency	DTS Channel center frequency
RBW:	100kHz
VBW:	300kHz
Span	1.5times the DTS bandwidth
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

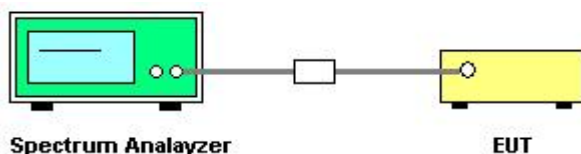
(3) Establish Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(4) Set the spectrum analyzer as follows:

RBW:	100kHz
VBW:	300kHz
Span	Encompass frequency range to be measured
Number of measurement points	$\geq \text{span}/\text{RBW}$
Detector Mode:	Peak
Sweep time:	auto
Trace mode	Max hold

(5) Allow the trace to stabilize, use the peak marker function to determine the maximum amplitude of all unwanted emissions outside of the authorized frequency band

6.3 TEST SETUP

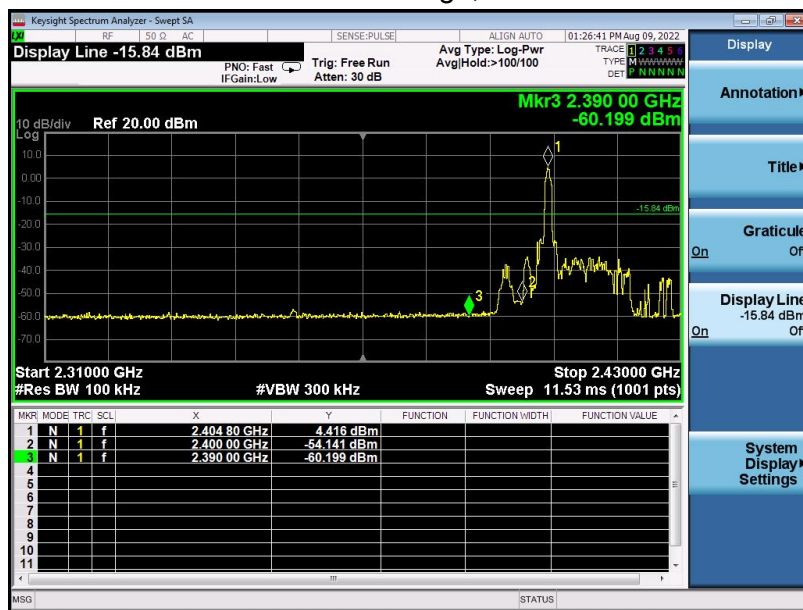


6.5 TEST RESULTS

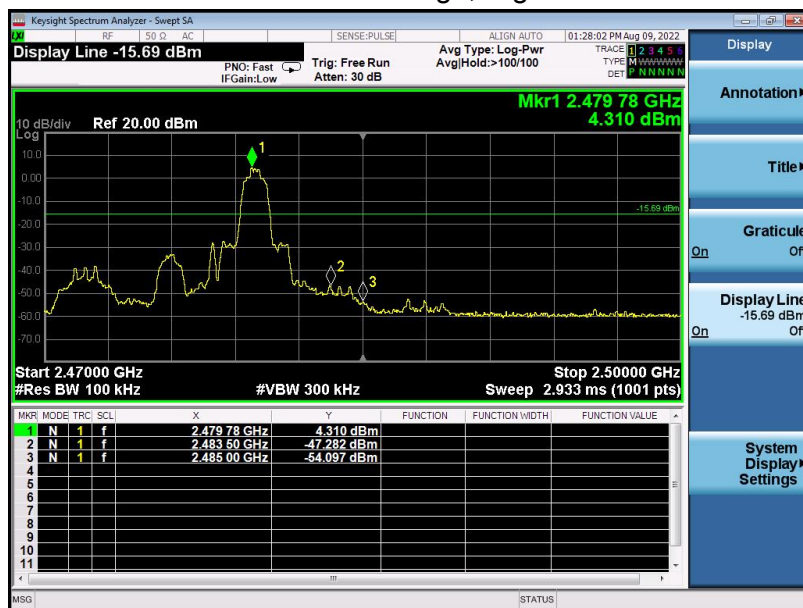
Eut set mode	CH or Frequency	Result
GFSK	CH11	Pass
	CH26	Pass
GFSK	CH11	Pass
	CH18	Pass
	CH26	Pass

6.5 Original test data

GFSK: Band Edge, Low CH

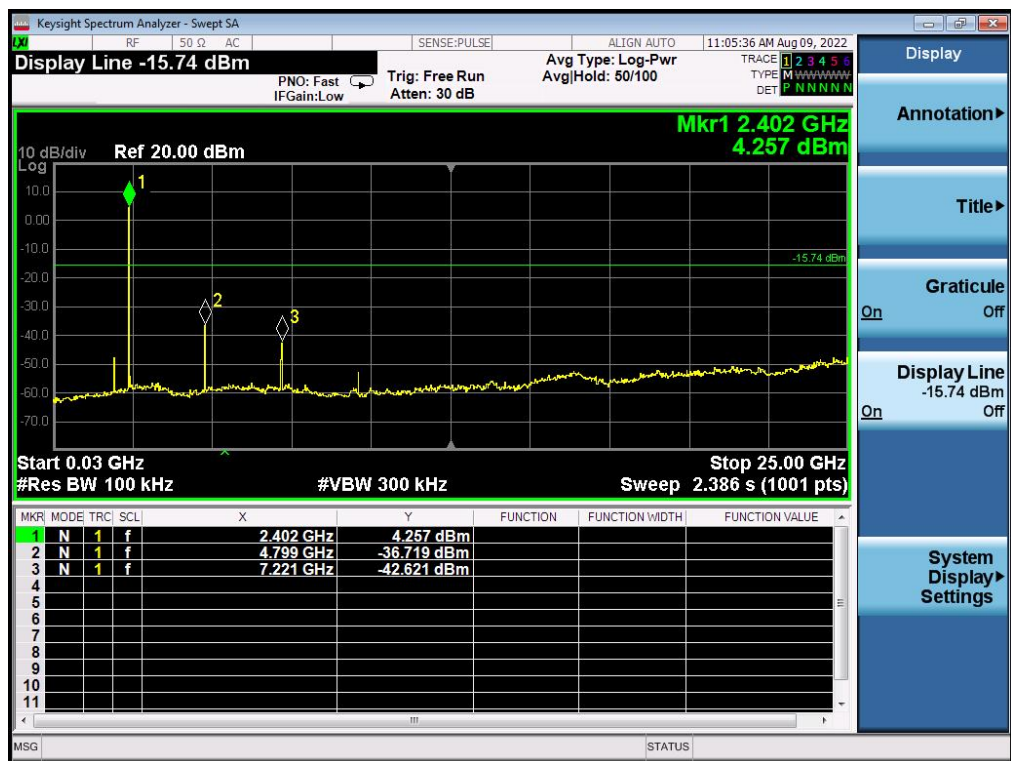


GFSK: Band Edge, High CH

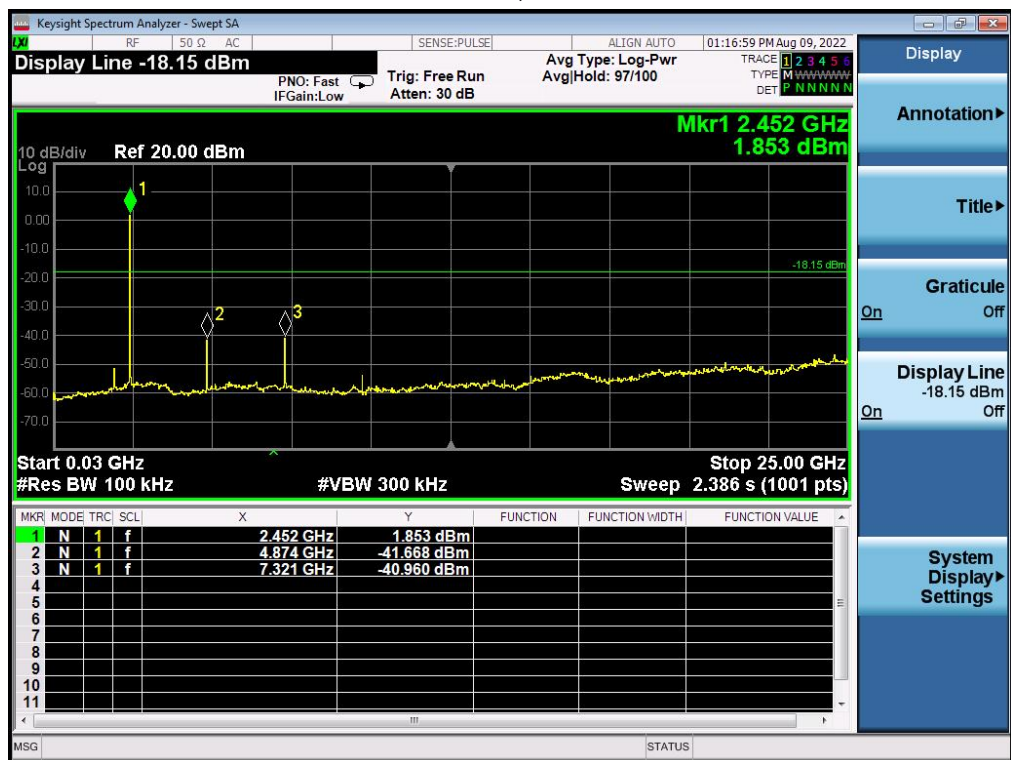


Spurious emissions (GFSK) 30MHz-25GHz

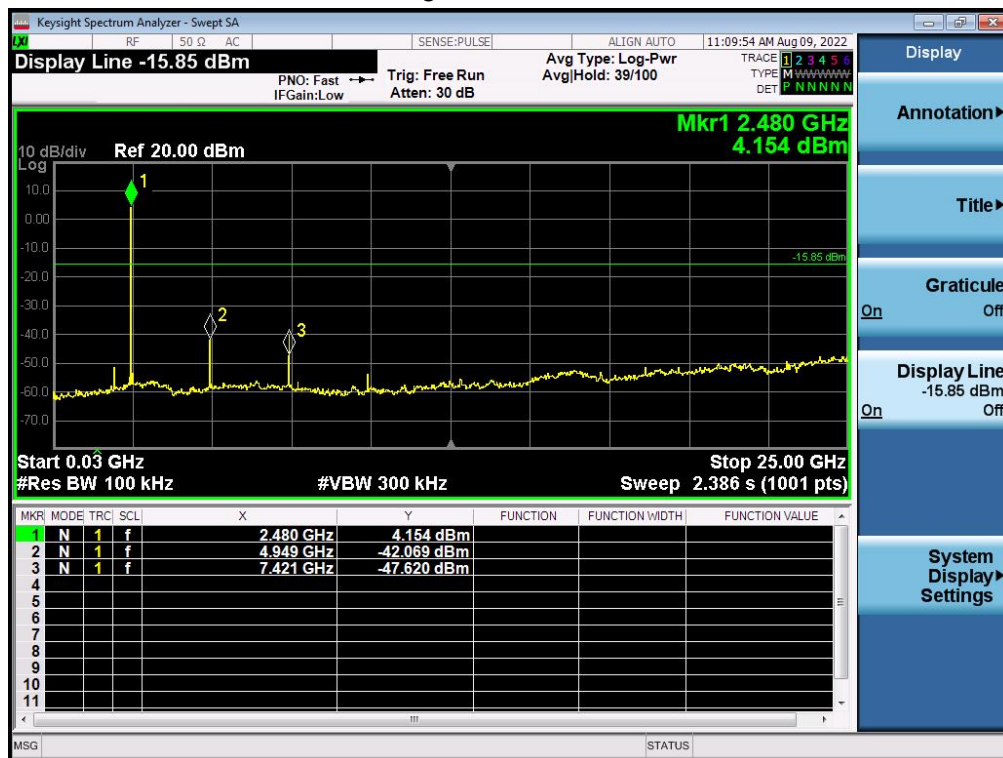
Low CH 2405MHz



Middle CH, 2440MHz



High CH, 2480MHz



7 RADIATED EMISSION MEASUREMENT

7.1 RADIATED EMISSION LIMITS

In any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the Restricted band specified on Part15.205(a)&209(a) limit in the table and according to ANSI C63.10-2013 below has to be followed

LIMITS OF RADIATED EMISSION MEASUREMENT (0.009MHz - 1000MHz)

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
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (1GHz-25 GHz)

FREQUENCY (MHz)	(dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

For Radiated Emission

Spectrum Parameter	Setting
Attenuation	Auto
Detector	Peak/AV
Start Frequency	1000 MHz(Peak/AV)
Stop Frequency	10th carrier hamonic(Peak/AV)
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz /10 Hz

For Band edge

Spectrum Parameter	Setting
Detector	Peak/AV
Start/Stop Frequency	Lower Band Edge: 2310 to 2430 MHz Upper Band Edge: 2470 to 2500 MHz
RB / VB (emission in restricted band)	PK=1MHz / 1MHz, AV=1 MHz / 10 Hz

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

7.2 TEST PROCEDURE

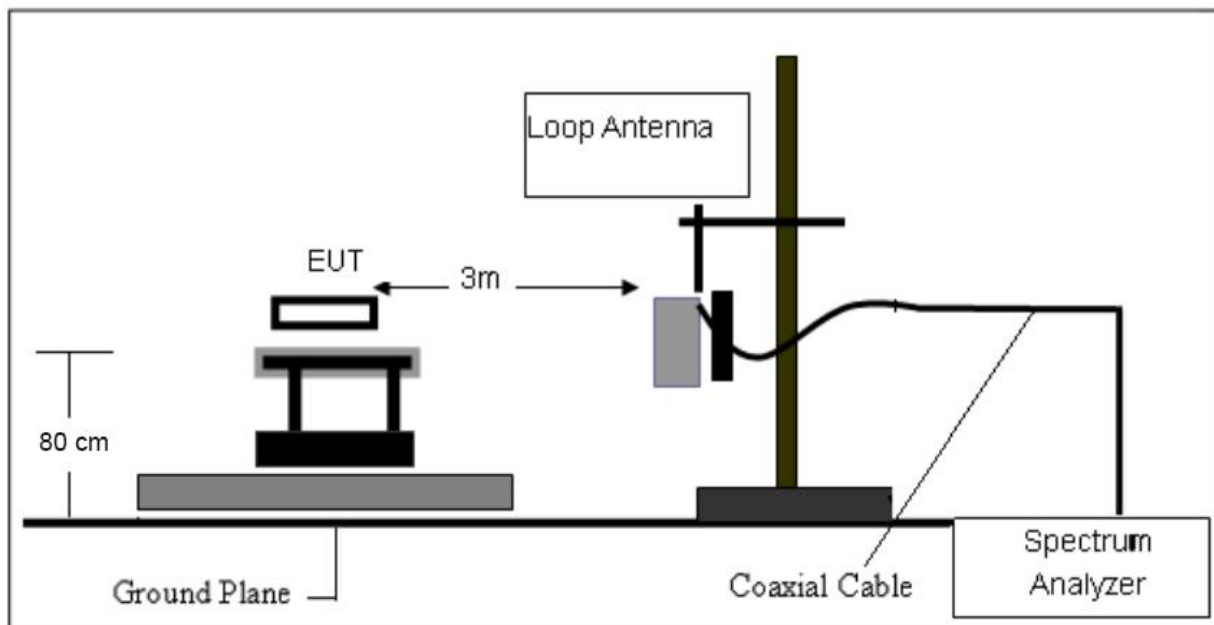
- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment shall be 0.8 m (above 1GHz is 1.5 m); the height of the test antenna shall vary between 1 m to 4 m. horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

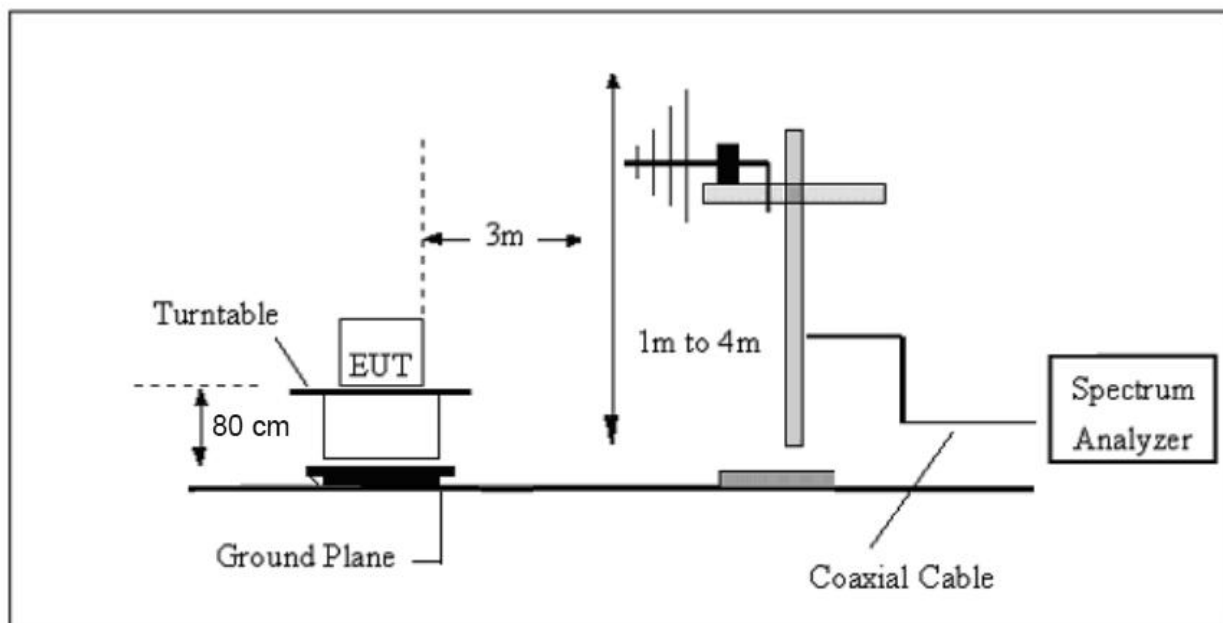
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

7.3 TESTSETUP

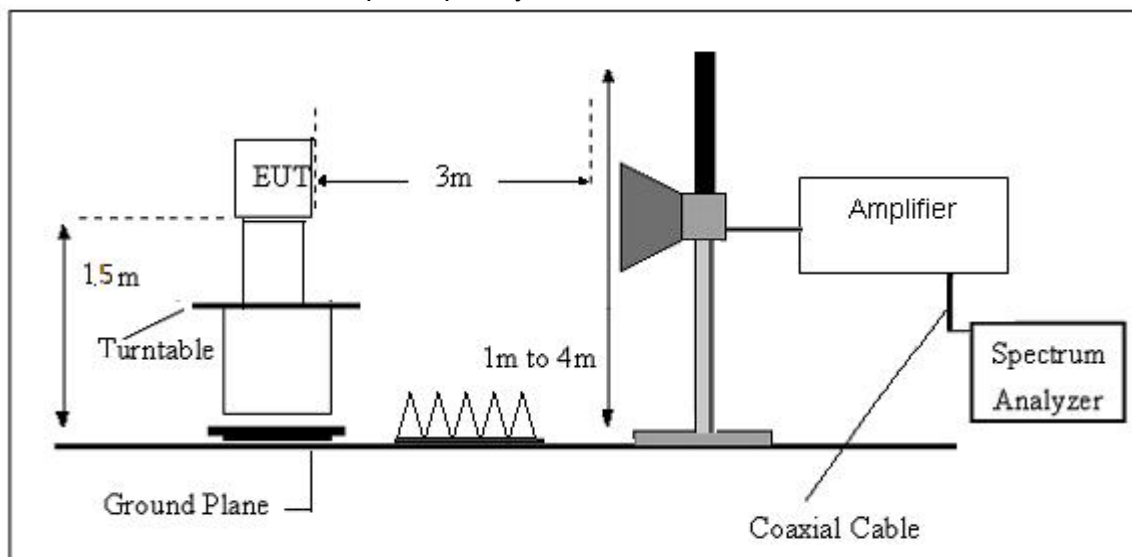
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



7.4. TEST RESULTS

(9KHz-30MHz)

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	AC 110V	Test Mode:	GFSK

Freq.	Reading	Limit	Margin	State	Test Result
(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 = $40 \log (\text{specific distance/test distance})$ (dB);

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

7.5 (30MHZ-1000MHZ)

Temperature:	24.7°C	Relative Humidity:	61%
Test Voltage:	AC 110V	Phase:	Horizontal
Test Mode:	GFSK(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.0250	48.62	-16.62	32.00	40.00	-8.00	QP
2	74.1350	55.72	-21.16	34.56	40.00	-5.44	QP
3	148.4410	59.26	-20.05	39.21	43.50	-4.29	QP
4	222.9501	56.89	-15.39	41.50	46.00	-4.50	QP
5	520.8881	51.07	-9.70	41.37	46.00	-4.63	QP
6	962.1622	45.16	-2.37	42.79	54.00	-11.21	QP

Note: 1. Margin = Result (Result =Reading + Factor)-Limit

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Temperature:	22.7°C	Relative Humidity:	61%
Test Voltage:	AC 110V	Phase:	Vertical
Test Mode:	GFSK(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	37.0250	51.48	-16.62	34.86	40.00	-5.14	QP
2	74.1350	55.94	-21.16	34.78	40.00	-5.22	QP
3	111.3468	56.23	-17.29	38.94	43.50	-4.56	QP
4	297.2241	55.47	-13.81	41.66	46.00	-4.34	QP
5	520.8881	51.86	-9.74	42.12	46.00	-3.88	QP
6	962.1621	43.99	-2.37	41.62	54.00	-12.38	QP

Note: 1. Margin = Result (Result = Reading + Factor)-Limit

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

7.6 (ABOVE 1GHZ) RESTRICTED BAND AND SPURIOUS EMISSION REQUIREMENTS

Low channel Peak

Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4810.00	35.94	31.78	8.60	32.09	44.23	74.00	-29.77	Vertical
7215.00	30.93	36.15	11.65	32.00	46.73	74.00	-27.27	Vertical
9620.00	30.66	37.95	14.14	31.62	51.13	74.00	-22.87	Vertical
12025.25	*					74.00		Vertical
14430.00	*					74.00		Vertical
4810.00	39.95	31.78	8.60	32.09	48.24	74.00	-25.76	Horizontal
7215.00	32.56	36.15	11.65	32.00	48.36	74.00	-25.64	Horizontal
9620.00	29.96	37.95	14.14	31.62	50.43	74.00	-23.57	Horizontal
12025.25	*					74.00		Horizontal
14430.00	*					74.00		Horizontal

Low channel IAv

Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4810.00	25.01	31.78	8.60	32.09	33.30	54.00	-20.70	Vertical
7215.00	19.77	36.15	11.65	32.00	35.57	54.00	-18.43	Vertical
9620.00	18.93	37.95	14.14	31.62	39.40	54.00	-14.60	Vertical
12025.25	*					54.00		Vertical
14430.00	*					54.00		Vertical
4810.00	29.09	31.78	8.60	32.09	37.38	54.00	-16.62	Horizontal
7215.00	21.85	36.15	11.65	32.00	37.65	54.00	-16.35	Horizontal
9620.00	18.55	37.95	14.14	31.62	39.02	54.00	-14.98	Horizontal
12025.25	*					54.00		Horizontal
14430.00	*					54.00		Horizontal

Middle Peak

Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.00	36.04	31.85	8.67	32.12	44.44	74.00	-29.56	Vertical
7320.00	30.99	36.37	11.72	31.89	47.19	74.00	-26.81	Vertical
9760.00	30.72	38.35	14.25	31.62	51.70	74.00	-22.30	Vertical
12200.00	*					74.00		Vertical
14640.00	*					74.00		Vertical
4880.00	40.07	31.85	8.67	32.12	48.47	74.00	-25.53	Horizontal
7320.00	32.63	36.37	11.72	31.89	48.83	74.00	-25.17	Horizontal
9760.00	30.02	38.35	14.25	31.62	51.00	74.00	-23.00	Horizontal
12200.00	*					74.00		Horizontal
14640.00	*					74.00		Horizontal

Middle Av

Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4880.00	25.10	31.85	8.67	32.12	33.50	54.00	-20.50	Vertical
7320.00	19.82	36.37	11.72	31.89	36.02	54.00	-17.98	Vertical
9760.00	18.98	38.35	14.25	31.62	39.96	54.00	-14.04	Vertical
12200.00	*					54.00		Vertical
14640.00	*					54.00		Vertical
4880.00	29.19	31.85	8.67	32.12	37.59	54.00	-16.41	Horizontal
7320.00	21.91	36.37	11.72	31.89	38.11	54.00	-15.89	Horizontal
9760.00	18.61	38.35	14.25	31.62	39.59	54.00	-14.41	Horizontal
12200.00	*					54.00		Horizontal
14640.00	*					54.00		Horizontal

High Peak

Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.00	25.02	31.93	8.73	32.16	33.52	54.00	-20.48	Vertical
7440.00	19.77	36.59	11.79	31.78	36.37	54.00	-17.63	Vertical
9920.00	18.93	38.81	14.38	31.88	40.24	54.00	-13.76	Vertical
12400.00	*					54.00		Vertical
14880.00	*					54.00		Vertical
4960.00	29.10	31.93	8.73	32.16	37.60	54.00	-16.40	Horizontal
7440.00	21.85	36.59	11.79	31.78	38.45	54.00	-15.55	Horizontal
9920.00	18.55	38.81	14.38	31.88	39.86	54.00	-14.14	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

High Av

Frequency (MHz)	Reading (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
4960.00	35.89	31.93	8.73	32.16	44.39	74.00	-29.61	Vertical
7440.00	30.89	36.59	11.79	31.78	47.49	74.00	-26.51	Vertical
9920.00	30.64	38.81	14.38	31.88	51.95	74.00	-22.05	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	39.89	31.93	8.73	32.16	48.39	74.00	-25.61	Horizontal
7440.00	32.53	36.59	11.79	31.78	49.13	74.00	-24.87	Horizontal
9920.00	29.92	38.81	14.38	31.88	51.23	74.00	-22.77	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					74.00		Horizontal

Remark:

1. Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*” means the test results were attenuated more than 20dB below the permissible limits, so the results don't record in the report.

7.7 TEST RESULT

Low CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	40.57	27.59	5.38	30.18	43.36	74.00	-30.64	Horizontal
2400.00	54.23	27.58	5.39	30.18	57.02	74.00	-16.98	Horizontal
2390.00	40.30	27.59	5.38	30.18	43.09	74.00	-30.91	Vertical
2400.00	53.41	27.58	5.39	30.18	56.20	74.00	-17.80	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2390.00	32.30	27.59	5.38	30.18	35.09	54.00	-18.91	Horizontal
2400.00	39.47	27.58	5.39	30.18	42.26	54.00	-11.74	Horizontal
2390.00	32.13	27.59	5.38	30.18	34.92	54.00	-19.08	Vertical
2400.00	41.41	27.58	5.39	30.18	44.20	54.00	-9.80	Vertical

High CH

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	43.75	27.53	5.47	29.93	46.82	74.00	-27.18	Horizontal
2500.00	44.93	27.55	5.49	29.93	48.04	74.00	-25.96	Horizontal
2483.50	43.52	27.53	5.47	29.93	46.59	74.00	-27.41	Vertical
2500.00	42.16	27.55	5.49	29.93	45.27	74.00	-28.73	Vertical

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
2483.50	33.59	27.53	5.47	29.93	36.66	54.00	-17.34	Horizontal
2500.00	32.81	27.55	5.49	29.93	35.92	54.00	-18.08	Horizontal
2483.50	34.03	27.53	5.47	29.93	37.10	54.00	-16.90	Vertical
2500.00	34.97	27.55	5.49	29.93	38.08	54.00	-15.92	Vertical

Remark:

1. *Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor*

8. CONDUCTED EMISSION TEST

8.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 207(a) limit in the table below has to be followed.

FREQUENCY (MHz)	Conducted Emissionlimit (dBuV)	
	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.

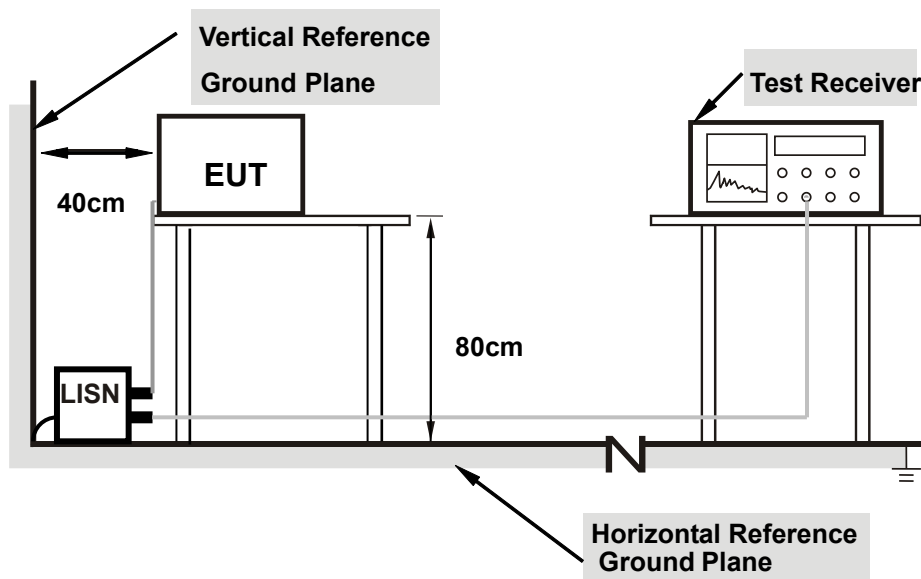
The following table is the setting of the receiver

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

8.1.2 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.

8.1.3 TEST SETUP

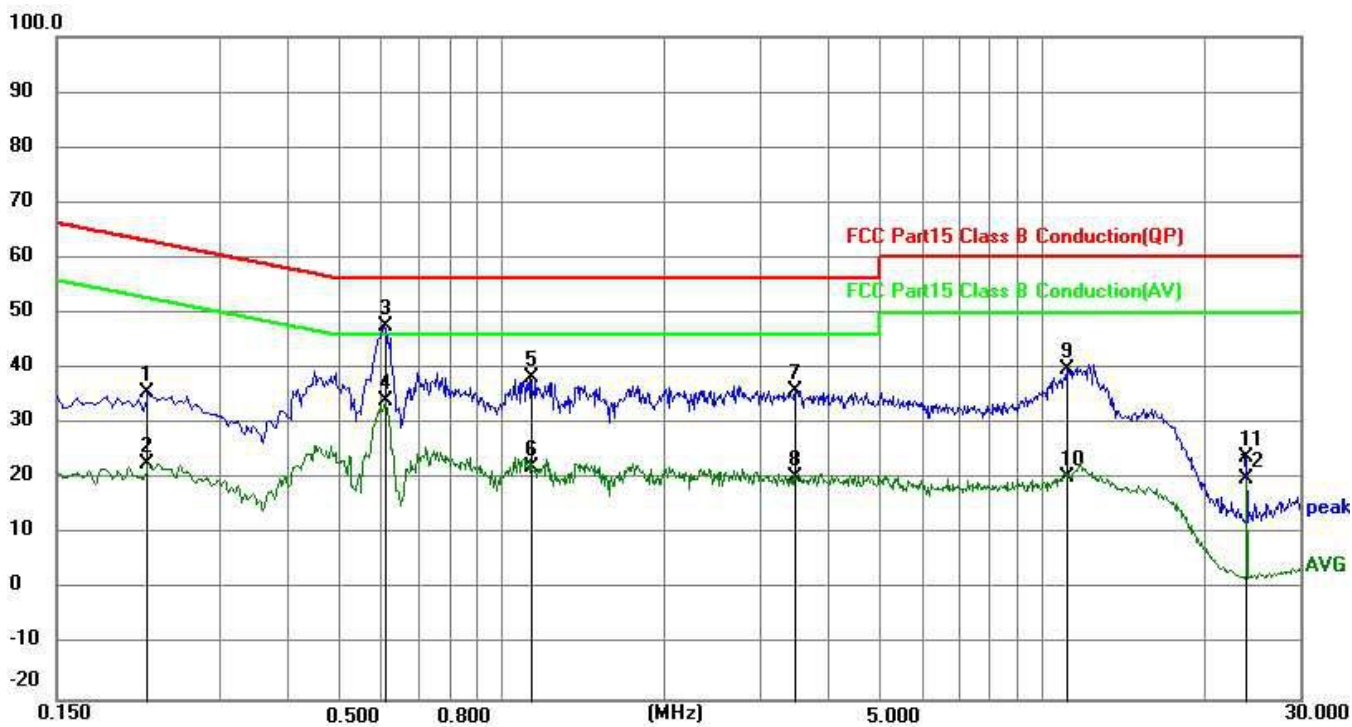


Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

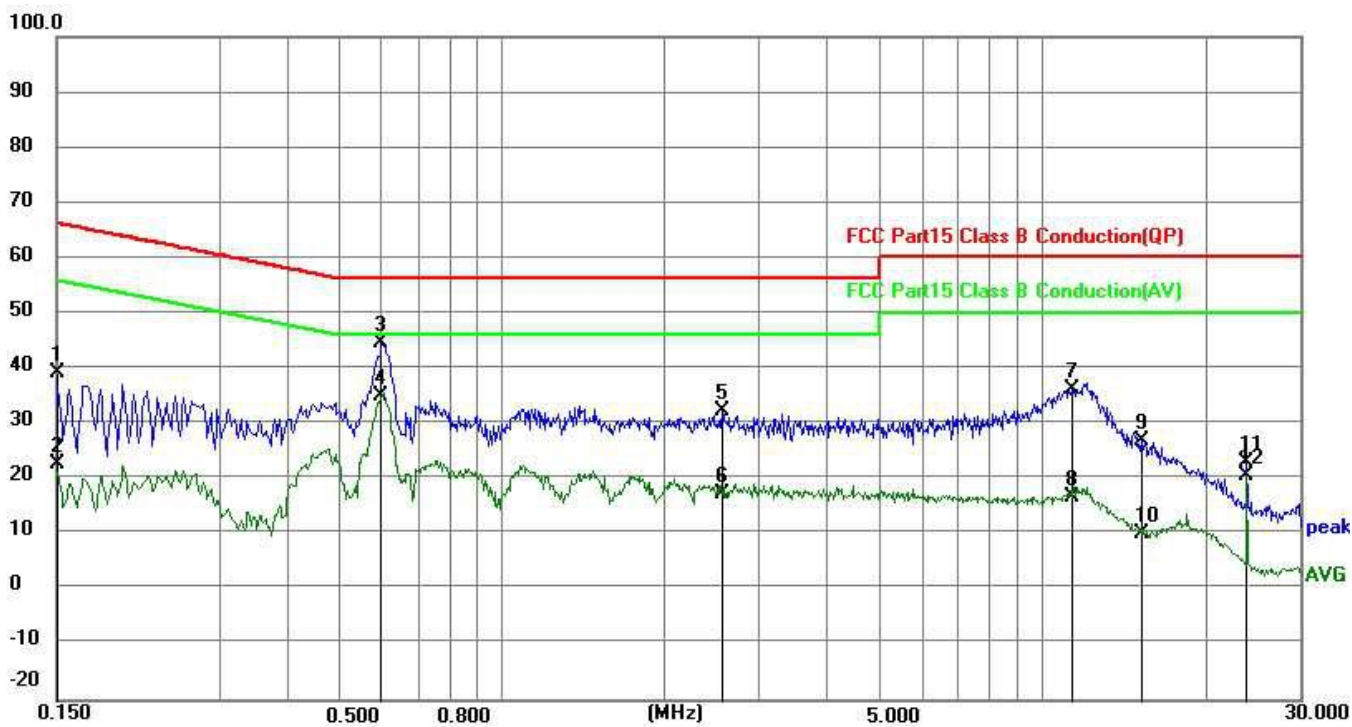
8.1.4 TEST RESULT

Temperature:	22.1 °C	Relative Humidity:	56%
Test Voltage:	AC 110V	Phase:	L
Test Mode:	GFSK(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1500	29.72	9.52	39.24	66.00	26.76	QP
2	0.1500	13.09	9.52	22.61	56.00	33.39	AVG
3	0.6000	35.17	9.56	44.73	56.00	11.27	QP
4	0.6000	25.40	9.56	34.96	46.00	11.04	AVG
5	2.5620	22.69	9.58	32.27	56.00	23.73	QP
6	2.5620	7.78	9.58	17.36	46.00	28.64	AVG
7	11.3415	26.58	9.65	36.23	60.00	23.77	QP
8	11.3415	7.11	9.65	16.76	50.00	33.24	AVG
9	15.2880	17.35	9.71	27.06	60.00	32.94	QP
10	15.2880	0.44	9.71	10.15	50.00	39.85	AVG
11	24.0000	13.29	9.77	23.06	60.00	36.94	QP
12	24.0000	10.76	9.77	20.53	50.00	29.47	AVG

Temperature:	22.1 °C	Relative Humidity:	56%
Test Voltage:	AC 110V	Phase:	N
Test Mode:	GFSK(worst)		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.2220	26.06	9.53	35.59	62.74	27.15	QP
2	0.2220	13.20	9.53	22.73	52.74	30.01	AVG
3	0.6045	38.23	9.56	47.79	56.00	8.21	QP
4	0.6045	24.66	9.56	34.22	46.00	11.78	AVG
5	1.1310	28.81	9.57	38.38	56.00	17.62	QP
6	1.1310	12.48	9.57	22.05	46.00	23.95	AVG
7	3.4935	26.37	9.61	35.98	56.00	20.02	QP
8	3.4935	10.74	9.61	20.35	46.00	25.65	AVG
9	11.0985	30.14	9.81	39.95	60.00	20.05	QP
10	11.0985	10.63	9.81	20.44	50.00	29.56	AVG
11	24.0000	14.02	9.84	23.86	60.00	36.14	QP
12	24.0000	10.21	9.84	20.05	50.00	29.95	AVG

9. ANTENNA REQUIREMENT

9.1 STANDARD REQUIREMENT

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

9.2 RESULT

The antennas used for this product are PCB Antenna and other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is 1.11dBi.

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