



FCC Test Report

Report No: FCS202112081W01

Issued for

Applicant:	Guangzhou Longyu Intelligent Electronic Technology Co., LTD
Address:	Room 201, No. 3 furong Hebin West Road, Shiling Town, Huadu District, Guangzhou city
Product Name:	Smart Bluetooth Glasses
Brand Name:	N/A
Model Name:	SKY-B
Series Model:	SKY-A,SKY-C
FCC ID:	2A36V-SKYB
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.....: Guangzhou Longyu Intelligent Electronic Technology Co., LTD

Address.....: Room 201, No. 3 furong Hebin West Road, Shiling Town, Huadu District, Guangzhou city

Manufacture's Name.....: Guangzhou Longyu Intelligent Electronic Technology Co., LTD

Address.....: Room 201, No. 3 furong Hebin West Road, Shiling Town, Huadu District, Guangzhou city

Product Description

Product Name.....: Smart Bluetooth Glasses

Model Name.....: SKY-B

Series Model.....: SKY-A,SKY-C

Test Standards.....: FCC Rules and Regulations Part 15 Subpart C, Section 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.: 20 Dec. 2021 ~ 25 Dec. 2021

Date of Issue.....: 25 Dec. 2021

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	25 Dec. 2021	N/A	N/A

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) (1)	20dB Bandwidth	PASS	--
FCC 15.247 (b) (3)	Conducted Output Power	PASS	--
15.247(a)(1)	Carrier Frequencies Separation	PASS	--
FCC 15.247 (d) FCC 15.209 FCC 15.205	Radiated Band Edge Compliance	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	--
15.205	Restricted Band Edge Emission	PASS	--
FCC 15.207	Power Line Conducted Emission	PASS	--
15.247(a)(1)	Dwell time	PASS	--
FCC 15.203	Antenna requirement	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
FCC Test Firm Registration Number: 514908 Designation number: CN0127 A2LA accreditation number: 5545.01	

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	± 0.71 dB
2	Unwanted Emissions, conducted	± 2.988 dB
3	Conducted Emission (9KHz-150KHz)	± 4.13 dB
4	Conducted Emission (150KHz-30MHz)	± 4.74 dB
5	All emissions, radiated (<1G) 30MHz-1000MHz	± 5.2 dB
6	All emissions, radiated 1GHz -18GHz	± 4.66 dB
7	All emissions, radiated 18GHz -40GHz	± 4.31 dB

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF THE EUT

Product Name	Smart Bluetooth Glasses
Trade Name	N/A
Model Name	SKY-B
Series Model	SKY-A,SKY-C
Model Difference	The above product with same circuit, PCB layout, electrical parts, materials and wiring structures, Appearance shape, the materials of decorative accessories is same, only different color,
Channel List	Please refer to the Note 2.
Operation frequency	2402MHz-2480MHz
Modulation:	GFSK
Transmitter rate:	1Mbps
Power supply	DC 5V
Battery	DC 3.7V/90mAh
Hardware version number	V1.0
Software version number	V1.0
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. Channel List

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz
20	2421MHz	40	2441MHz	60	2461MHz		

3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)	NOTE
1	NA	FGCX	Chip Antenna	N/A	1.0	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



Test software: the FCC tool

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

No.	Test model descrtion
1	Low channel GFSK
2	Middle channel GFSK
3	High channel GFSK

Note:

- (1) According exploratory test, EUT will have maximum output power in those data rate, so those data rate were used for all test,
- (2) During the test, the dutycycle>98%, the test voltage was tuned from 85% to 115% of the Nominal rate supply votage, and found that the worst case was the nominal rated supply condition, So the report just shows that condition's data

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
1	Adapter	N/A	JHD-AP036E-120300AA-A	N/A	This phone is for testing only in report.

Support units

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

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	2021.05.26	2022.05.25
Signal Analyzer	R&S	FSV40-N	FCS-E012	2021.05.26	2022.05.25
Active loop Antenna	ZHINAN	ZN30900C	FCS-E013	2021.07.08	2022.07.07
Bilog Antenna	SCHWARZBECK	VULB 9168	FCS-E002	2021.08.26	2022.08.25
Horn Antenna	SCHWARZBECK	BBHA 9120D	FCS-E003	2021.08.26	2022.08.25
SHF-EHF Horn Antenna (18G-40GHz)	A-INFO	LB-180400-KF	FCS-E018	2021.05.26	2022.05.25
Pre-Amplifier(0.1M-3G Hz)	EMCI	EM330N	FCS-E004	2021.05.26	2022.05.25
Pre-Amplifier (1G-18GHz)	N/A	TSAMP-0518SE	FCS-E014	2021.05.26	2022.05.25
Pre-Amplifier (18G-40GHz)	TERA-MW	TRLA-0400	FCS-E019	2021.07.08	2022.07.07
Temperature & Humidity	HTC-1	victor	FCS-E005	2021.08.26	2022.08.25

Conduction Test equipment

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
EMI Test Receiver	R&S	ESPI	FCS-E020	2021.05.26	2022.05.25
LISN	R&S	ENV216	FCS-E007	2021.07.08	2022.07.07
LISN	ETS	3810/2NM	FCS-E009	2021.05.26	2022.05.25
Temperature & Humidity	HTC-1	victor	FCS-E008	2021.07.08	2022.07.07

RF Connected Test

Kind of Equipment	Manufacturer	Type No.	Company No.	Last calibration	Calibrated until
MXA SIGNAL Analyzer	Keysight	N9020A	FCS-E015	2021.05.26	2022.05.25
Spectrum Analyzer	Agilent	E4447A	MY50180039	2021.07.08	2022.07.07
Spectrum Analyzer	R&S	FSV-40	101499	2021.08.26	2022.08.25
Power Sensor	Agilent	UX2021XA	FCS-E021	2021.05.26	2022.05.25

3. 20DB BANDWIDTH

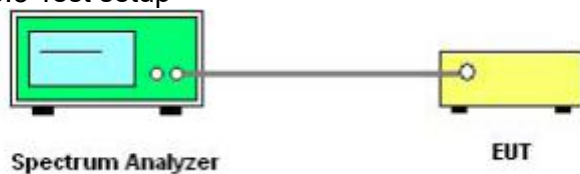
3.1 Limit

FCC Part15 (15.247) , Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247a(1)	20dB bandwidth	N/A	2400-2483.5

3.2 Test Procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
Bandwidth: RBW=30 kHz, VBW=100 kHz, detector= Peak

3.3 Test setup



3.4 Test results

TestMode	Channel (MHz)	20dB Bandwidth (MHz)	Limit [MHz]	Verdict
Lowest	2402MHz	0.9412	0.5	Pass
Middle	2440MHz	0.9421	0.5	Pass
Highest	2480MHz	0.9359	0.5	Pass

3.5 Original Test Data

Lowest



Middle



Highest



4 CONDUCTED OUTPUT POWER

4.1 limit

FCC Part15 Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(b)(1)	Peak output power	Power<1W(30dBm)	2400-2483.5

4.2 test procedure

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
 RBW=1MHz, VBW=3MHz, Detector=Peak (If 20dB BW ≤1 MHz)
 RBW=3MHz, VBW=8MHz, Detector=Peak (If 20dB BW > 1 MHz)
- (3) The EUT was set to continuously transmitting in the max power during the test.

4.3 TEST SETUP



Spectrum Analyzer

4.5 test results

TestMode	Channel (MHz)	Result (dBm)	Limit (dBm)	Verdict
Lowest	2402MHz	-0.546	30	Pass
Middle	2441MHz	-1.178	30	Pass
Highest	2480MHz	-1.789	30	Pass

4.6 original test data

Lowest



Middle



Highest



5. CARRIER FREQUENCY SEPARATION

5.1 LIMIT

FCC Part 5 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(1)	Channel Separation	>25kHz or >two-thirds of the 20 dB bandwidth (Which is greater)	2400-2483.5

5.2 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting:
RBW=30 kHz, VBW=100 kHz, detector= Peak, Sweep Time =auto.
- (3) The EUT was set to the Hopping Mode for Channel Separation Test and continuously transmitting for the Test.

5.3 TEST SETUP



MODE	CHANNEL	FREQUENCY (MHZ)	TEST RESULT (KHZ)	LIMIT (KHZ)		RESULT
GFSK	LOW	2402	1002	941.2	20dB	PASS
	MIDDLE	2441	1002	942.1	20dB	PASS
	HIGH	2480	1004	935.9	20dB	PASS

Lowest



Middle



Highest



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:	AVG
Sweep time:	auto
Trace mode	Max hold

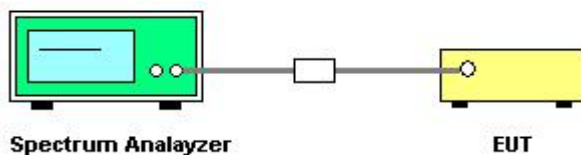
(3) Establish Allow the trace to stabilize, use the peak marker function to determine the maximum peak power level to establish the reference level.

(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:	AVG
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

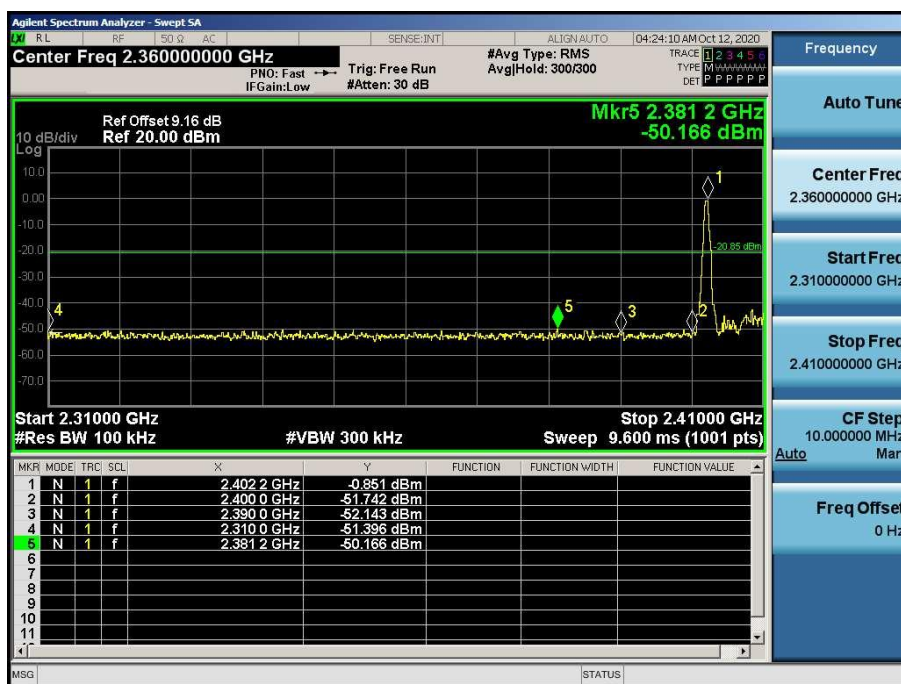


6.5 TEST RESULTS

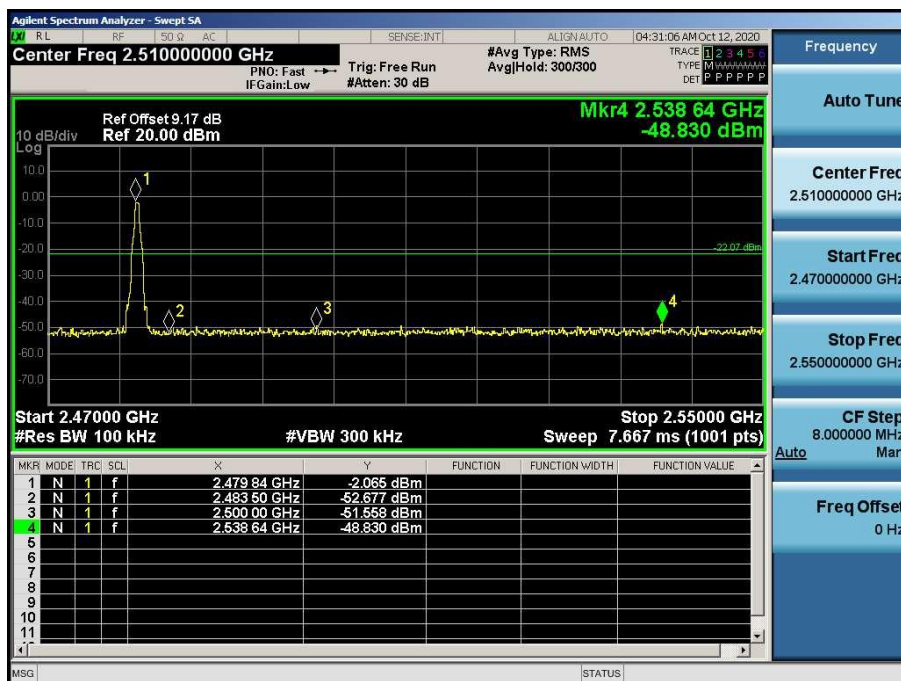
Eut set mode	CH or Frequency	Result
GFSK	CH1	Pass
	CH79	Pass

6.5 Original test data

CH 1 2402MHz

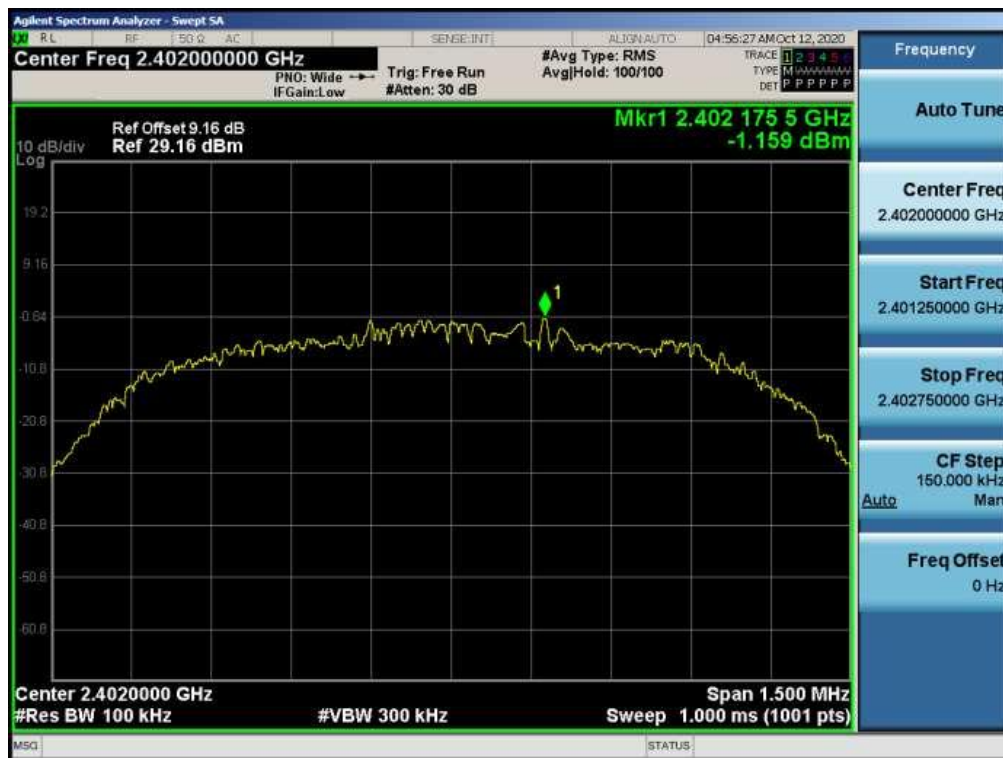


CH 79 2480MHz

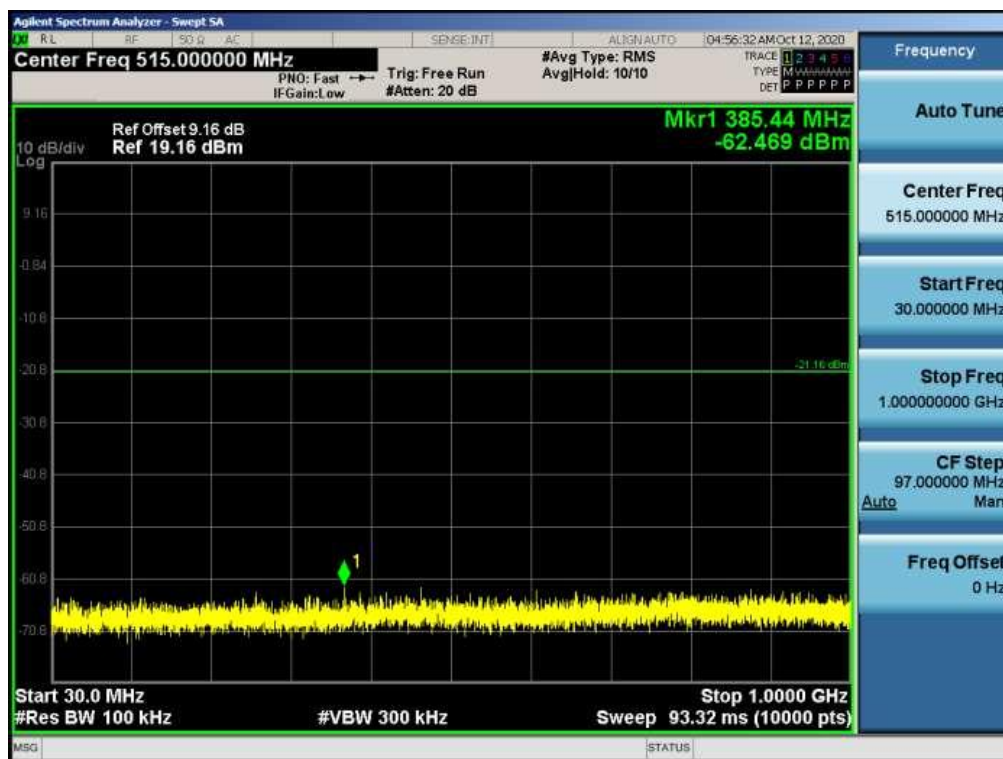


Spurious emissions

Low CH, 2402MHZ



30MHZ-1GHZ



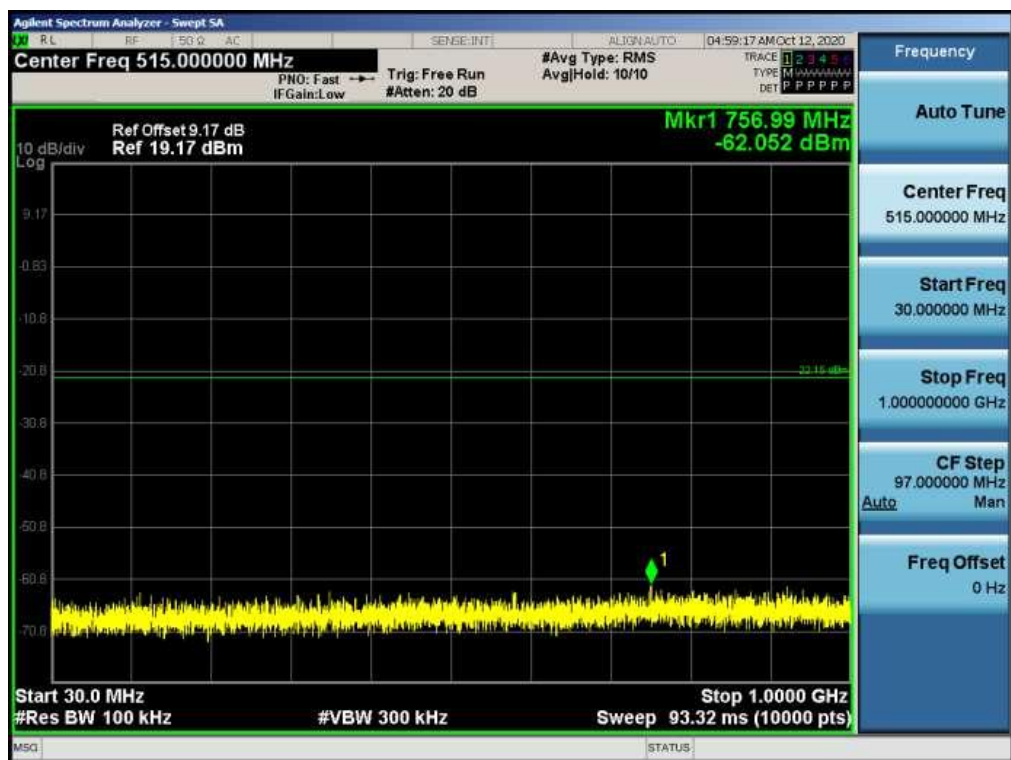
1GHZ-26.5GHZ



Middle CH, 2441MHz



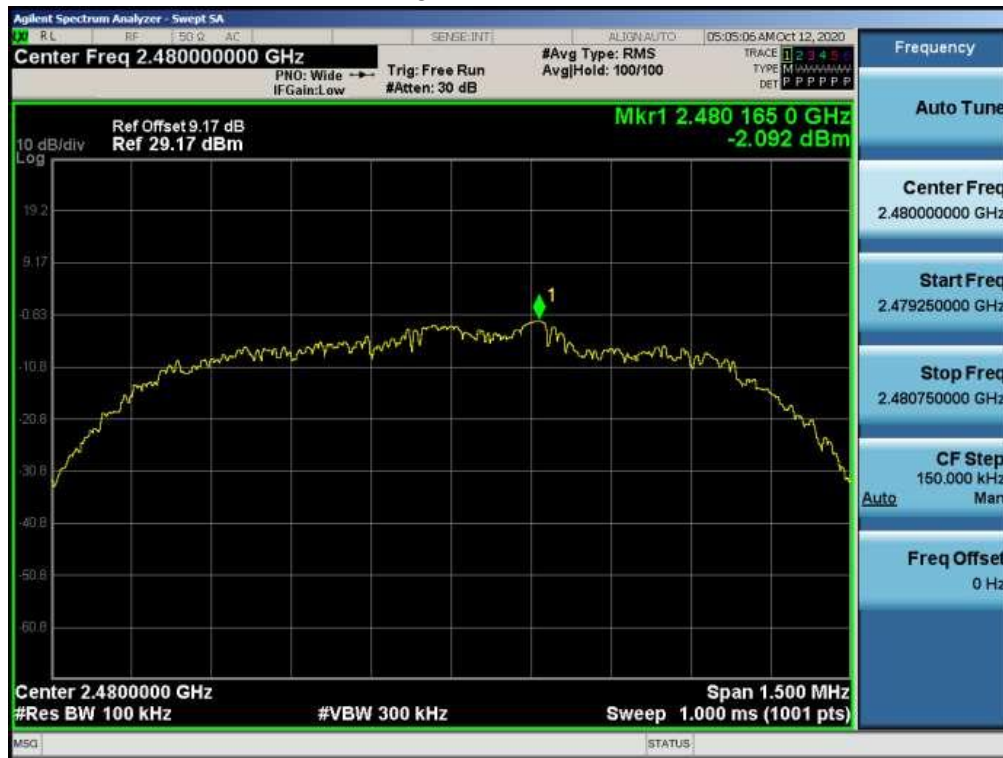
30MHZ-1GHZ



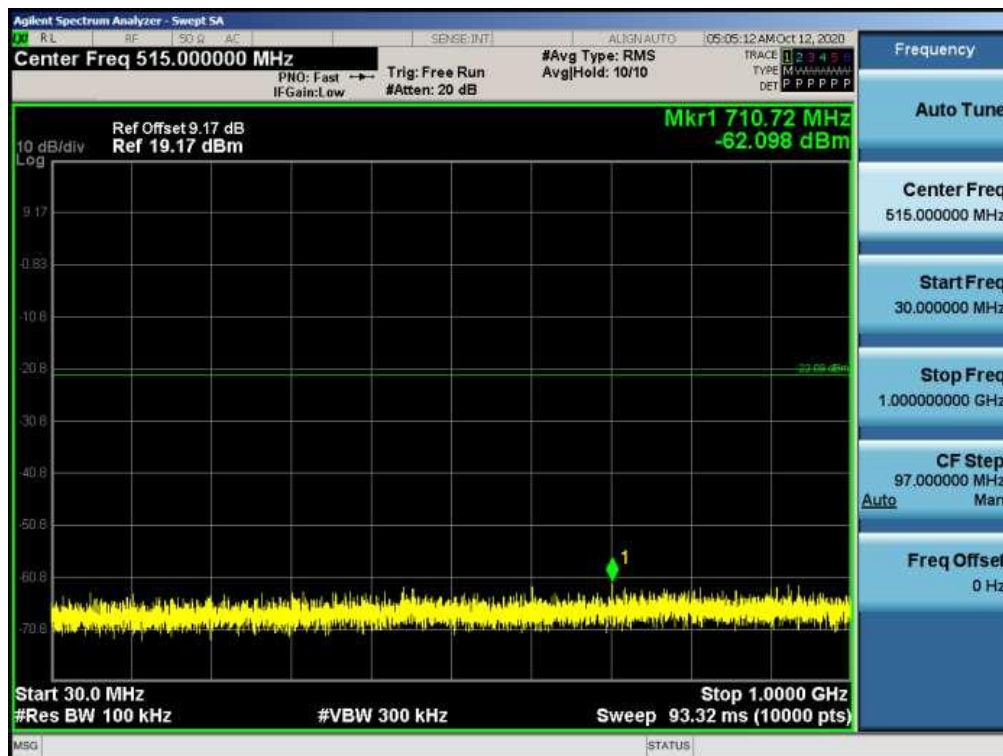
1GHZ-26.5GHZ



High CH, 2480MHz



30MHZ-1GHZ



1GHZ-26.5GHZ



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: 2300 to 2403 MHz Upper Band Edge: 2479 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

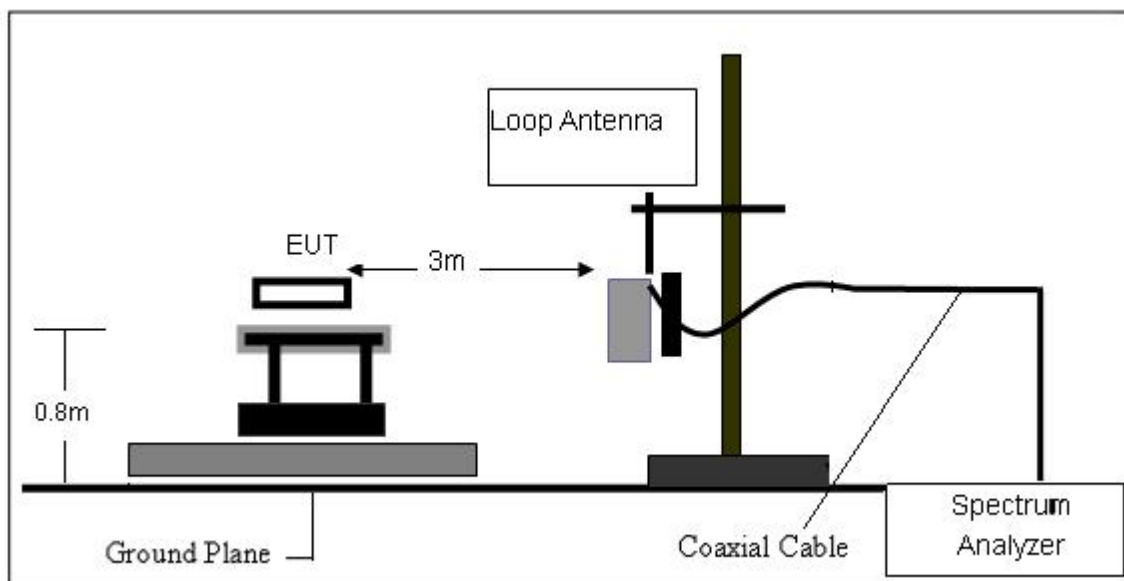
- The measuring distance of at 3 m shall be used for measurements at frequency 0.009MHz up to 1GHz, and above 1GHz.
- The EUT was placed on the top of a rotating table 0.8 meters (above 1GHz is 1.5 m) above the ground at a 3 meter anechoic chamber test site. The table was rotated 360 degrees to determine 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:

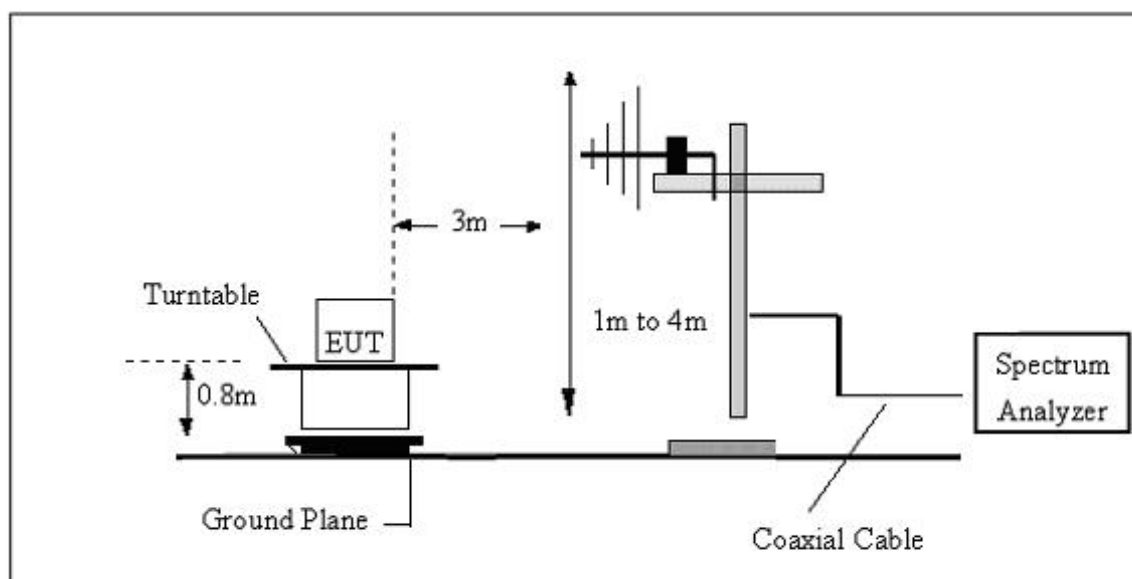
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

7.3 TESTSETUP

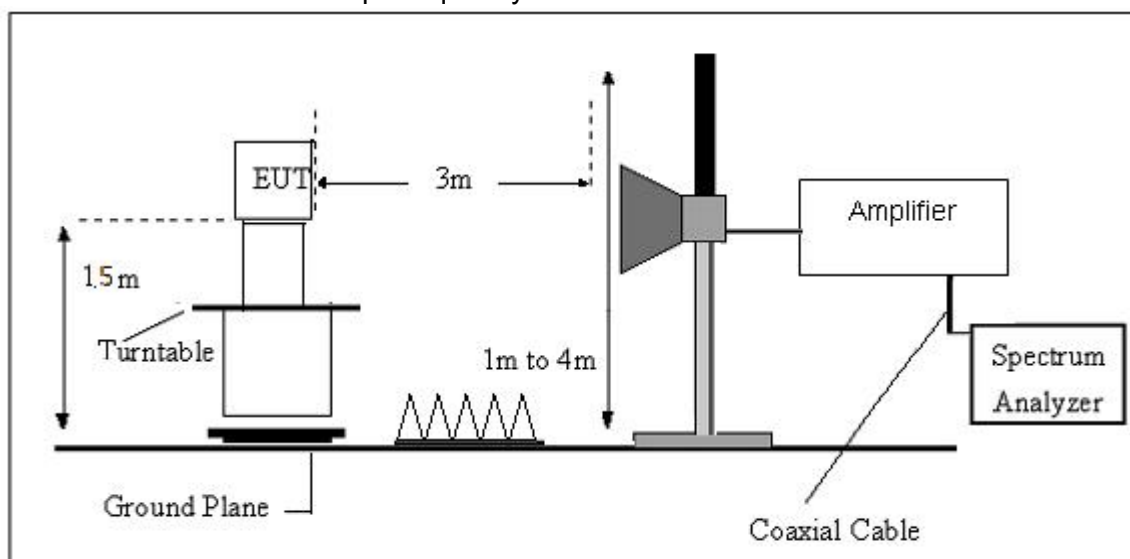
(A) Radiated Emission Test-Up Frequency Below 30MHz



(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:	DC 3.7V	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.

(30MHz-1000MHz)

Temperature:	24.7°C	Relative Humidity:	61%
Test Voltage:	DC 3.7V	Phase:	Horizontal
Test Mode:	GFSK		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	40.5591	32.11	-17.01	15.10	40.00	-24.90	QP
2	71.3300	39.64	-20.64	19.00	40.00	-21.00	QP
3	110.9570	32.65	-17.84	14.81	43.50	-28.69	QP
4	254.7281	44.52	-17.58	26.94	46.00	-19.06	QP
5	435.5898	54.31	-14.44	39.87	46.00	-6.13	QP
6	599.3211	35.18	-11.36	23.82	46.00	-22.18	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:	DC 3.7V	Phase:	Vertical
Test Mode:	GFSK		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/ m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	41.2764	65.42	-40.24	25.18	40.00	-14.82	QP
2	51.3004	69.52	-40.24	29.28	40.00	-10.72	QP
3	71.5806	64.62	-40.24	24.38	40.00	-15.62	QP
4	171.9944	62.83	-40.24	22.59	43.50	-20.91	QP
5	249.4250	67.43	-40.24	27.19	46.00	-18.81	QP
6	449.5557	80.76	-40.24	40.52	46.00	-5.48	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.

(1GHz~25GHz) Restricted band and Spurious emission Requirements

Lowest

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
4804.00	36.21	31.78	8.6	32.09	44.5	74.00	-29.5	Vertical
7206.00	31.24	36.15	11.65	32	47.04	74.00	-26.96	Vertical
9608.00	31.22	37.95	14.14	31.62	51.69	74.00	-22.31	Vertical
12010.00	*							Vertical
14412.00	*							Vertical
4804.00	39.67	31.78	8.6	32.09	47.96	74.00	-26.04	Horizontal
7206.00	33.01	36.15	11.65	32	48.81	74.00	-25.19	Horizontal
9608.00	29.54	37.95	14.14	31.62	50.01	74.00	-23.99	Horizontal
12010.00	*					74.00		Horizontal
14412.00	*					74.00		Horizontal

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
4804.00	25.12	31.78	8.6	32.09	33.41	54.00	-20.59	Vertical
7206.00	20.06	36.15	11.65	32	35.86	54.00	-18.14	Vertical
9608.00	19.23	37.95	14.14	31.62	39.7	54.00	-14.30	Vertical
12010.00	*					54.00		Vertical
14412.00	*					54.00		Vertical
4804.00	29.01	31.78	8.6	32.09	37.3	54.00	-16.70	Horizontal
7206.00	22.23	36.15	11.65	32	38.03	54.00	-15.97	Horizontal
9608.00	18.15	37.95	14.14	31.62	38.62	54.00	-15.38	Horizontal
12010.00	*					54.00		Horizontal
14412.00	*					54.00		Horizontal

Middle

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.00	39.06	31.85	8.67	32.12	47.46	74.00	-26.54	Vertical
7323.00	32.99	36.37	11.72	31.89	49.19	74.00	-24.81	Vertical
9764.00	32.50	38.35	14.25	31.62	53.48	74.00	-20.52	Vertical
12205.00	*					74.00		Vertical
14646.00	*					74.00		Vertical
4882.00	43.70	31.85	8.67	32.12	52.10	74.00	-21.90	Horizontal
7323.00	34.90	36.37	11.72	31.89	51.10	74.00	-22.90	Horizontal
9764.00	32.09	38.35	14.25	31.62	53.07	74.00	-20.93	Horizontal
12205.00	*					74.00		Horizontal
14646.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4882.00	27.56	31.85	8.67	32.12	35.96	54.00	-18.04	Vertical
7323.00	21.49	36.37	11.72	31.89	37.69	54.00	-16.31	Vertical
9764.00	20.46	38.35	14.25	31.62	41.44	54.00	-12.56	Vertical
12205.00	*					54.00		Vertical
14646.00	*					54.00		Vertical
4882.00	31.98	31.85	8.67	32.12	40.38	54.00	-13.62	Horizontal
7323.00	23.78	36.37	11.72	31.89	39.98	54.00	-14.02	Horizontal
9764.00	20.34	38.35	14.25	31.62	41.32	54.00	-12.68	Horizontal
12205.00	*					54.00		Horizontal
14646.00	*					54.00		Horizontal

Highest

Peak value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	35.86	31.93	8.73	32.16	44.36	74.00	-29.64	Vertical
7440.00	31.05	36.59	11.79	31.78	47.65	74.00	-26.35	Vertical
9920.00	31.26	38.81	14.38	31.88	52.57	74.00	-21.43	Vertical
12400.00	*					74.00		Vertical
14880.00	*					74.00		Vertical
4960.00	39.54	31.93	8.73	32.16	48.04	74.00	-25.96	Horizontal
7440.00	32.99	36.59	11.79	31.78	49.59	74.00	-24.41	Horizontal
9920.00	29.62	38.81	14.38	31.88	50.93	74.00	-23.07	Horizontal
12400.00	*					74.00		Horizontal
14880.00	*					74.00		Horizontal

Average value:

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
4960.00	25.16	31.93	8.73	32.16	33.66	54.00	-20.34	Vertical
7440.00	20.03	36.59	11.79	31.78	36.63	54.00	-17.37	Vertical
9920.00	19.65	38.81	14.38	31.88	40.96	54.00	-13.04	Vertical
12400.00						54.00		Vertical
14880.00						54.00		Vertical
4960.00	29.02	31.93	8.73	32.16	37.52	54.00	-16.48	Horizontal
7440.00	22.45	36.59	11.79	31.78	39.05	54.00	-14.95	Horizontal
9920.00	18.35	38.81	14.38	31.88	39.66	54.00	-14.34	Horizontal
12400.00	*					54.00		Horizontal
14880.00	*					54.00		Horizontal

Remarks:

1. Final Level = Receiver Read level + Antenna Factor + Cable Loss – Preamplifier Factor
2. “*”, means this data is the too weak instrument of signal is unable to test.
3. The emission levels of other frequencies are very lower than the limit and not show in test report.

Radiated Band Edge data

Remark: All restriction band have been tested, and only the worst case is shown in report

Low CH (GFSK)

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	39.19	27.59	5.38	30.18	41.98	74.00	-32.02	Horizontal
2400.00	55.45	27.58	5.39	30.18	58.24	74.00	-15.76	Horizontal
2390.00	39.38	27.59	5.38	30.18	42.17	74.00	-31.83	Vertical
2400.00	57.09	27.58	5.39	30.18	59.88	74.00	-14.12	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	30.57	27.59	5.38	30.18	33.36	54.00	-20.64	Horizontal
2400.00	41.59	27.58	5.39	30.18	44.38	54.00	-9.62	Horizontal
2390.00	30.25	27.59	5.38	30.18	33.04	54.00	-20.96	Vertical
2400.00	42.89	27.58	5.39	30.18	45.68	54.00	-8.32	Vertical

High CH(GFSK)

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	46.43	27.53	5.47	24.80	54.63	74.00	-19.37	Horizontal
2500.00	45.73	27.55	5.49	24.86	53.91	74.00	-20.09	Horizontal
2483.50	47.43	27.53	5.47	24.80	55.63	74.00	-18.37	Vertical
2500.00	46.89	27.55	5.49	24.86	55.07	74.00	-18.93	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	35.58	27.53	5.47	24.80	43.78	54.00	-10.22	Horizontal
2500.00	35.59	27.55	5.49	24.86	43.77	54.00	-10.23	Horizontal
2483.50	36.31	27.53	5.47	24.80	44.51	54.00	-9.49	Vertical
2500.00	35.41	27.55	5.49	24.86	43.59	54.00	-10.41	Vertical

Remarks:

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

8 CONDUCTED EMISSION TEST

8.1. 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.

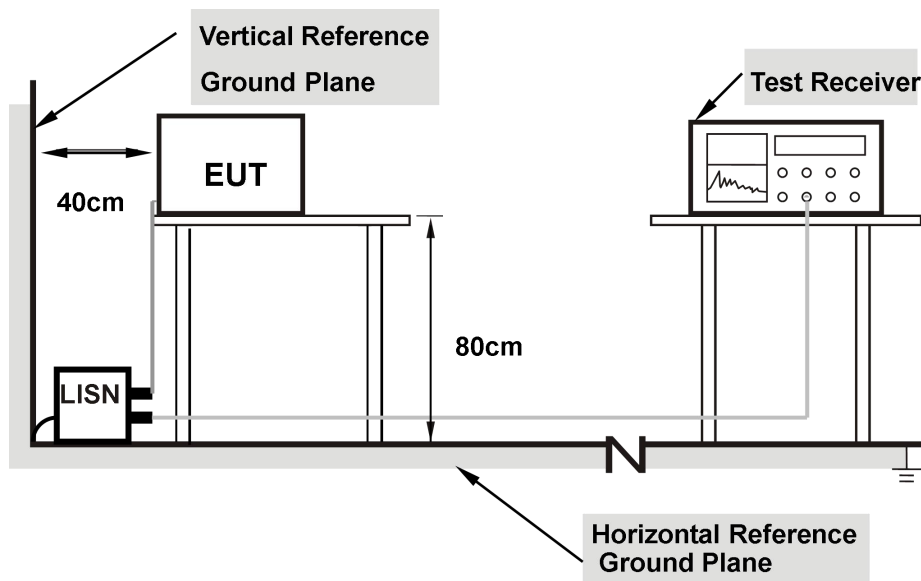
The following table is the setting of the receiver

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

8.2 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.

8.3 TEST SETUP

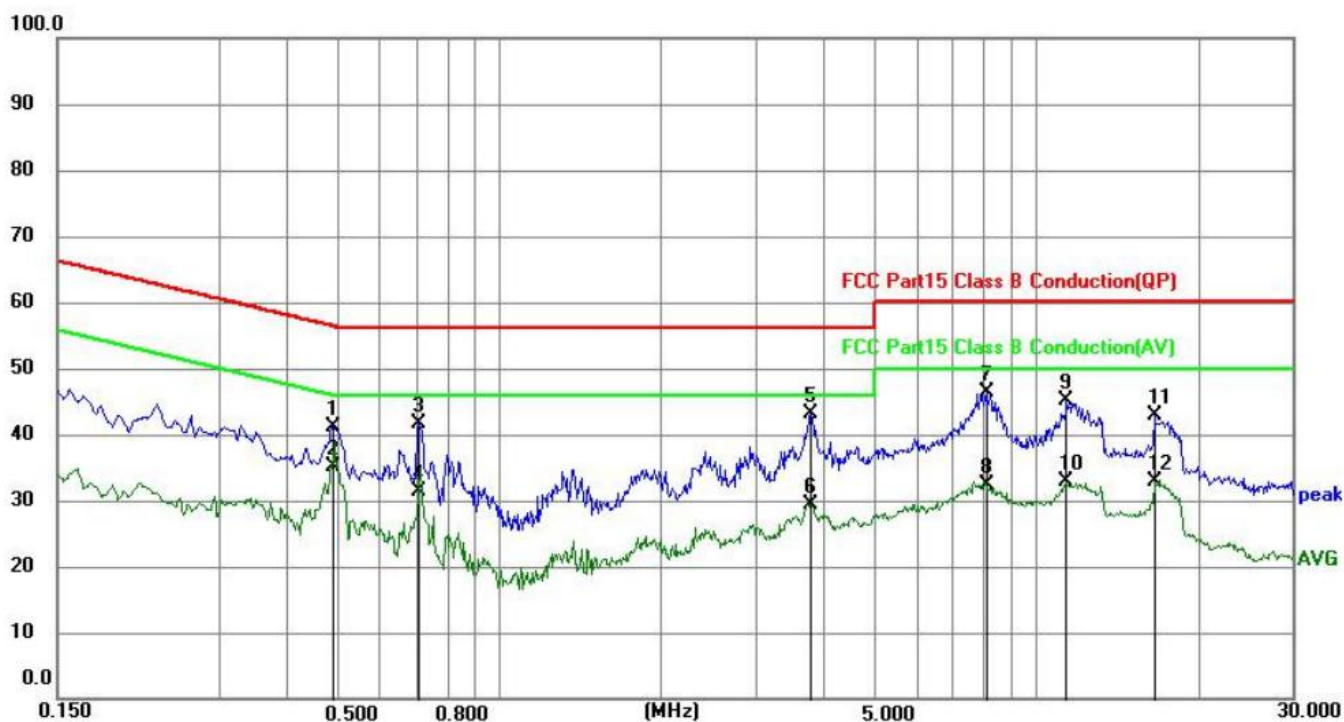


Note: 1.Support units were connected to second LISN.

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

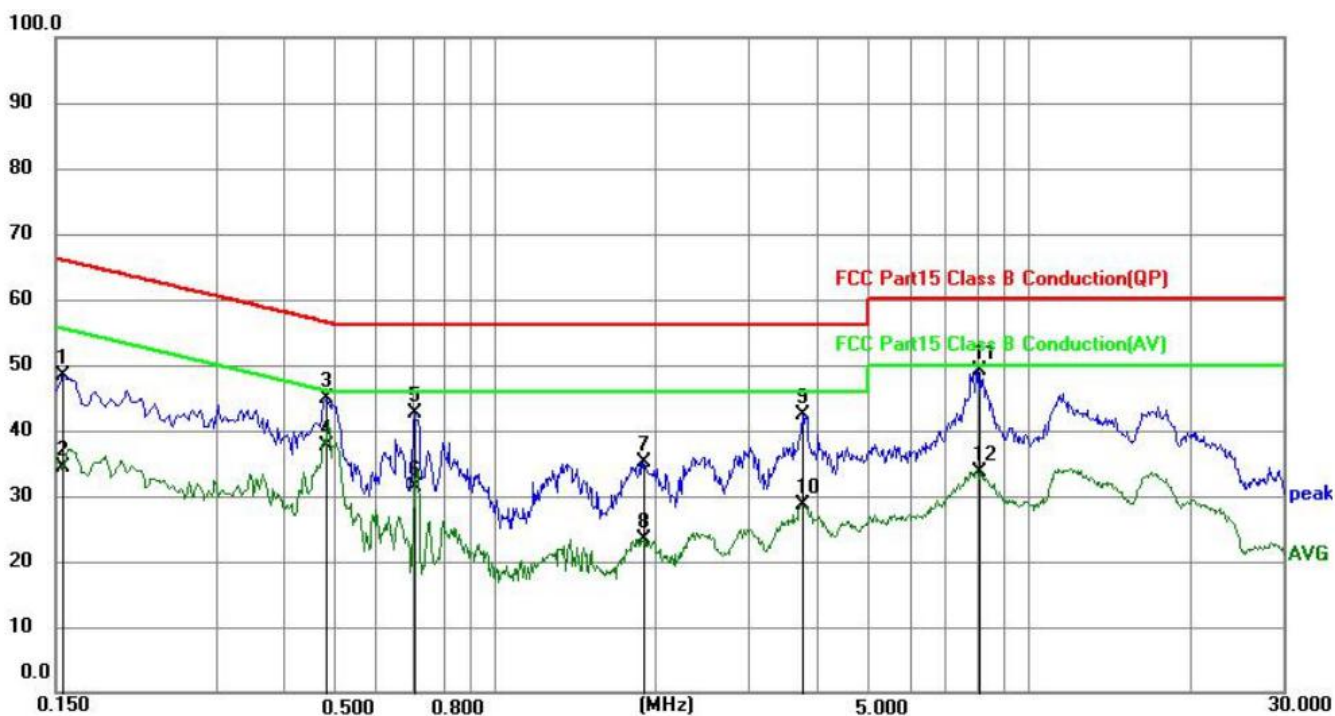
8.4 TEST RESULT

Temperature:	22.1 °C	Relative Humidity:	56%
Test Voltage:	DC 5V	Phase:	L
Test Mode:	GFSK		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.4875	31.19	9.87	41.06	56.21	15.15	QP
2	0.4875	25.16	9.87	35.03	46.21	11.18	AVG
3	0.7080	31.84	9.89	41.73	56.00	14.27	QP
4	0.7080	21.50	9.89	31.39	46.00	14.61	AVG
5	3.7995	25.06	17.95	43.01	56.00	12.99	QP
6	3.7995	11.41	17.95	29.36	46.00	16.64	AVG
7	8.0700	26.40	20.00	46.40	60.00	13.60	QP
8	8.0700	12.27	20.00	32.27	50.00	17.73	AVG
9	11.4090	25.19	20.04	45.23	60.00	14.77	QP
10	11.4090	12.74	20.04	32.78	50.00	17.22	AVG
11	16.6560	22.85	20.13	42.98	60.00	17.02	QP
12	16.6560	12.66	20.13	32.79	50.00	17.21	AVG

Temperature:	22.1 °C	Relative Humidity:	56%
Test Voltage:	DC 5V	Phase:	N
Test Mode:	GFSK		



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	0.1545	38.68	9.77	48.45	65.75	17.30	QP
2	0.1545	24.50	9.77	34.27	55.75	21.48	AVG
3	0.4830	34.97	9.87	44.84	56.29	11.45	QP
4	0.4830	27.87	9.87	37.74	46.29	8.55	AVG
5	0.7080	32.77	9.89	42.66	56.00	13.34	QP
6	0.7080	21.59	9.89	31.48	46.00	14.52	AVG
7	1.8960	20.64	14.41	35.05	56.00	20.95	QP
8	1.8960	8.94	14.41	23.35	46.00	22.65	AVG
9	3.7725	24.40	17.94	42.34	56.00	13.66	QP
10	3.7725	10.69	17.94	28.63	46.00	17.37	AVG
11	8.0475	29.05	20.14	49.19	60.00	10.81	QP
12	8.0475	13.37	20.14	33.51	50.00	16.49	AVG

9. DWELL TIME

9.1 LIMIT

FCC Part 5 (15.247), Subpart C			
Section	Test Item	Limit	Frequency Range (MHz)
15.247(a)(1)	Dwell time	0.4 sec	2400-2483.5

9.2 TEST PROCEDURE

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Spectrum Setting: RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak
- (3) Use video trigger with the trigger level set to enable triggering only on full pulses.
- (4) Sweep Time is more than once pulse time.
- (5) Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- (6) Measure the maximum time duration of one single pulse.
- (7) Set the EUT for packet transmitting.
- (8) Measure the maximum time duration of one single pulse.
- (9) The EUT was set to the Hopping Mode for Dwell Time Test.

9.3 TEST SETUP



9.4 Test Results

Mode	Data Packet	Frequency (MHz)	Pulse Duration (ms)	Dwell Time (ms)	Limit(s)	Conclusion
GFSK	DH1	2441	0.3825	122.40	<0.4	Pass
	DH3	2441	1.654	264.64	<0.4	Pass
	DH5	2441	2.898	309.12	<0.4	Pass

Note1: A period time = 0.4 (s) * 79 = 31.6

Note2:

DH1 time slot = Pulse Duration * (1600/(2*79)) * A period time

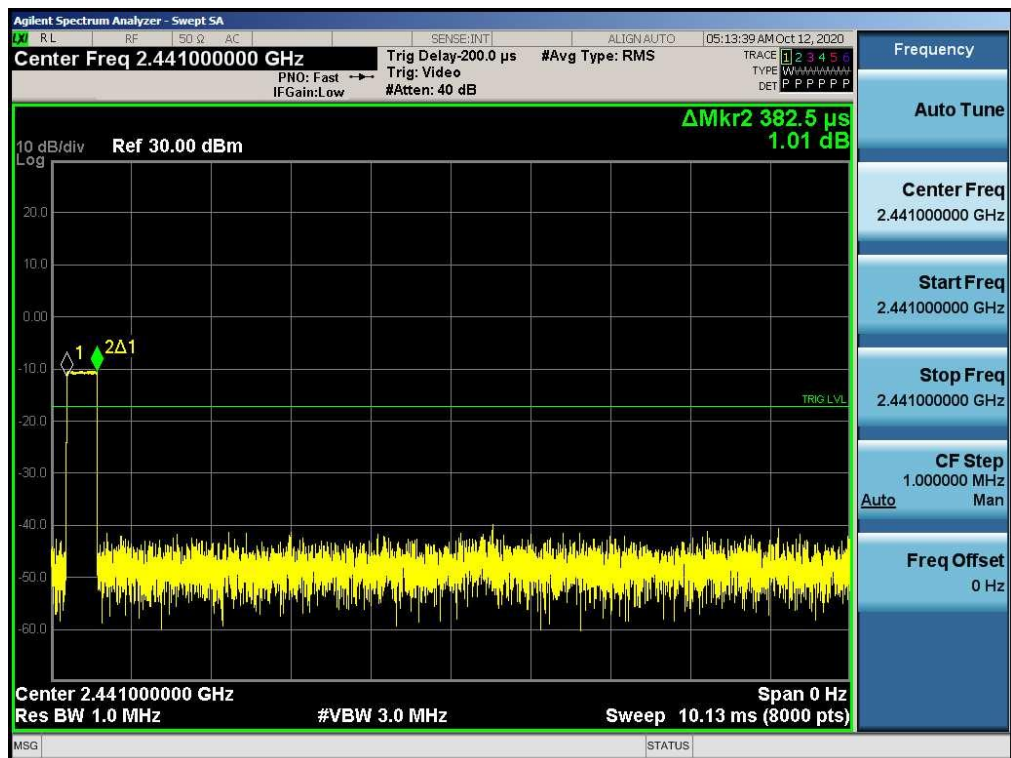
DH3 time slot = Pulse Duration * (1600/(4*79)) * A period time

DH5 time slot = Pulse Duration * (1600/(6*79)) * A period time

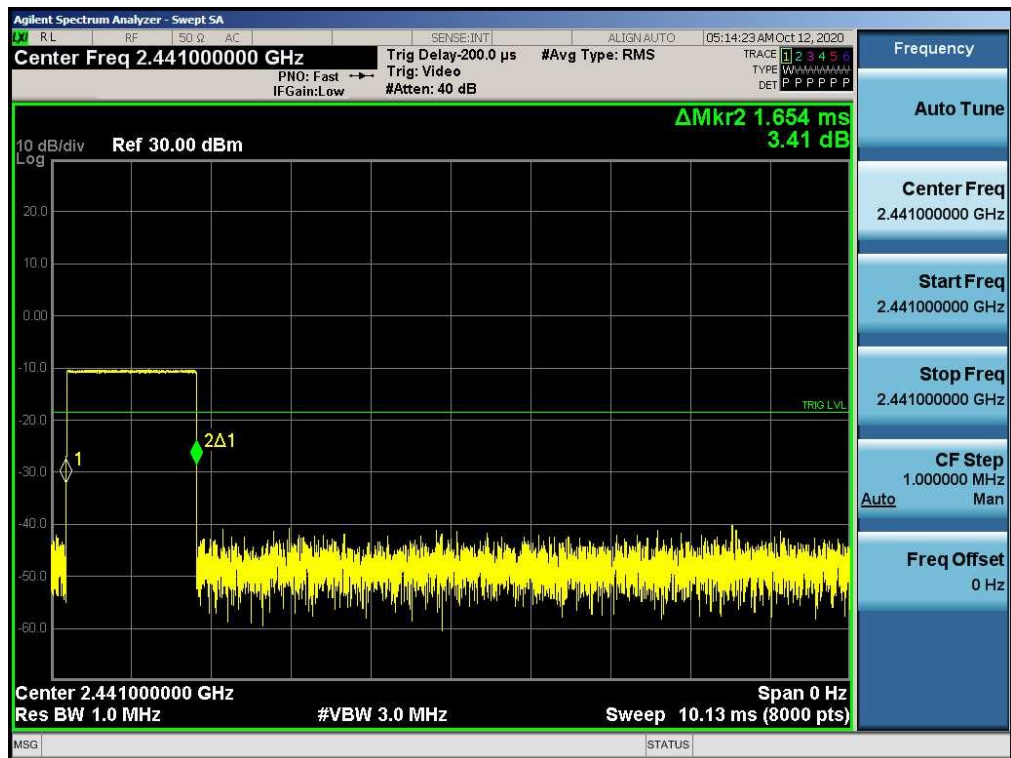
Note3: For GFSK :The test period: T= 0.4 Second/Channel x 79 Channel=31.6 s

9.5 Original Test Data

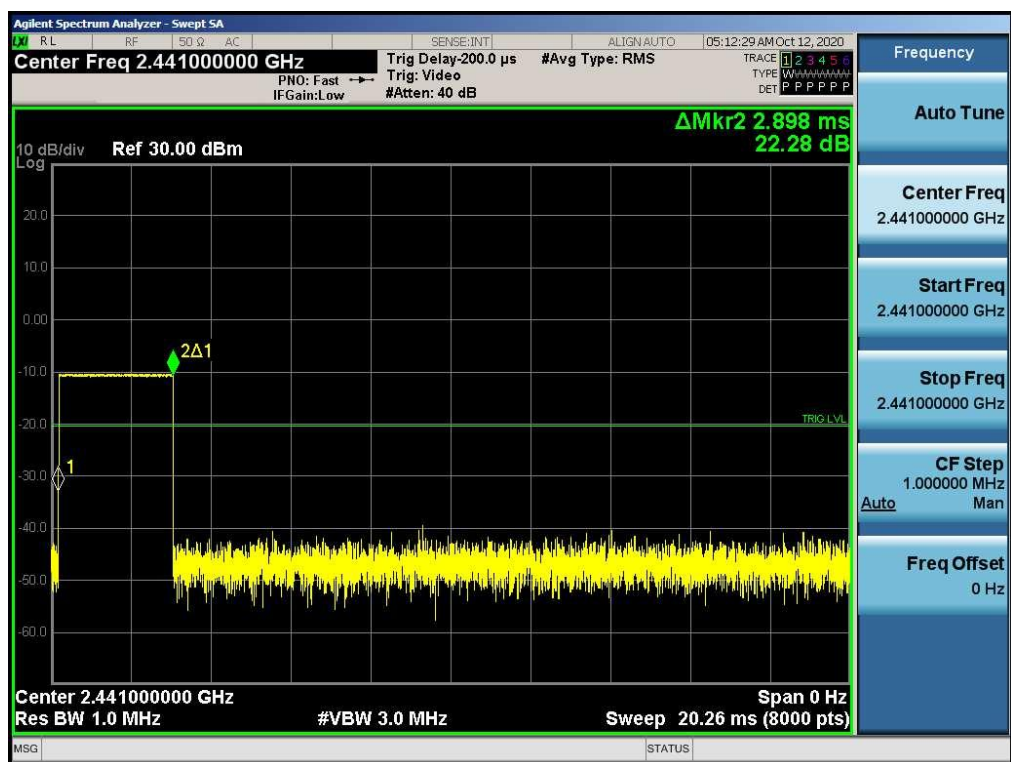
DH1



DH3



DH5



10. ANTENNA REQUIREMENT

10.1 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.

10.2 RESULT

The antennas used for this product are Chip 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 1.0dBi.

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