

Certification of Compliance

CFR 47 Part 15 Subpart C

Order No. : CSTS-C1003-099
Test Report No. : CSTS-A10-FCC013
Applicant : GD TECH CO., LTD.
Address of Applicant : #190-28 2F, cheongcheo2-dong, Bupyeong-gu, Incheon, 403-032, Korea


Equipment Under Test (EUT)

Kind of Product : BONE CONDUCTION BLUETOOTH HEADSET
Model Name : GDB-401
FCC ID : YD3GDB-401
Buyer Model(s) : N/A

Standards : FCC CFR Part 15 Subpart C :2008
ANSI C63.4:2003

Date of Receipt : 01 April, 2010
Date of Test : 5~16 April, 2010
Date of Issue : 29 April, 2010

Test Result : ☒ Positive ☐ Negative



Ji Hwan Kim / Testing By Engineer



Chang Woo, Kim / General Manager

In the configuration tested, the EUT complied with the standards specified above.

Remarks :

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

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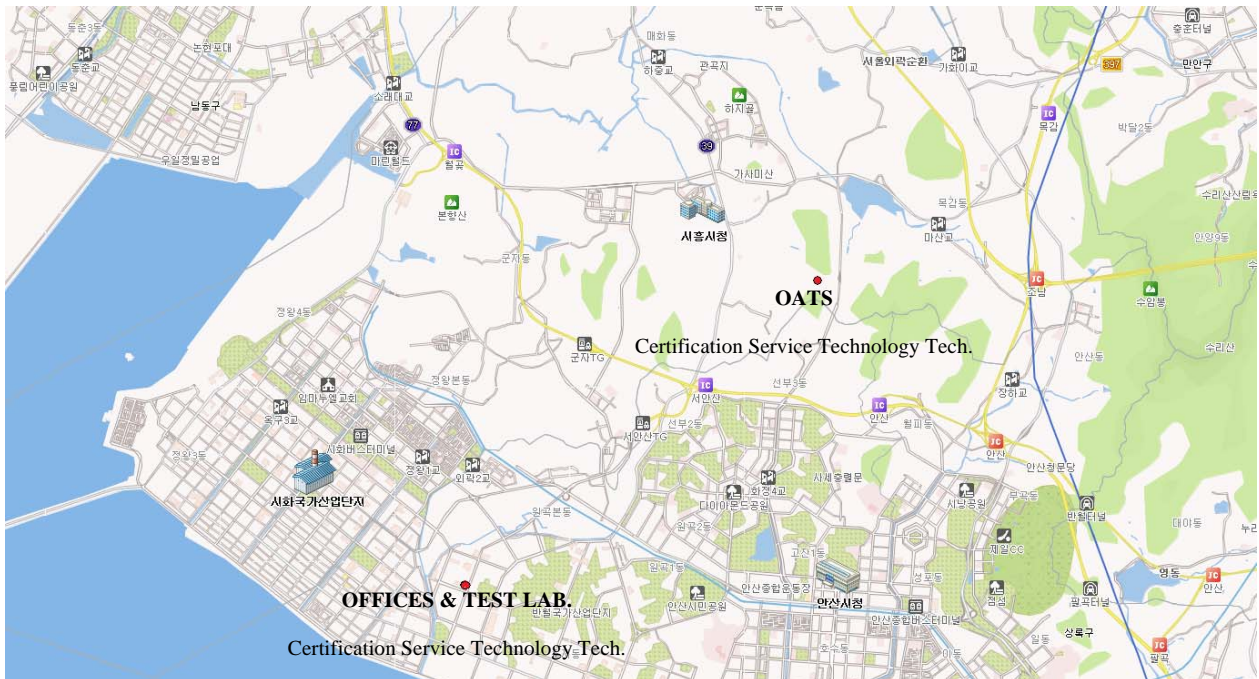
1. General Information

1.1 Information of Test Laboratory.

FCC Registration Number:289252

Name	:	Certification Service Technology Inc.
Address 3mFullChamber Conducted Emission	:	2F/1055, Shingil-Dong, Danwon-Gu, Ansan-City, Gyeonggi-Do Korea, 425-839
Radiated Emission (OATS)	:	456 Sanhyeun-Dong, Sihung-City, Gyeonggi-Do Korea
Tel/Fax	:	+82-31-493-2001 / +82-31-493-2055

Web site : <http://www.cstlab.co.kr> E-mail : telecom@cstlab.co.kr



We , Certification Service Technology Inc. are an independent EMC and RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited by the following accreditation Bodies in compliance with ISO 17025:

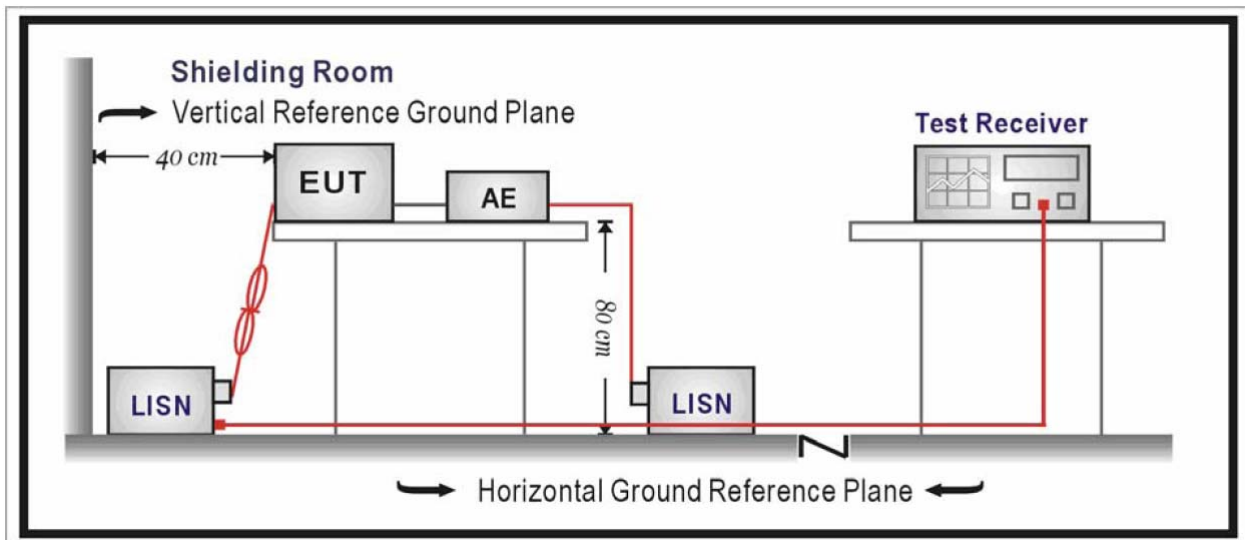
1.2 Description of Test

Conducted Emissions:

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination.(Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed on conducted measurement.

Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.



Limit Of Conducted Emission:

Test Specification

: According to FCC CFR Title 47 Part 15 Subpart C Section 15.207

FREQUENCY (MHz)	Limit	
	Quasi-peak	Average
0.15 to 0.5	66 to 56 *	56 to 46
0.5 to 5	56	46
5 to 30	60	50

*Decrease with the logarithm of the frequency.

Radiated Emissions:

The measurement was performed over the frequency range of 30MHz to 1GHz using antenna as the input transducer to a Spectrum analyzer or a Field Intensity Meter. The measurement was made with the detector set for "quasi-peak" within a bandwidth of 120kHz.

Procedure of Test Preliminary measurements were made at 3 meter using bi-log antennas, and spectrum analyzer to determine the frequency producing the max. emission in anechoic chamber. Appropriate precaution was taken to ensure that all emission from the EUT were maximized and investigated. The system configuration, mode of operation, turn-table azimuth and height with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30MHz to 1000MHz using bi-log antenna. Above 1GHz, linearly polarized double ridge horn antennas were used. Final measurements were made at open site with 3-meters test distance using bi-log antenna or horn antenna. The OATS have been verified in regular for its normalized site attenuation. The test equipment was placed on a wooden table. Sufficient time for the EUT, peripheral equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined by manual. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 120kHz or 1MHz depending on the frequency of type of signal. The EUT, peripheral equipment and interconnecting cables were re-configured to the set-up producing the max. emission for the frequency and were placed on top of a 0.8-meter high nonmetallic 1 x 1.5 meter table. The EUT, peripheral equipment, and interconnecting cables were re-arranged and manipulated to maximize each emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation to the EUT and/or peripheral equipment and changing the polarity of the antenna, whichever determined the worst-case emission.(The bandwidth below 1GHz setting on the field strength meter is 120kHz and above 1GHz is 1MHz.)

Limit Of Radiated Emission :

Test Specification

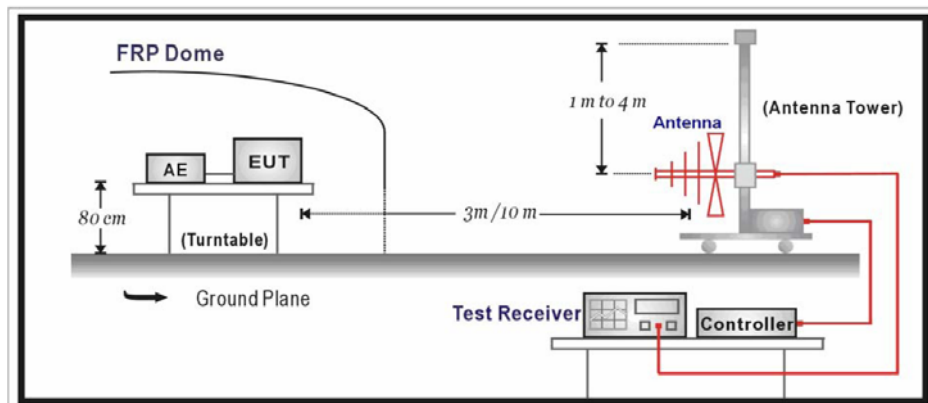
: According to FCC CFR Title 47 Part 15 Subpart C Section 15.209, 15.247

Limits		
Frequency (MHz)	$\mu\text{V}/\text{meter}$	$\text{dB}\mu\text{V}/\text{meter}$
30-88	100	40.00
88-216	150	43.52
216-960	200	46.02
Above 960	500	53.98

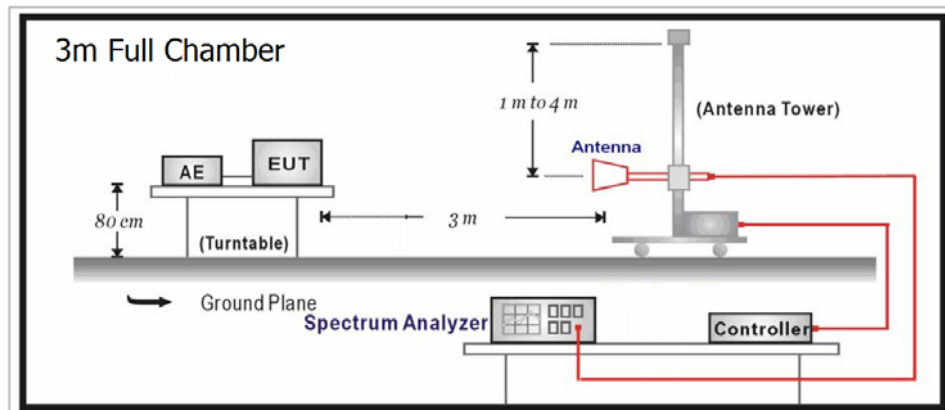
Remarks :

1. $RF\text{ Voltage}(\text{dB}\mu\text{V}) = 20 \log RF\text{ Voltage}(\mu\text{V})$
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring Instrument antenna and the closed point of any part of the device or System.

Below 1GHz Test Setup:



Above 1GHz Test Setup:



1.3 Measurement Uncertainty Calculations

Conducted Emissions

TYPE	Contribution	Probability Distribution	Uncertainty	Remark
B	LISN	normal(k=2)	±1.3	CAL.
	Impedance	normal(k=2)	±0.12	CAL.
	Voltage Division Factor	normal(k=2)	±0.2	NONCAL.
	cable	normal(k=2)	±0.2	NONCAL.
	Receiver	normal(k=1.64)	±0.0070	CAL.
B	Input Impedance	normal(k=2)	±0.20 dB	
	QP Sine-Wave Voltage Accuracy	normal(k=2)	±0.40 dB	
	QP-Pulse Amplitude Sensibility	normal(k=2)	±0.57 dB	
	QP-Pulse Frequency Response	normal(k=2)	±0.35 dB	
	Random Noise	normal(k=2)	±0.35 dB	
A	Mismatch	U-Shaped	+0.7/-0.8	CISPR Theory
	AMN to Receiver			
A	System Repeatability	Std deviation	±0.0721	
Combined Standard Uncertainty		normal	± 1.1155 [dB]	
Expanded Uncertainty U		normal(k=2)	± 2.23	95.45 %

Radiated Emission

TYPE	Contribution	Probability Distribution	Uncertainty 3/10m	Remark
B	Antenna factor frequency interpolation height variation direcvalupsy difference phase center location	normal(k=2) rectangular rectangular rectangular	±0.5 dB ±0.1039 dB +1.5/-2.6 dB +0/-1.0 dB ±1.0 dB	NPL NAMAS NAMAS
	Cable loss	normal(k=2)	±0.5 dB	
	Receiver Input Impedance QP Sine-Wave Voltage Accuracy QP-Pulse Amplitude Sensibility QP-Pulse Frequency Response Random Noise	normal(k=1.64) normal(k=2) normal(k=2) normal(k=2) normal(k=2)	±0.0070 ±0.20 dB ±0.40 dB ±0.57 dB ±0.35 dB	
	Mismatch : AMN – receiver Γ _{antenna} =0.33 Γ _{receiver} =0.33	U-Shaped	+0.9/-1.0 dB	CISPR
	A	System repeatability	Std deviation	±0.1149 dB
Combined standard Uncertainty		normal	±1.3193 [dB]	
Expanded Uncertainty U		normal(k=2)	± 2.63	95.45 %

1.4 Manufacturer Information

Manufacturer	:	GD TECH CO., LTD.
Address	:	#190-28 2F, Cheongcheon2-dong, Bupyeong-gu, Incheon, 403-032, Korea

1.5 General Description of EUT

Name	:	BONE CONDUCTION BLUETOOTH HEADSET
Model No.	:	GDB-401
Alt. Name	:	N/A
FCC ID	:	YD3GDB-401
Serial No.	:	N/A

1.6 Details of EUT

Tx Frequencies	2402 ~ 2480 MHz
The Number of Channels	79 CH
Oscillation mechanism	Crystal Oscillationg
Input Voltage	Charger Supply DC 5 V
Operationg Voltage	DC 3.7 V
Dimensions (HWL)	142 x 160 x 63 (mm)
Weight	50 g
Operating Tem.	-10 °C ~ 50 °C
Typ of Emission	Wireless Device for Wireless Data Communication System (Thpe Code : F1D)
Communication Mode	Simplex
Modulation	GFSK

- Please refer to user's manual.

1.7 Description of Support Units

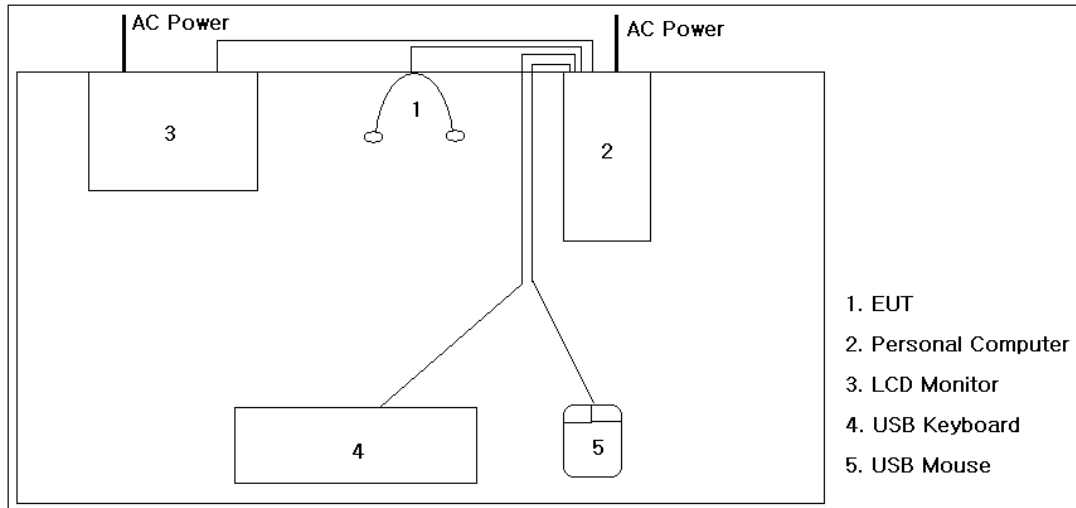
Product	Model No.	Serial No.	Manufacturer	Certification
BONE CONDUCTION BLUETOOTH HEADSET	GDB-401	N/A	GD TECH CO., LTD.	EUT
Personal Computer	Dx7300	CNG645027S	H.P.	-
LCD Monitor	TGL 190G	717351750C18D	LG Electronics Nanjing Display Co., Ltd.	-
USB Keyboard	1366	0065800985837	Microsoft	-
USB Mouse	1113	N/A	Micooft	-

1.8 Cable List

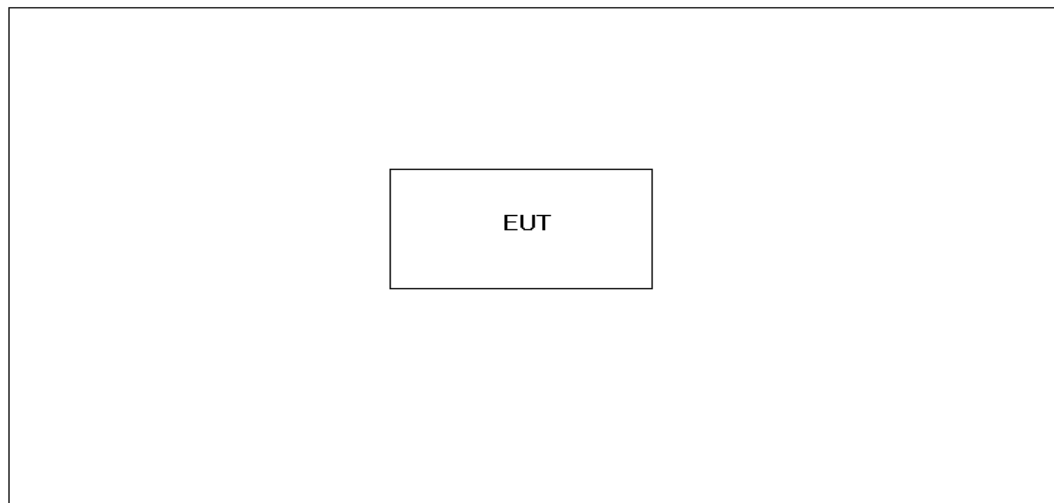
Start		END		Cable Spec	
Name	I/O Port	Name	I/O Port	Lenth (m)	Shield
EUT	USB	Personal Computer	USB port	0.5	Unshielded
Personal Computer	DVI	LCD monitor	DVI port	1.8	Unshielded
	USB	USB Mouse	-	1.8	Unshielded
	USB	USB Keyboard	-	1.8	Unshielded
	Power	AC-POWER	AC-Line	1.8	Unshielded

1.10 Test Set-Up Configuration

Mode A : Charging Mode



Mode B : Continuous Tx mode



1.11 Test Methodology And Configuration

Normal operating mode and Charging mode

1.12 Standards Applicable for Testing

Table of tests to be carried out under FCC Part 15 Subpart C

Test Standards	Status
FCC Part 15 Subpart C	A
Deviation from Standard	No Deviation

Note) N/A : Indicates that the test is not applicable

A : Indicates that the test is applicable

2. SUMMARY of TEST RESULT

The EUT has been tested according to the following specifications :

Applied Standard : FCC Part 15, Subpart C				
Standard Section	Description	Limit	Result	Remark
15.207	AC Power Conducted Emission	15.207	PASS	Meet the requirement of limit. Minimum passing margin is -7.20 dB at 0.433 MHz
15.247(a)(1)	Number of Hoppiing Frequency	15 CH \leq	PASS	Meet the requirement of limit.
15.247(a)(1)	Dwell Time on Each Channel	\leq 0.4 sec in 31.6 sec period	PASS	Meet the requirement of limit.
15.247(a)(1)	Hopping Channel Separation	2/3 of 20 dB BW \leq	PASS	Meet the requirement of limit.
15.247(b)(1)	Maximum Peak Output Power	\leq 1W	PASS	Meet the requirement of limit.
15.247(d)	Transmitter Radiated Emissions	15.207 & 15.247	PASS	Meet the requirement of limit.
15.209 & 15.247(d)	Band Edge Measurement	15.209 & 15.247(d)	PASS	Meet the requirement of limit.
15.203 & 15.247(b)	Antenna Requirement	N/A	PASS	Meet the requirement of limit.

3. Equipment Under Test

3.1 Conducted Emission

3.1.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Test Receiver	LIG NEX1	ER-30	L0804A003	Sep. 24, 2010
LISN	EMCO	3825/2	8912-1576	Oct. 06, 2010
LISN	EMCO	3825/2	9006-1666	Mar. 30, 2011
Transient Limiter	HAMEG	HZ560	N/A	Jul. 30, 2010
Shielded Room	BRADEN	N/A	DAC-60-005	-

Note :

- 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.*
- 2. The calibration interval of horn ant. and loop ant. is 24 months*

3.1.2 Test Area

Conducted Room(Shielded Room)

3.1.3 Operation of EUT

Operating Environment

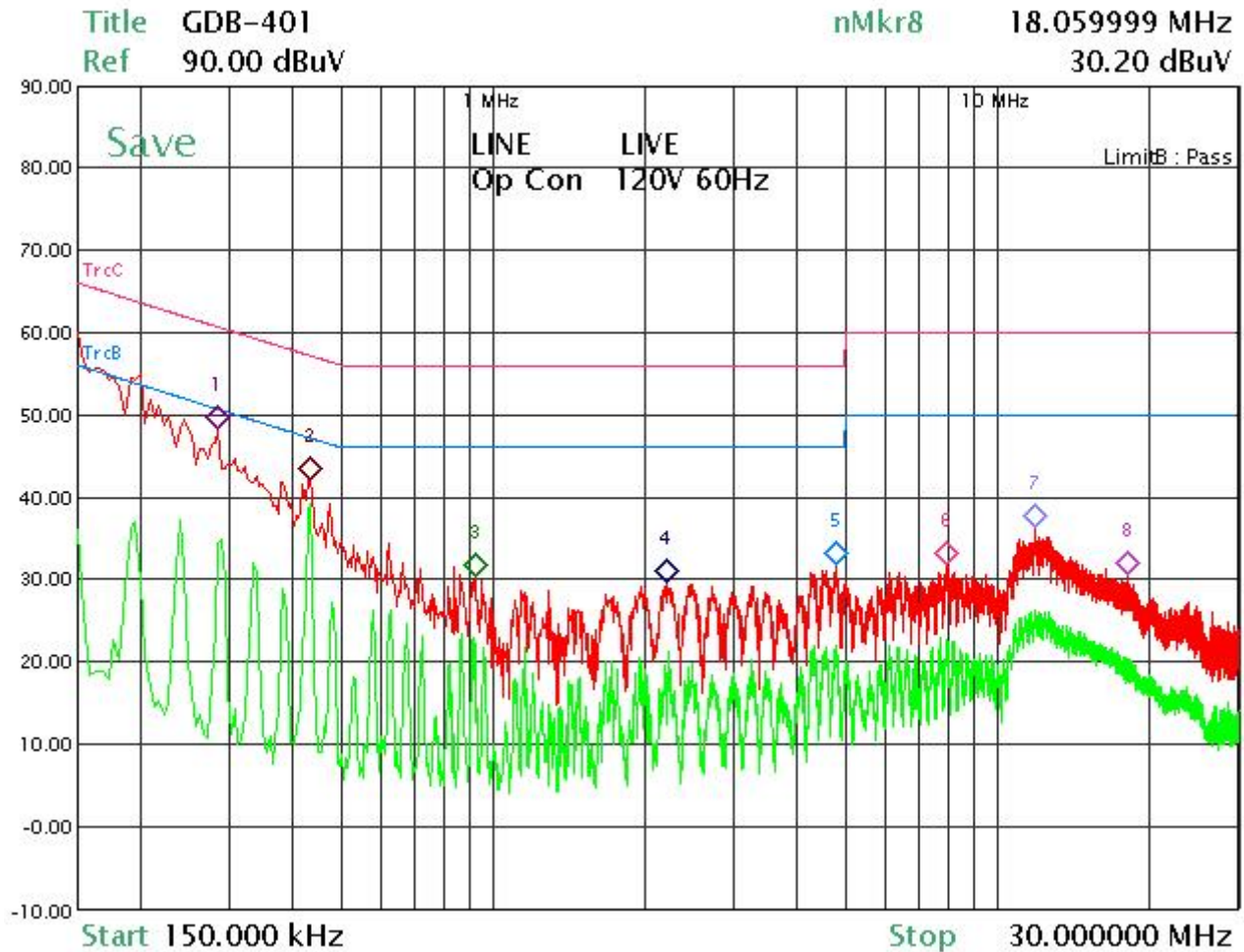
Temperature : 24.4 degree C
Humidity : 47 %RH
Atmospheric Pressure : 986 mBar

3.1.4 Test Date

April 05, 2010

3.1.5 Conducted Emissions Result(According to 15.207)

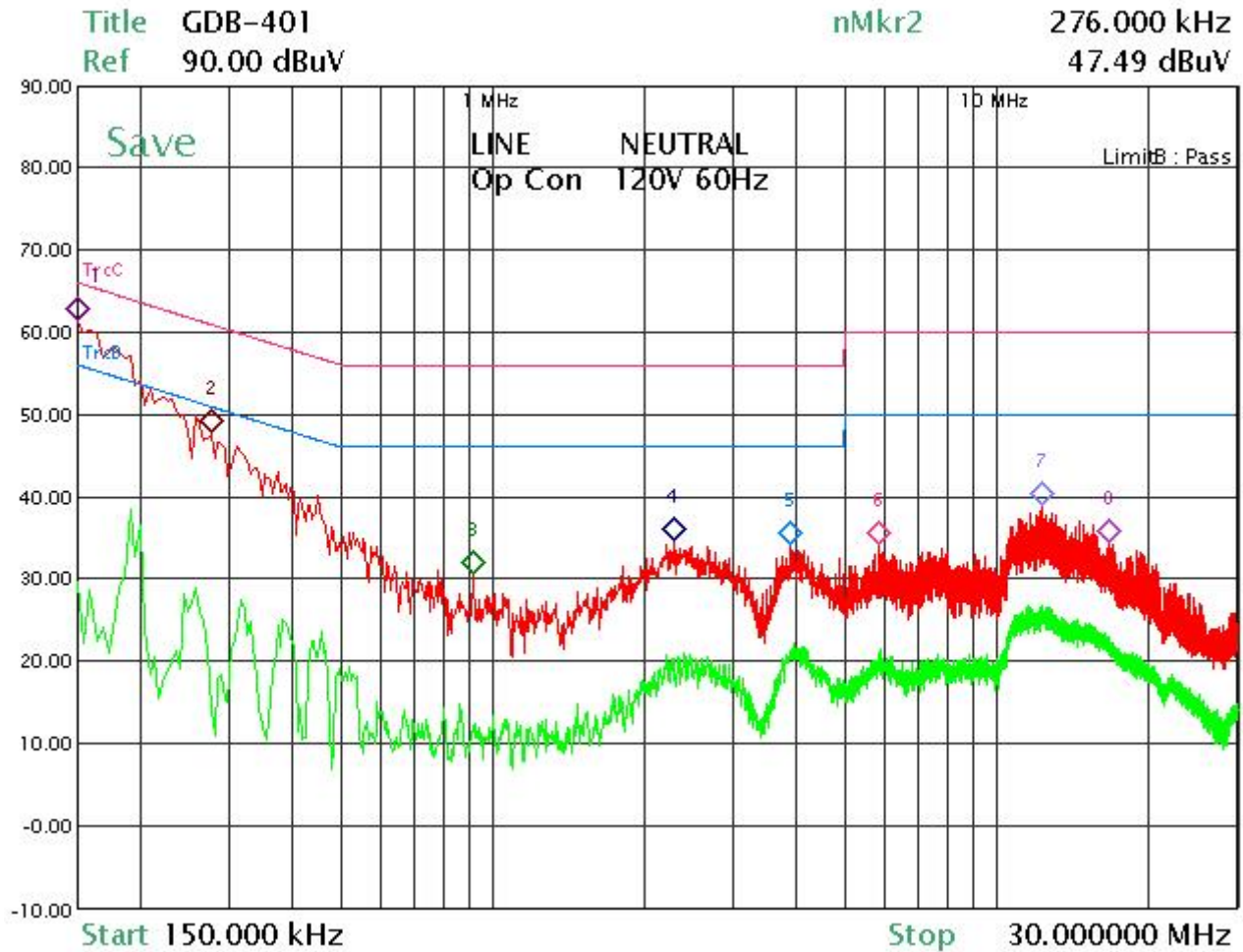
Phase : Live



Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss [dB]	Cable Loss [dB μ V]	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.285	40.88	36.83	60.67	50.67	0.06	0.07	41.01	36.96	19.66	13.71
0.433	40.19	39.87	57.19	47.19	0.05	0.07	40.31	39.99	16.88	7.20
0.919	29.43	21.27	56.00	46.00	0.04	0.06	29.53	21.37	26.47	24.63
2.206	28.19	20.92	56.00	46.00	0.04	0.04	28.27	21.00	27.73	25.00
7.944	26.28	20.08	60.00	50.00	0.08	0.43	26.79	20.59	33.21	29.41
11.877	30.92	25.38	60.00	50.00	0.13	0.52	31.57	26.03	28.43	23.97

Note : Charging Mode

Phase : Neutral



Freq. [MHz]	Measurement [dB μ V]		Limit [dB μ V]		Insertion Loss [dB]	Cable Loss [dB μ V]	Result [dB μ V]		Margin [dB]	
	Q-peak	Average	Q-peak	Average			Q-peak	Average	Q-peak	Average
0.150	55.39	29.01	66.00	56.00	0.12	0.05	55.56	29.18	10.44	26.82
0.276	41.47	20.00	60.94	50.94	0.10	0.07	41.64	20.17	19.30	30.77
2.283	30.88	20.97	56.00	46.00	0.08	0.04	31.00	21.09	25.00	24.91
3.894	30.36	21.28	56.00	46.00	0.09	0.05	30.50	21.42	25.50	24.58
5.838	28.98	20.79	60.00	50.00	0.10	0.22	29.30	21.11	30.70	28.89
12.327	33.78	25.85	60.00	50.00	0.20	0.52	34.50	26.57	25.50	23.43

Note : Charging Mode

3.2 Radiated Emission

3.2.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Test Receiver	LIG NEX1	ER-265	L0804B002	Jul. 10, 2010
BICONILOG ANT.	EMCO	3142	9701-1128	Nov. 13, 2010
Horn Antenna	R&S	BBHA9120D233	0501	Sep. 10, 2010
Horn Antenna	R&S	BBHA9170	BBHA9170152	Sep. 16, 2010
BICONICAL ANT.	EMCO	3104C	9012-4380	Feb. 28, 2012
LOGPERIODIC ANT.	EMCO	3146	91071232	Feb. 28, 2012
LOOP ANT.	R&S	HFH2-Z2	100187	Jul. 07, 2011
Turn Table	EMCO	D-TT 06	N/A	-
Ant. Mast	EMCO	D-AM 06	N/A	-
Controller	EMCO	D-CTR 06	N/A	-
T-TABLE CONTROLLER	EMCO	1060-1.511	9101-1517	N/A
CHAMBER	BRADEN	RF Shielded door Assembly	DAC-60-004	N/A

Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. For the limit is employed average value, therefore the peak value can be transferred to average value by subtracting the duty factor. The basic equation with a sample calculation is as follows:

$$\text{Peak} = \text{Reading} + \text{Corrected Factor}$$

Where

Corr. Factor = Antenna Factor + Cable Factor - Amplifier Gain (if any)

3.2.2 Test Area

3m Full Chamber

3.2.3 Operation of EUT

Operating Environment

Temperature : 24.4 degree C

Humidity : 46 %RH

Atmospheric Pressure : 986 mBar

3.2.4 Test Date

April 06, 2010

3.2.5 Radiated Emission Limit

All emission from a digital device, including any network of conductors and apparatus connected thereto shall not exceed the level of field strength specified below:

FCC Part 15 Subpart C paragraph 15.249(a) Limit

Fundamental Frequency (MHz)	Field Strength of Fundamental (3m)			Field Strength of Harmonics (3m)		
	mV/m	dBuV/m		uV/m	dBuV/m	
2400-2483.5	50	94(Average)	114(Peak)	500	54(Average)	74(Peak)

Note :

1. RF Field Strength (dBuV) = $20 \log \text{RF Voltage}(\mu\text{V})$
2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.
3. The emission limit in this paragraph is based on measurement instrumentation employing an average detector

Frequencies in restricted band are complied to limit on Paragraph 15.209

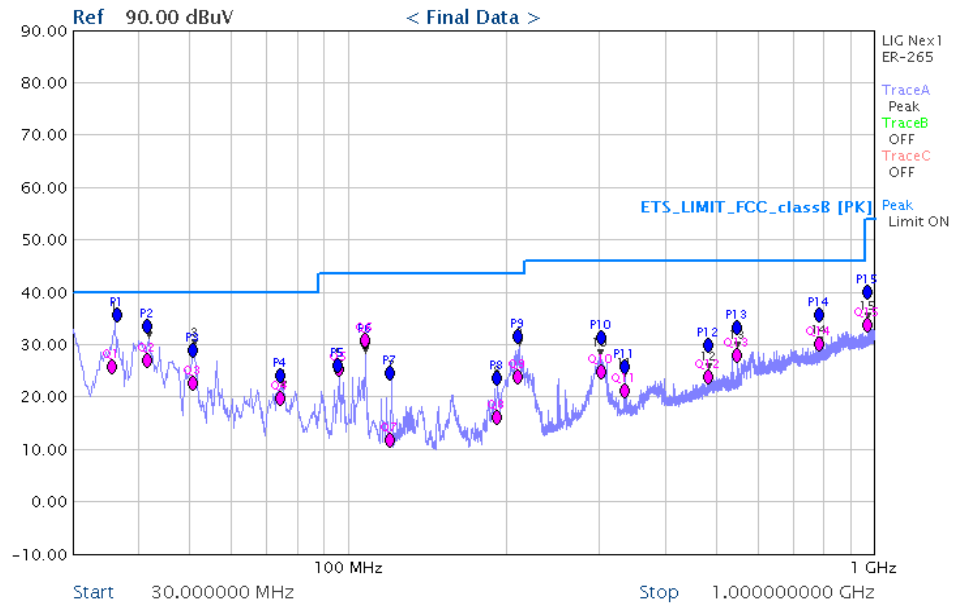
Frequency Range (MHz)	Distance (m)	Field strength (dBuV/m)
30-88	3	40.0
88-216	3	43.5
216-960	3	46.0
Above 960	3	54.0

Note :

1. RF voltage (dBuV) = $20 \log \text{RF Voltage}(\mu\text{V})$
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the EUT
4. This device used to install a wall device. The location of EUT measurements has the Y-plane(Stand).
5. All scanning using PK detector. And the final emission level was get using QP detector for frequency range from 30 – 1000 MHz. As to 1G-26G, the final emission level got using PK and AV detector.
6. If measurement is made at 3m distance.
7. Modulation Type – GFSK Mode

3.2.5 .1Radiated Emission Result(30 MHz to 1000 MHz)

Test Mode	Charging Mode	Test Channel	-
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	-
Test Result	PASS		

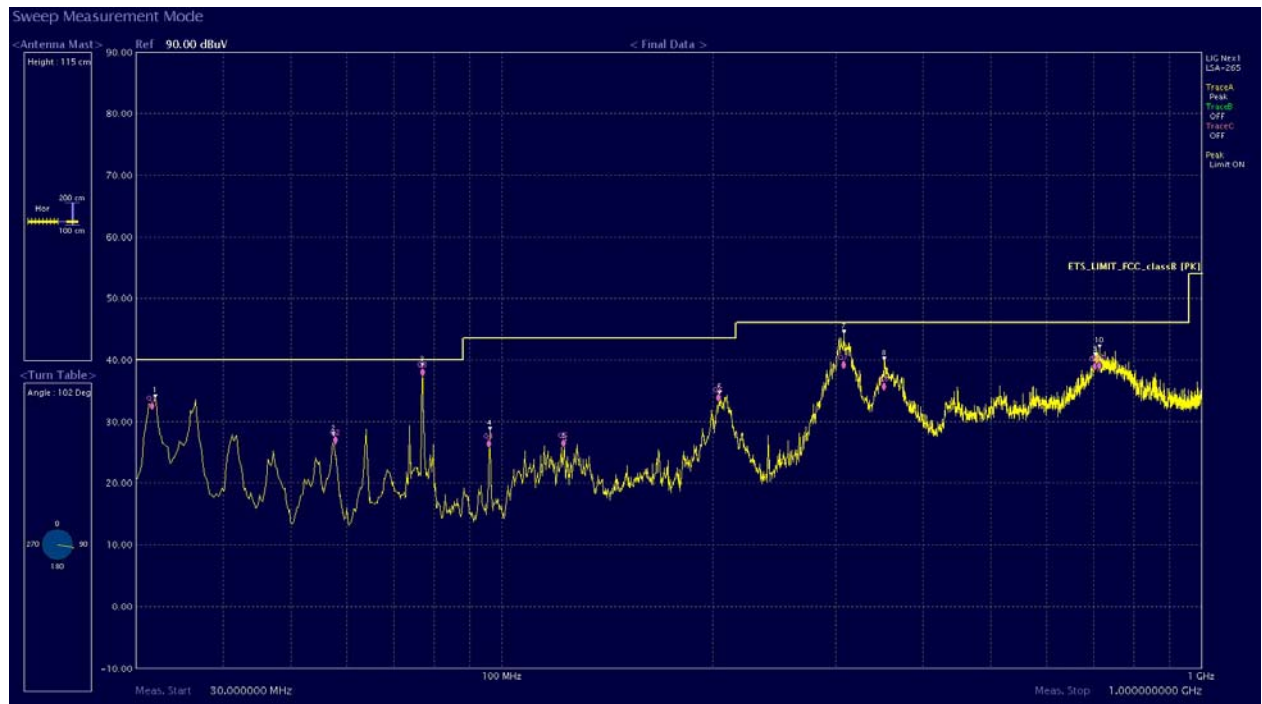


Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
35.55	9.73	V	15.52	0.0	40.00	25.25	14.75
41.53	14.24	H	12.53	0.0	40.00	26.77	13.23
95.92	15.78	V	9.41	0.0	43.50	25.19	18.31
107.69	21.32	H	9.30	0.0	43.50	30.62	12.88
302.38	8.54	V	16.10	0.0	46.00	24.64	21.36
549.28	5.71	H	22.13	0.0	46.00	27.84	18.16
788.66	3.22	H	26.68	0.0	46.00	29.90	16.10
969.99	4.62	V	29.01	0.0	54.00	33.63	20.37

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

Test Mode	Continuous TX	Test Channel	0CH (2402 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	X-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
32.01	28.21	V	5.68	0.0	40.00	33.89	6.11
57.47	21.37	V	6.25	0.0	40.00	27.62	12.38
77.01	30.71	H	7.11	0.0	40.00	37.82	2.18
204.44	21.22	H	13.20	0.0	43.50	34.42	9.08
307.94	23.46	H	15.66	0.0	46.00	39.12	6.88
351.52	20.04	H	16.79	0.0	46.00	36.83	9.17
704.30	13.69	H	25.16	0.0	46.00	38.85	7.15
714.25	13.74	H	25.09	0.0	46.00	38.83	7.17

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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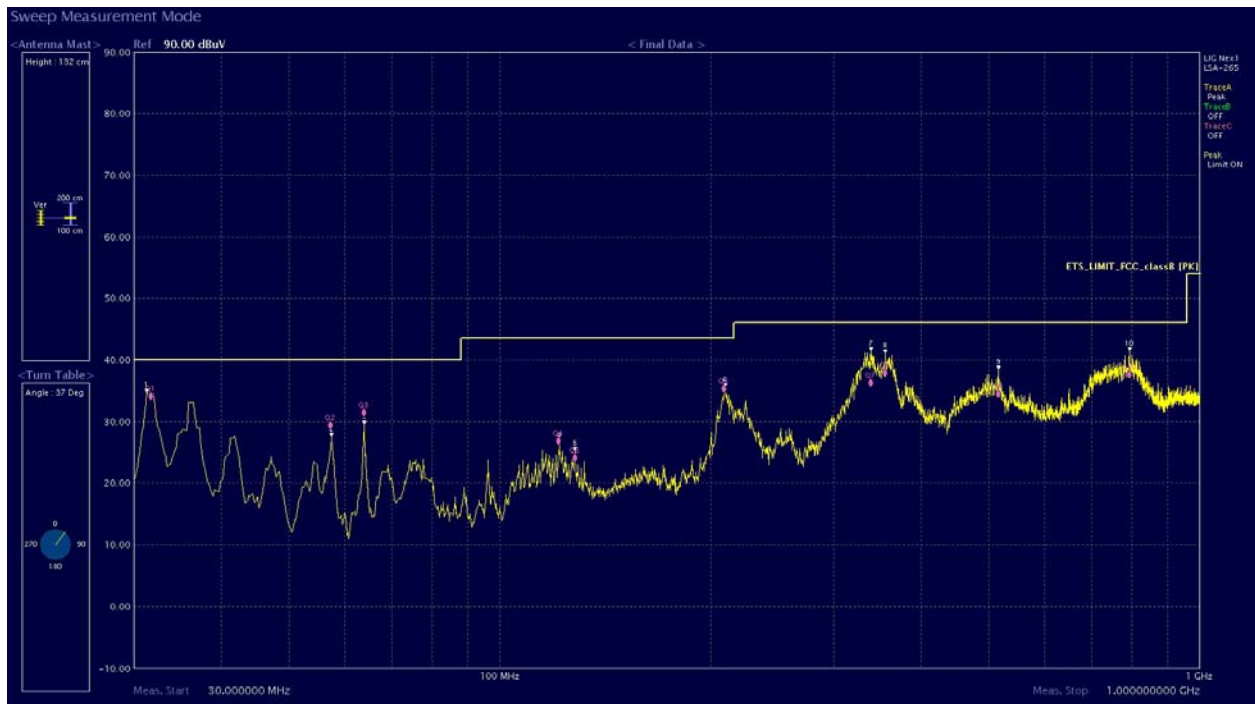
C.S.Tech., Inc.: 1055, Singil-dong ,Danwon-gu ,Ansan-si, Gyeonggi-do, Korea 425-839

Tel: +82 31 493 2001

Fax: +82 31 493 2055

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Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	Y-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
31.30	30.43	V	4.29	0.0	40.00	34.72	5.28
57.47	23.25	V	6.25	0.0	40.00	29.50	10.50
63.99	26.85	V	5.55	0.0	40.00	32.40	7.60
209.65	22.18	H	13.40	0.0	43.50	35.58	7.92
339.20	19.59	H	16.65	0.0	43.50	36.24	7.26
355.43	21.59	V	16.97	0.0	46.00	38.56	7.44
515.53	13.19	V	21.06	0.0	46.00	34.25	11.75
793.71	12.16	V	26.35	0.0	46.00	38.51	7.49

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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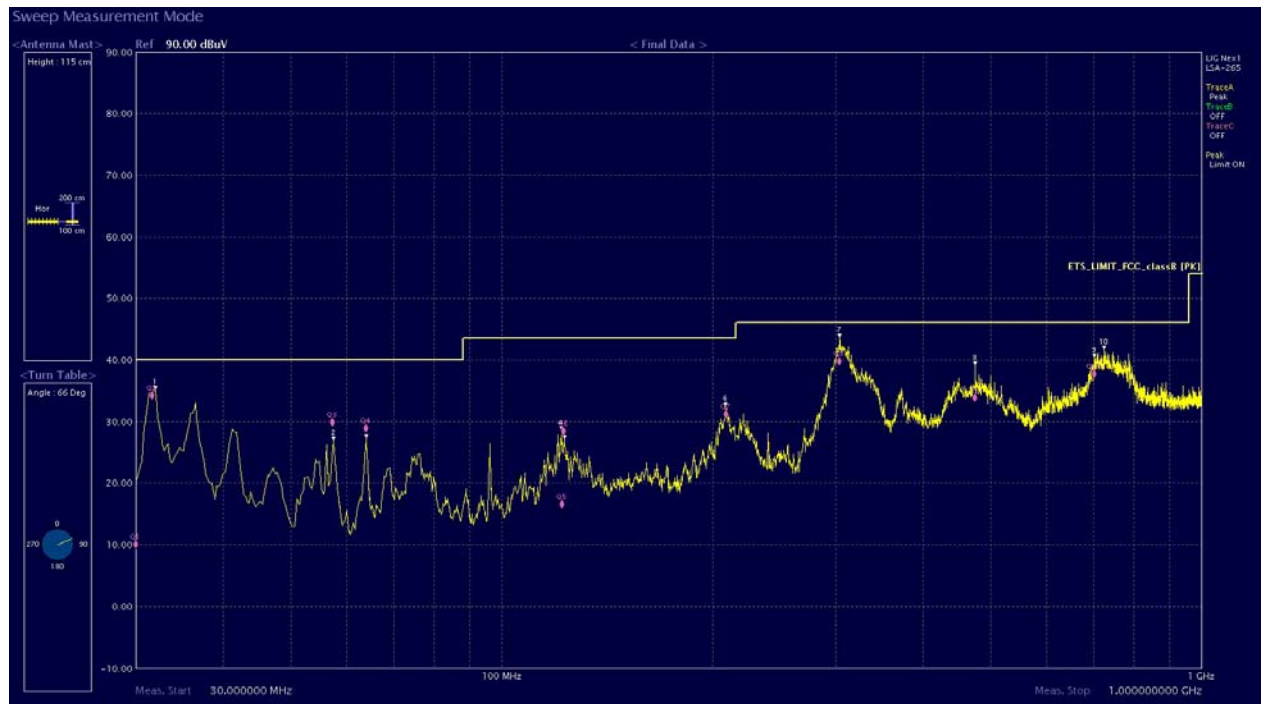
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Test Mode	Continuous TX	Test Channel	0 CH(2402 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	Z-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
32.01	29.44	V	5.68	0.0	40.00	35.12	4.88
57.47	23.79	V	6.25	0.0	40.00	30.04	9.96
63.99	24.01	V	5.55	0.0	40.00	29.56	10.44
122.84	15.14	H	13.25	0.0	43.50	28.39	15.11
208.94	18.10	H	13.37	0.0	43.50	31.47	12.03
304.03	25.09	H	15.51	0.0	46.00	40.60	5.40
701.81	9.28	H	25.08	0.0	46.00	34.36	11.64
725.97	13.38	H	25.16	0.0	46.00	38.54	7.46

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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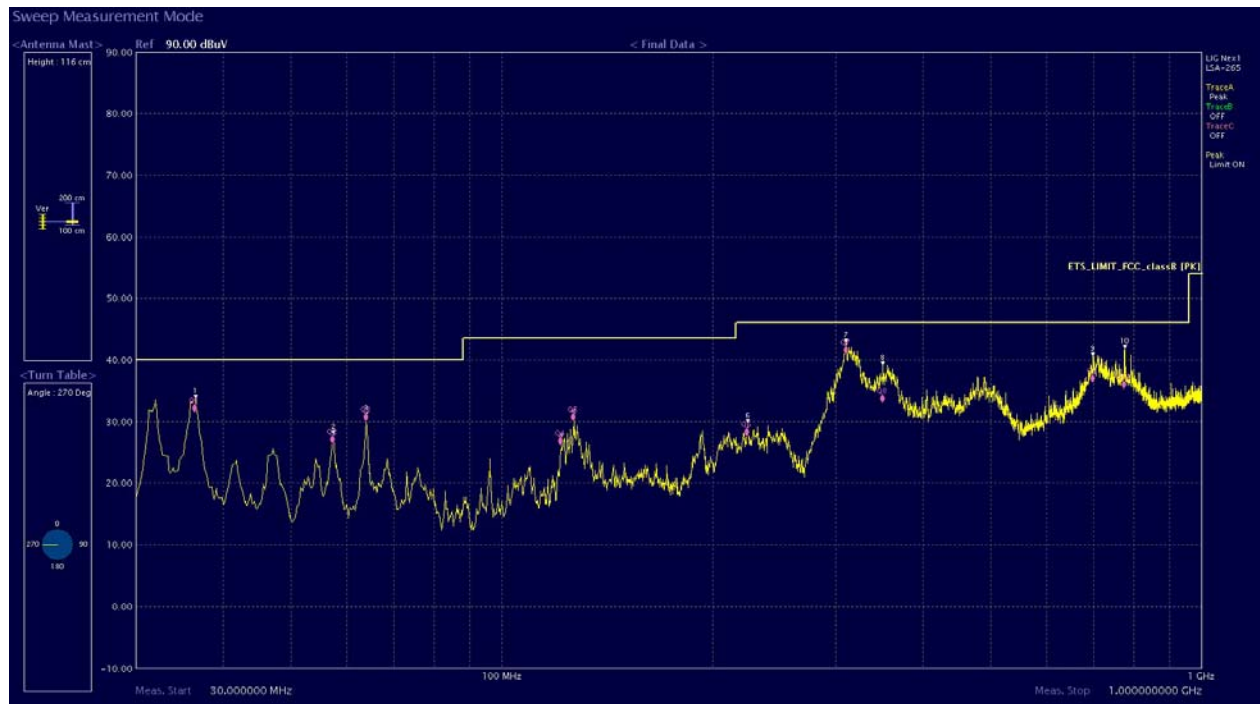
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Test Mode	Continuous TX	Test Channel	39 CH(2441 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	X-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
36.51	21.78	V	11.91	0.0	40.00	33.69	6.31
57.47	21.66	V	6.25	0.0	40.00	27.91	12.09
63.99	25.34	V	5.55	0.0	40.00	30.89	9.11
126.75	16.17	H	14.05	0.0	43.50	30.22	13.28
310.54	27.04	H	15.76	0.0	46.00	42.80	3.20
350.21	17.48	H	16.73	0.0	46.00	34.21	11.79
699.92	12.57	H	25.02	0.0	46.00	37.59	8.41
776.06	11.02	V	25.85	0.0	46.00	36.87	9.13

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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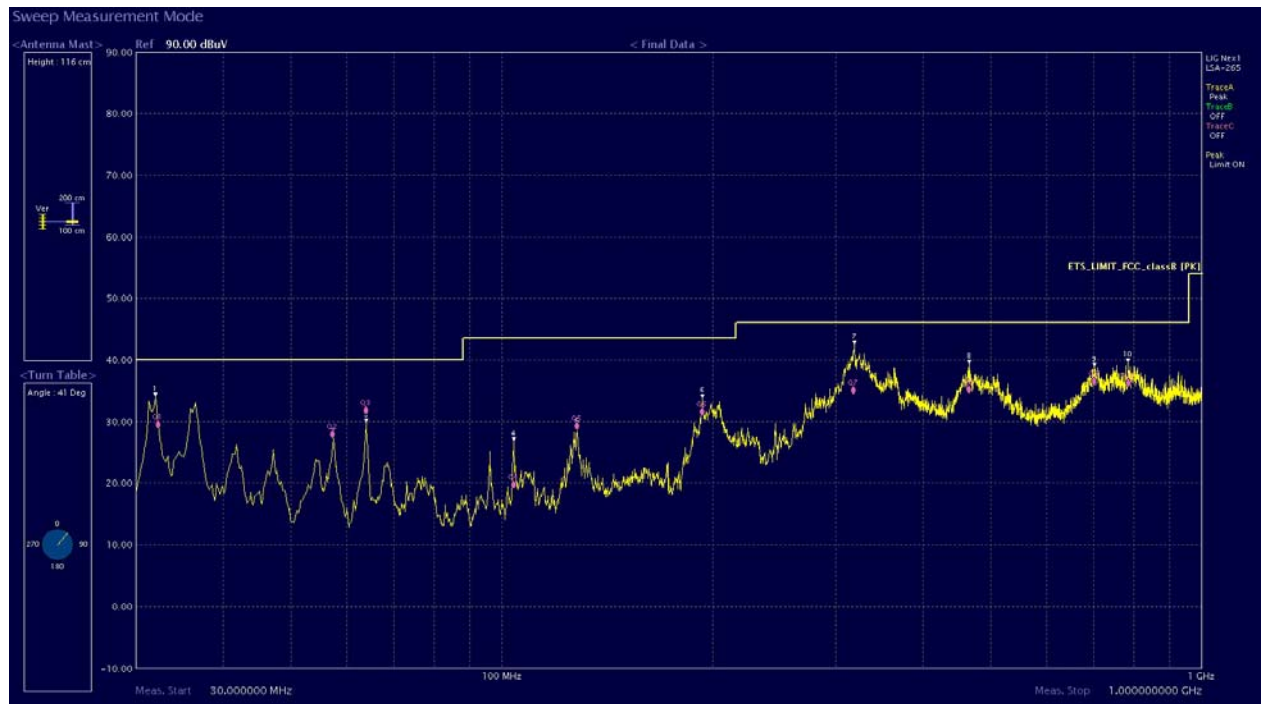
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Test Mode	Continuous TX	Test Channel	39 CH(2441 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	Y-Plane
Test Result	PASS		



Frequency MHz	Reading dBμV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBμV/m	Total dBμV/m	Margin dB
32.01	24.28	H	5.68	0.0	40.00	29.96	10.04
63.99	25.69	V	5.55	0.0	40.00	31.24	8.76
128.05	15.55	H	14.32	0.0	43.50	29.87	13.63
193.42	18.79	H	14.09	0.0	43.50	32.88	10.62
319.07	19.43	H	16.16	0.0	46.00	35.59	10.41
464.85	16.30	V	20.05	0.0	46.00	36.35	9.65
702.52	12.04	H	25.10	0.0	46.00	37.14	8.86
785.18	10.98	V	26.13	0.0	46.00	37.11	8.89

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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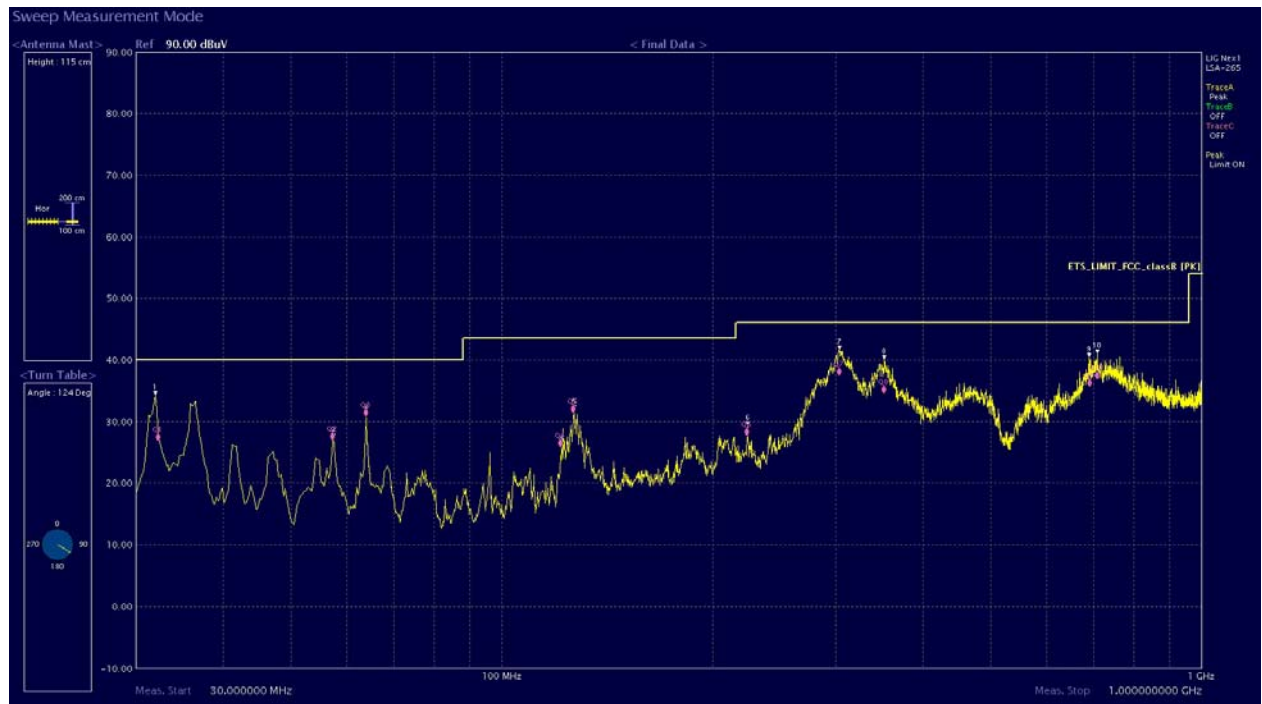
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Test Mode	Continuous TX	Test Channel	39 CH(2441 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	Z-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
32.01	22.66	H	5.68	0.0	40.00	28.34	11.66
57.47	22.54	V	6.25	0.0	40.00	28.79	11.21
63.99	26.93	V	5.55	0.0	40.00	32.48	7.52
126.75	18.64	H	14.05	0.0	43.50	32.69	10.81
303.44	23.27	H	15.48	0.0	46.00	38.75	7.25
352.23	18.82	H	16.82	0.0	46.00	35.64	10.36
691.39	11.34	H	24.70	0.0	46.00	36.04	9.96
709.63	12.16	H	25.33	0.0	46.00	37.49	8.51

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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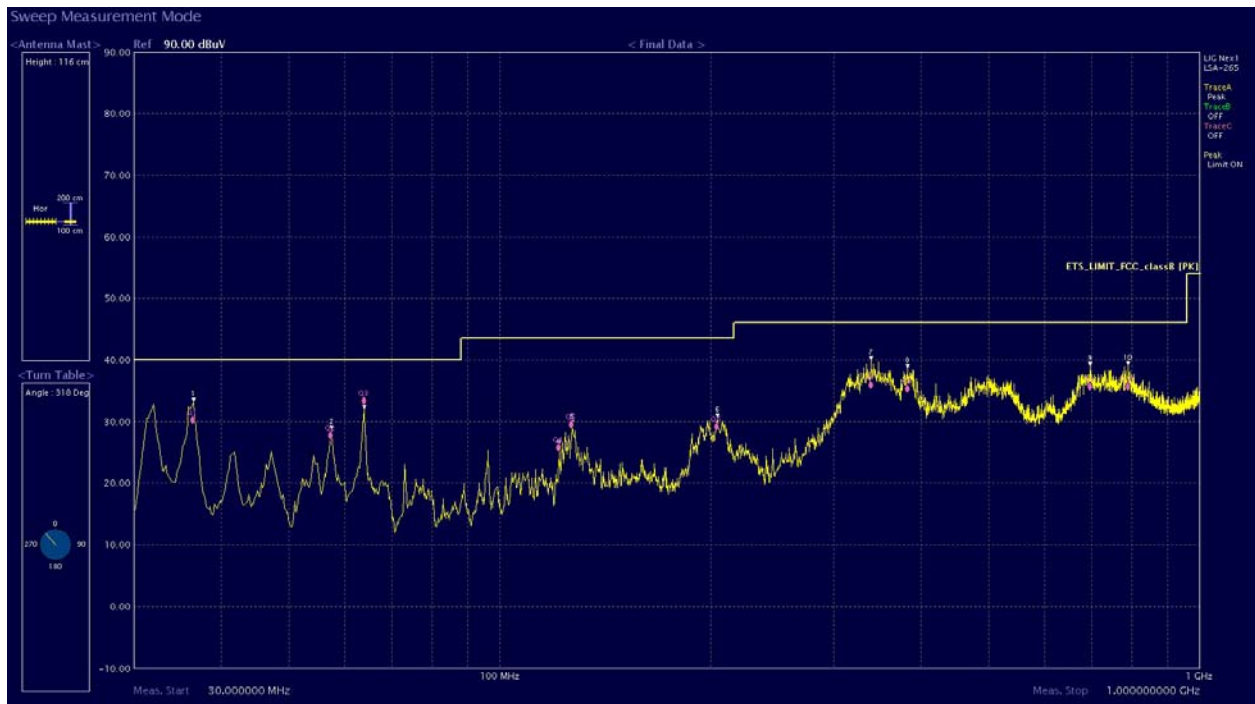
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Test Mode	Continuous TX	Test Channel	79 CH(2480 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	X-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
36.51	21.36	H	11.91	0.0	40.00	33.27	6.73
63.99	26.45	V	5.55	0.0	40.00	32.00	8.00
126.75	15.50	H	14.05	0.0	43.50	29.55	13.95
204.44	17.52	H	13.20	0.0	43.50	30.72	12.78
339.20	23.30	H	16.65	0.0	46.00	39.95	6.05
382.07	20.80	H	17.85	0.0	46.00	38.65	7.35
697.31	14.06	H	24.92	0.0	46.00	38.98	7.02
790.39	12.72	H	26.42	0.0	46.00	39.14	6.86

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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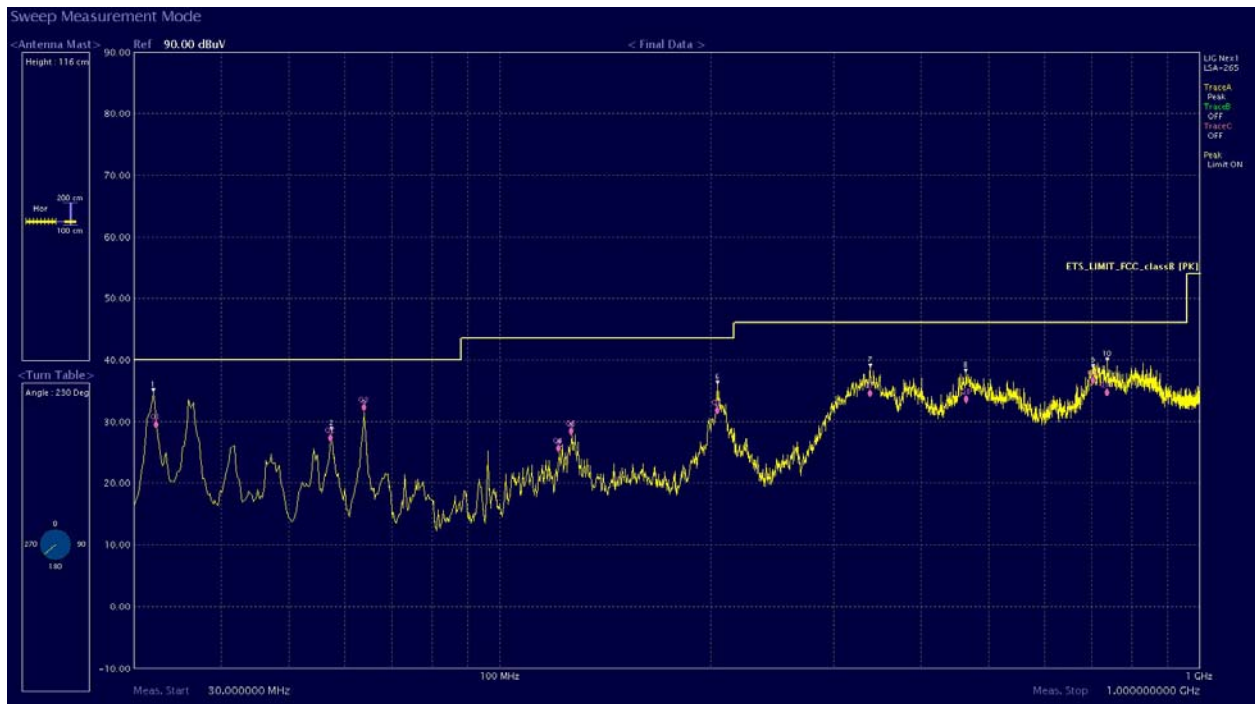
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Test Mode	Continuous TX	Test Channel	79 CH(2480 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	Y-Plane
Test Result	PASS		



Frequency MHz	Reading dBμV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBμV/m	Total dBμV/m	Margin dB
32.01	24.08	H	5.68	0.0	40.00	29.76	10.24
57.47	22.22	V	6.25	0.0	40.00	28.47	11.53
63.99	27.27	V	5.55	0.0	40.00	32.82	7.18
204.44	18.76	H	13.20	0.0	43.50	31.96	11.54
337.90	19.10	H	16.65	0.0	46.00	35.75	10.25
463.55	15.21	V	20.03	0.0	46.00	35.24	10.76
704.30	11.29	H	25.16	0.0	46.00	36.45	9.55
738.29	10.59	H	25.39	0.0	46.00	35.98	10.02

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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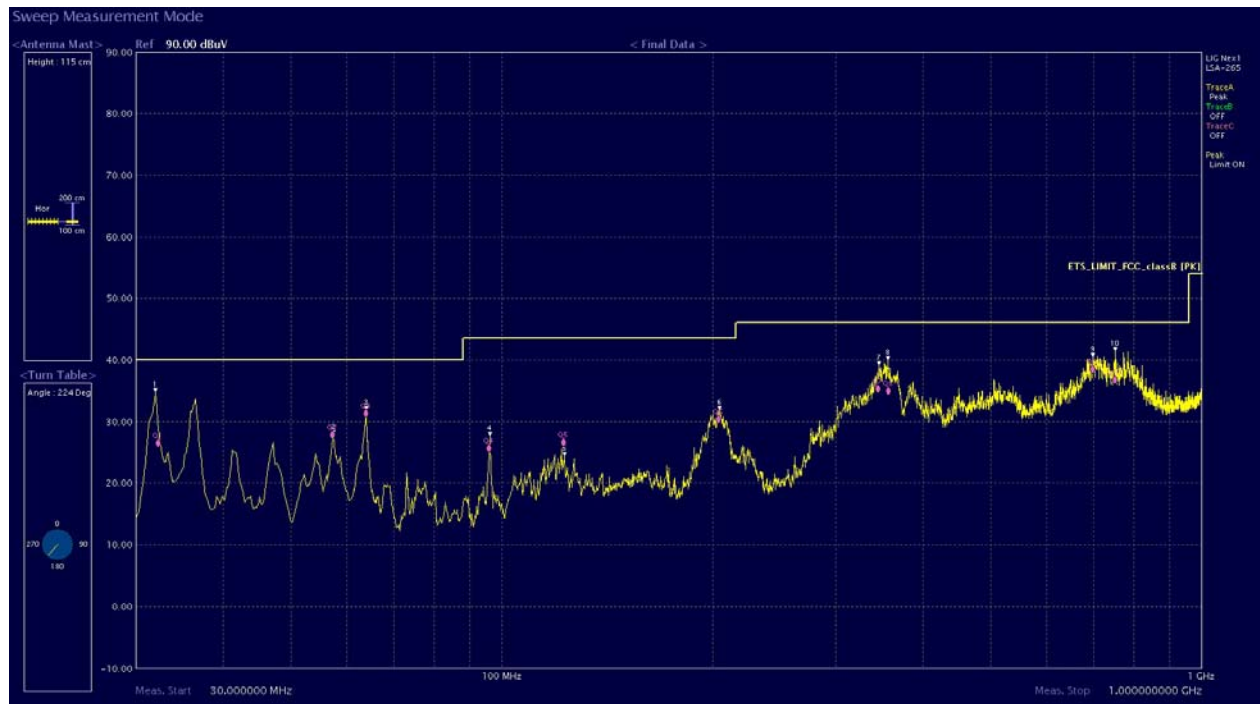
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Test Mode	Continuous TX	Test Channel	79 CH(2480 MHz)
Test Item	Radiated Emission(30 to 1000 MHz)	Polarization	Z-Plane
Test Result	PASS		



Frequency MHz	Reading dBuV/m	P (H, V)	Correct Factor dB	AMP GAIN dB	Limit dBuV/m	Total dBuV/m	Margin dB
32.01	20.86	H	5.68	0.0	40.00	26.54	13.46
57.47	21.66	V	6.25	0.0	40.00	27.91	12.09
63.99	26.39	V	5.55	0.0	40.00	31.94	8.06
204.44	18.76	H	13.20	0.0	43.50	31.96	11.54
345.71	18.45	H	16.69	0.0	46.00	35.14	10.86
356.14	17.67	H	17.00	0.0	46.00	34.67	11.33
699.21	13.58	H	24.99	0.0	46.00	38.57	7.43
752.02	12.06	H	25.78	0.0	46.00	37.84	8.16

Note :

1. All reading levels are Quasi-peak value.
2. Measurement level = reading level + correct factor
3. Correct factor = Ant. Factor + Cable loss

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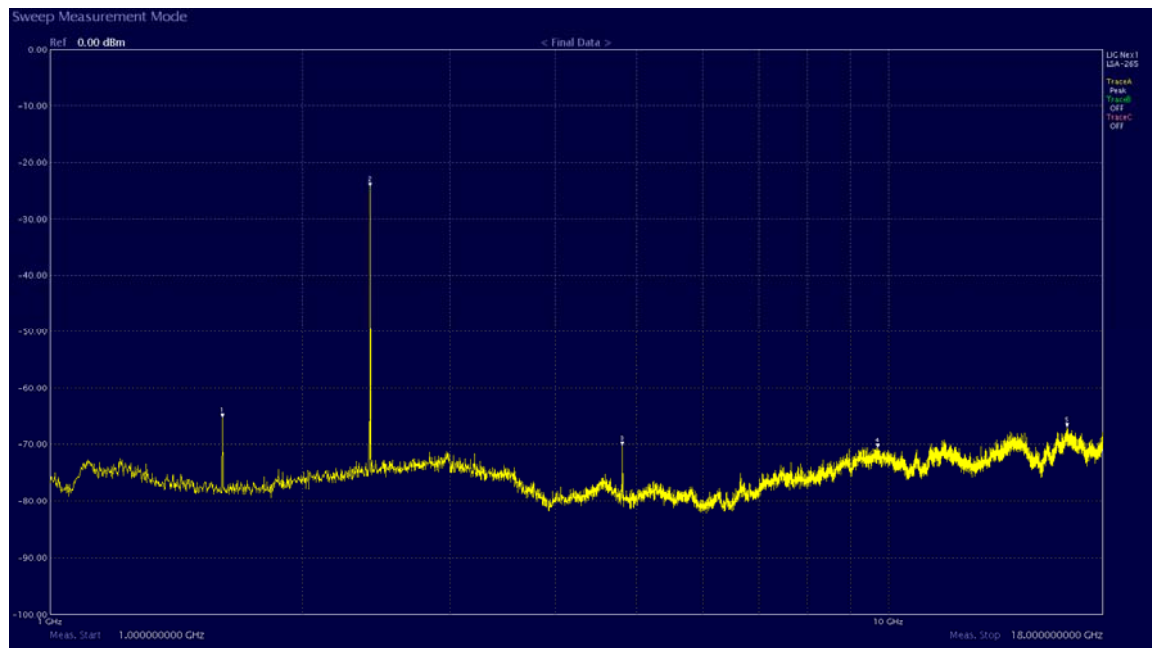
Tel: +82 31 493 2001

Fax: +82 31 493 2055

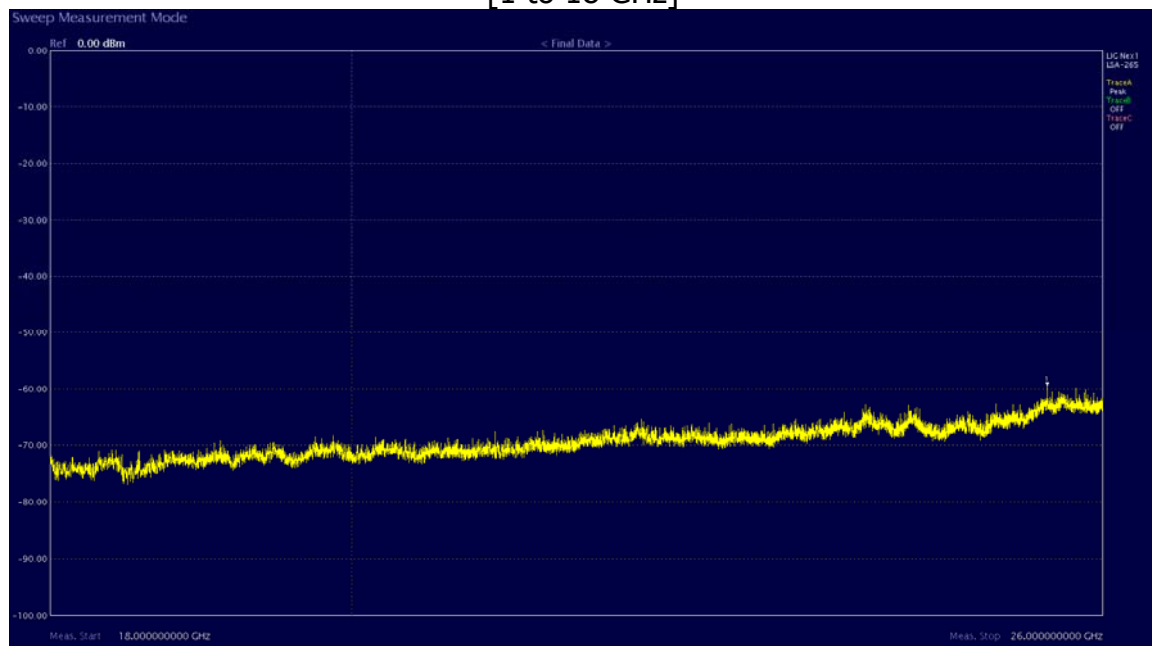
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3.2.5.3 Fundamental & Harmonics Radiated Emission Result(1 GHz to 26 GHz)

Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	X-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

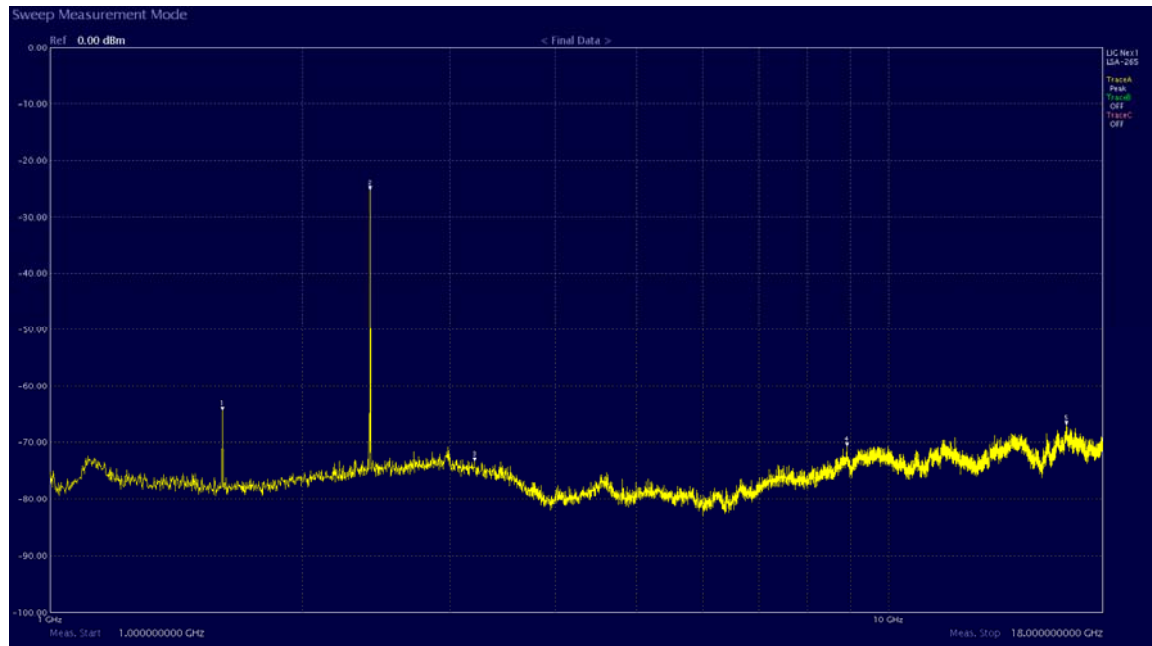
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2402	82.75(PK)	Hor.	114/94	31.25
1606	41.75(PK)	Hor.	74/54	32.25
25501	47.49(PK)	Hor.	74/54	26.51
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

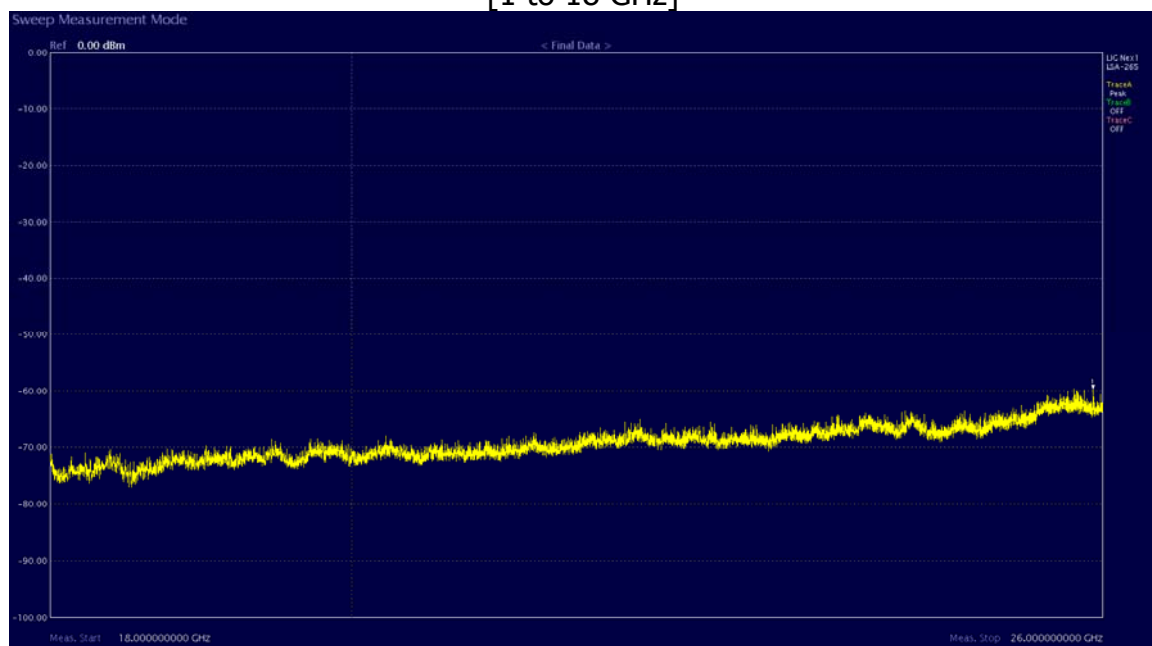
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	X-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

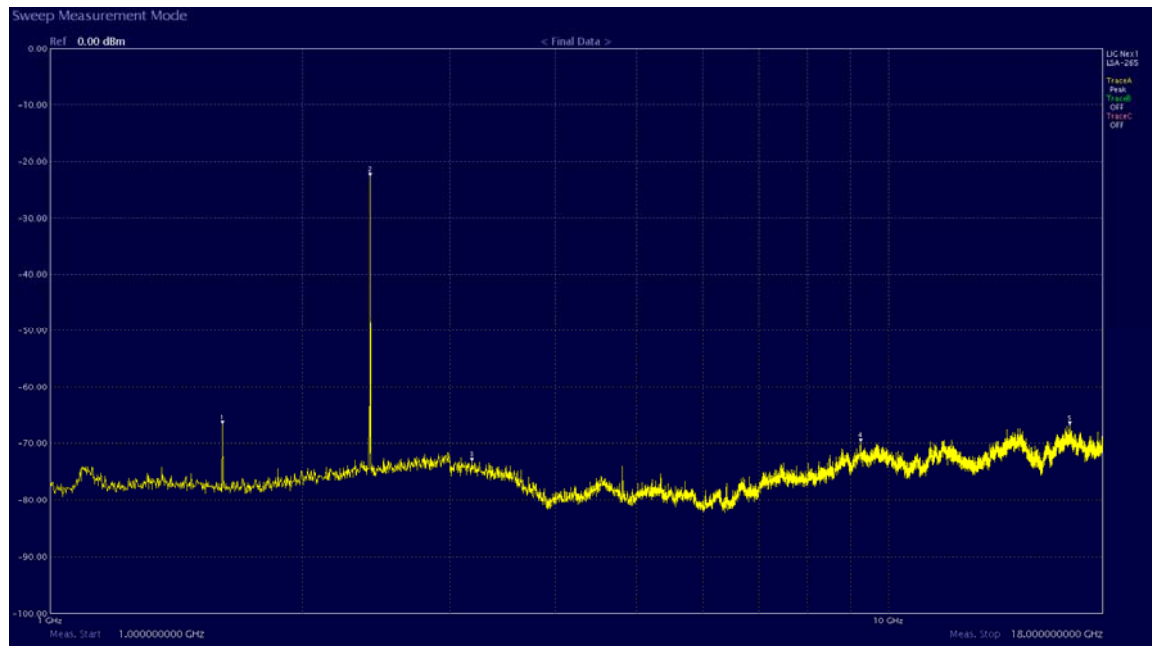
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2402	81.72(PK)	Ver.	114/94	32.28
1606	42.61(PK)	Ver.	74/54	31.39
25914	42.28(PK)	Ver.	74/54	31.72
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

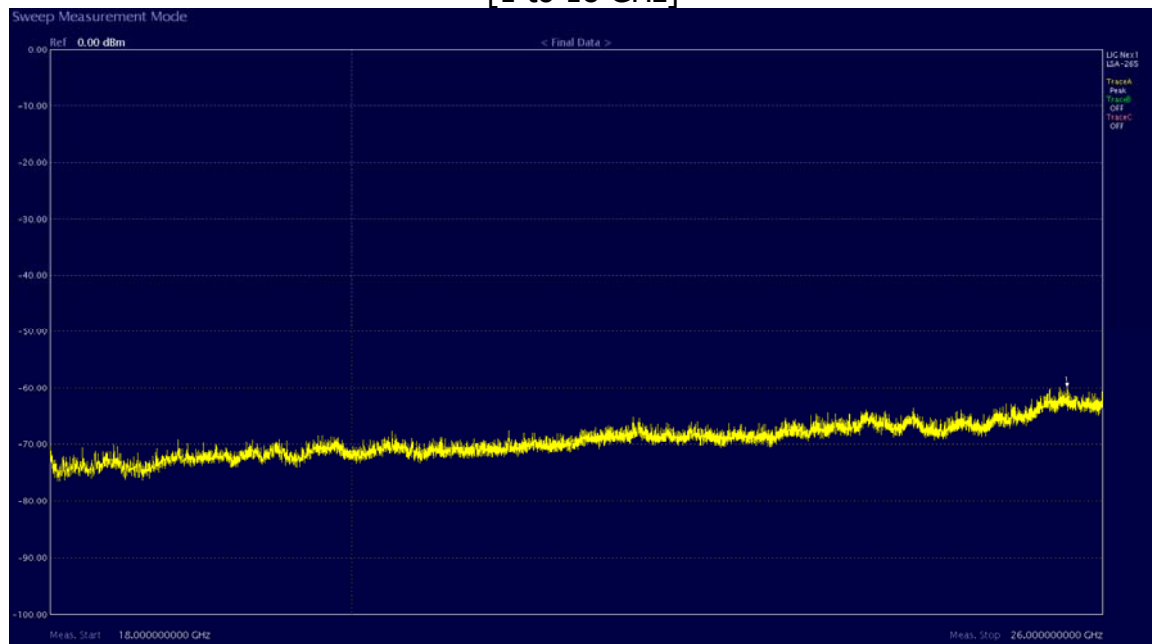
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Y-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

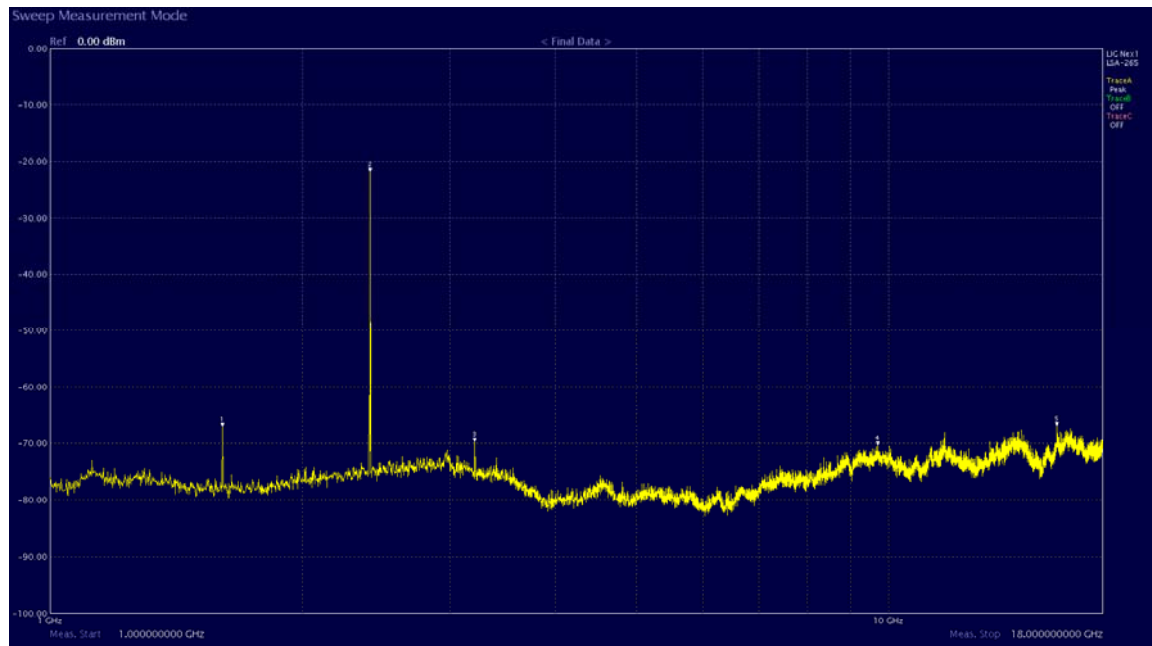
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2402	84.31(PK)	Hor.	114/94	29.69
1606	40.28(PK)	Hor.	74/54	33.72
25678	47.14(PK)	Hor.	74/54	26.86
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

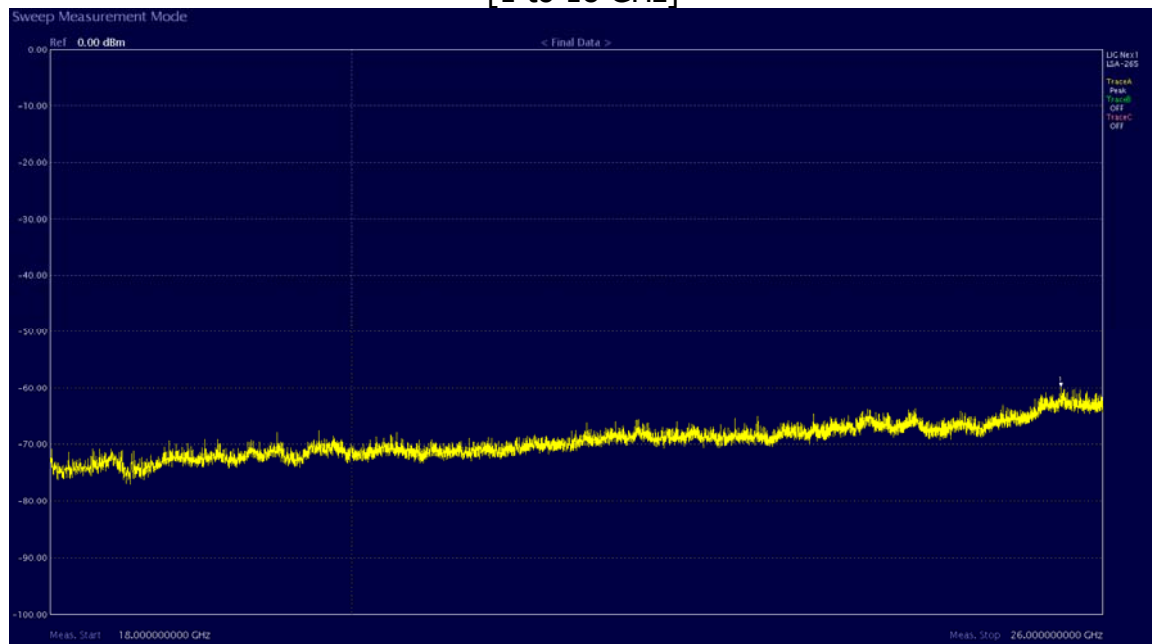
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Y-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

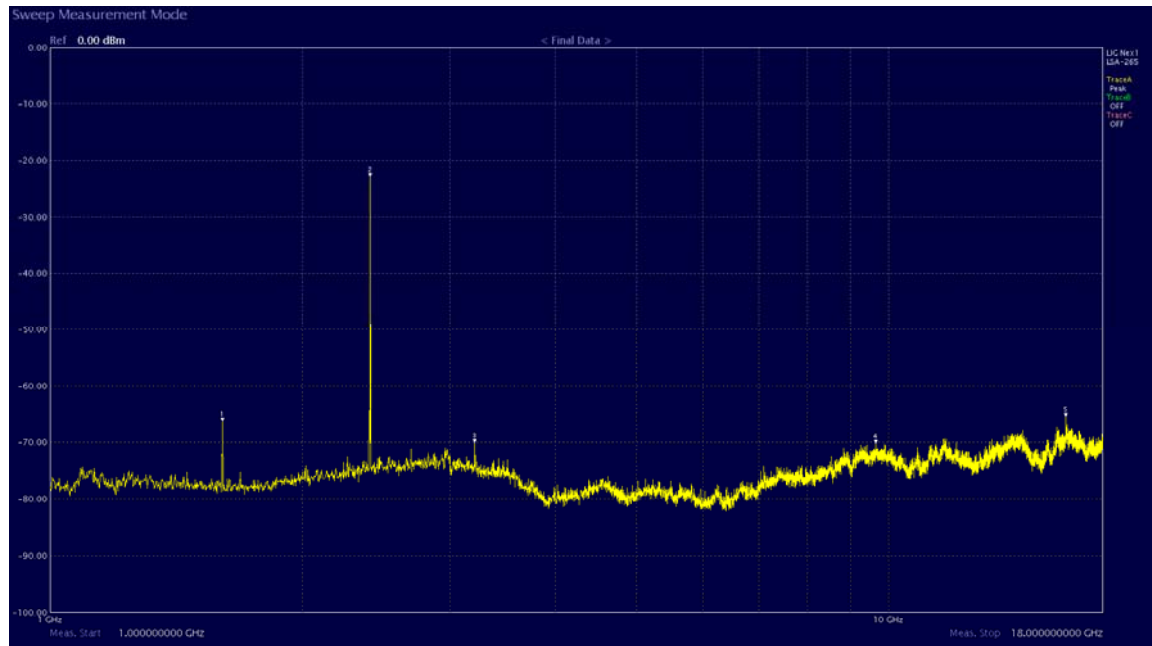
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2402	85.11(PK)	Ver.	114/94	28.89
1606	39.93(PK)	Ver.	74/54	34.07
25678	47.14(PK)	Ver.	74/54	26.86
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

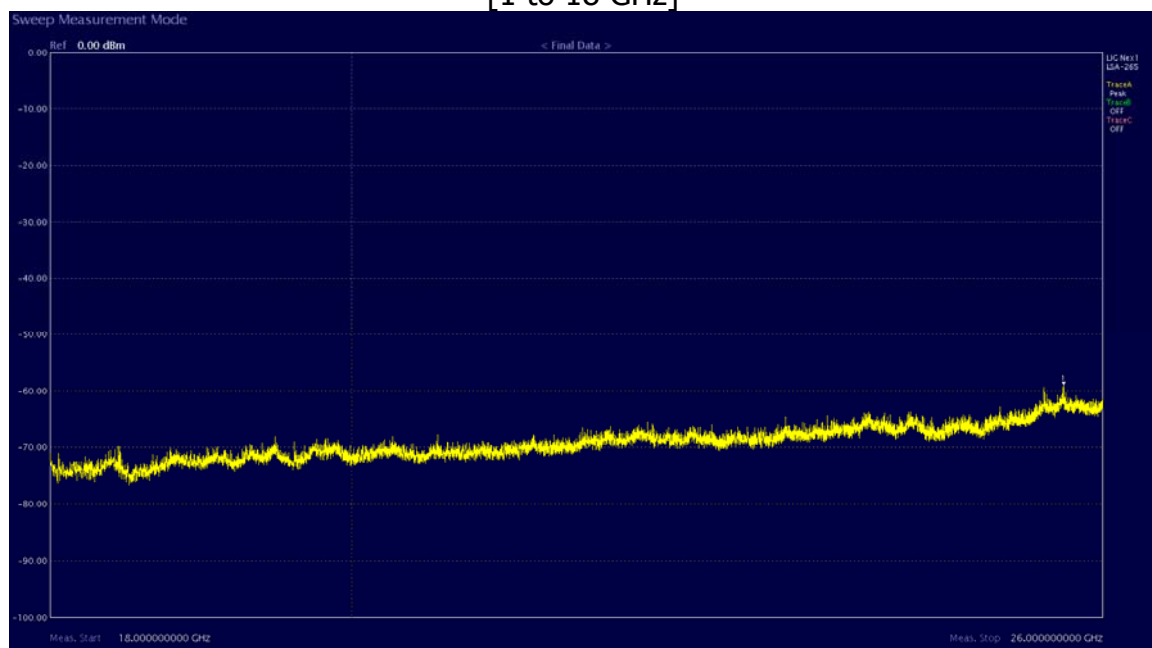
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Z-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

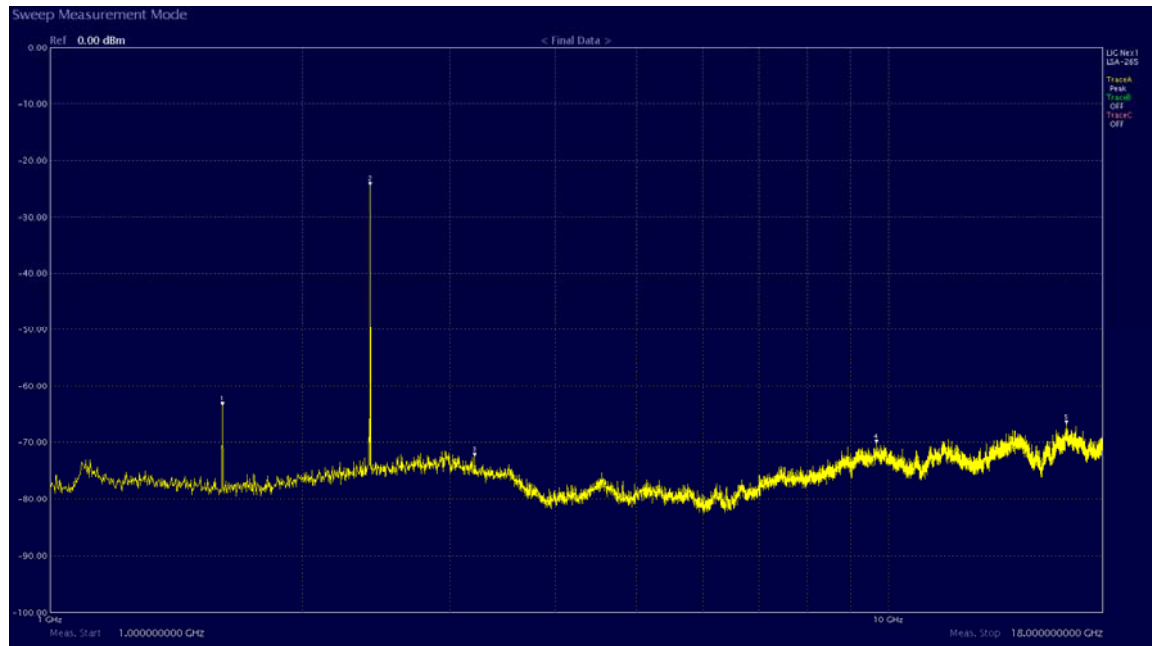
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2402	84.04(PK)	Hor.	114/94	29.96
1606	40.67(PK)	Hor.	74/54	33.33
25646	47.93(PK)	Hor.	74/54	26.07
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

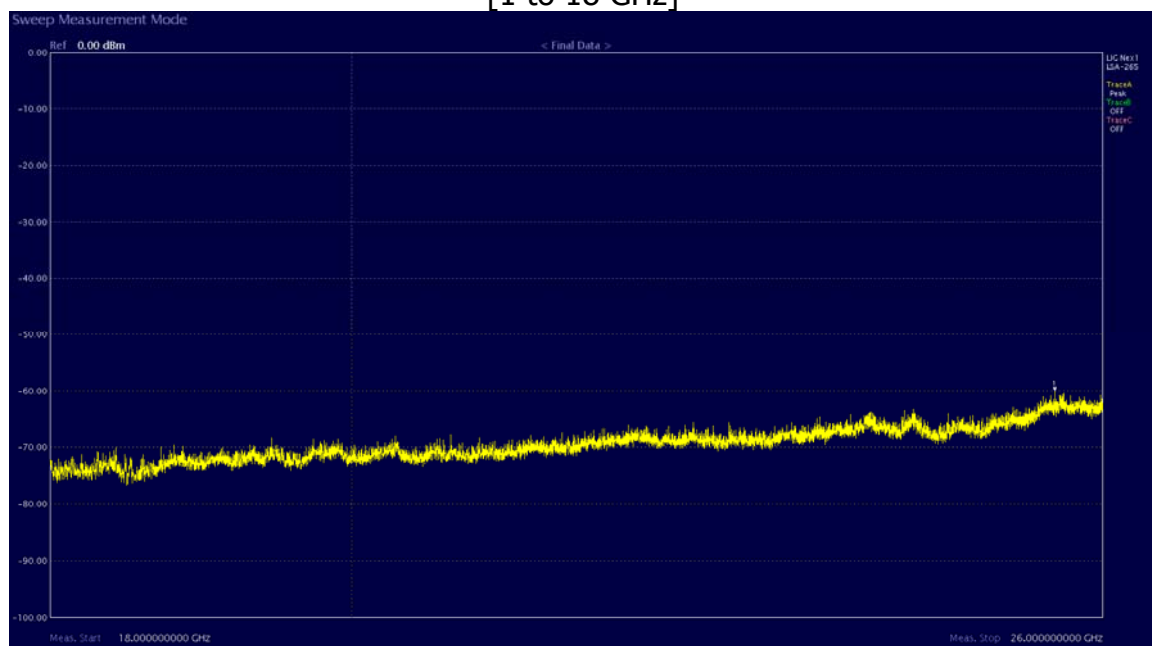
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	0 CH (2402 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Z-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

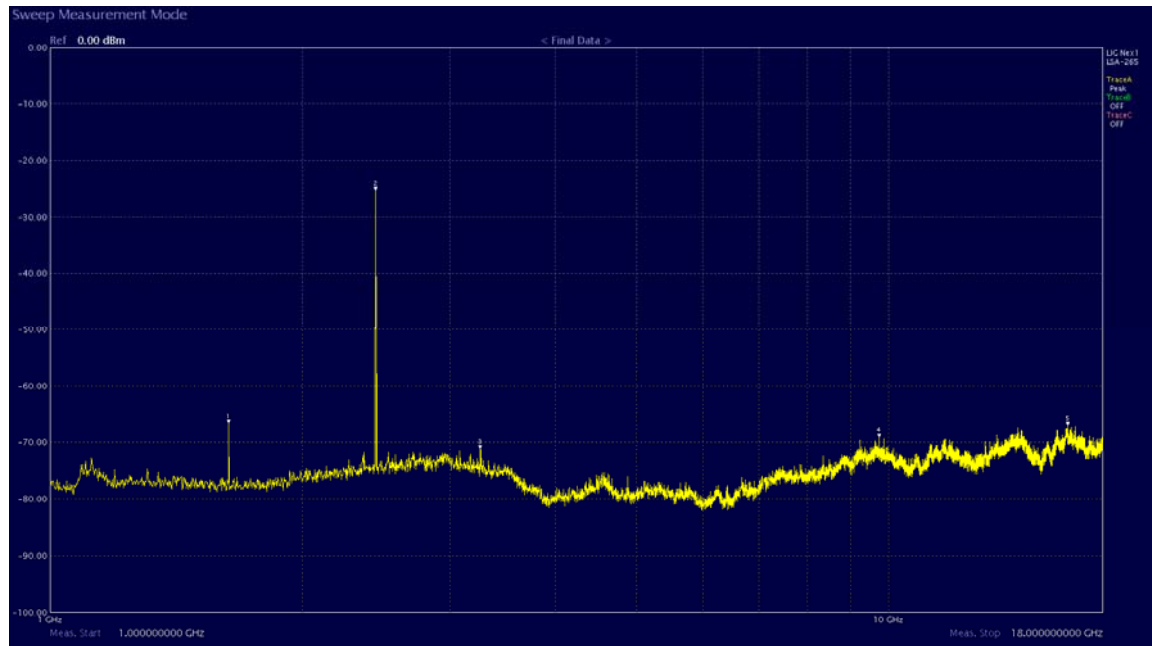
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2402	82.54(PK)	Ver.	114/94	31.46
1606	43.41(PK)	Ver.	74/54	30.59
25571	46.90(PK)	Ver.	74/54	27.10
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

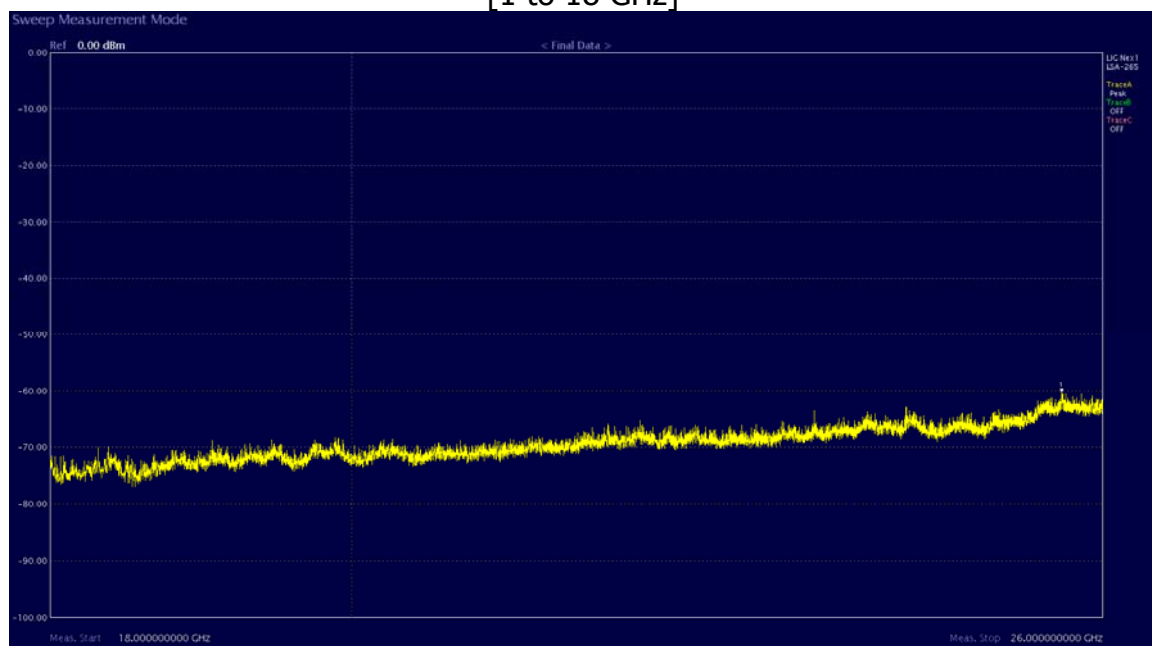
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	39CH (2441 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	X-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

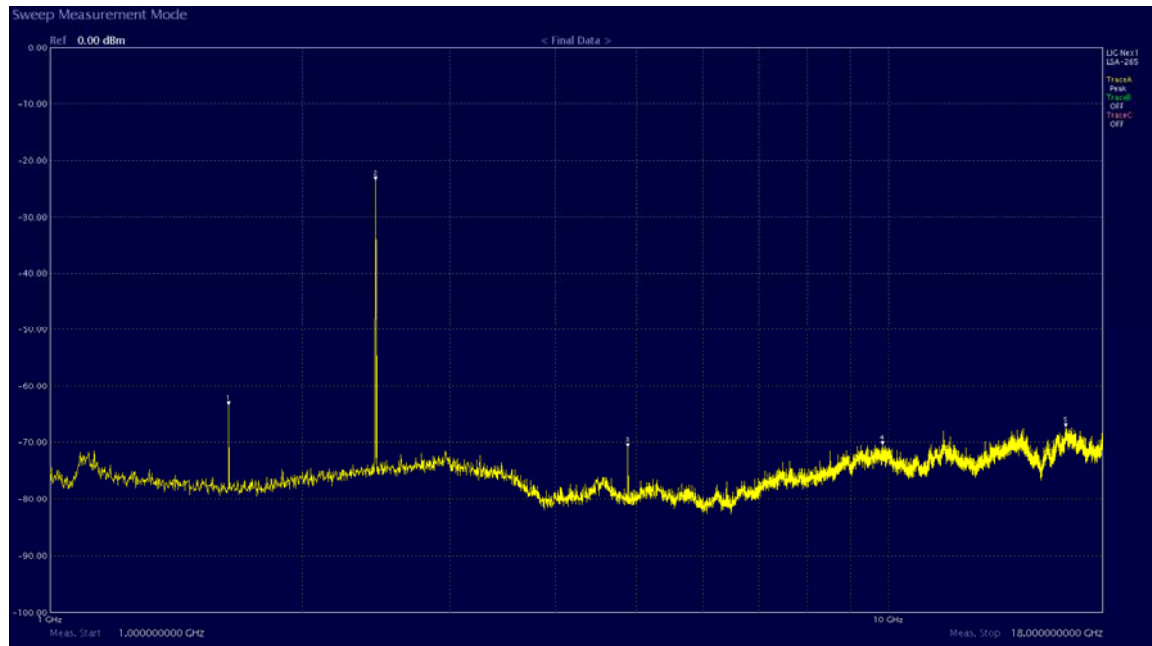
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2441	81.70(PK)	Hor.	114/94	32.30
1630	40.33(PK)	Hor.	74/54	33.67
25631	46.67(PK)	Hor.	74/54	27.33
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

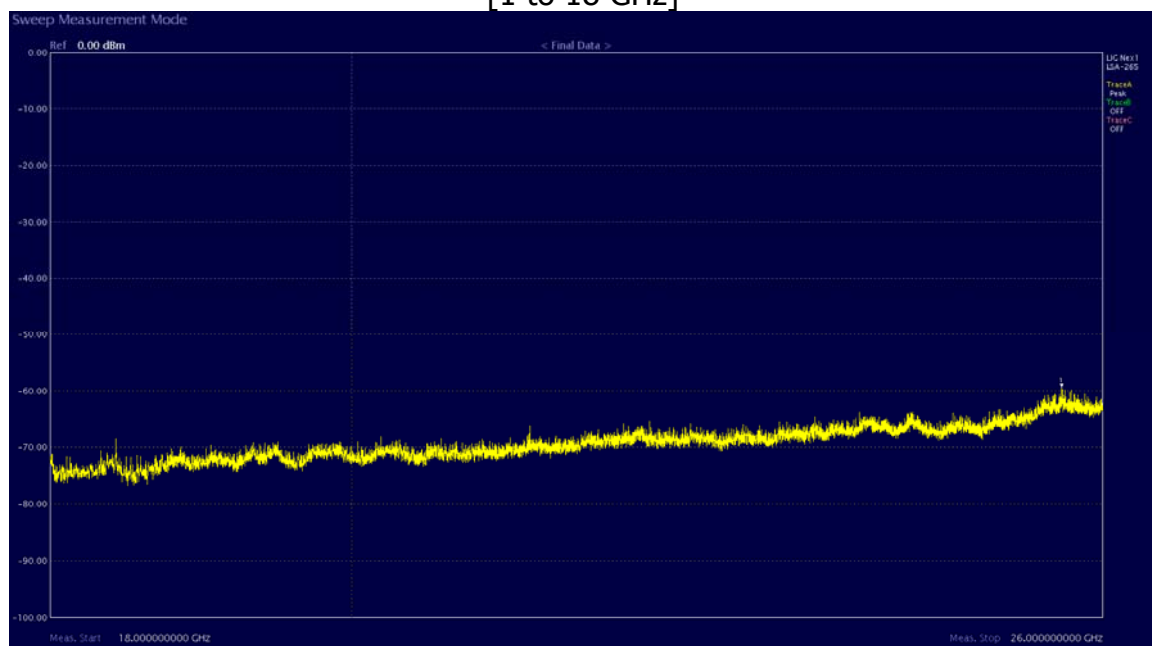
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	39CH (2441 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	X-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

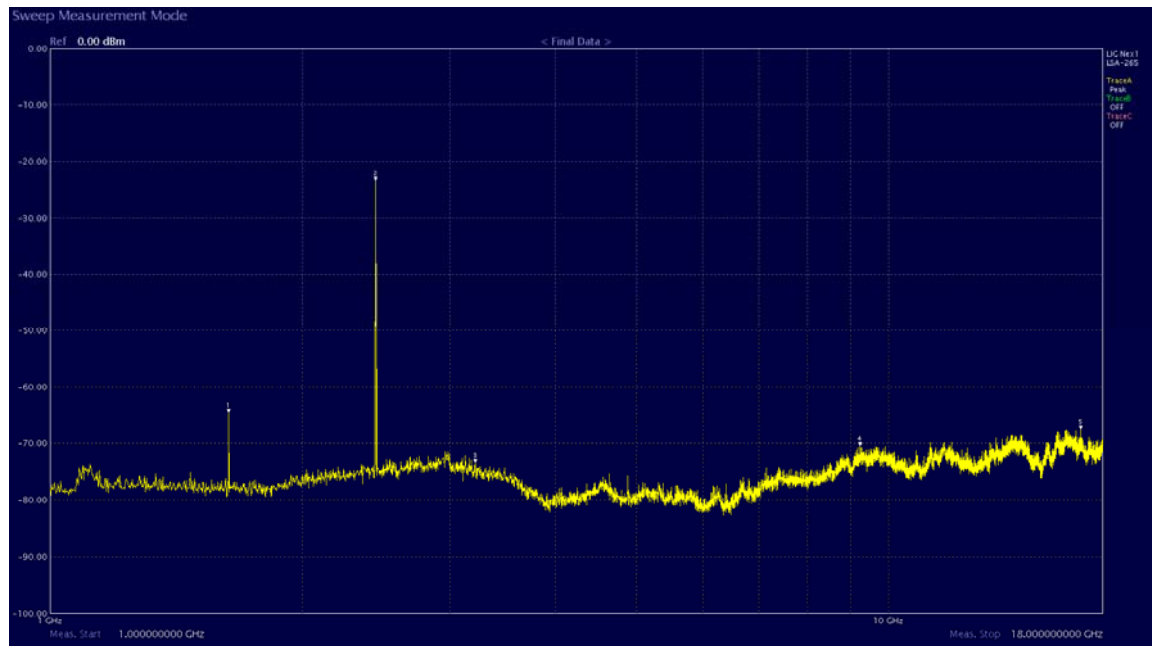
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2441	83.50(PK)	Ver.	114/94	30.50
1630	43.55(PK)	Ver.	74/54	30.45
25628	47.58(PK)	Ver.	74/54	26.42
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

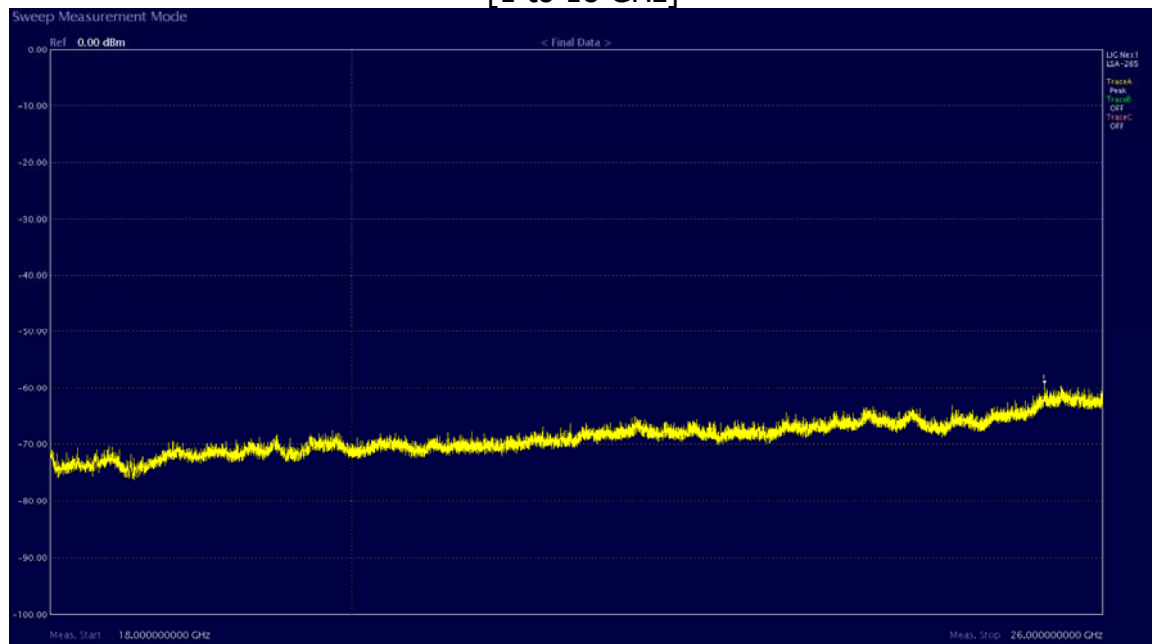
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	39CH (2441 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Y-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

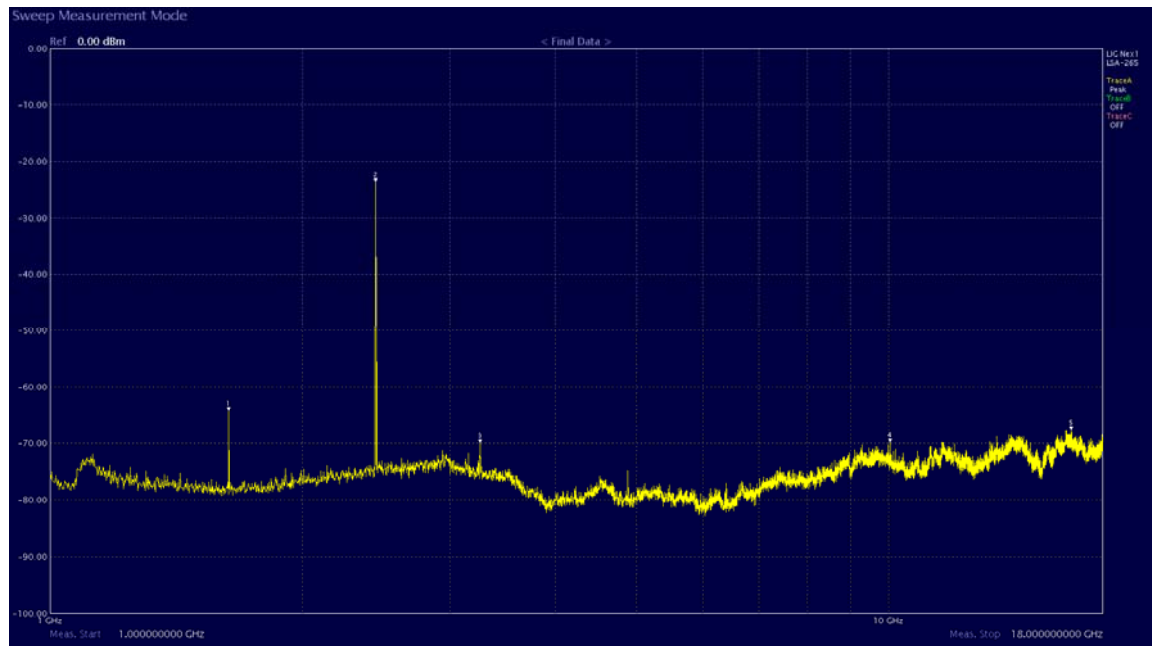
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2441	83.63(PK)	Hor.	114/94	30.37
1630	42.32(PK)	Hor.	74/54	31.68
25478	47.56(PK)	Hor.	74/54	26.44
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

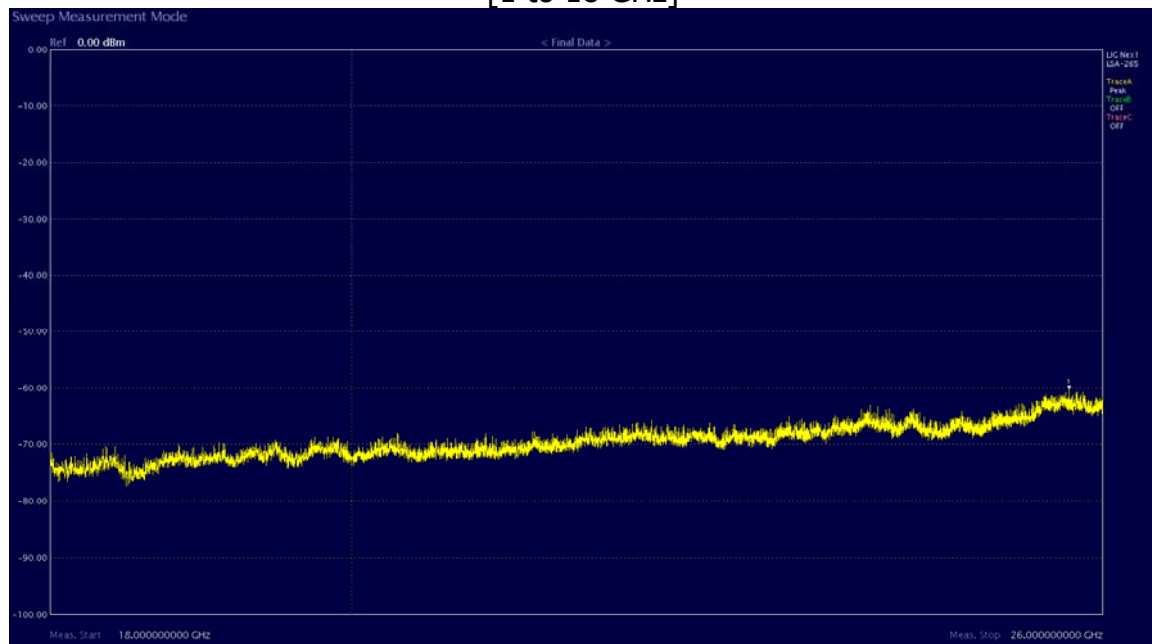
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	39CH (2441 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Y-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

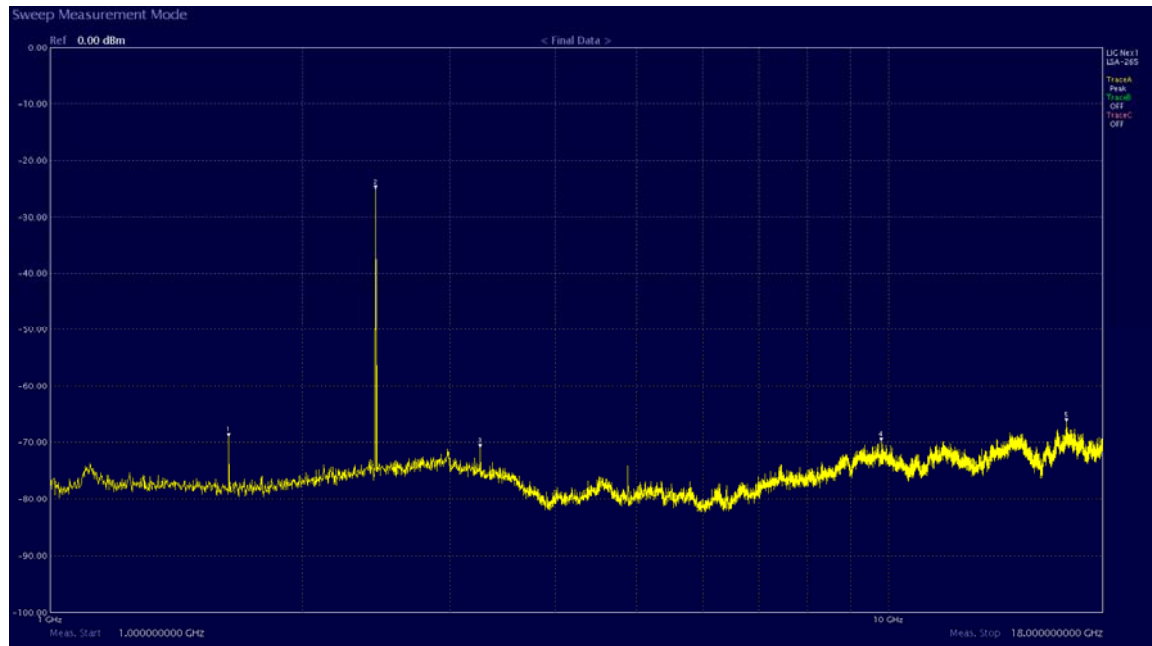
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2441	83.37(PK)	Ver.	114/94	30.63
1630	42.72(PK)	Ver.	74/54	31.28
25696	46.67(PK)	Ver.	74/54	27.33
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

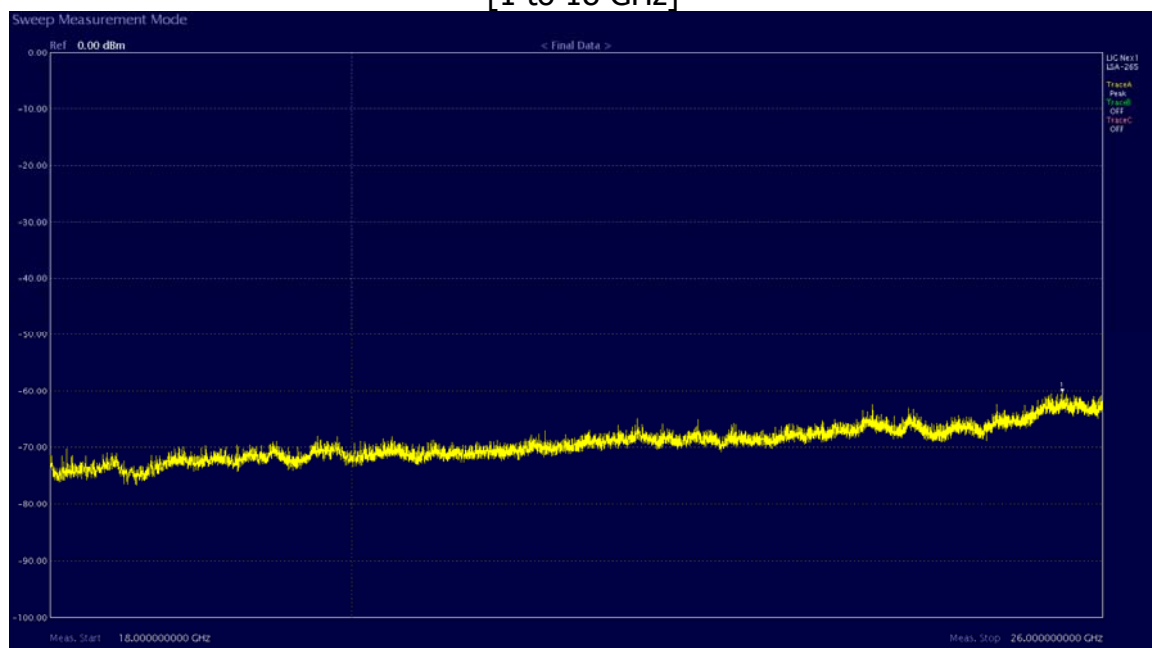
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	39CH (2441 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Z-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

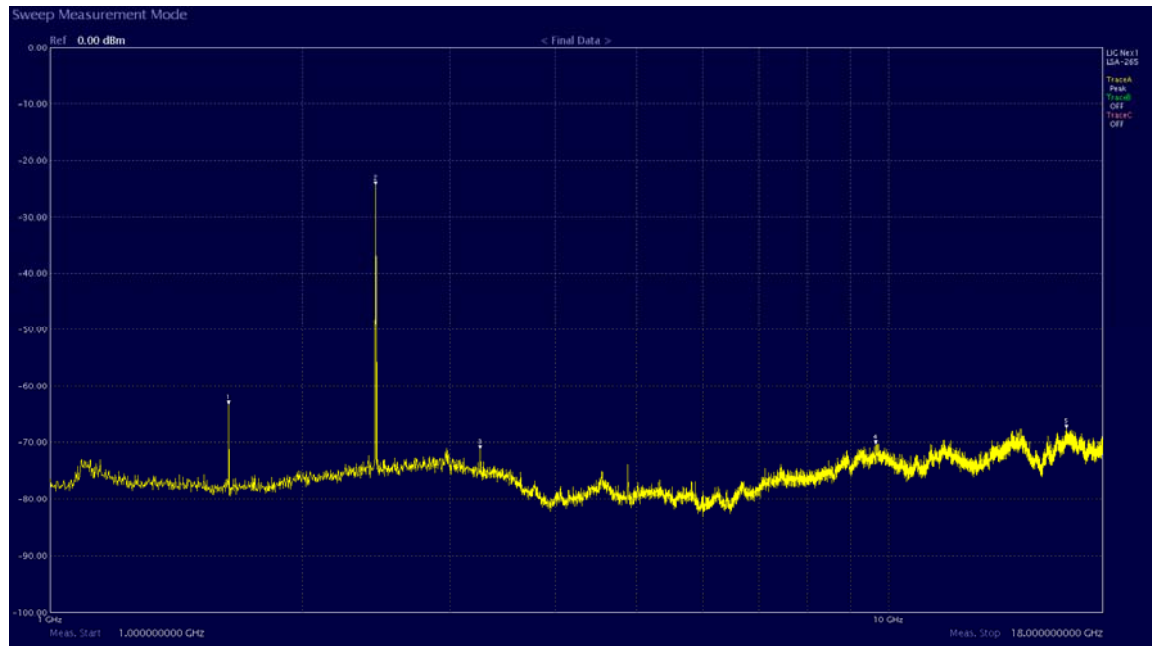
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2441	79.53(PK)	Hor.	114/94	37.47
16291	40.54(PK)	Hor.	74/54	33.46
25633	46.72(PK)	Hor.	74/54	27.28
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

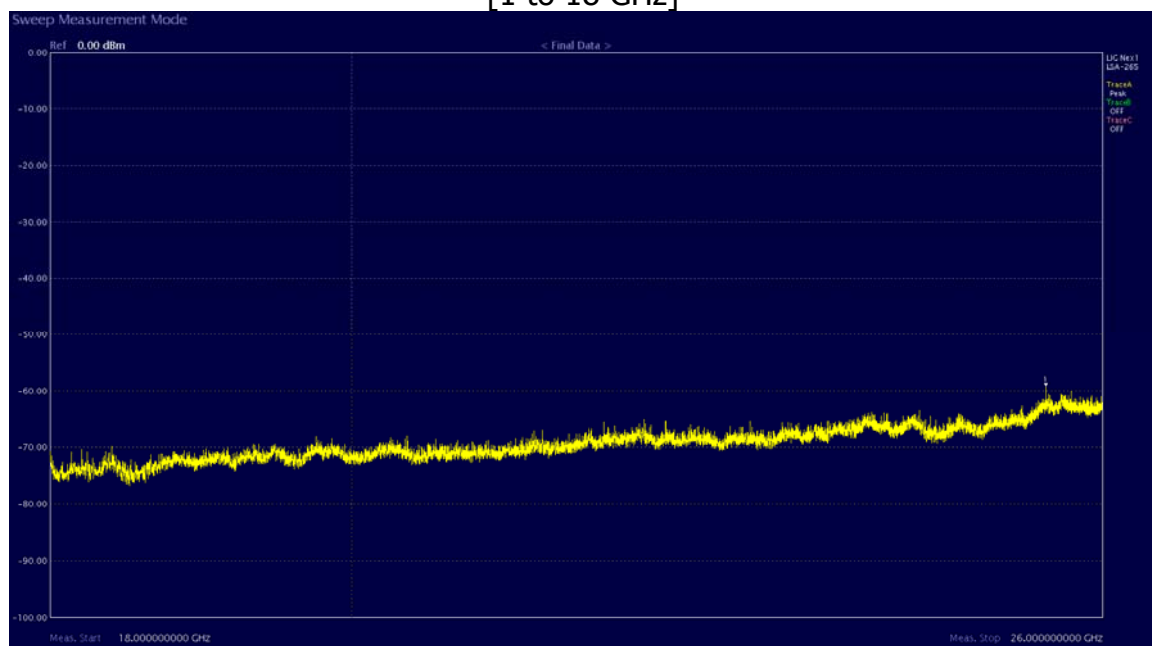
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	39CH (2441 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Z-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

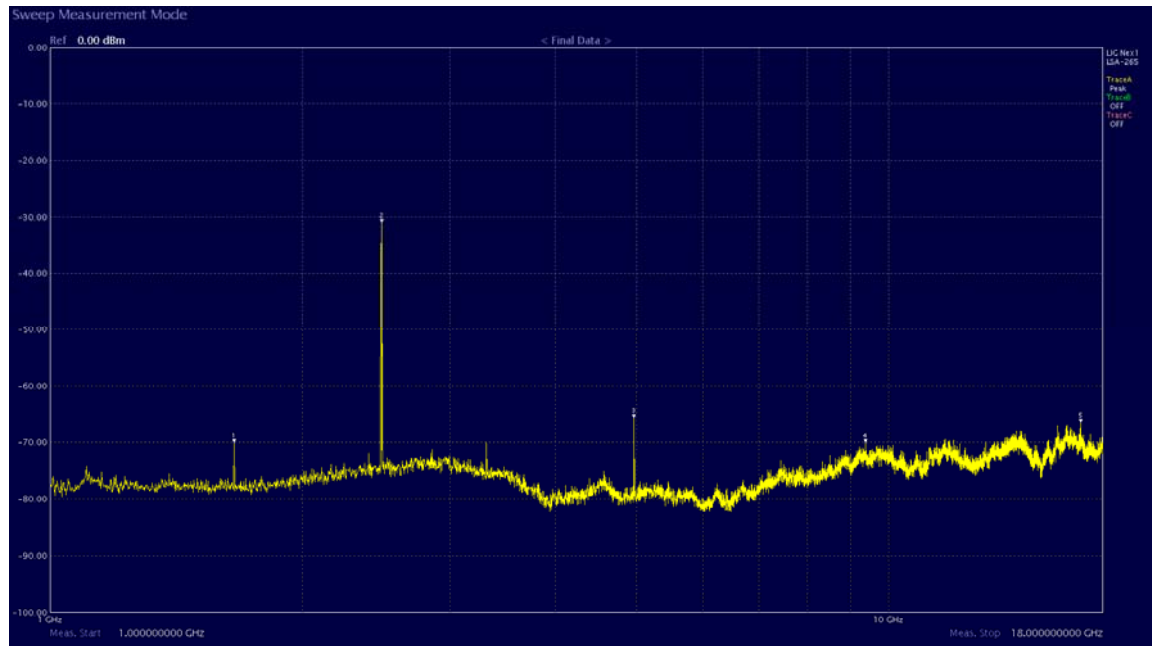
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2441	82.58(PK)	Ver.	114/94	31.42
1630	43.72(PK)	Ver.	74/54	30.28
25489	47.64(PK)	Ver.	74/54	26.36
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

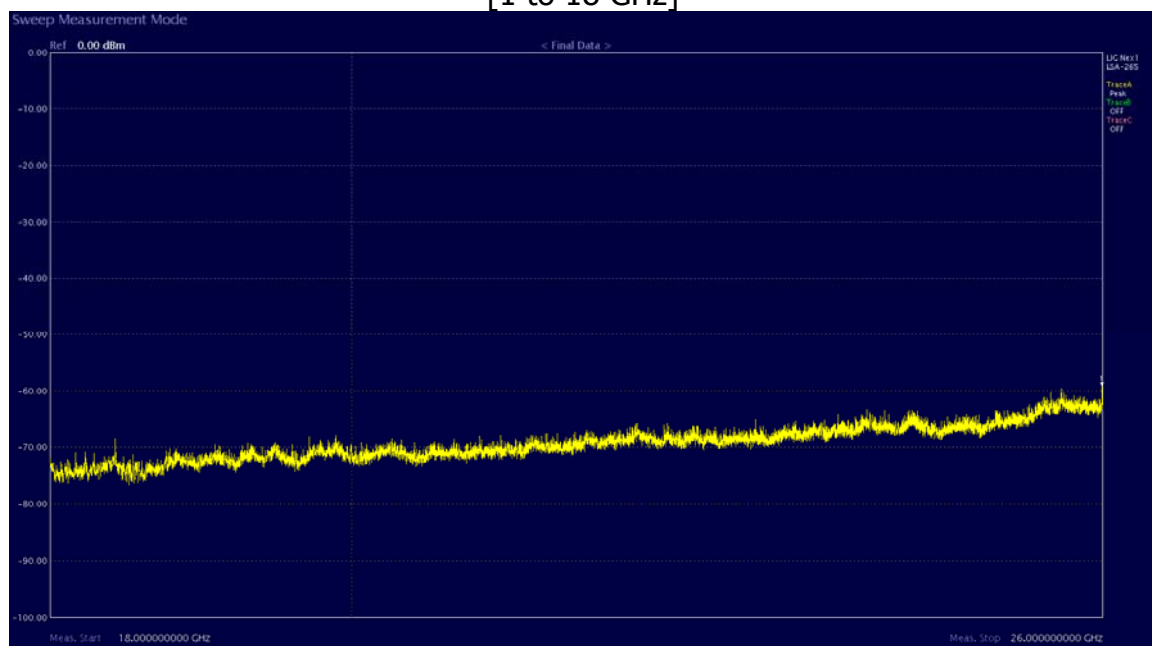
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	78CH (2480 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	X-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

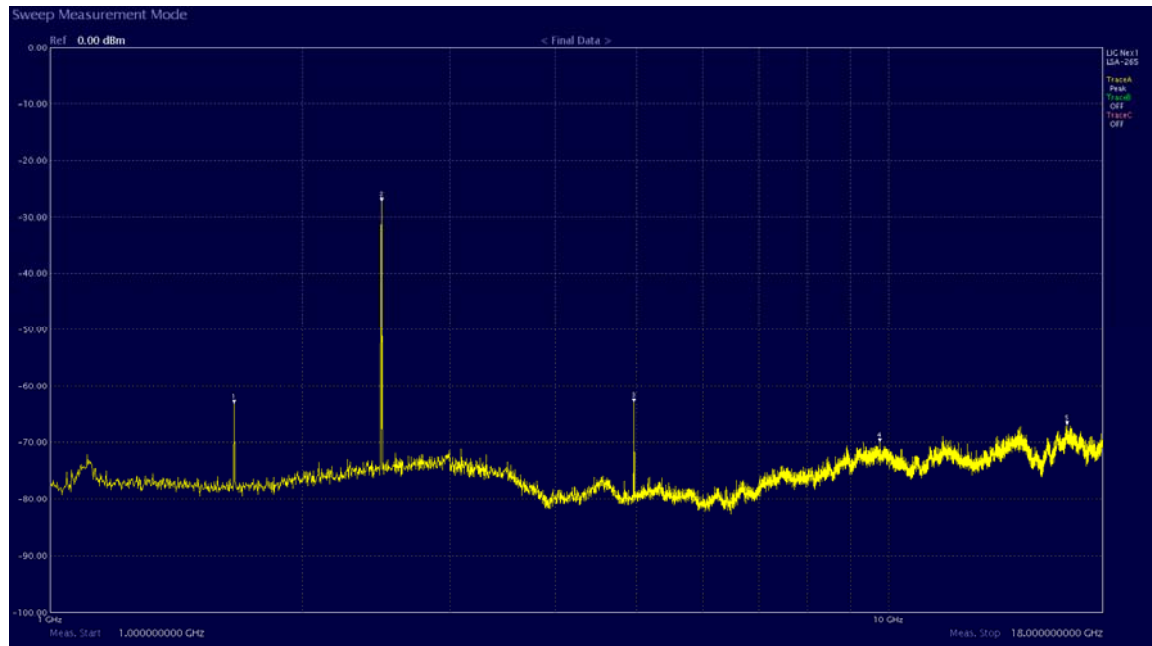
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2480	75.94(PK)	Hor.	114/94	38.06
4964	41.33(PK)	Hor.	74/54	32.67
25996	47.77(PK)	Hor.	74/54	26.23
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

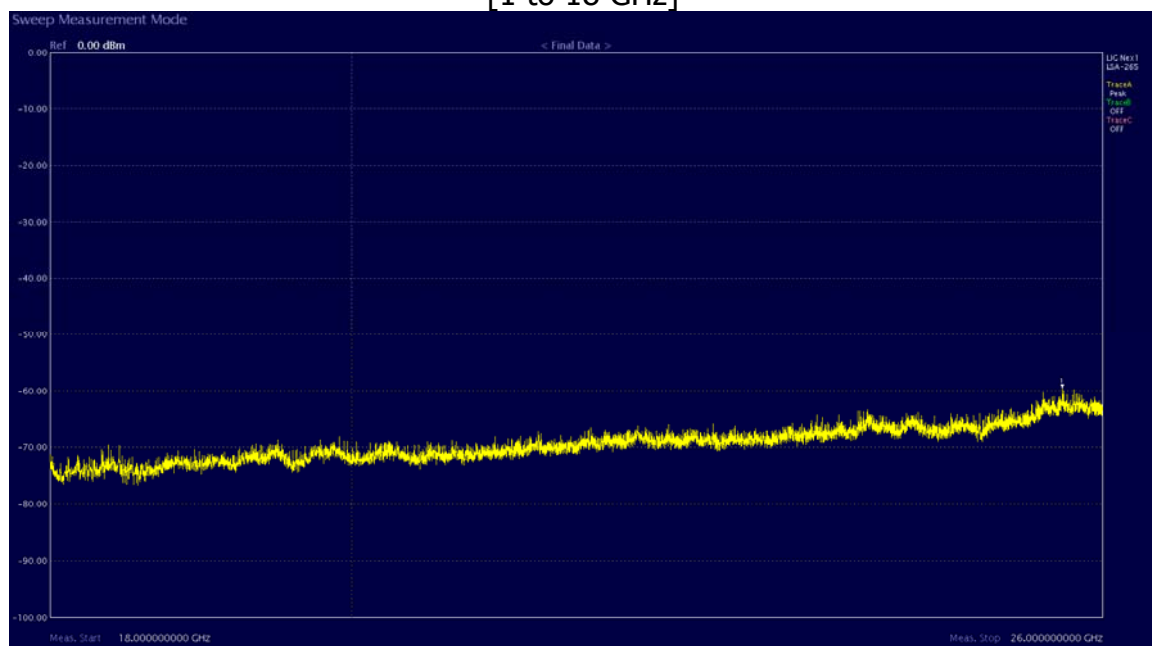
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	78CH (2480 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	X-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

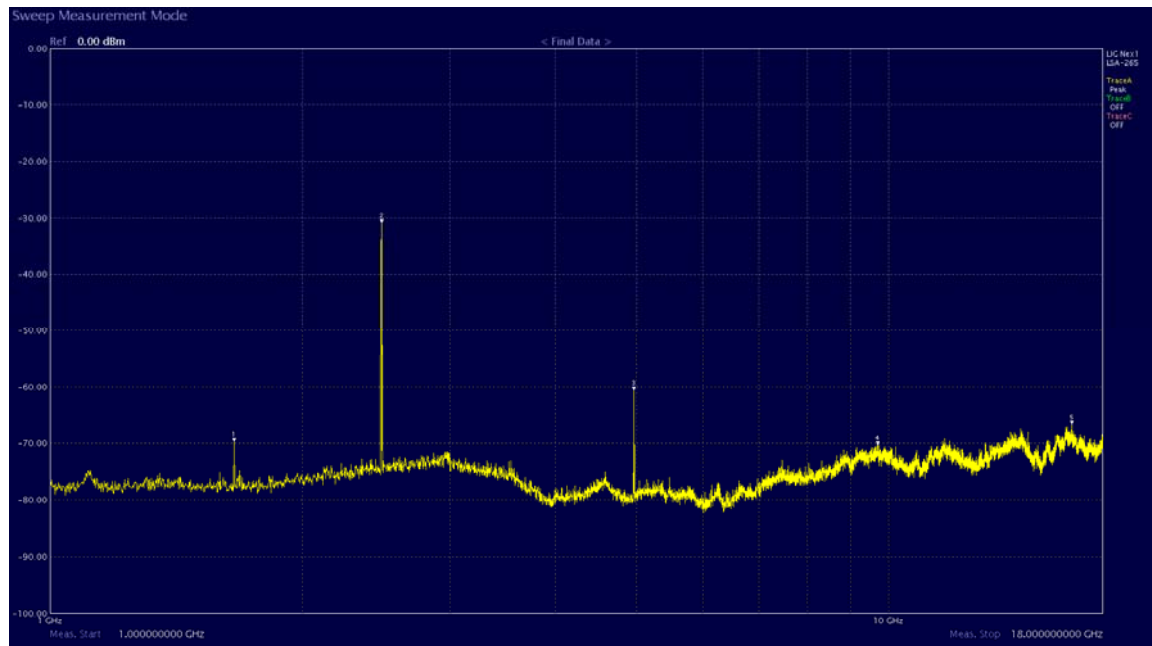
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2480	79.66(PK)	Ver.	114/94	34.34
4964	44.02(PK)	Ver.	74/54	29.98
25637	47.38(PK)	Ver.	74/54	26.62
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

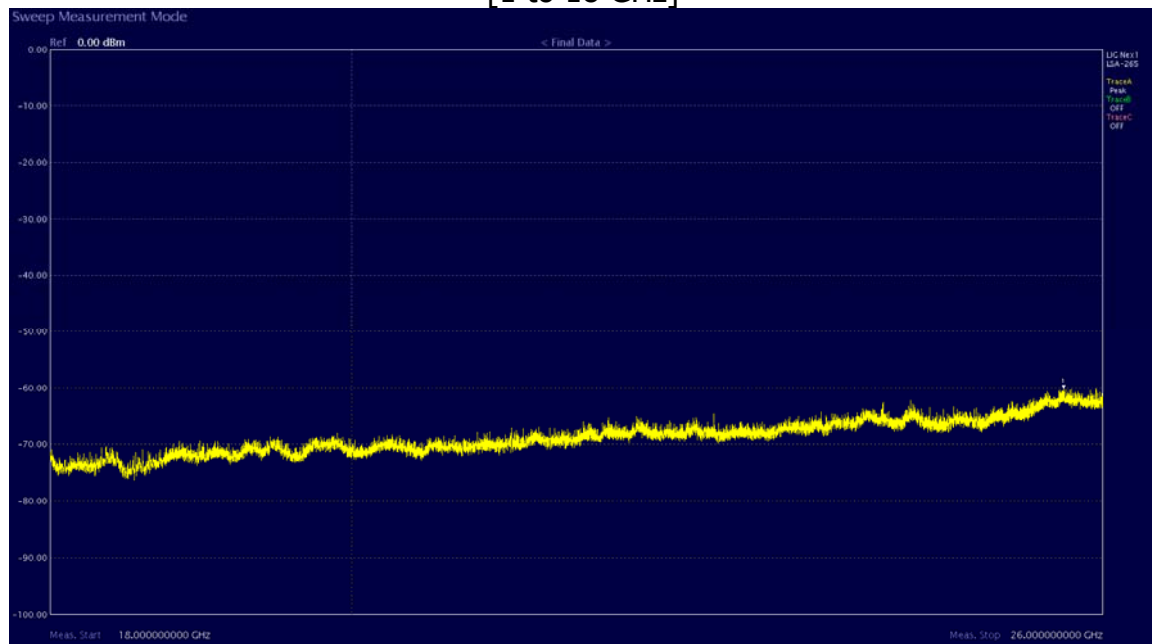
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	78CH (2480 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Y-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

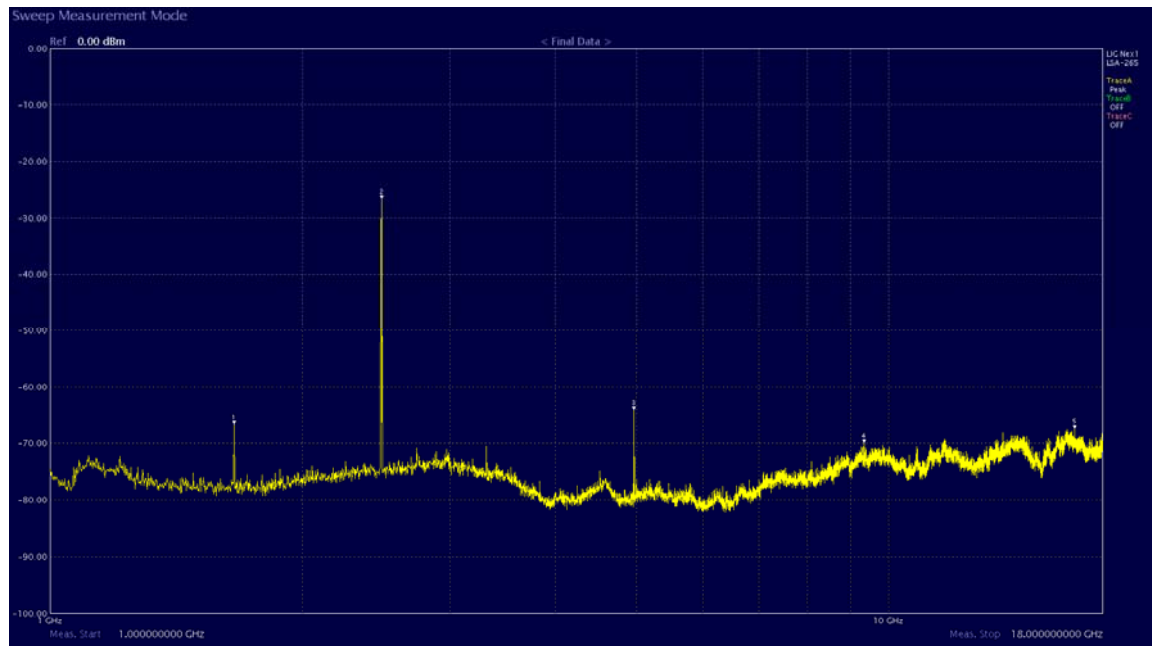
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2480	76.15(PK)	Hor.	114/94	37.85
4964	46.33(PK)	Hor.	74/54	27.67
25646	46.89(PK)	Hor.	74/54	27.11
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

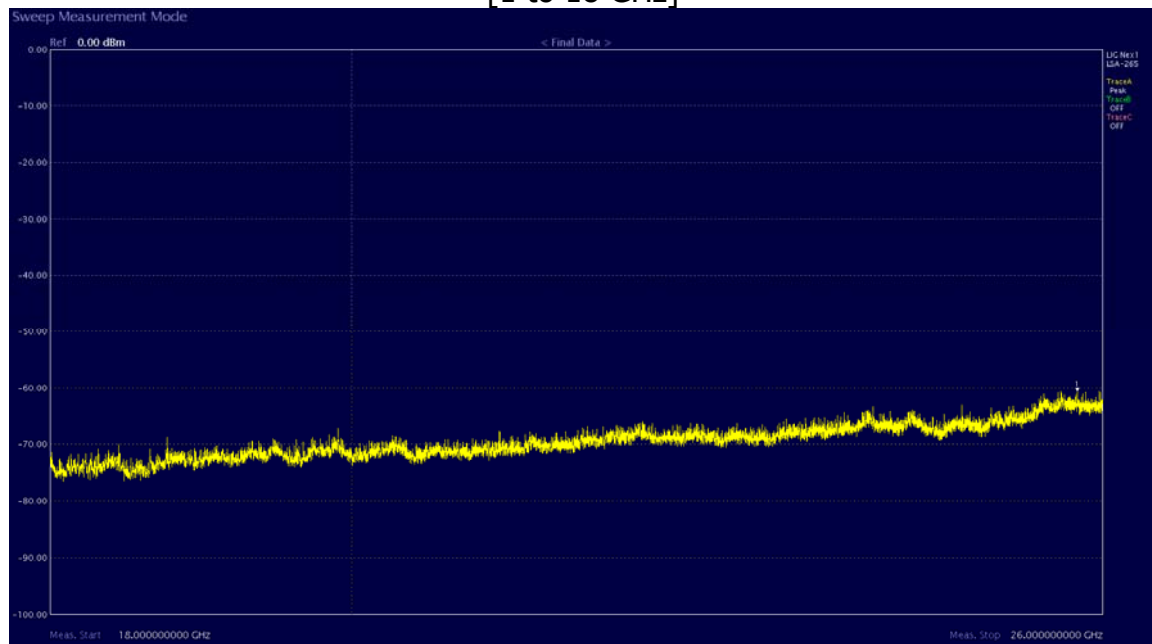
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	78CH (2480 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Y-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

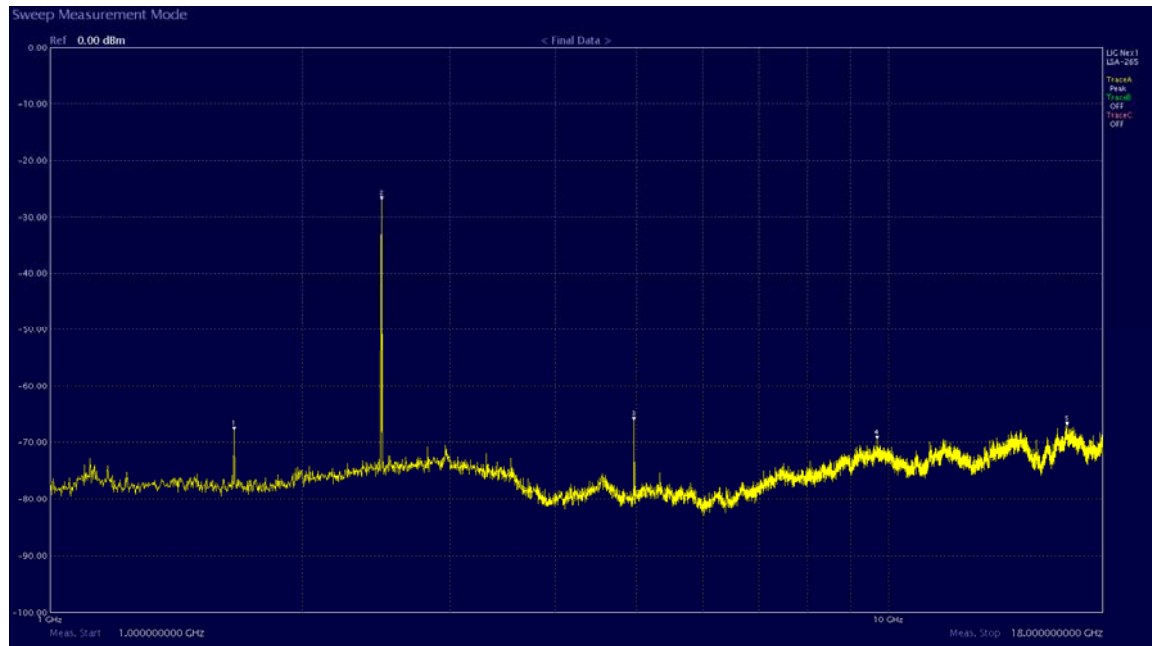
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2480	80.27(PK)	Ver.	114/94	33.73
4964	42.90(PK)	Ver.	74/54	31.10
25773	46.39(PK)	Ver.	74/54	27.61
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

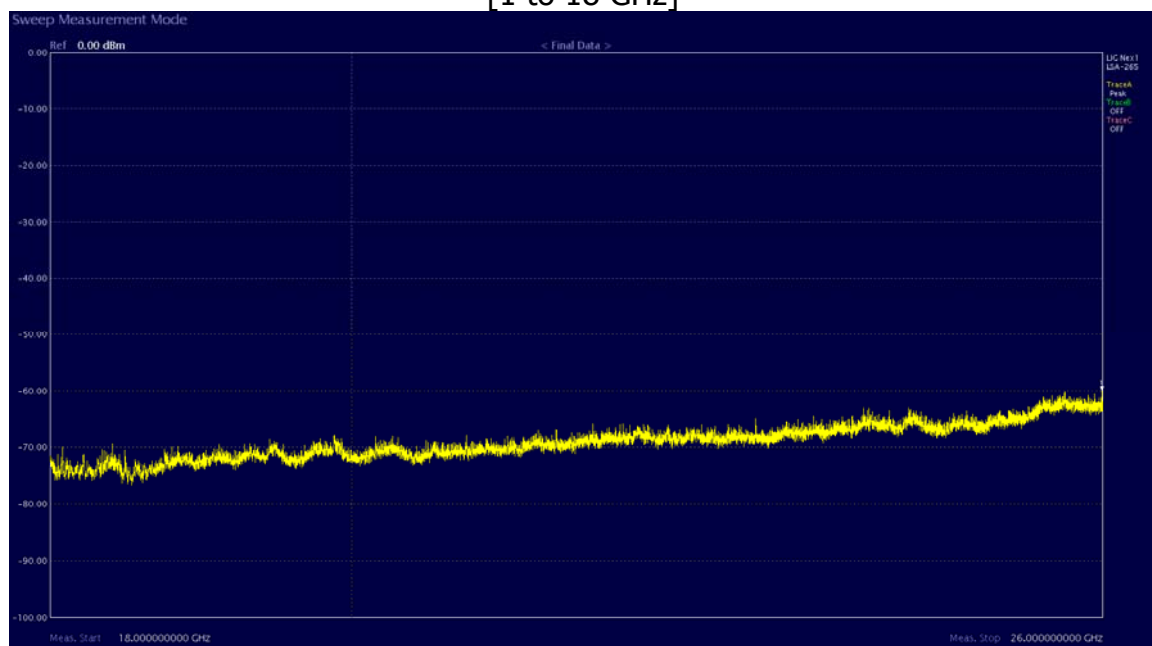
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	78CH (2480 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Z-Plane
Test Result	PASS	Ant. Polarization	Horizontal



[1 to 18 GHz]



[18 to 26 GHz]

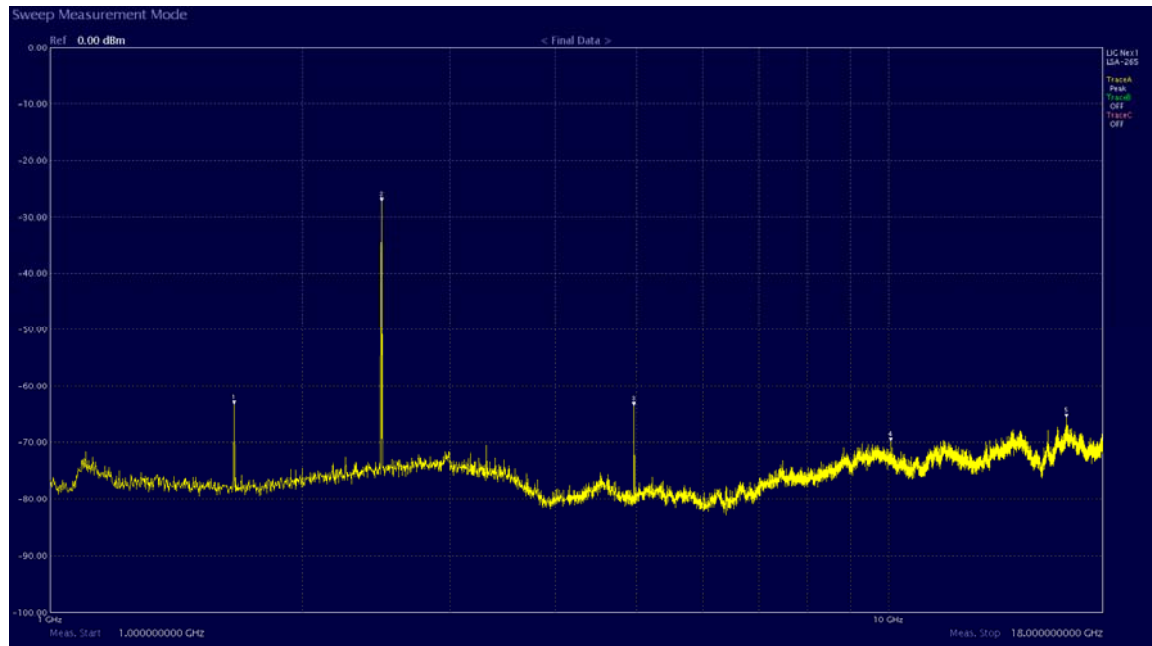
Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2480	79.97(PK)	Hor.	114/94	34.03
4964	40.81(PK)	Hor.	74/54	33.19
25996	47.03(PK)	Hor.	74/54	26.97
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

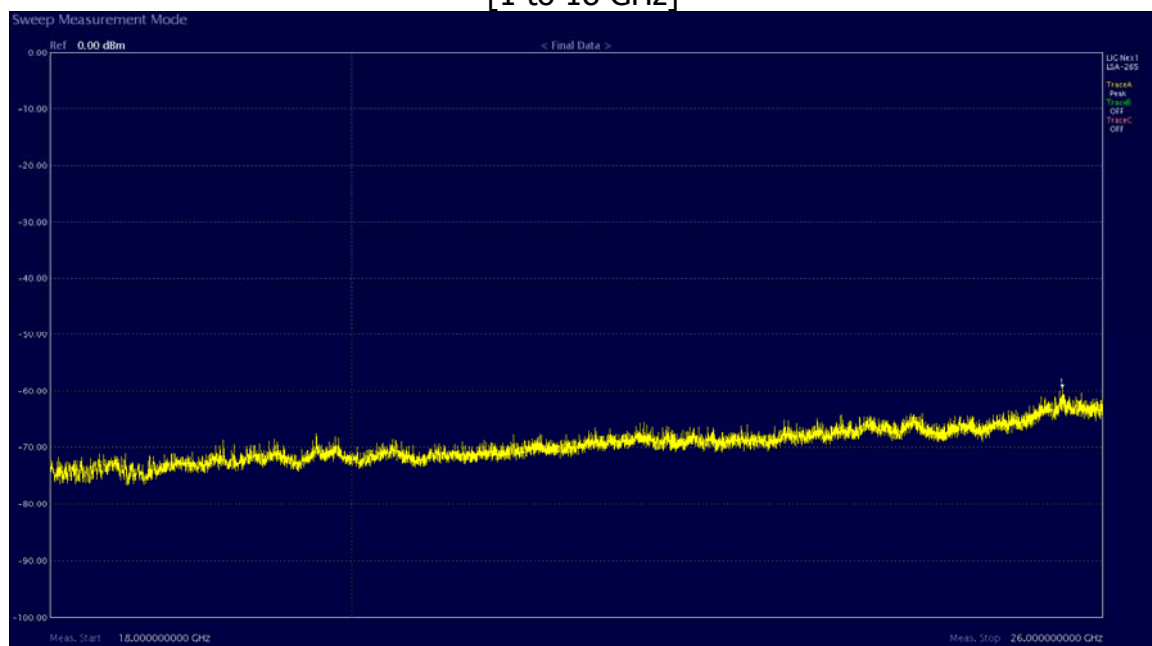
2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

Test Mode	Continuous TX	Test Channel	78CH (2480 MHz)
Test Item	Fundamental & Harmonics Radiated Emission Test Result	Polarization	Z-Plane
Test Result	PASS	Ant. Polarization	Vertical



[1 to 18 GHz]



[18 to 26 GHz]

Frequency (MHz)	Emission PK/AV (dBuV/m)	Polarization	Limits PK/AV (dBuV/m)	Margin (dB)
2480	79.76(PK)	Ver.	114/94	34.24
1657	43.69(PK)	Ver.	74/54	31.31
25635	47.41(PK)	Ver.	74/54	26.59
-	-	-	-	-

Note : 1. Other emissions don't exceed the level of 20 dB below the applicable Limit.

2. Measurement level = reading level + correct factor

3. This device used to install a wall device. The location of EUT measurements has the Y-Plane.

3.3 Number of Hopping Frequency Used

3.3.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Spectrum Analyzer	Advantest	R3273	121100554	Jun. 15, 2010
RF Test Room	-	-	-	-

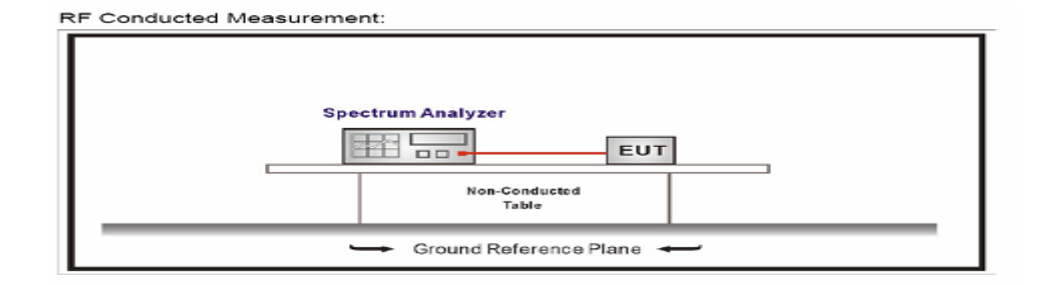
Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

3.3.2 Limit

At least 15 channels frequencies, and should be equally spaced.

3.3.3 Test Configuration

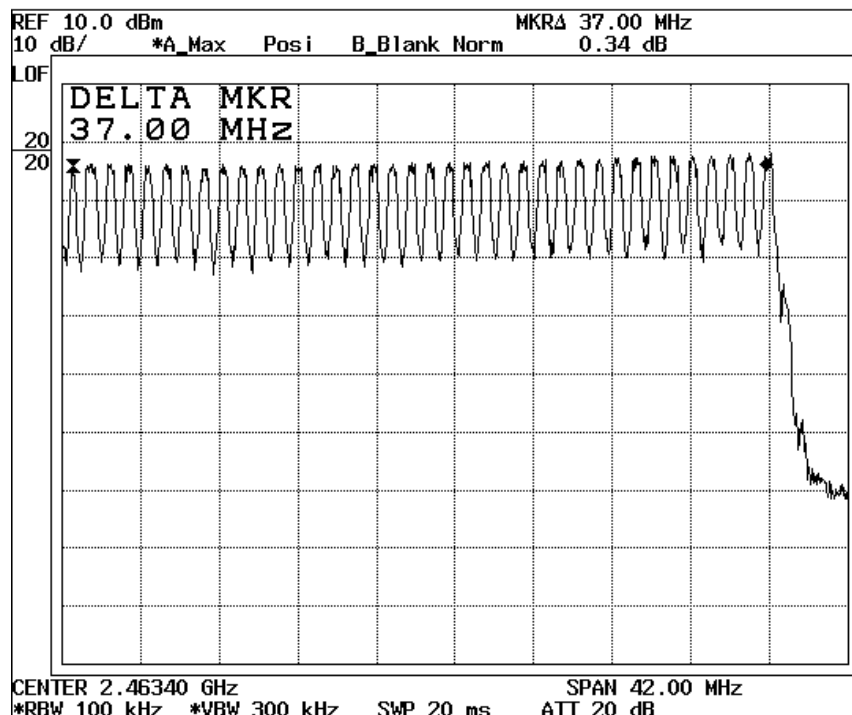
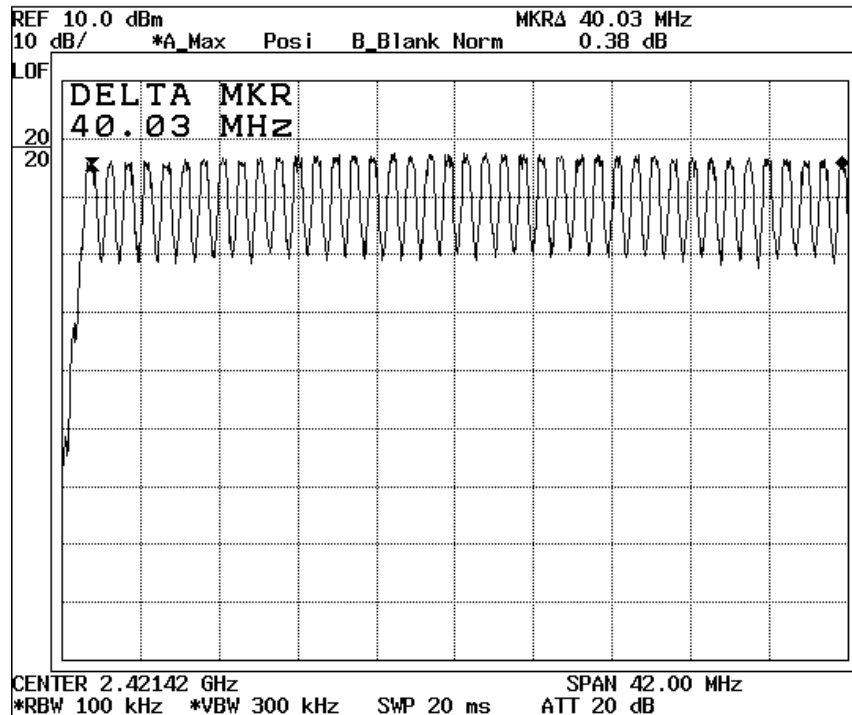


3.3.4 Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Turn off the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operating range and make sure the instrument is operated in its linear range.
3. Set the SA on MaxHold Mode, and keep the EUT in hopping mode. Record all the signals from each channel until each one has been recorded.
4. Set the SA on View Mode and plot the result on the SA screen.
5. Repeat the above procedures until all frequencies measured were complete.

3.3.5 Number of Hopping Frequency Test Result

Test Mode	GFSK	Test Site	RF Test Room
Test Result	PASS		



3.4 Dwell Time On Each Channel

3.4.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Spectrum Analyzer	Advantest	R3273	121100554	Jun. 15, 2010
RF Test Room	-	-	-	-

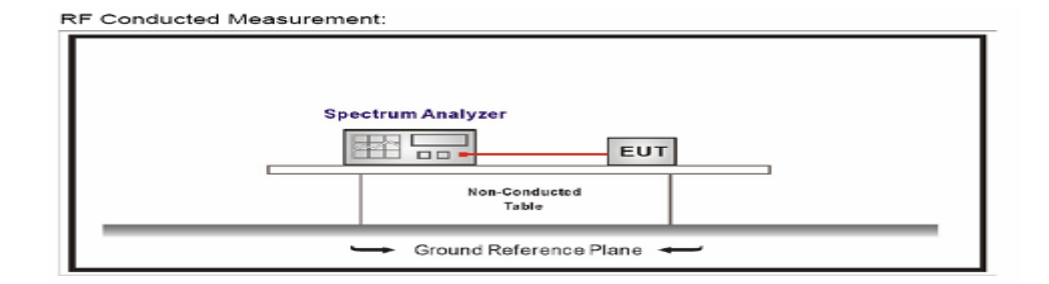
Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

3.4.2 Limit

The average time of occupancy on any channel shall not be greater the 0.4 seconds within a period fo 04. Seconds multiplied by the number of hopping channels employed.

3.4.3 Test Configuration



3.4.4 Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal
2. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. The set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
4. Measure the time duration of one transmission in the measured frequency. And then plot the result with time difference of this time duration.
5. Repeat above procedures until all different time-slot modes have been completed.

3.4.5 Dwell Time Test Result

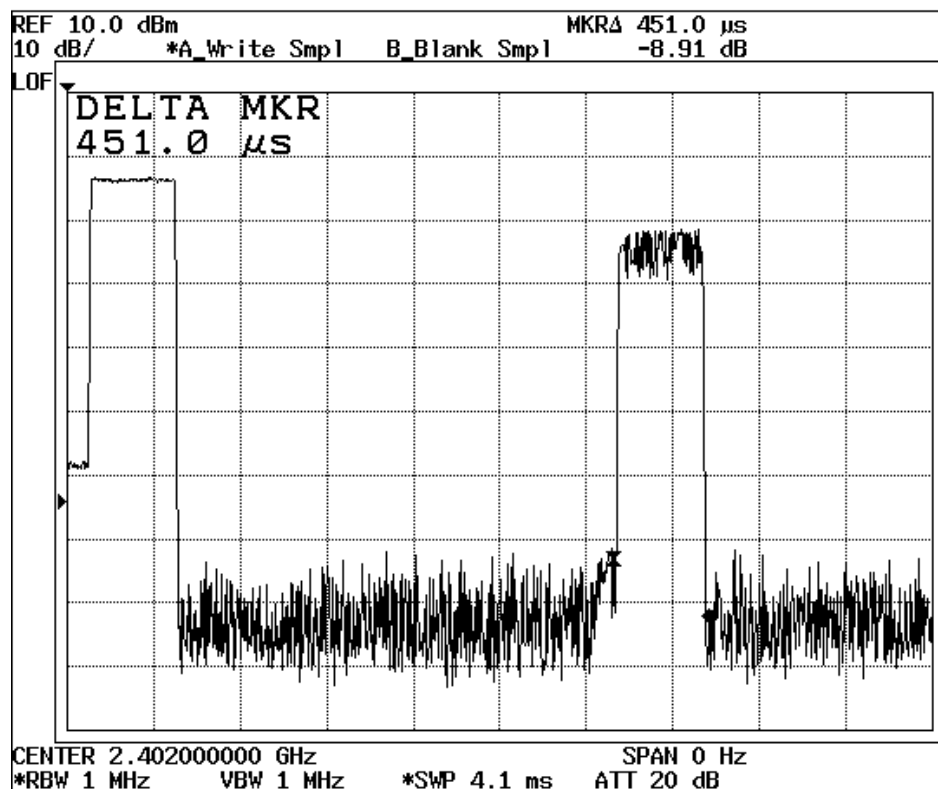
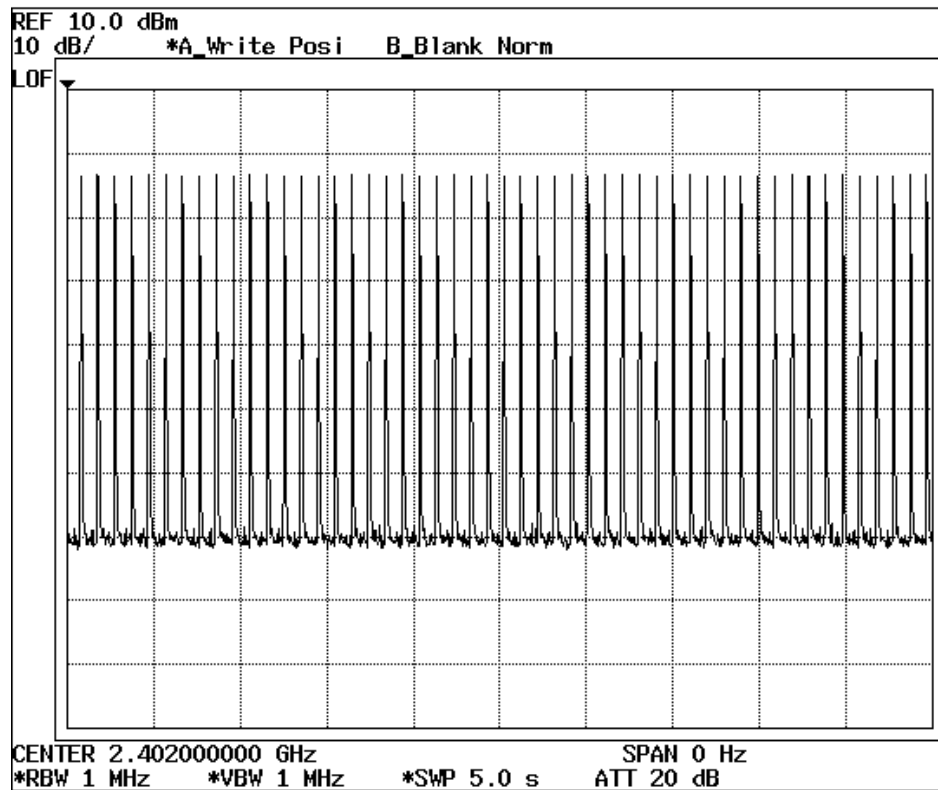
Test Mode	GFSK	Test Site	RF Test Room
Test Result	PASS		

Mode	Number of transmission in a 31.6 (79 Hopping*0.4)	Length of transmission time (msec)	Result (msec)	Limit (msec)
DH1	51 (times / 5 sec)*6.32 = 322.32times	0.451	145.37	400
DH3	26 (times / 5 sec)*6.32 = 164.32times	1.693	278.19	400
DH5	17 (times / 5 sec)*6.32 = 107.44times	2.964	318.45	400

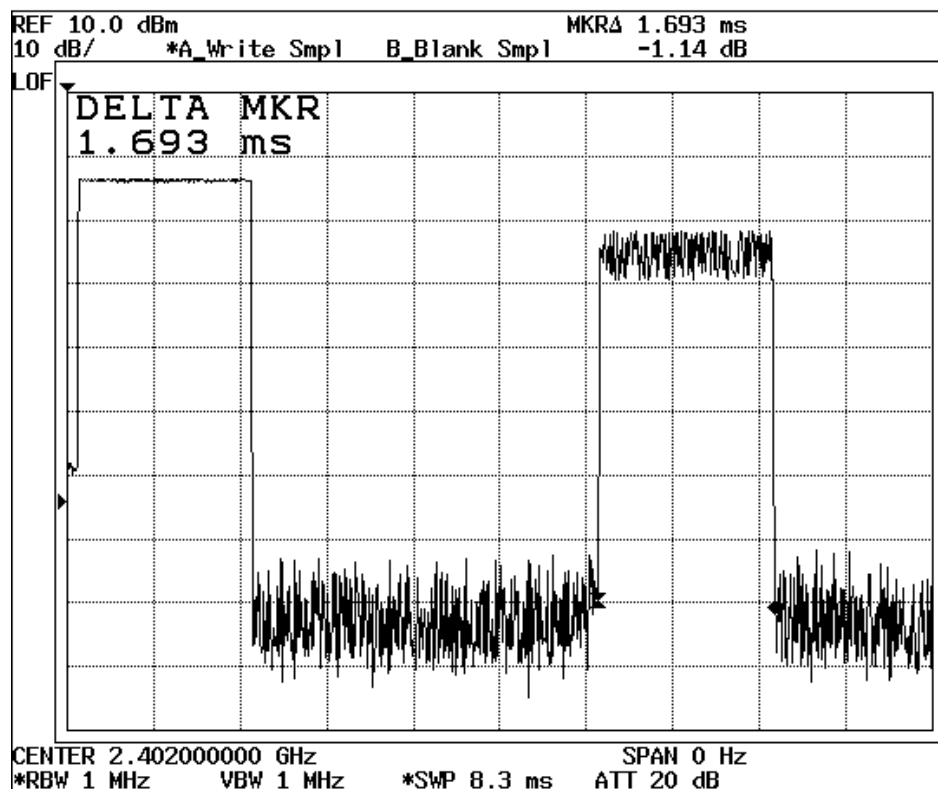
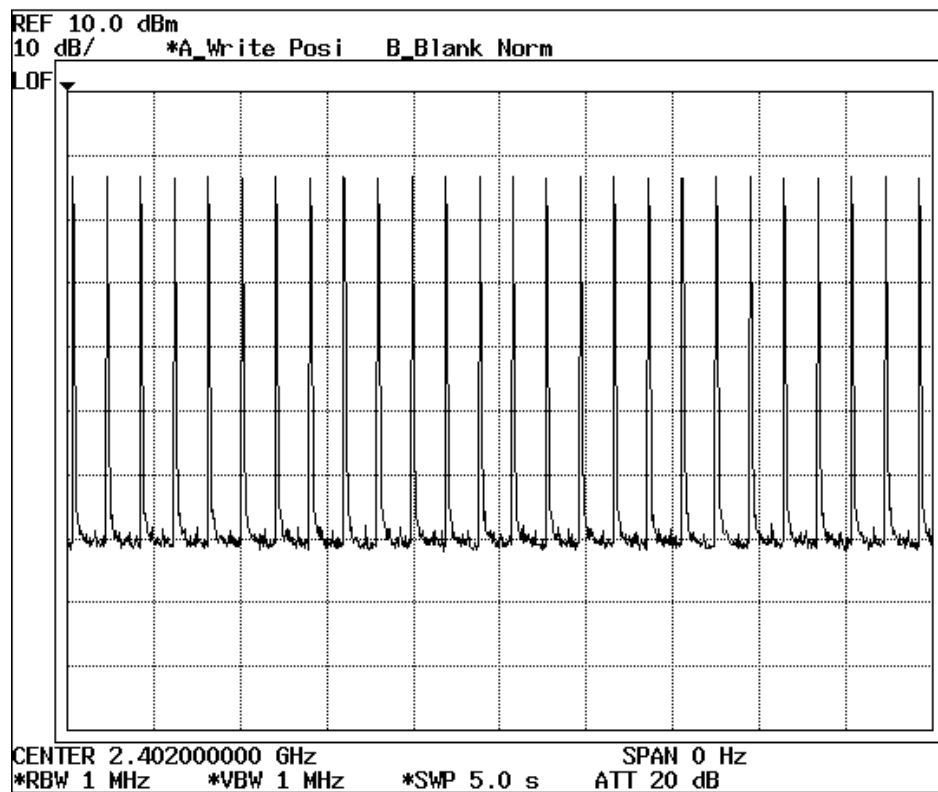
Note) 1. Test plots of the transmitting time slot are shown on next 3 pages.

2. Dwell Time = 79(Channels) x 0.4(s) x average hopping channel x package transfer time

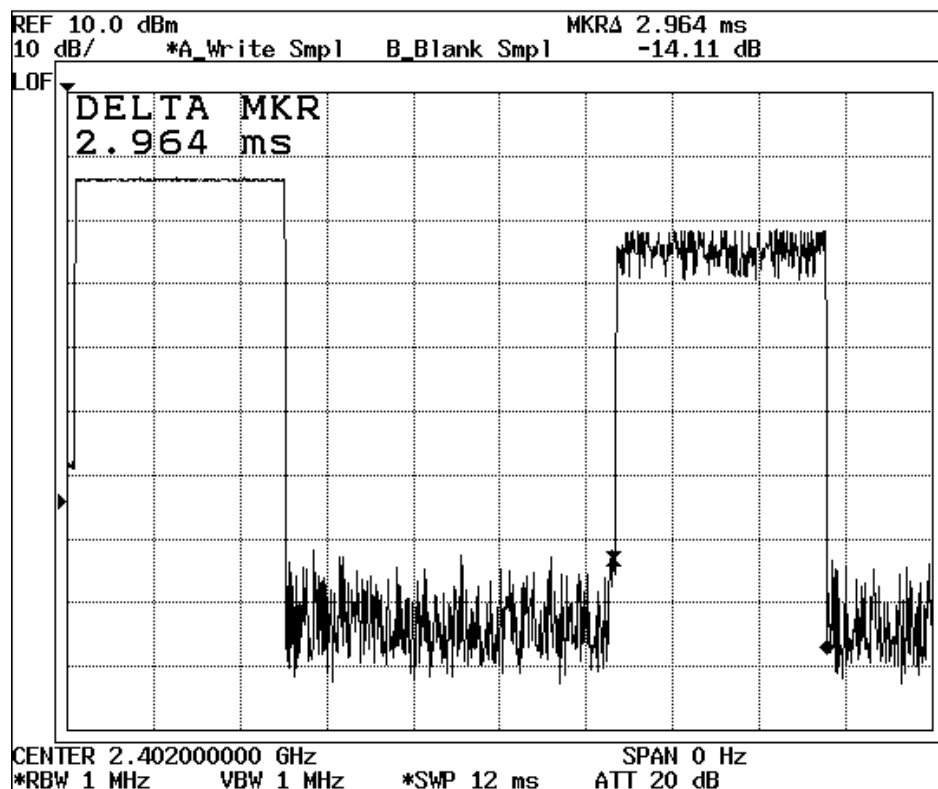
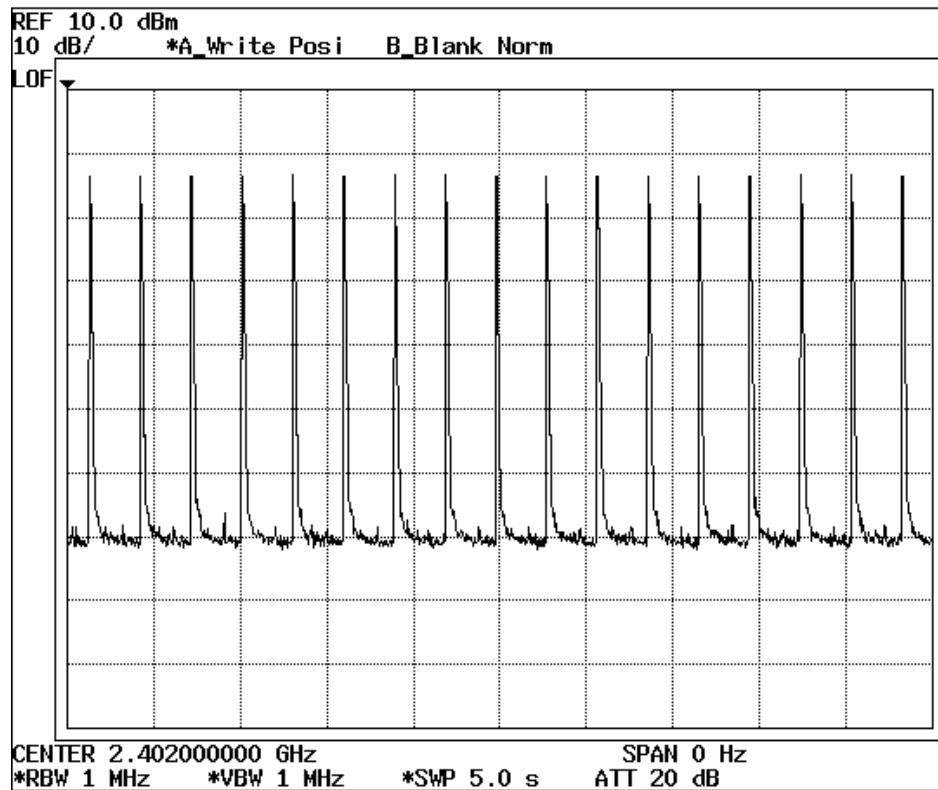
DH1



DH3



DH5



3.5 Channel Bandwidth

3.5.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Spectrum Analyzer	Advantest	R3273	121100554	Jun. 15, 2010
RF Test Room	-	-	-	-

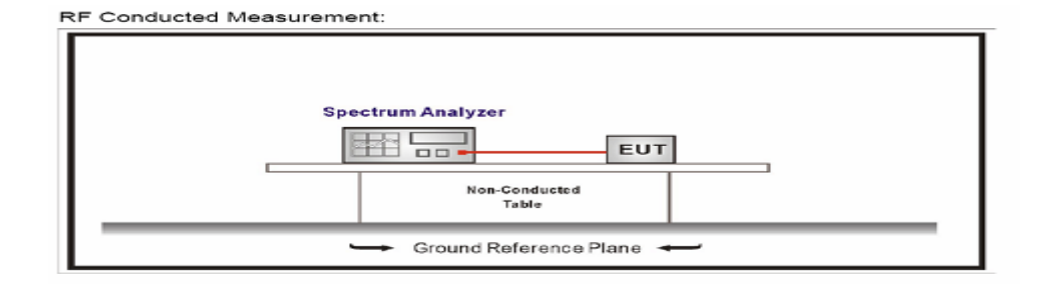
Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

3.5.2 Limit

For frequency hopping system operating in the 2400-2483.5 MHz, if the 20 dB bandwidth of hopping channel is greater than 25 kHz, tow-thirds 20 dB bandwidth of hopping channel shell be a minimum limit for the hopping channel separation.

3.5.3 Test Configuration



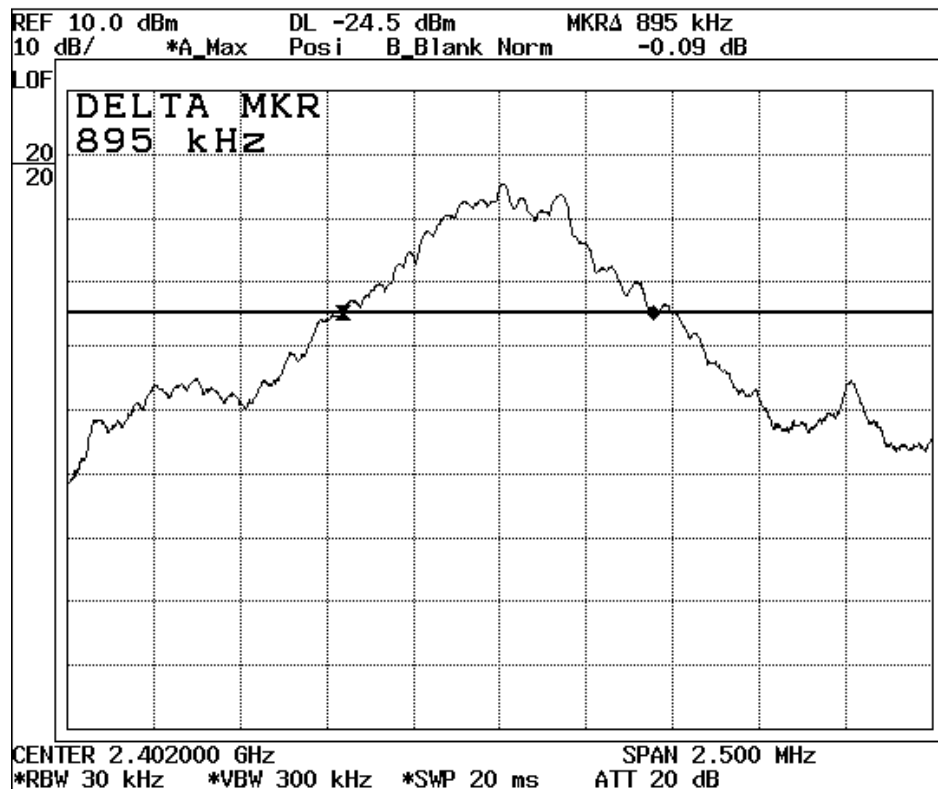
3.5.4 Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

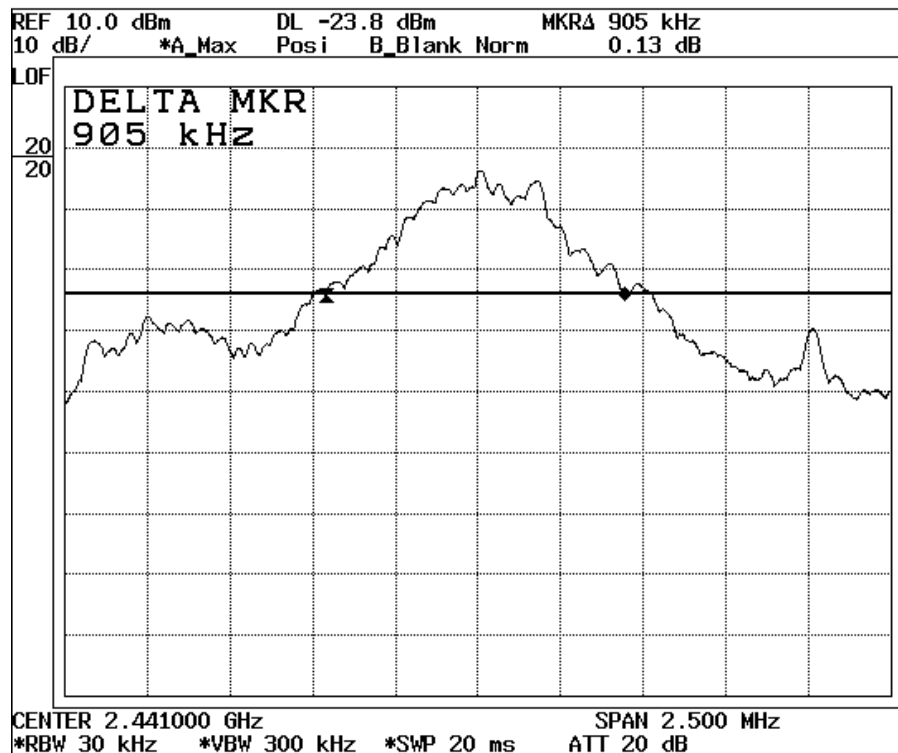
3.5.5 Channel Bandwidth Test Result

Test Mode	GFSK	Test Site	RF Test Room
Test Result	PASS		

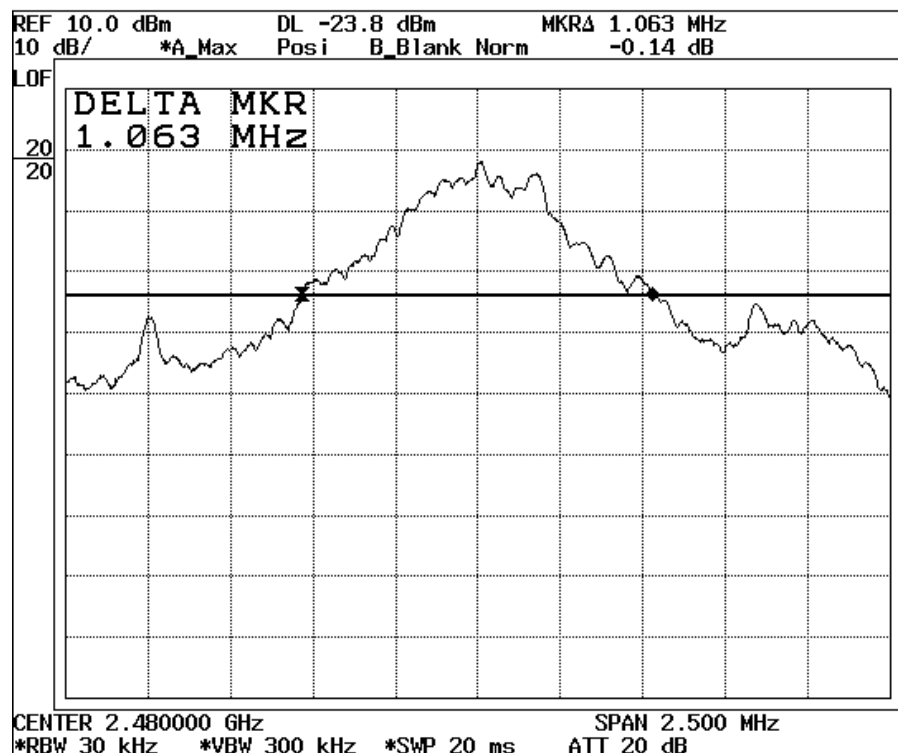
CHANNEL	CHANNEL FREQUENCY (MHz)	20 dB bandwidth (MHz)
0	2402	0.895
39	2441	0.905
78	2480	1.063

CH 0 (2402)

CH 39 (2441)



CH 78 (2480)



3.6 Hopping Channel Separation

3.6.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Spectrum Analyzer	Advantest	R3273	121100554	Jun. 15, 2010
RF Test Room	-	-	-	-

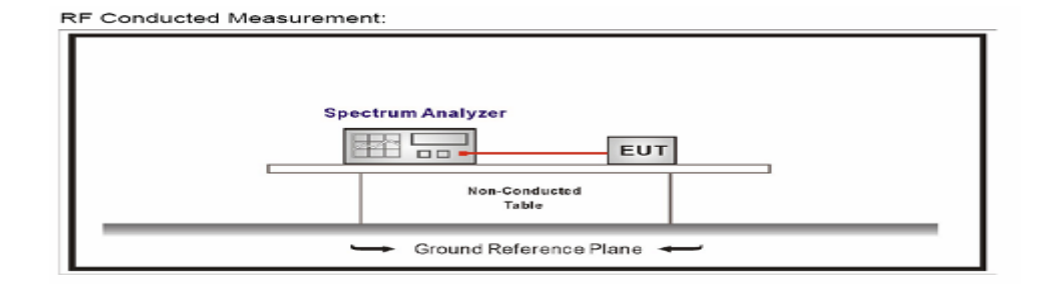
Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

3.6.2 Limit

At least 25 kHz or two-third of 20 dB hopping Channel bandwidth (whichever is greater).

3.6.3 Test Configuration



3.6.4 Test Procedure

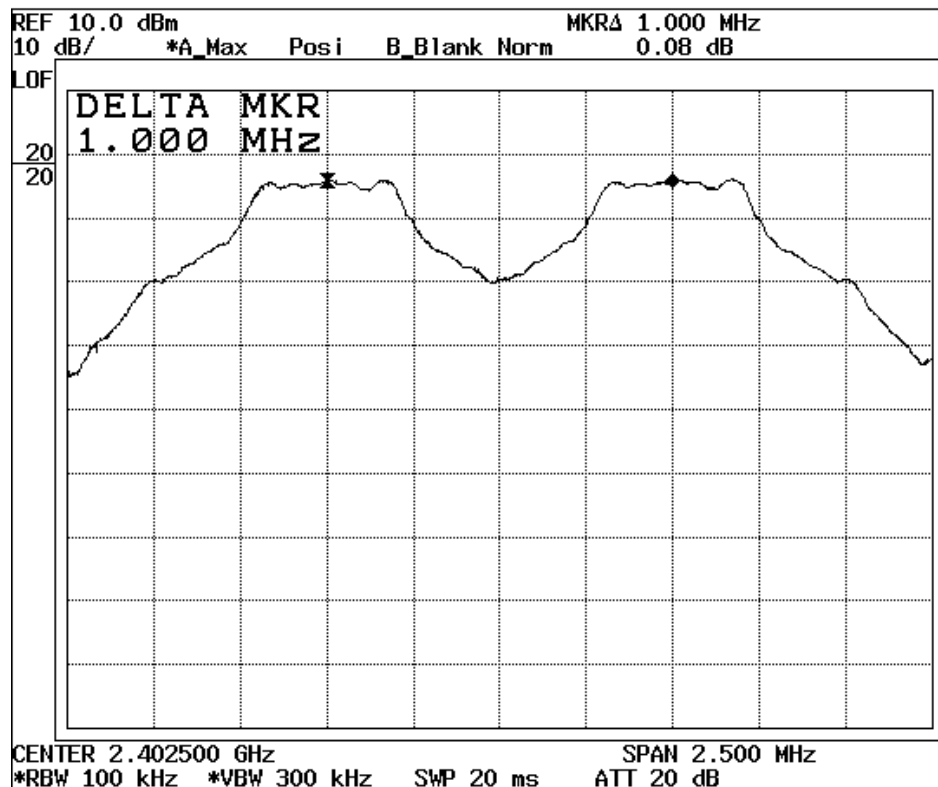
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
3. By using the Maxhold function record the separation of two adjacent channels.
4. Measure the frequency difference of these two adjacent channels by SA mark function. And then plot the result on SA screen.

3.6.5 Hopping Channel Separation Test Result

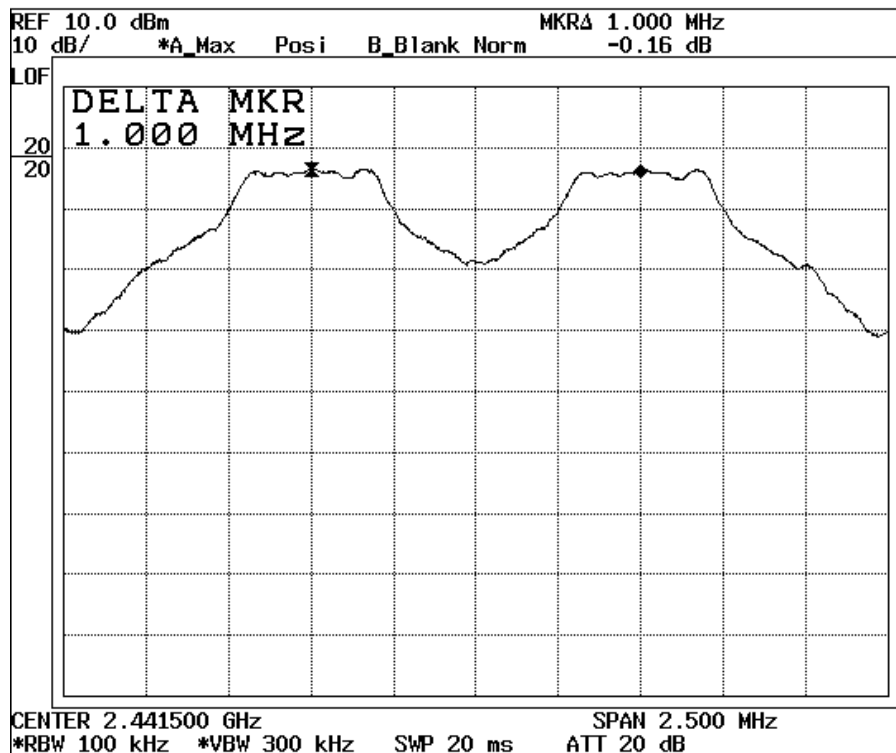
Test Mode	GFSK	Test Site	RF Test Room
Test Result	PASS		

CHANNEL	FREQUENCY (MHz)	ADJACENT CHANNEL SEPARATION (MHz)	RESULT
0	2402	1.00	PASS
39	2441	1.00	PASS
78	2480	1.00	PASS

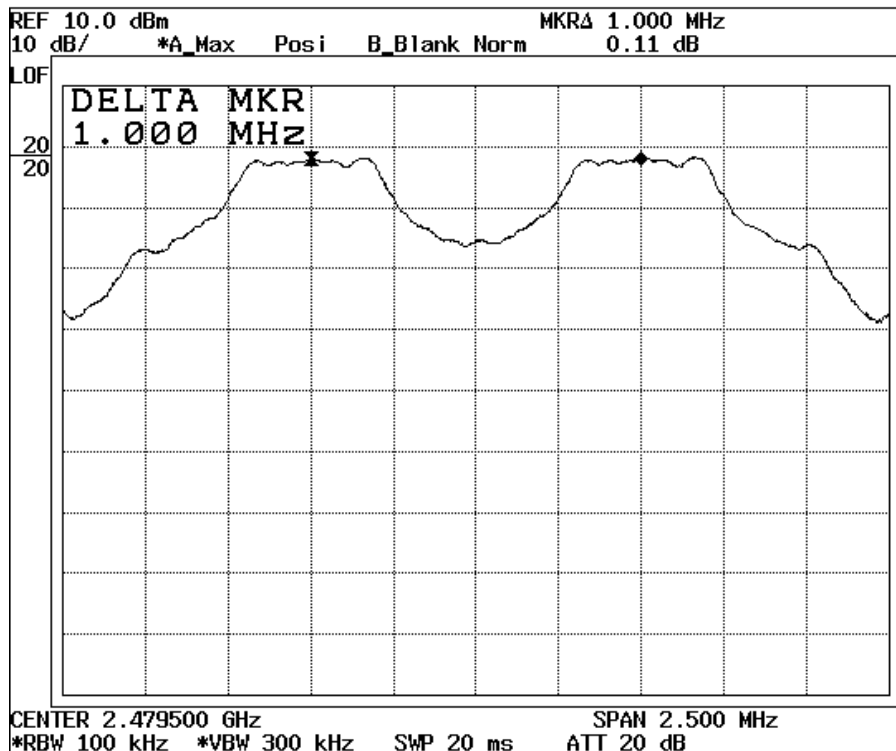
CH 0 (2402 MHz)



CH 39 (2441 MHz)



CH 78 (2480 MHz)



3.7 Maximum Peak Output Power

3.7.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Spectrum Analyzer	Advantest	R3273	121100554	Jun. 15, 2010
RF Test Room	-	-	-	-

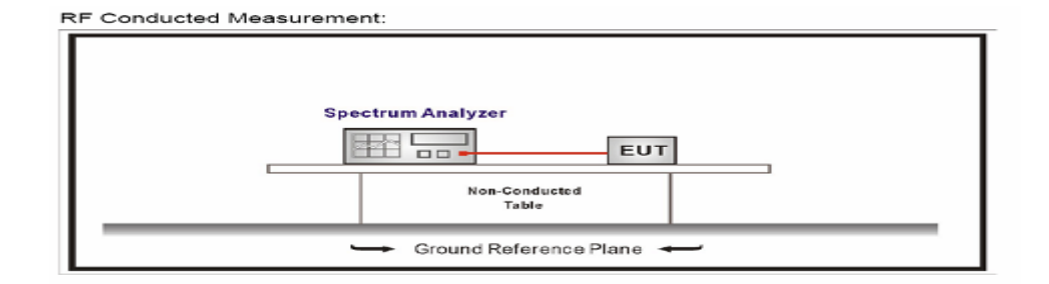
Note : 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.

2. The calibration interval of horn ant. and loop ant. is 24 months

3.7.2 Limit

The maximum antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

3.7.3 Test Configuration



3.7.4 Test Procedure

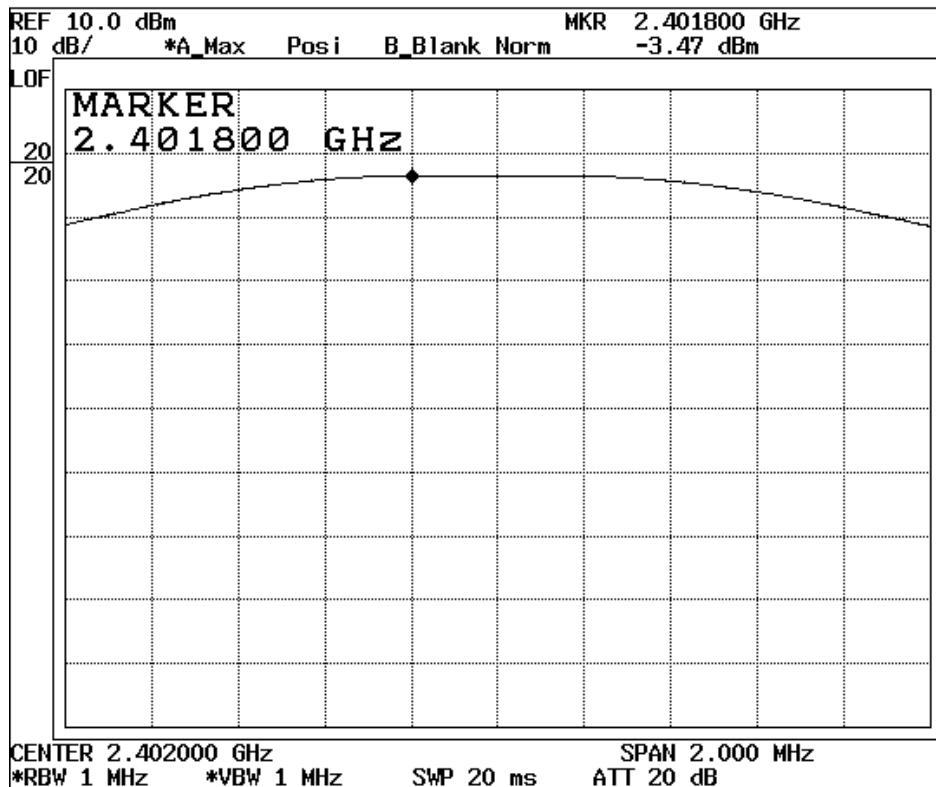
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operation range. Set a reference level on the measuring instrument equal to the highest peak value.
3. The center frequency of the spectrum analyzer is set to the fundamental frequency and using 1 MHz RBW and 1 MHz VBW.
4. Measure the captured power within the band and recording the plot.
5. Repeat above procedures until all frequencies required were complete.

3.7.5 Maximum Peak Output Power Test Result

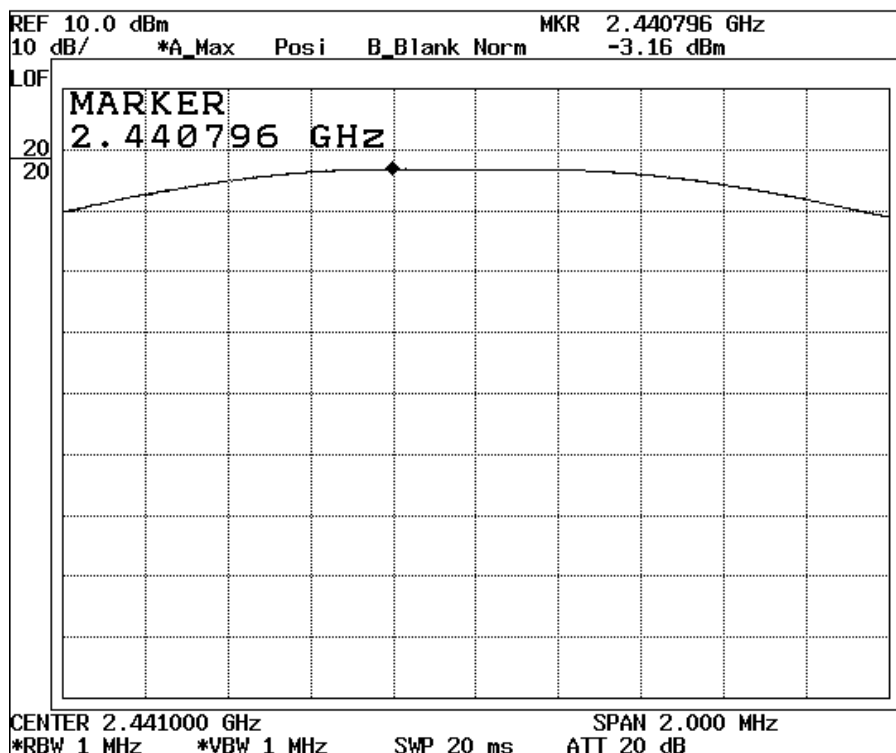
Test Mode	GFSK	Test Site	RF Test Room
Test Result	PASS		

Channel No.	Frequency (MHz)	Measue Leve (dBm)	Limit (dBm)	Result
0	2402	-3.47	1Watt = 30 dBm	PASS
39	2441	-3.16	1Watt = 30 dBm	PASS
78	2480	-1.51	1Watt = 30 dBm	PASS

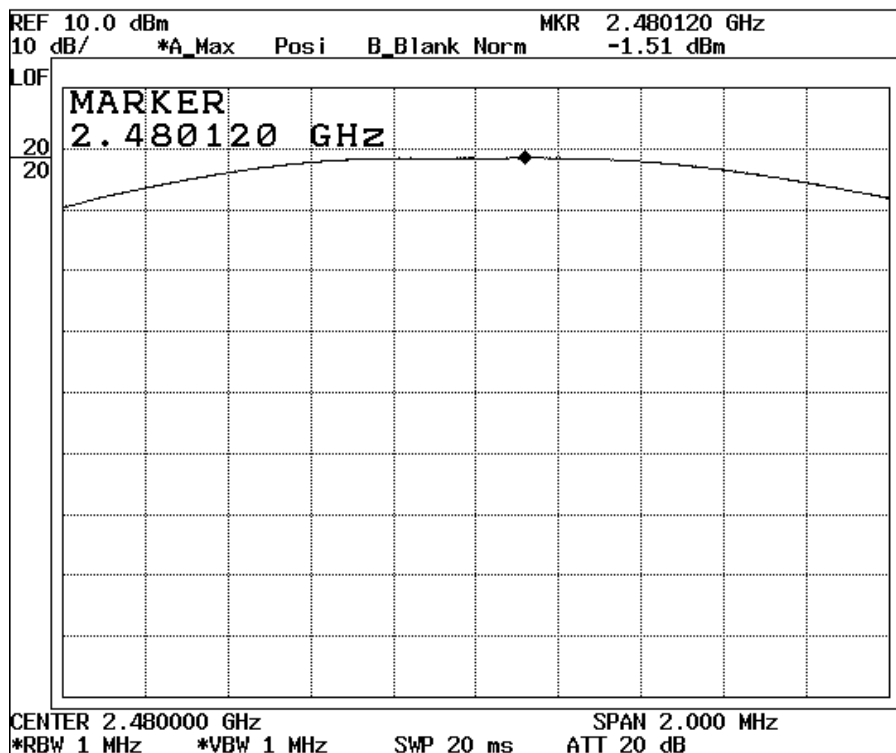
CH 0 (2402 MHz)



CH 39 (2441 MHz)



CH 78 (2480 MHz)



3.8 Band Edge

3.8.1 Test Instruments

Description	Manufacturer	Model No.	Serial No.	Next of Calibration
Test Receiver	LIG NEX1	ER-265	L0804A002	Jul. 10, 2010
Horn Antenna	R&S	BBHA9120D233	0501	Sep. 10. 2010
Horn Antenna	R&S	BBHA9170	BBHA9170152	Sep. 16. 2010
Spectrum Analyzer	Advantest	R3273	121100554	Jun. 15, 2010

Note :

- 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to RRL, KRISS, KTL and HCT.*
- 2. The calibration interval of horn ant. and loop ant. is 24 months*

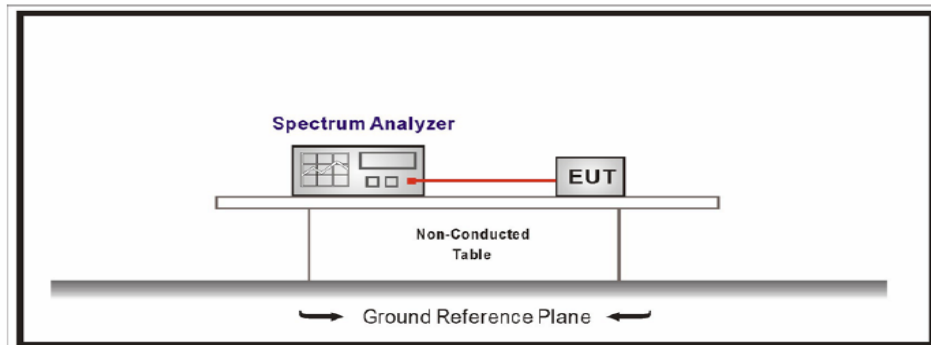
3.8.2 Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio Frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within The band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

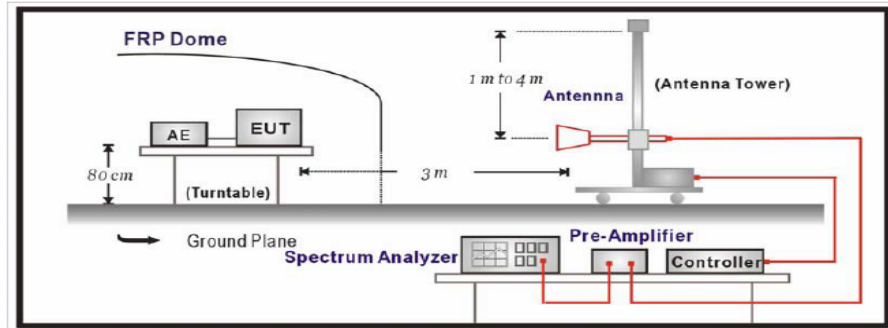
Attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emission which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a)(see Section 15.205(c)).

3.8.3 Test Configuration

RF Conducted Measurement:



RF Radiated Measurement:



3.8.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters. The antenna can move up and down between 1 meter and 4 meters to fine out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.

The bandwidth below 1 GHz setting on the field strength meter is 100 kHz, above 1GHz are 1MHz.

3.8.5 Test Result Method of Band Edge Test Result of Radiated Test.

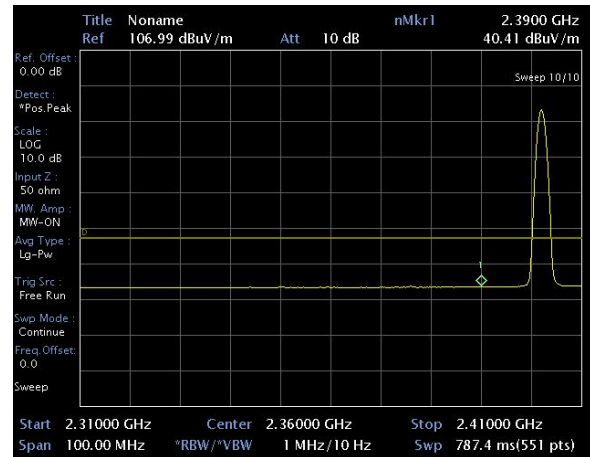
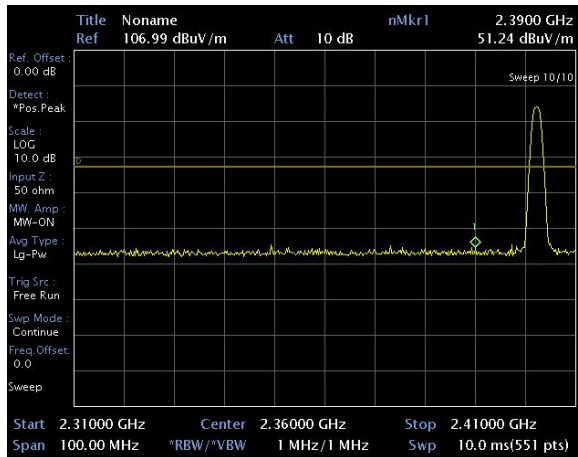
Emission Level(dBuV/m) = Reading Level + Correct Factor.

Note : Correct Factor = AF + CL

AF – Antenna Factor , CL-Cable Loss

3.8.6 Band Edge Test Result

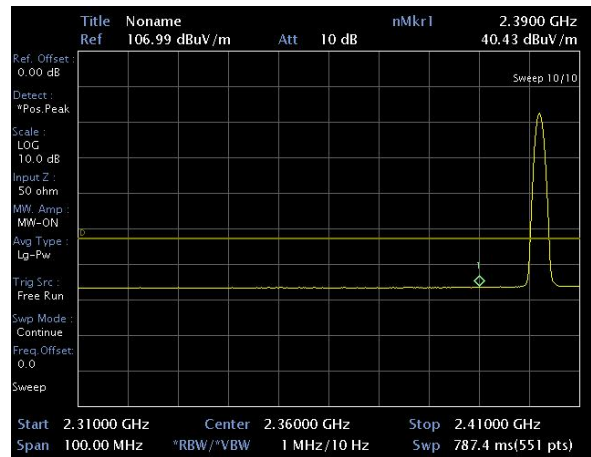
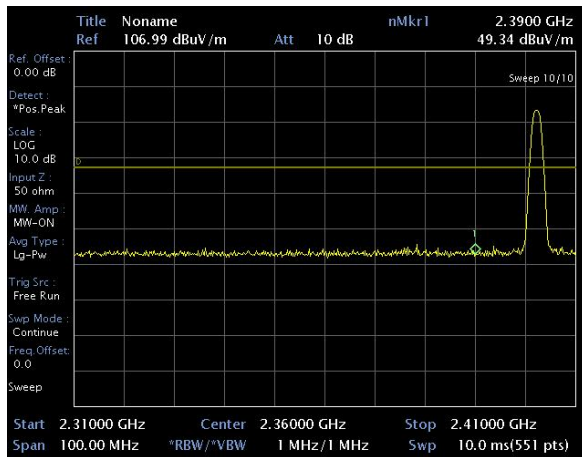
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	0 CH (2402 MHz)
Ant. Polarization	Vertical	Polarization	X-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2390	23.86/13.03	27.38	74/54	51.24/40.41	23.76/13.59

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

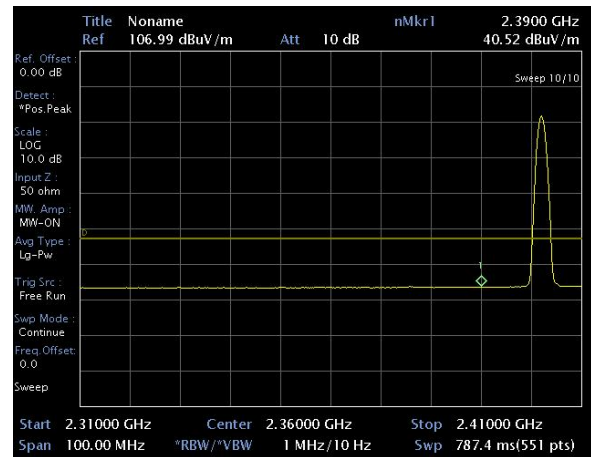
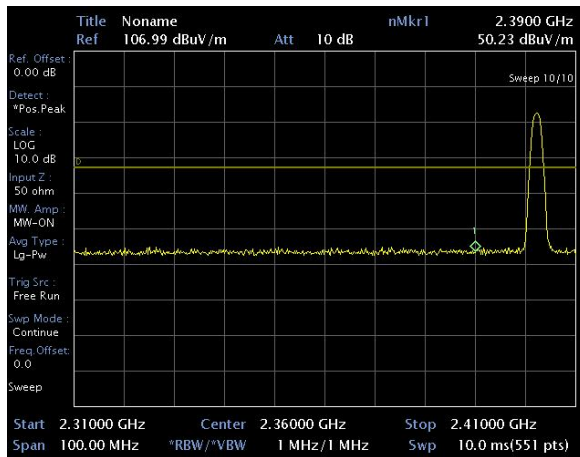
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	0 CH (2402 MHz)
Ant. Polarization	Horizontal	Polarization	X-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2390	21.96/13.05	27.38	74/54	49.34/40.43	24.66/13.57

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

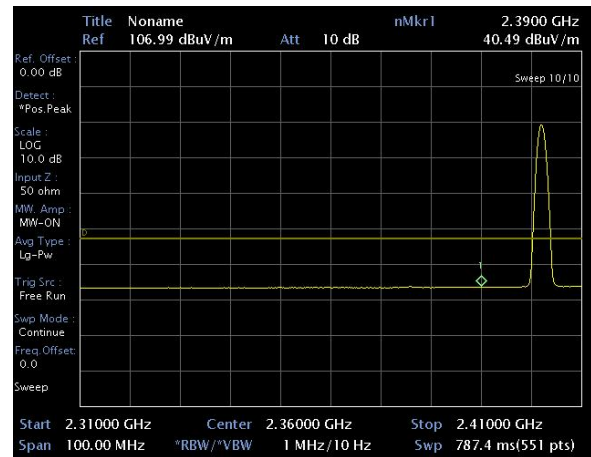
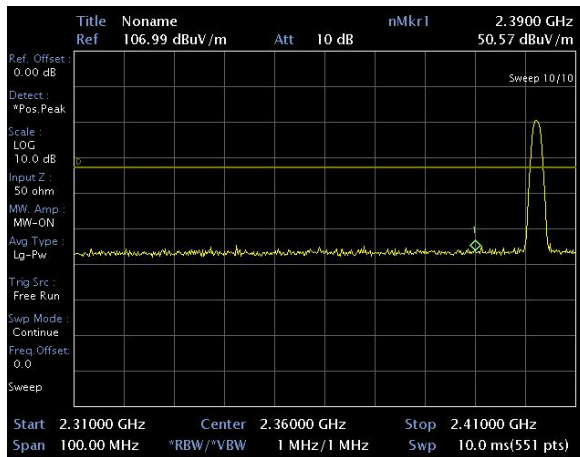
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	0 CH (2402 MHz)
Ant. Polarization	Vertical	Polarization	Y-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2390	22.85/13.14	27.38	74/54	50.23/40.52	23.77/13.48

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

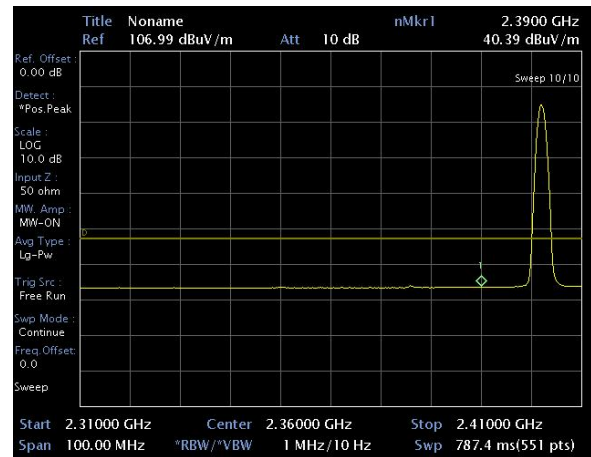
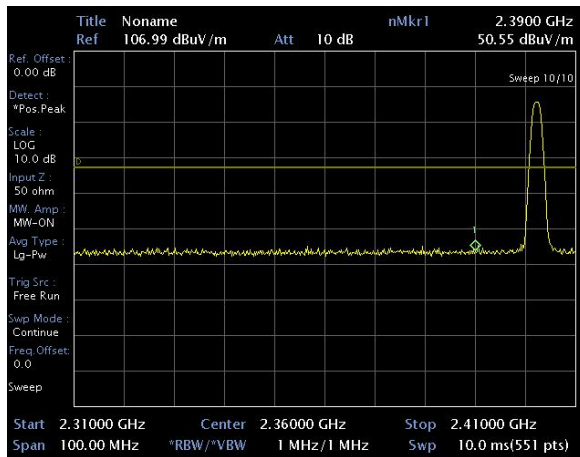
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	0 CH (2402 MHz)
Ant. Polarization	Horizontal	Polarization	Y-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2390	23.19/13.11	27.38	74/54	50.57/40.49	23.43/13.51

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

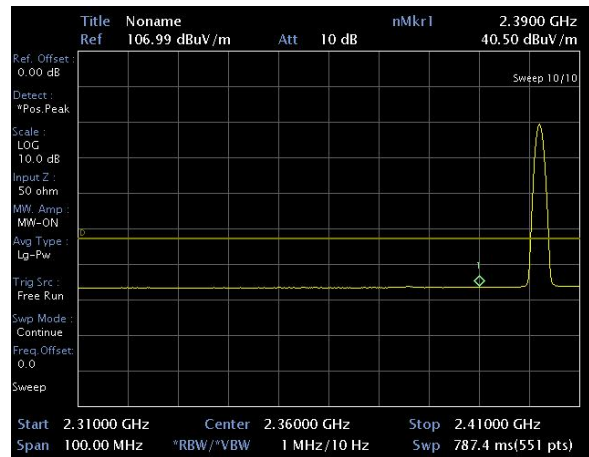
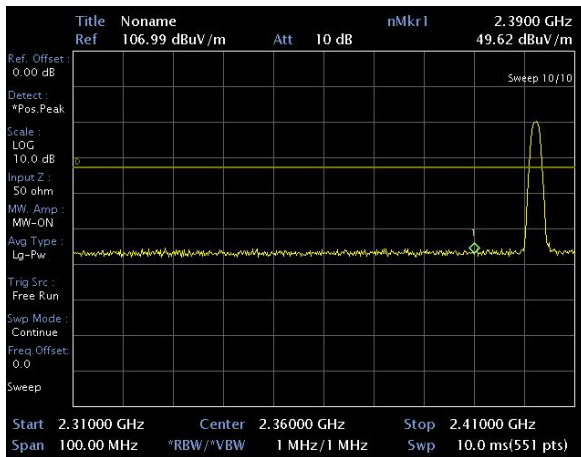
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	0 CH (2402 MHz)
Ant. Polarization	Vertical	Polarization	Z-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2390	23.17/13.01	27.38	74/54	50.55/40.39	23.45/13.61

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

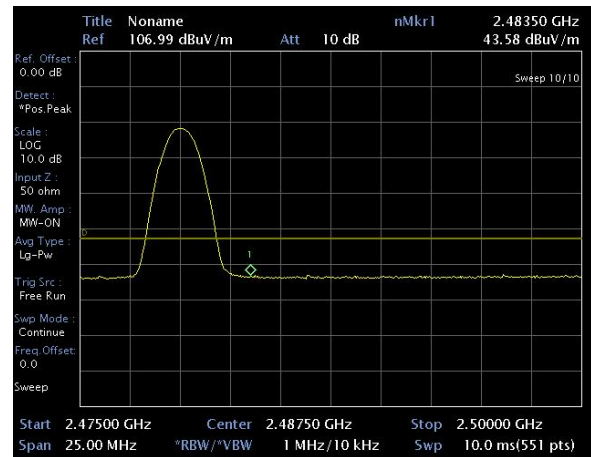
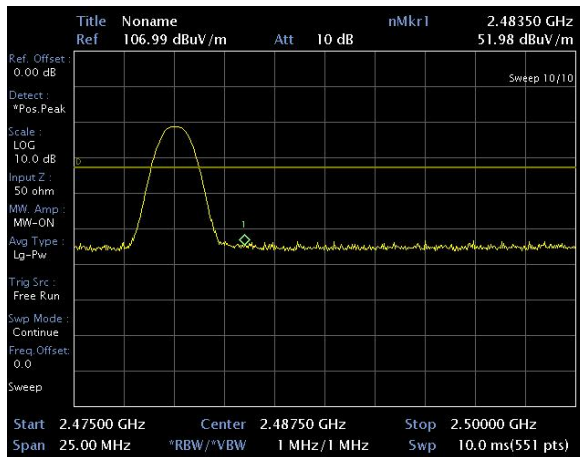
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	0 CH (2402 MHz)
Ant. Polarization	Horizontal	Polarization	Z-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2390	22.24/13.12	27.38	74/54	49.62/40.50	24.38/13.50

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

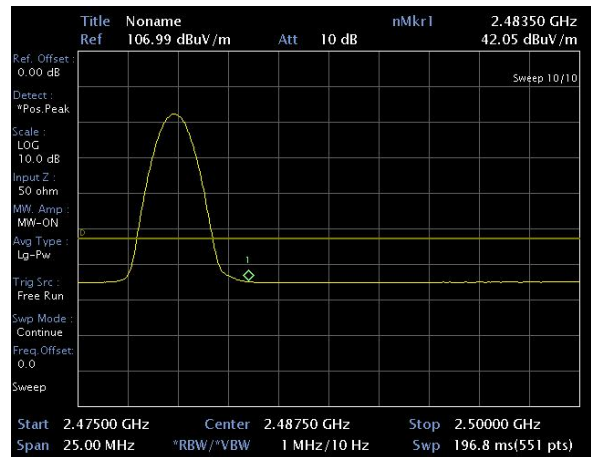
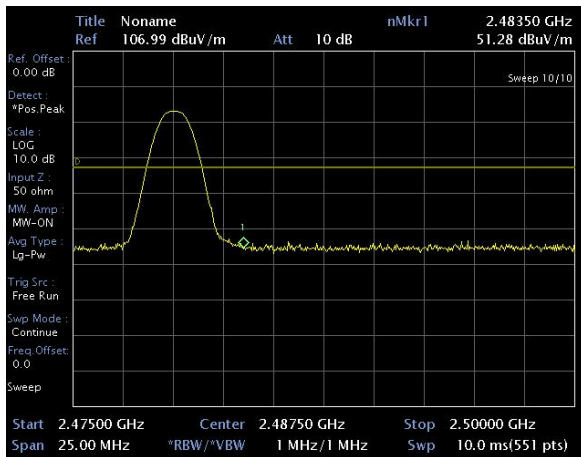
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	78 CH (2480 MHz)
Ant. Polarization	Vertical	Polarization	X-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2483.5	24.44/16.04	27.54	74/54	51.98/43.58	22.02/10.42

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

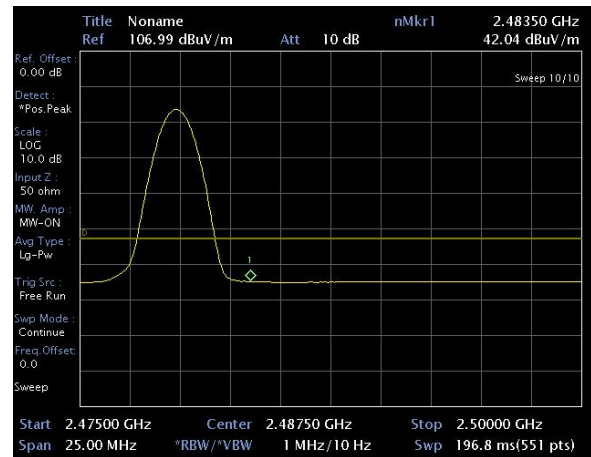
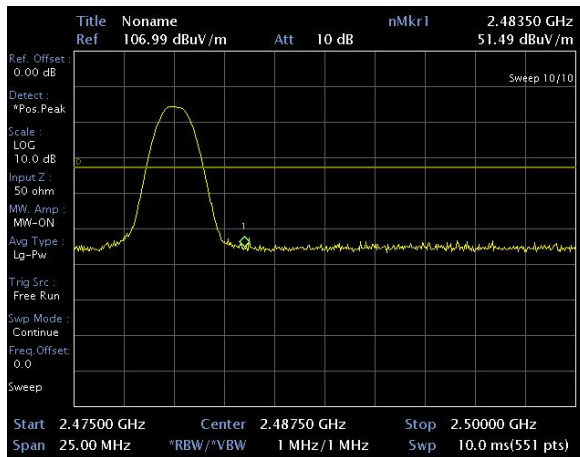
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	78 CH (2480 MHz)
Ant. Polarization	Horizontal	Polarization	X-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2483.5	23.74/14.51	27.54	74/54	51.28/42.05	22.72/11.95

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

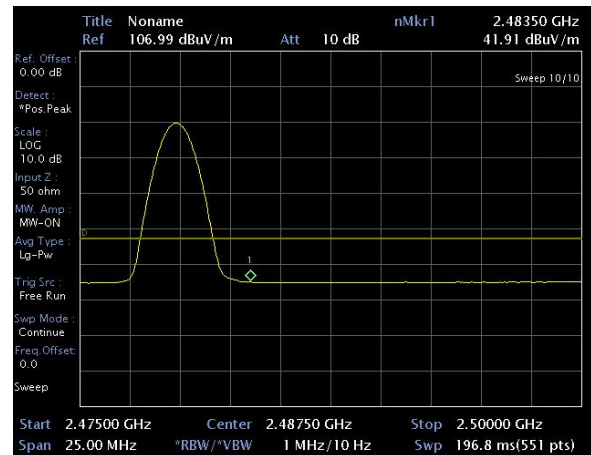
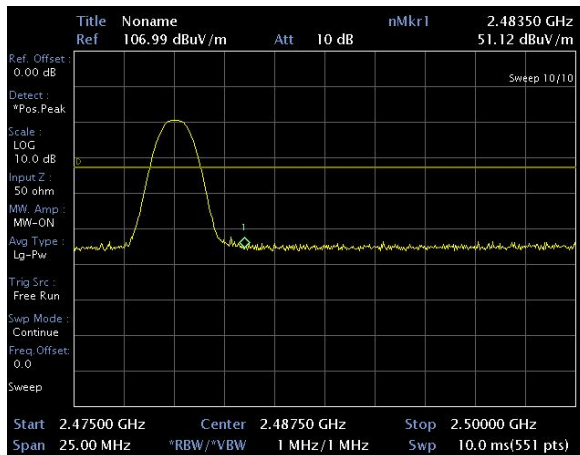
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	78 CH (2480 MHz)
Ant. Polarization	Vertical	Polarization	Y-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2483.5	23.95/14.48	27.54	74/54	51.49/42.04	22.51/11.98

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

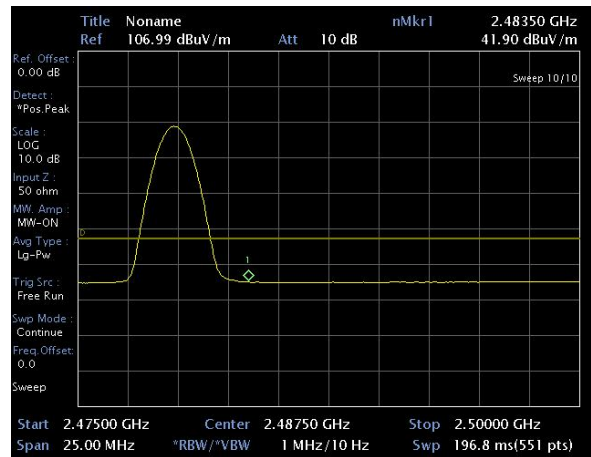
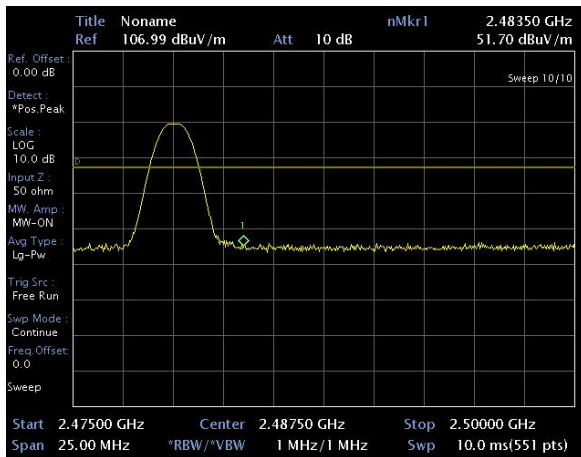
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	78 CH (2480 MHz)
Ant. Polarization	Horizontal	Polarization	Y-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2483.5	23.58/14.37	27.54	74/54	51.12/41.91	22.88/12.09

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

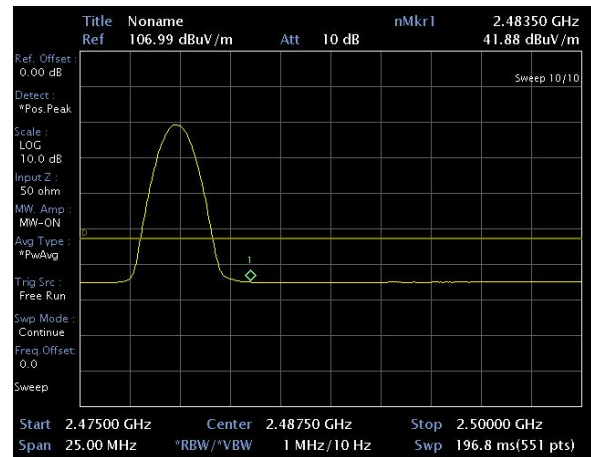
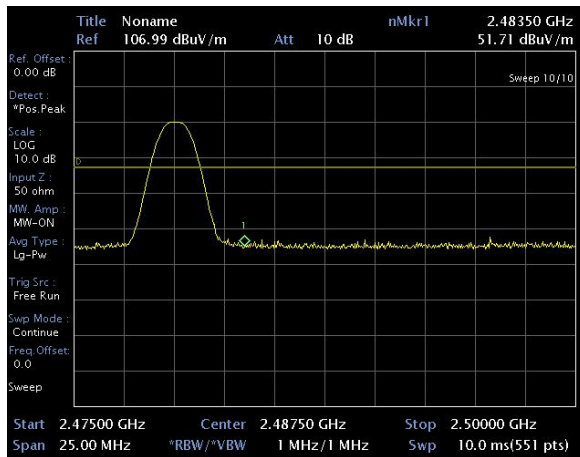
Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	78 CH (2480 MHz)
Ant. Polarization	Vertical	Polarization	Z-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2483.5	24.16/14.36	27.54	74/54	51.70/41.90	22.30/12.10

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

Detect mode	Peak / Average Mode	Test Site	3m Full Chamber
Test mode	GFSK	Test Channel	78 CH (2480 MHz)
Ant. Polarization	Horizontal	Polarization	Z-Plane



Frequency (MHz)	Reading PK/AV (dBuV/m)	Factor(dB) CL+AF	Limits PK/AV (dBuV/m)	Result PK/AV (dBuV/m)	Margin PK/AV (dB)
2483.5	24.17/14.34	27.54	74/54	51.71/41.88	22.29/12.12

Note : Emission Level(dBuV/m) = Reading Level + Correct Factor

4.0 Antenna Requirement

Applicable Standard

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. The use of a permanently attached antenna or of an antenna that uses the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna type used in this product is CHIP antenna without connector and it is considered to meet antenna requirement. The antenna peak gain of EUT is less than 6 dBi. The antenna peak gain is 0 dBi.

Test Result : Pass

Appendix A. The Photo of Test Setup

- **Front View of Conducted Emission**



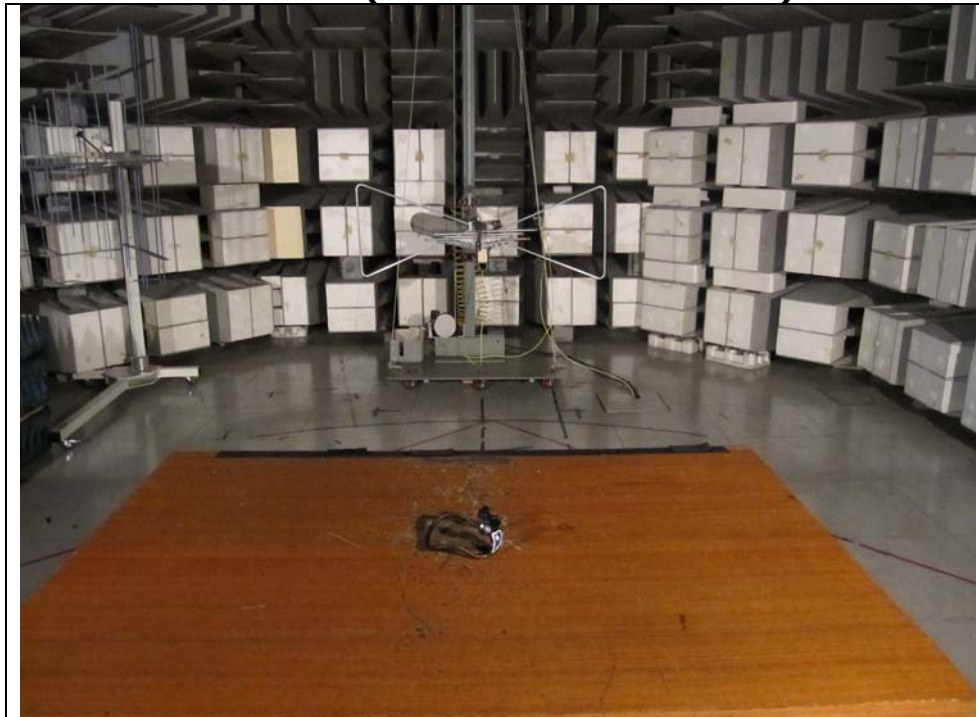
- **Rear View of Conducted Emission**



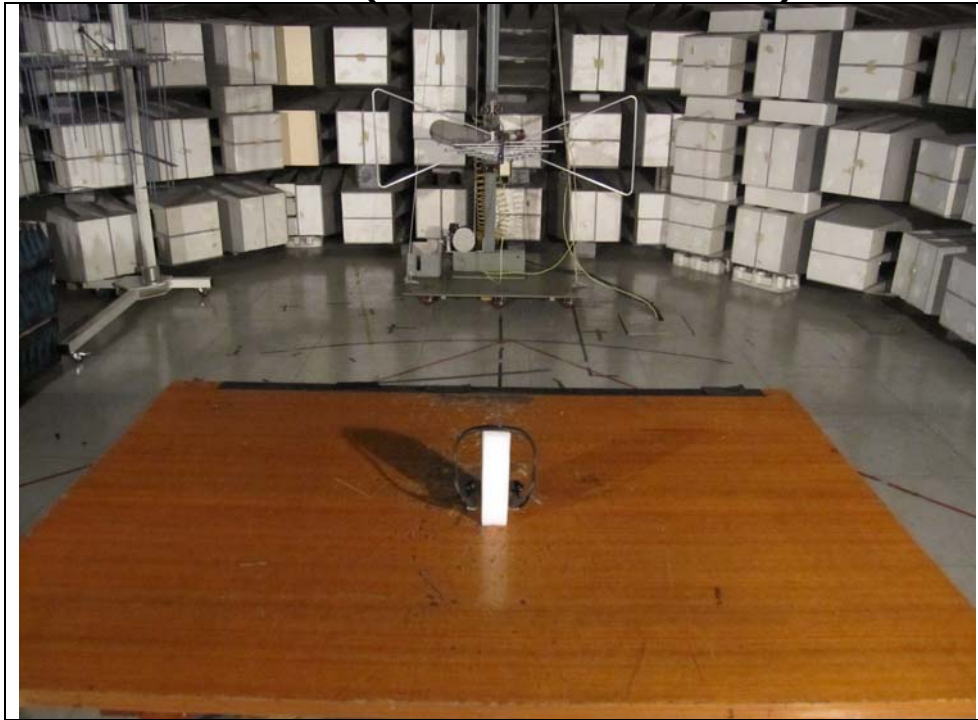
● **View of Radiated Emission (30 ~ 1000 MHz : Charge mode)**



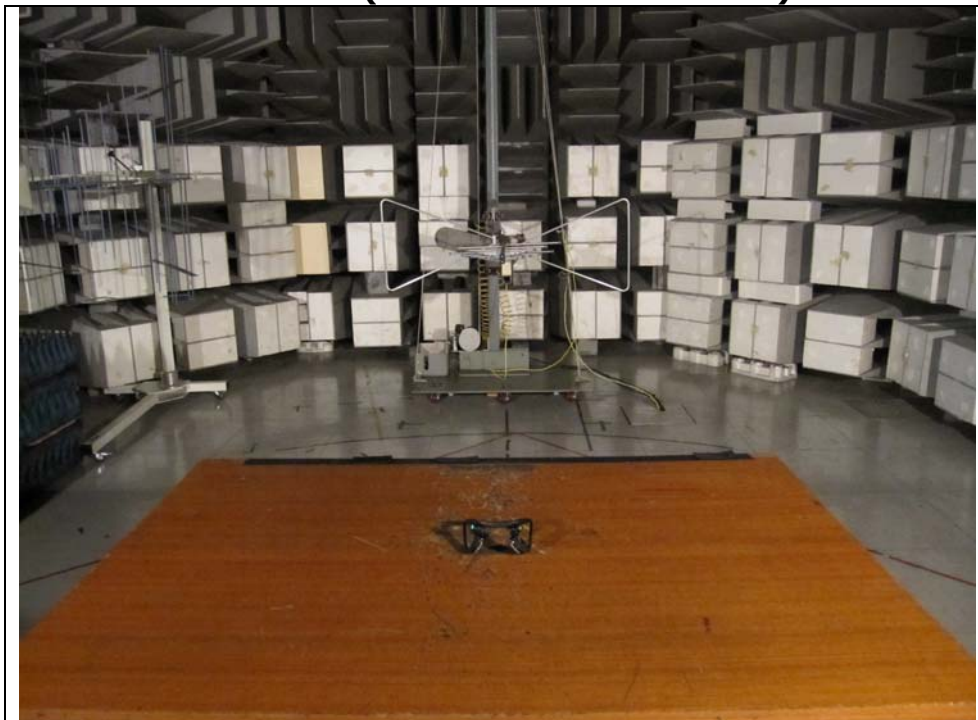
● **View of Radiated Emission (30 ~ 1000 MHz : X-Plane)**



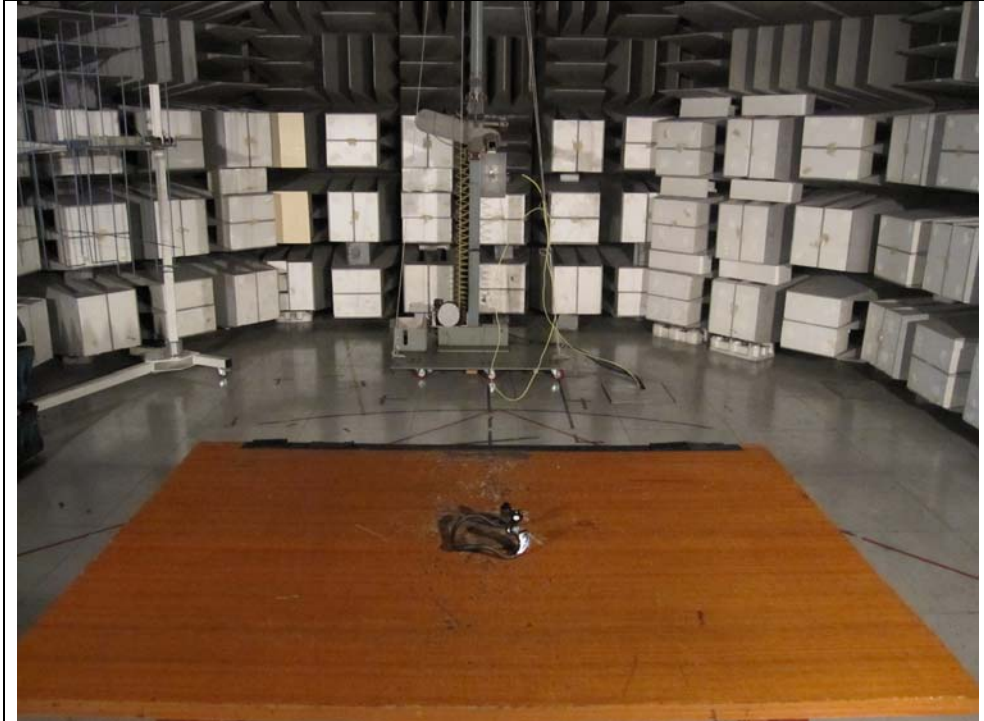
- **View of Radiated Emission (30 ~ 1000 MHz : Y-Plane)**



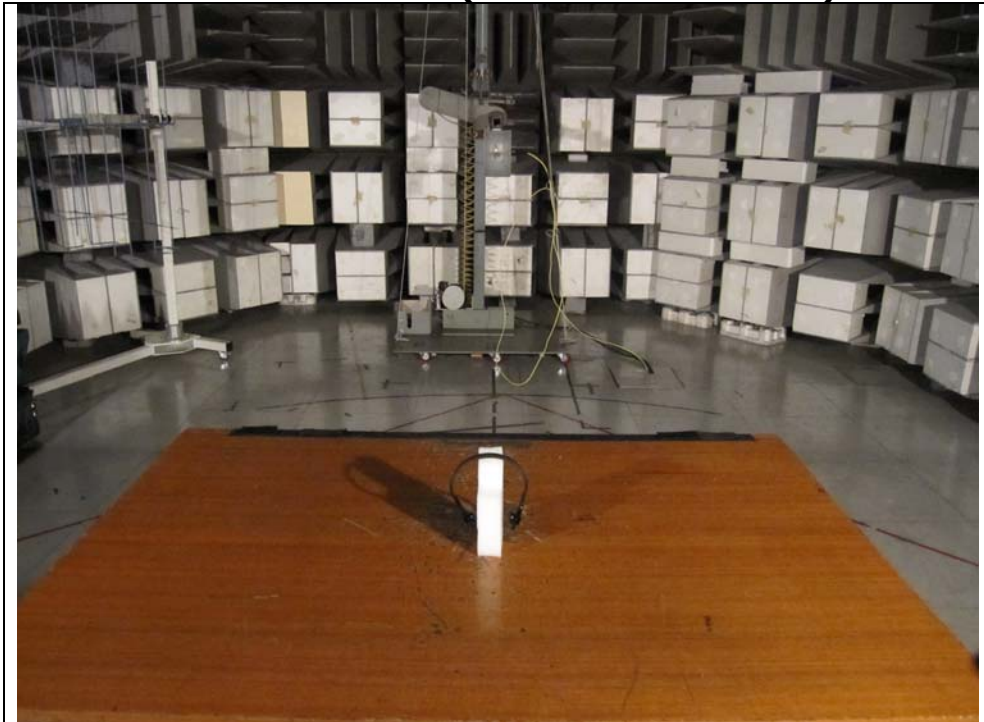
- **View of Radiated Emission (30 ~ 1000 MHz : Z-Plane)**



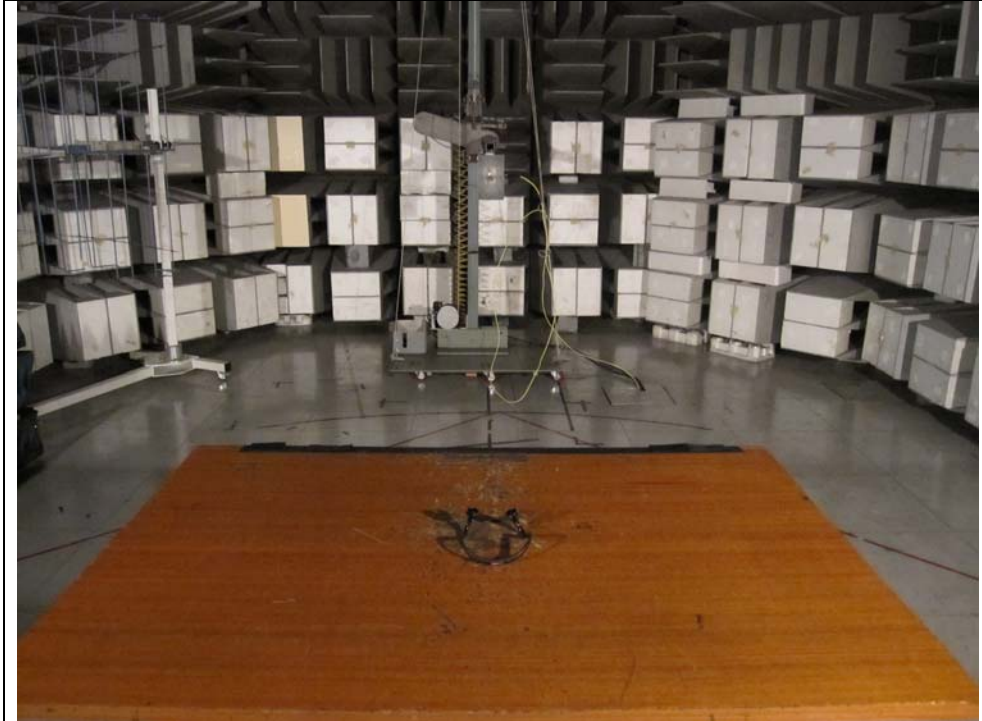
● **Front View of Radiated Emission (Above 1GHz : X-Plane)**



● **Front View of Radiated Emission (Above 1GHz : Y-Plane)**



● **Front View of Radiated Emission (Above 1GHz : Z-Plane)**



Appendix B. The Photo of Equipment Under Test

Front View of EUT



Rear View of EUT



Inside View of EUT

