Prüfbericht-Nr.: *Test report no.*:	**CN2491D6 001**	**Auftrags-Nr.:** *Order no.*:	**168457207**	Seite 1 von 19 *Page 1 of 19*
Kunden-Referenz-Nr.: *Client reference no.*:	N/A	**Auftragsdatum:** *Order date:*	2023-12-14	
Auftraggeber: *Client*:	**Shenzhen Zongguan Innovation Co., Ltd.** Room 225, Galaxy Lingchuang World Phase II, Longgang District, Shenzhen, Guangdong 51800, China			
Prüfgegenstand: *Test item*:	Remote Controller			
Bezeichnung / Typ-Nr.: *Identification / Type no.*:	ZMRCSAFG1 (Trademark: Mowrator)			
Auftrags-Inhalt: *Order content*:	Test Report			
Prüfgrundlage: *Test specification*:	CFR47 FCC Part 15: Subpart C Section 15.247			

Wareneingangsdatum: *Date of sample receipt*:	2024-03-26	Please refer to Photo Document
Prüfmuster-Nr.: *Test sample no:*	A003680935-001~005	
Prüfzeitraum: *Testing period*:	2024-03-26 - 2024-04-26	
Ort der Prüfung: *Place of testing*:	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.	
Prüfergebnis*: *Test result**:	Pass	

geprüft von: tested by:	X Jonathan Li Signed by: Jonathan Li	**genehmigt von:** *authorized by*:	X Bell Hu Signed by: Bell Hu
Datum: *Date:* 2024-10-08		**Ausstellungsdatum:** *Issue date:* 2024-10-08	
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other*: FCC ID: 2BE7P-ZMRCSAFG1

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery*: Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.
V05

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. *The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.* *Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
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Test Summary

5.1.1 ANTENNA REQUIREMENT
RESULT: Pass

5.1.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER
RESULT: Pass

5.1.3 CONDUCTED POWER SPECTRAL DENSITY
RESULT: Pass

5.1.4 6DB BANDWIDTH
RESULT: Pass

5.1.5 99% BANDWIDTH
RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHZ BANDWIDTH
RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION
RESULT: Pass

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1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test Results of 2.4GHz SRD

Appendix B: Photographs of the Test Set-up

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen 518110, Guangdong, China

FCC Accreditation Designation No.: CN1260

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing (SRD-Tonscend)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EXA Signal Analyzer, Multi-touch	Keysight	N9010B	MY60241175	21.09.2024
MXG X-Series RF Vector Signal Generator	Keysight	N5182B	MY61250137	21.09.2024
EXG X-Series Microwave Analog Signal Generator	Keysight	N5173B	MY61250141	21.09.2024
DC Power Supply	Keysight	E3642A	MY61276100	21.09.2024
Wireless Connectivity Tester	R&S	CMW270	102505	21.09.2024
Power Control Unit	Tonscend	JS0806-4ADC	N/A	21.09.2024
Automation Control Unit	Tonscend	JS0806-2	21C8060396	21.09.2024
Test Software	Tonscend	JS1120-3	N/A	N/A
Control PC	Lenovo	TianYi510S-071MB	YLX23JMF	N/A
Unwanted Emission Testing (TS9975)				
Equipment	**Manufacturer**	**Model**	**Serial No.**	**Cal. until**
EMI Test Receiver	R&S	ESR 7	102021	25.07.2024
Signal Analyzer	R&S	FSV 40	101439	25.07.2024
System Controller Interface	R&S	SCI-100	S10010038	N/A
Filterbank	R&S	Wlan	100759	25.07.2024
OSP	R&S	OSP 120	102040	N/A
Pre-amplifier	R&S	SCU08F1	08320031	25.07.2024
Amplifier	R&S	SCU-18F	180070	25.07.2024
Amplifier	R&S	SCU40A	100475	25.07.2024
Trilog Broadband Antenna (30 MHz - 7 GHz)	Schwarzbeck	VULB 9162	193	06.08.2024
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218717	06.08.2024
Wideband Ridged Horn Antenna (18-40 GHz)	Steatite	QMS-00880	19067	27.08.2024
Active Loop Antenna	Schwarzbeck	FMZB 1513	302	06.08.2024
Test software	R&S	EMC32 (V10.60.10)	N/A	N/A

Control PC	Dell	OptiPlex 7050	36NV9P2	N/A
3m Semi-Anechoic Chamber	Albatross	SAC-3m	APC17151-SAC	22.06.2024

2.3 Traceability

All measurement equipment calibrations are traceable to NIM (National Institute of Metrology) or where calibration is performed in other countries, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically by the manufacturer or according to manufacturer's specifications. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

The estimated combined standard uncertainty for radiated emissions and conducted emissions measurements as below table.

Table 2: Measurement Uncertainty

Parameter	Uncertainty (k=2)
RF output power, conducted	± 0.99 dB
Occupied Channel Bandwidth	± 2.08 %
RF power density, conducted	± 0.99 dB
Unwanted Emissions, conducted	± 0.89 dB
All emissions, radiated	±4.17 dB
Conducted Emission, (9kHz to 150kHz)/(150kHz to 30MHz)	± 3.70 dB / ± 3.30 dB

2.6 Location of Original Data

The original copies of all test data taken during actual testing were attached at Appendix A & B of this report and delivered to the applicant. A copy has been retained in the TÜV Rheinland (Shenzhen) Co., Ltd. file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at No.362, Huanguan Middle Road, Songyuansha Community, Guanhu Subdistrict, Longhua District, Shenzhen 518110, Guangdong, China is listed on the US Federal Communications Commission list of facilities approved to perform measurements.

3 General Product Information

3.1 Product Function and Intended Use

The Product is a Wireless Controller which supports 2.4GHz SRD function.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	**Value**
Product Name:	Remote Controller
Model No.:	ZMRCSAFG1
Trademark:	Mowrator
FCC ID:	2BE7P-ZMRCSAFG1
Operating Voltage:	DC 3.6V 2550mAh 18650 battery
Testing Voltage:	DC 3.6V 2550mAh 18650 battery
Operating Temperature Range:	0 °C ~ 40 °C
Technical Specification of 2.4G LORA	
Operating Frequency:	2402 MHz to 2480 MHz
Type of Modulation:	FLRC(GMSK)
Channel Number:	128
Channel Separation:	600kHz
Antenna Type:	Internal antenna
Antenna Gain:	ANT1: 2.53dBi Max, ANT2: 2.40dBi Max
Remark: ANT1 and ANT2 cannot transmitting simultaneously.	

Table 4: RF Channel and Frequency of 2.4GHz LORA

Unit: MHz

2402.3	2402.9	2403.5	2404.1	2404.7	2405.3	2405.9	2406.5	2407.1	2407.7
2408.3	2408.9	2409.5	2410.1	2410.7	2411.3	2411.9	2412.5	2413.1	2413.7
2414.3	2414.9	2415.5	2416.1	2416.7	2417.3	2417.9	2418.5	2419.1	2419.7
2420.3	2420.9	2421.5	2422.1	2422.7	2423.3	2423.9	2424.5	2425.1	2425.7
2426.3	2426.9	2427.5	2428.1	2428.7	2429.3	2429.9	2430.5	2431.1	2431.7
2432.3	2432.9	2433.5	2434.1	2434.7	2435.3	2435.9	2436.5	2437.1	2437.7
2438.3	2438.9	2439.5	2440.1	**2440.7**	2441.3	2441.9	2442.5	2443.1	2444.9
2445.5	2446.1	2446.7	2447.3	2447.9	2448.5	2449.1	2449.7	2450.3	2450.9
2451.5	2452.1	2452.7	2453.3	2453.9	2454.5	2455.1	2455.7	2456.3	2456.9
2457.5	2458.1	2458.7	2459.3	2459.9	2460.5	2461.1	2461.7	2462.3	2462.9
2463.5	2464.1	2464.7	2465.3	2465.9	2466.5	2467.1	2467.7	2468.3	2468.9
2469.5	2470.1	2470.7	2471.3	2471.9	2472.5	2473.1	2473.7	2474.3	2474.9
2475.5	2476.1	2476.7	2477.3	2477.9	2478.5	2479.1	**2479.7**		

Test frequencies are lowest channel: 2402.3 MHz, middle channel: 2440.7 MHz and highest channel: 2479.7MHz

3.3 Independent Operation Modes

The basic operation modes are:

A. On, LARA transmitting mode
   1) Low Channel
   2) Middle Channel
   3) High Channel

B. On, Normal operation

C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- User Manual
- ID Label and Location Info

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5. All tests were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all tests were performed on model ZMRCSAFG1 in this report.

4.3 Special Accessories and Auxiliary Equipment

Table 5: Auxiliary Equipment Used during Test

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

4.5 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test (Below 1GHz)

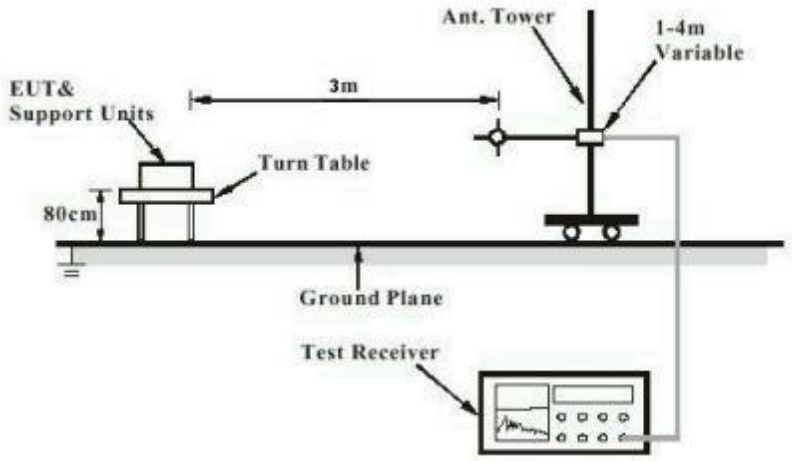


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

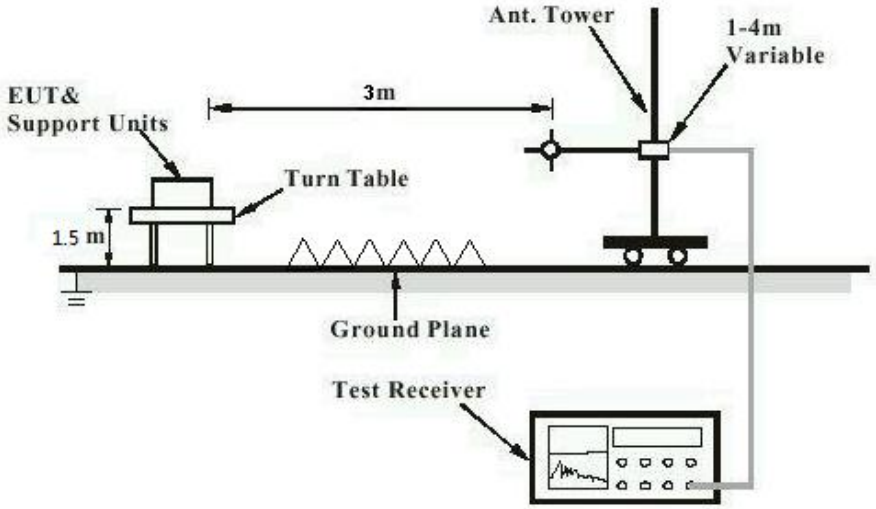
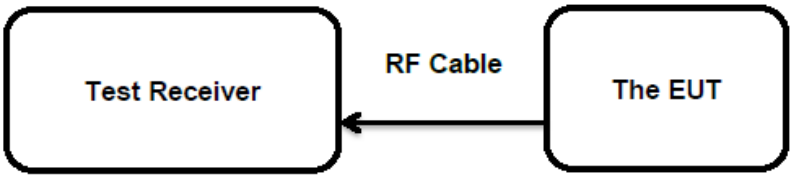


Diagram of Measurement Configuration for Conducted Transmitter Measurement



5 Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

RESULT: **Pass**

Test Specification

Test standard : FCC Part 15.247(b)(4) and Part 15.203

According to the manufacturer declared, the EUT has two internal antennas, the directional gain of antenna is 2.53dBi for ANT1 and 2.40dBi for ANT2, and the antenna connector is designed with permanent attachment and no consideration of replacement.

Therefore, the EUT is considered sufficient to comply with the provision.

Refer to EUT Photo for further details.

5.1.2 Maximum Peak Conducted Output Power

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(b)(3)
Basic standard	:	ANSI C63.10: 2013
Limits	:	1.0 Watts
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2024-03-26 - 2024-04-26
Input voltage	:	DC3.6 V by 18650 battery
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.4 ℃
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 6: Test Result of Maximum Peak Conducted Output Power

ANT1

Test Mode	Test Channel (MHz)	Measured Peak Power		Measured Average Power	Limit (W)
		(dBm)	(W)	(dBm)	
TX	2402.3	10.62	0.0115	7.32	< 1.0
	2440.7	11.03	0.0127	7.88	
	2479.7	11.37	0.0137	8.23	
Maximum Measured Value		11.37	0.0137	8.23	

ANT2

Test Mode	Test Channel (MHz)	Measured Peak Power		Measured Average Power	Limit (W)
		(dBm)	(W)	(dBm)	
TX	2402.3	10.47	0.0111	7.04	< 1.0
	2440.7	10.81	0.0121	7.74	
	2479.7	11.13	0.0130	8.05	
Maximum Measured Value		11.13	0.0130	8.05	

Note:
1) The cable loss is taken into account in results.
2) Antenna gain(G): 2.53 dBi for ANT1, 2.40 dBi for ANT2

5.1.3 Conducted Power Spectral Density

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(e)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 8 dBm / 3kHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2024-03-26 - 2024-04-26
Input voltage	:	DC3.6 V by 18650 battery
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.4 ℃
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

Note: Because ANT1 port share the same radio path from the chip with ANT2 port, here the worst-case result for ANT1 port with 2.53dBi gain was recorded.

5.1.4 6dB Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)(2)
Basic standard	:	ANSI C63.10: 2013
Limits	:	> 500 KHz
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2024-03-26 - 2024-04-26
Input voltage	:	DC3.6 V by 18650 battery
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.4 ℃
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

Note: Because ANT1 port share the same radio path from the chip with ANT2 port, here the worst-case result for ANT1 port with 2.53dBi gain was recorded.

5.1.5 99% Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(a)
Basic standard	:	ANSI C63.10: 2013
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2024-03-26 - 2024-04-26
Input voltage	:	DC3.6 V by 18650 battery
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.4 ℃
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

For the measurement records, refer to the appendix A.

Note: Because ANT1 port share the same radio path from the chip with ANT2 port, here the worst-case result for ANT1 port with 2.53dBi gain was recorded.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	20dB (below that in the 100kHz bandwidth within the band that contains the highest level of the desired power); In addition, radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits specified in 15.209(a)
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2024-03-26 - 2024-04-26
Input voltage	:	DC3.6 V by 18650 battery
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	25.4 ℃
Relative humidity	:	54 %
Atmospheric pressure	:	101 kPa

Test results of 100kHz Bandwidth of Frequency Band Edge by Conducted method refer to test plots, and compliance is achieved as well.

For the measurement records, refer to the appendix A.

Note: Because ANT1 port share the same radio path from the chip with ANT2 port, here the worst-case result for ANT1 port with 2.53dBi gain was recorded.

5.1.7 Radiated Spurious Emission

RESULT: **Pass**

Test Specification

Test standard	:	FCC Part 15.247(d) & FCC Part 15.205
Basic standard	:	ANSI C63.10: 2013
Limits	:	Refer to 15.209(a) of FCC part 15.247(d)
Kind of test site	:	3m Semi-anechoic Chamber

Test Setup

Date of testing	:	2024-03-26 - 2024-04-26
Input voltage	:	DC3.6 V by 18650 battery
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	Refer to test result
Relative humidity	:	Refer to test result
Atmospheric pressure	:	101 kPa

Remark:
Testing was carried out within frequency range 9kHz to the tenth harmonics, only worst-case mode data reported.
Because ANT1 port share the same radio path from the chip with ANT2 port, here the worst-case result for ANT1 port with 2.53dBi gain was recorded.
For the measurement records, refer to the appendix A.

6 Photographs of the Test Set-Up

For photographs of the test set-up, refer to the appendix B.

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Appendix A: Test Results of 2.4GHz SRD

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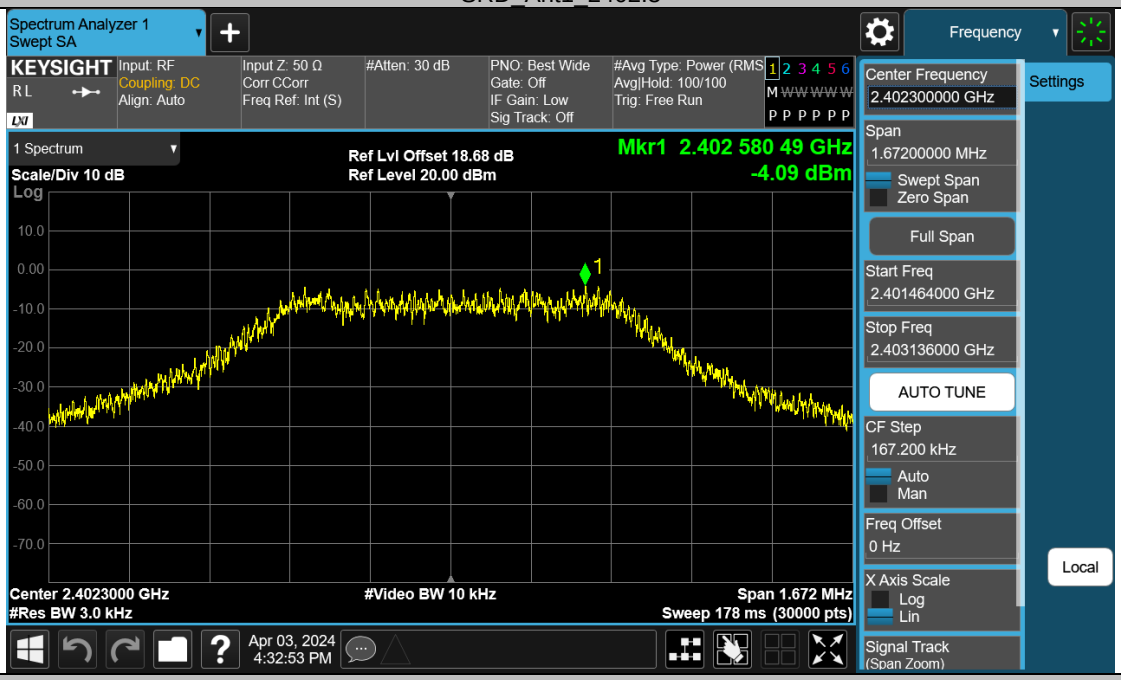
Appendix A.1: Test Results of Conducted Power Spectral Density

Test Result

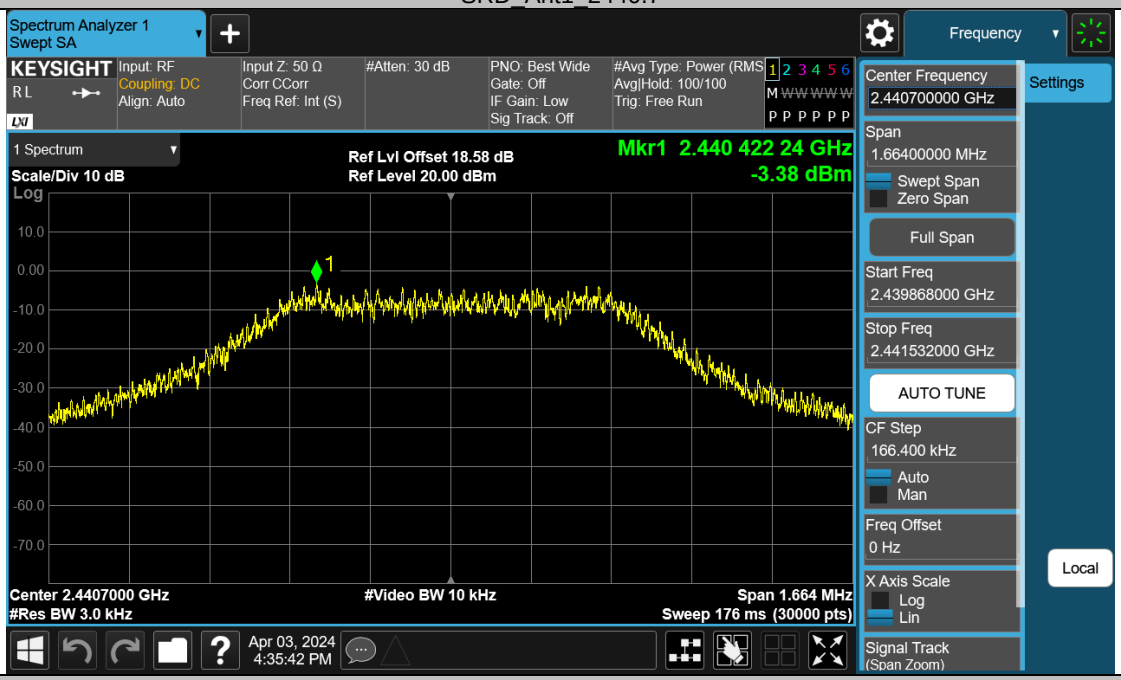
TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
SRD	Ant1	2402.3	-4.09	≤8.00	PASS
		2440.7	-3.38	≤8.00	PASS
		2479.7	-3.06	≤8.00	PASS

Test Graphs

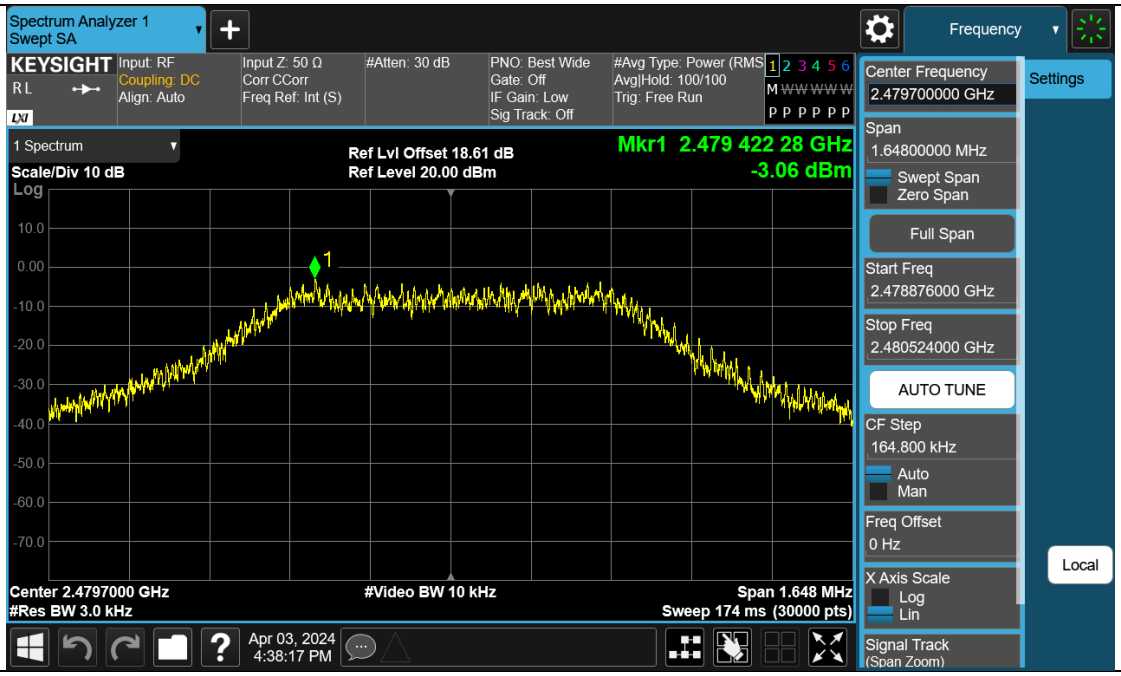
SRD_Ant1_2402.3



SRD_Ant1_2440.7



SRD_Ant1_2479.7


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 30 dB
PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Log
Ref Lvl Offset 18.61 dB
Ref Level 20.00 dBm
Mkr1 2.479 422 28 GHz
-3.06 dBm
Center 2.4797000 GHz
#Res BW 3.0 kHz
#Video BW 10 kHz
Span 1.648 MHz
Sweep 174 ms (30000 pts)
Apr 03, 2024
4:38:17 PM
Frequency
Center Frequency
2.479700000 GHz
Span
1.64800000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.478876000 GHz
Stop Freq
2.480524000 GHz
AUTO TUNE
CF Step
164.800 kHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Settings
Local

Appendix A.2: Test Results of 6dB Bandwidth

Test Result

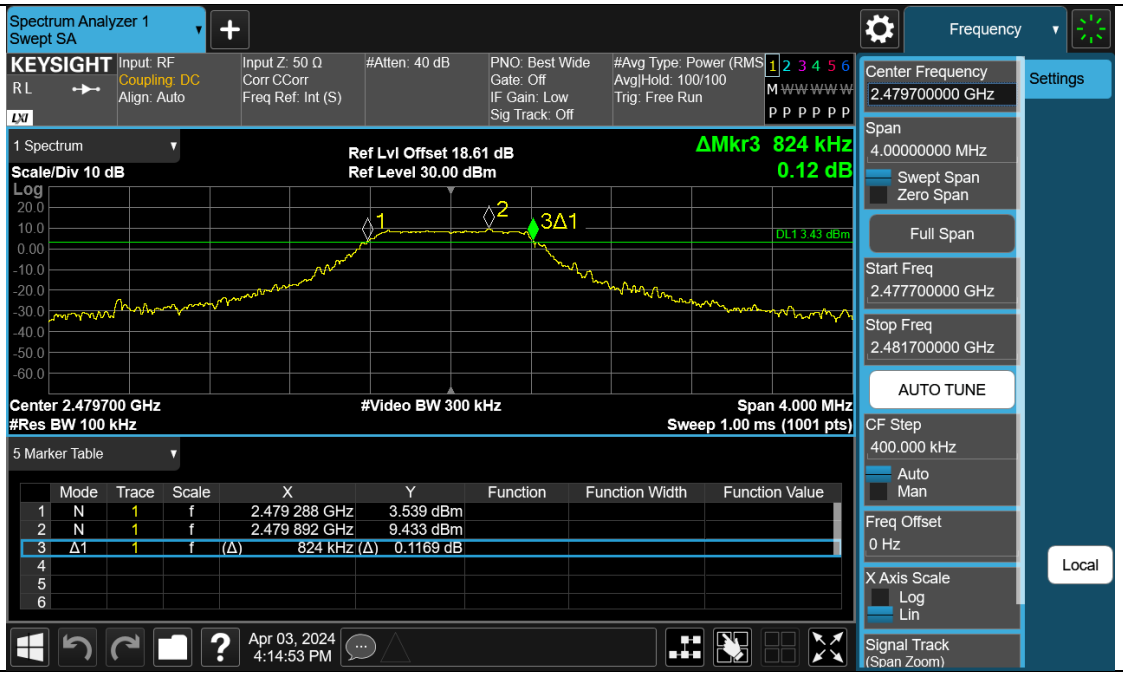
TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
SRD	Ant1	2402.3	0.836	2401.884	2402.72	0.5	PASS
		2440.7	0.832	2440.288	2441.12	0.5	PASS
		2479.7	0.824	2479.288	2480.112	0.5	PASS

Test Graphs

SRD_Ant1_2402.3

SRD_Ant1_2440.7

SRD_Ant1_2479.7


Spectrum Analyzer 1
Swept SA
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corr CCorr
Freq Ref: Int (S)
#Atten: 40 dB
PNO: Best Wide
Gate: Off
IF Gain: Low
Sig Track: Off
#Avg Type: Power (RMS
Avg|Hold: 100/100
Trig: Free Run
1 Spectrum
Scale/Div 10 dB
Ref Lvl Offset 18.61 dB
Ref Level 30.00 dBm
ΔMkr3 824 kHz
0.12 dB
DL1 3.43 dBm
Center 2.479700 GHz
#Res BW 100 kHz
#Video BW 300 kHz
Span 4.000 MHz
Sweep 1.00 ms (1001 pts)
5 Marker Table
Mode Trace Scale X Y Function Function Width Function Value
1 N 1 f 2.479 288 GHz 3.539 dBm
2 N 1 f 2.479 892 GHz 9.433 dBm
3 Δ1 1 f (Δ) 824 kHz (Δ) 0.1169 dB
Apr 03, 2024
4:14:53 PM
Frequency
Center Frequency
2.479700000 GHz
Span
4.00000000 MHz
Swept Span
Zero Span
Full Span
Start Freq
2.477700000 GHz
Stop Freq
2.481700000 GHz
AUTO TUNE
CF Step
400.000 kHz
Auto
Man
Freq Offset
0 Hz
X Axis Scale
Log
Lin
Signal Track
(Span Zoom)
Settings
Local

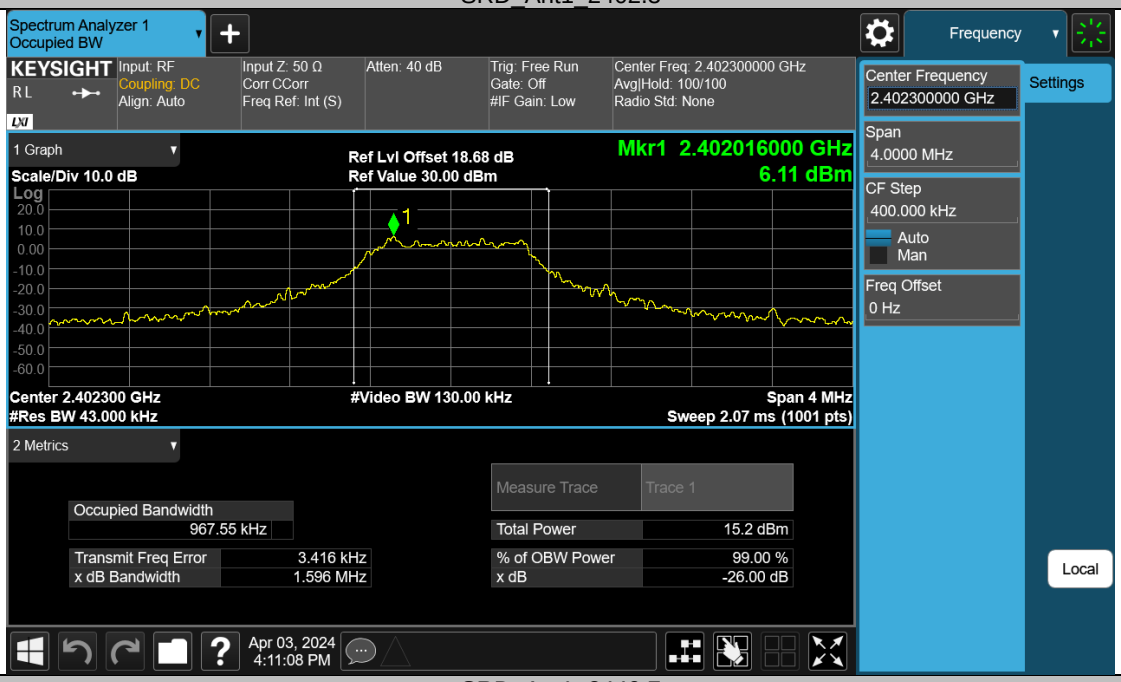
Appendix A.3: Test Results of 99% Bandwidth

Test Result

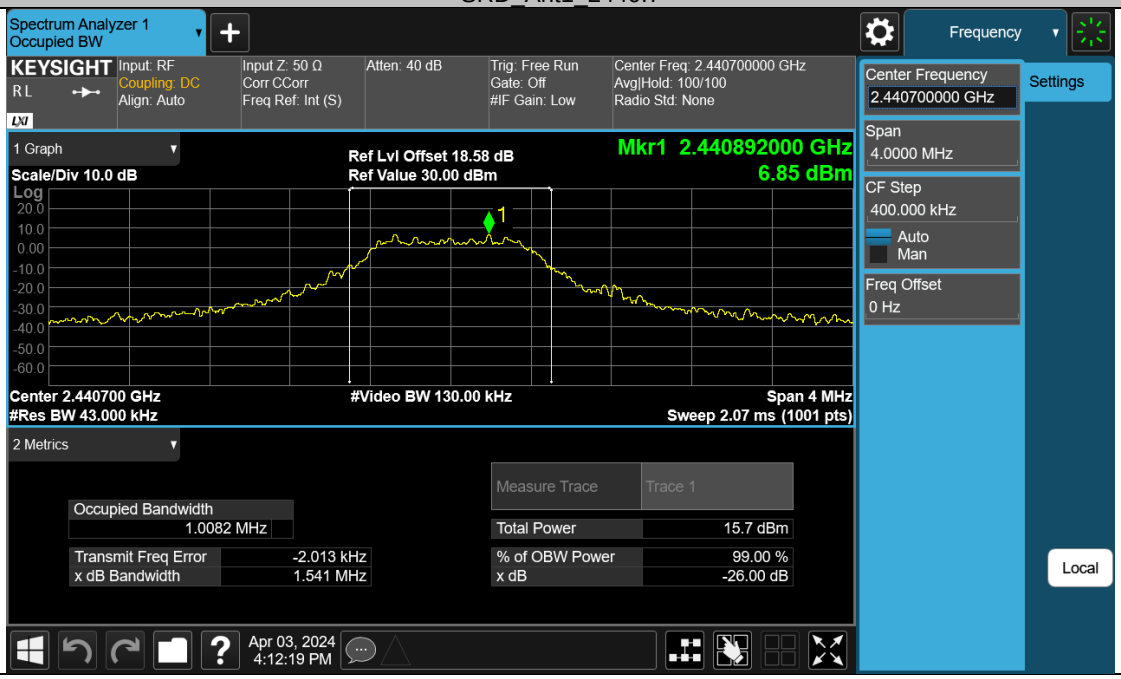
TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
SRD	Ant1	2402.3	0.968	2401.704	2402.672	---	---
		2440.7	1.008	2440.158	2441.166	---	---
		2479.7	0.982	2479.188	2480.170	---	---

Test Graphs

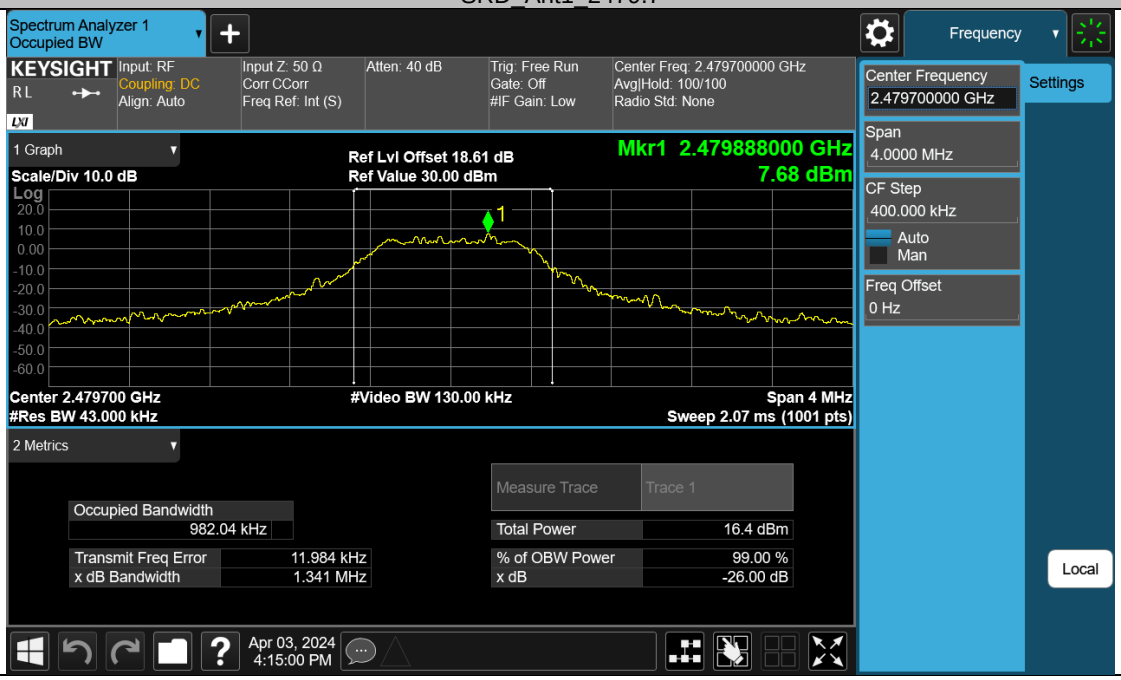
SRD_Ant1_2402.3



SRD_Ant1_2440.7



SRD_Ant1_2479.7



Appendix A.4: Test Results of Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Band Edge

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
SRD	Ant1	Low	2402.3	9.215	-38.74	≤-10.79	PASS
		High	2479.7	9.941	-43.12	≤-10.06	PASS

Test Graphs

SRD_Ant1_Low_2402.3

SRD_Ant1_High_2479.7

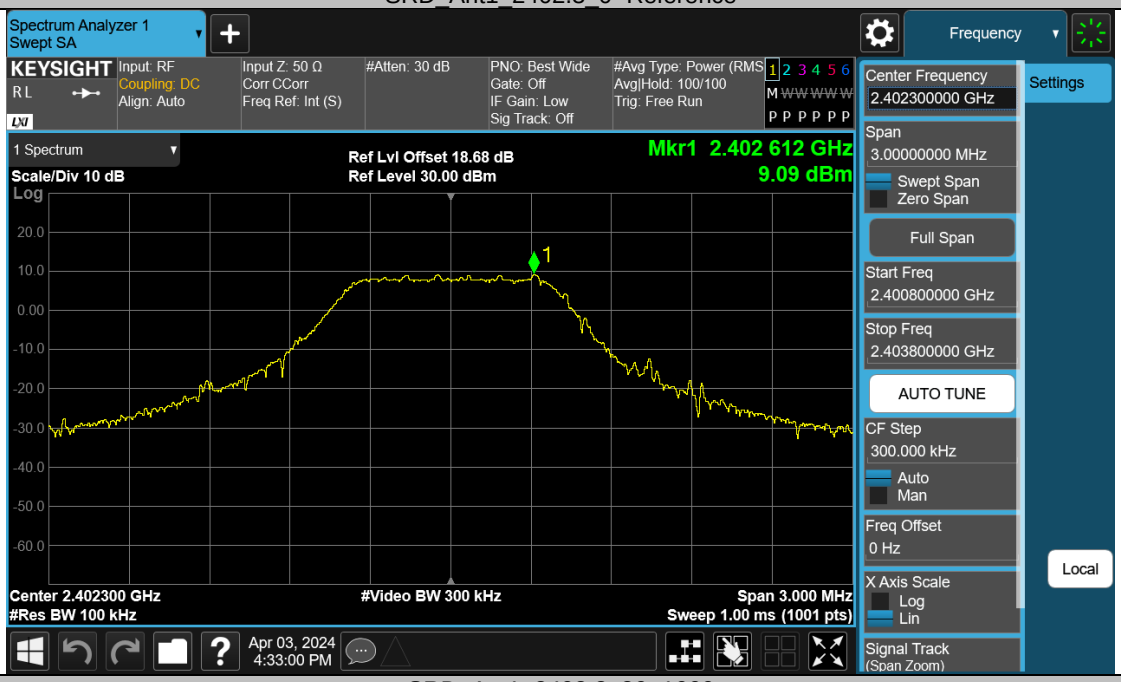
Conducted Spurious Emission

Test Result

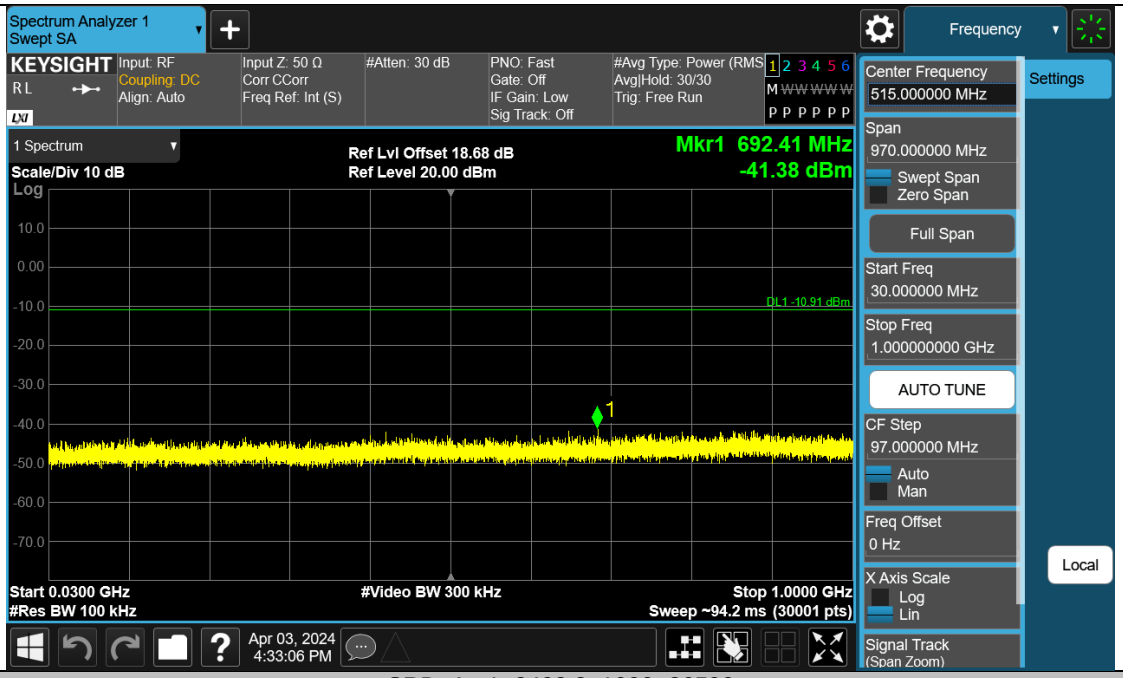
TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
SRD	Ant1	2402.3	Reference	9.09	9.09	---	PASS
			30~1000	9.09	-41.38	≤-10.91	PASS
			1000~26500	9.09	-32.37	≤-10.91	PASS
		2440.7	Reference	9.63	9.63	---	PASS
			30~1000	9.63	-40.82	≤-10.37	PASS
			1000~26500	9.63	-32.96	≤-10.37	PASS
		2479.7	Reference	9.88	9.88	---	PASS
			30~1000	9.88	-41.31	≤-10.12	PASS
			1000~26500	9.88	-32.39	≤-10.12	PASS

Test Graphs

SRD_Ant1_2402.3_0~Reference

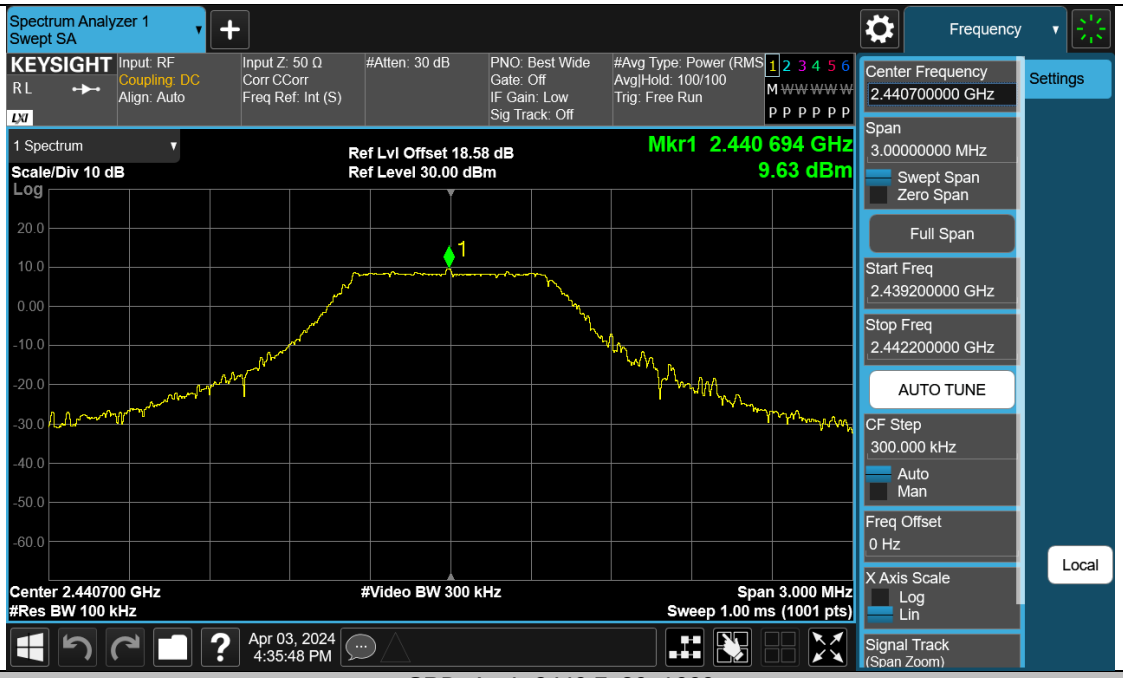


SRD_Ant1_2402.3_30~1000

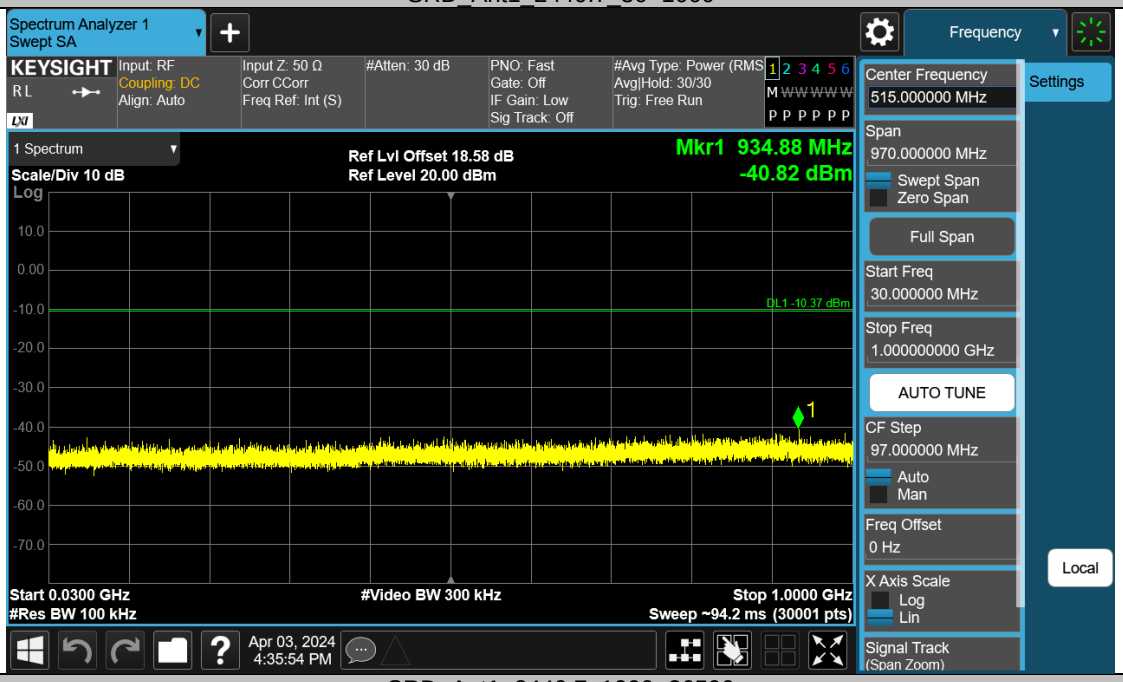


SRD_Ant1_2402.3_1000~26500

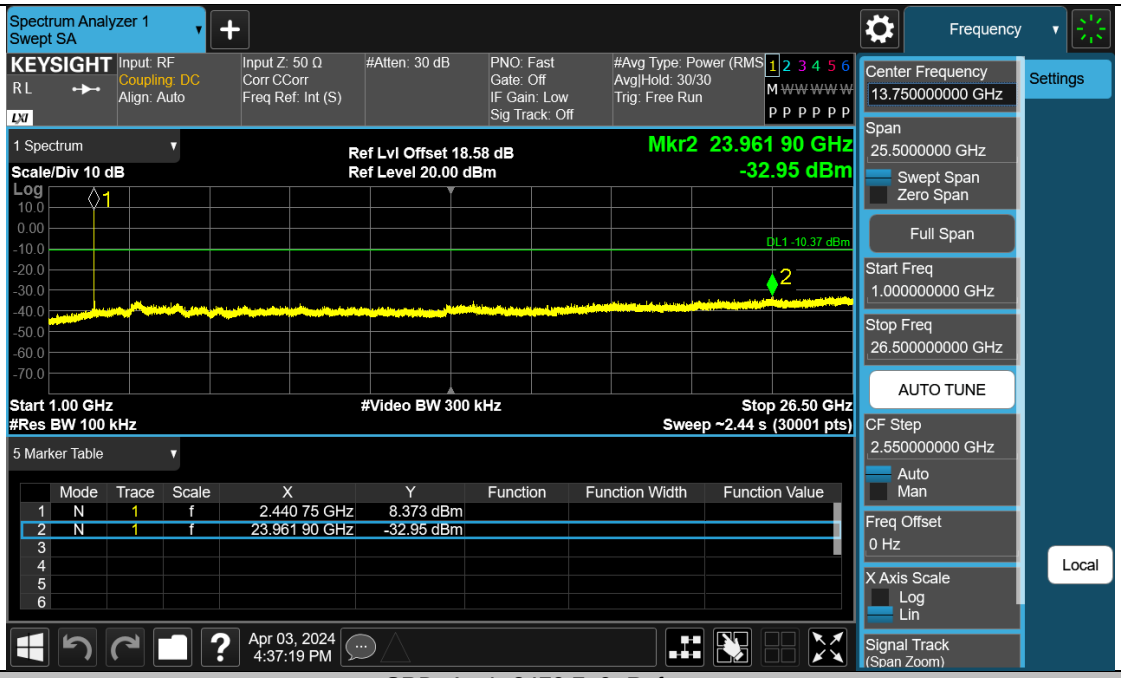
SRD_Ant1_2440.7_0~Reference



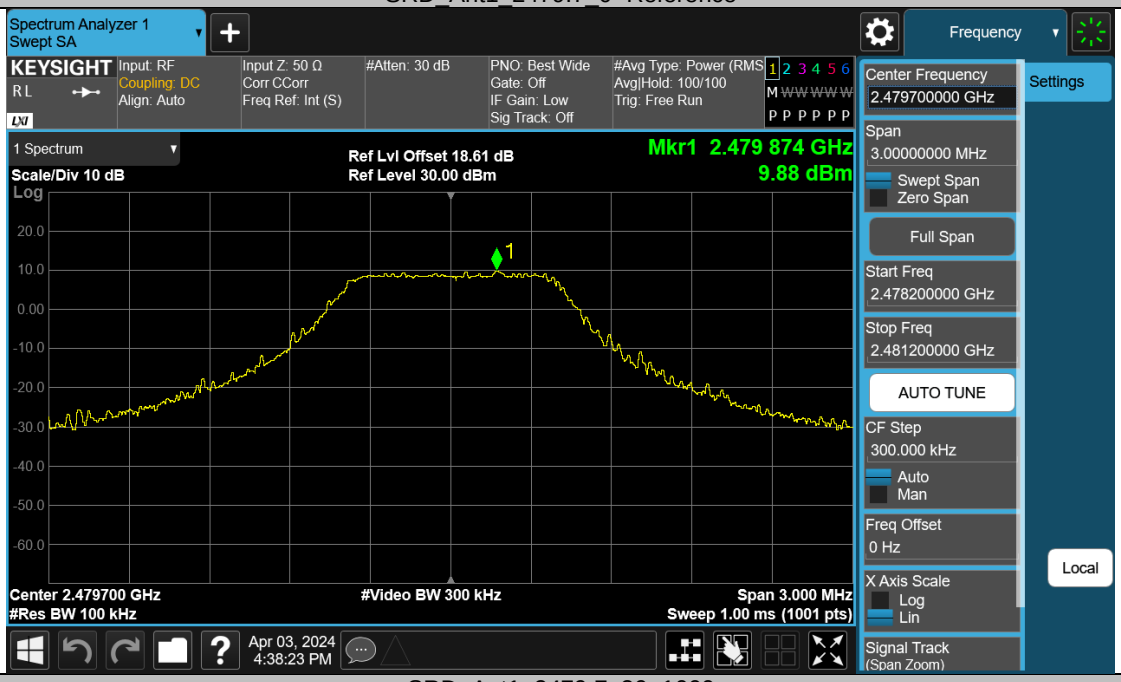
SRD_Ant1_2440.7_30~1000



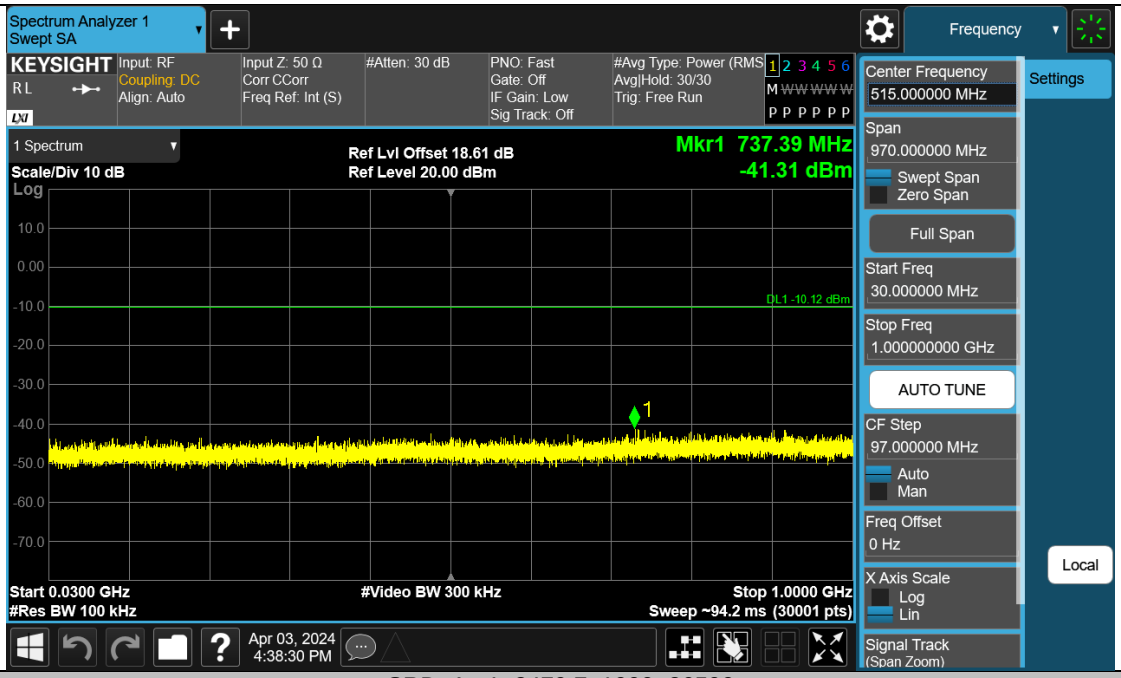
SRD_Ant1_2440.7_1000~26500



SRD_Ant1_2479.7_0~Reference



SRD_Ant1_2479.7_30~1000



SRD_Ant1_2479.7_1000~26500

Appendix A.5: Test Results of Radiated Spurious Emissions

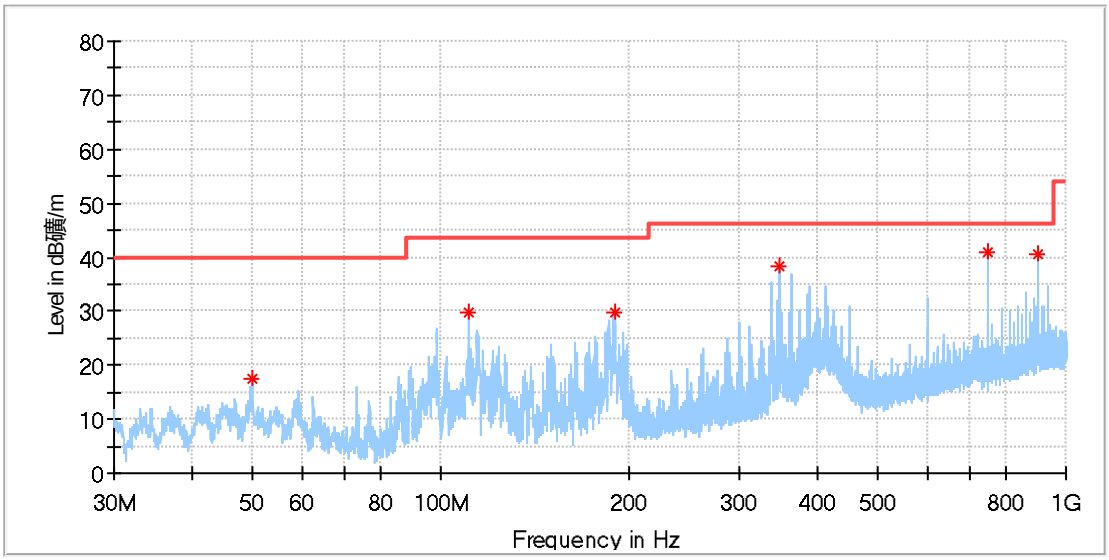
Note:
1) This testing was carried out on different modulations, but only the worst case was presented in this report.
2) Testing was carried out within frequency range 9kHz to the tenth harmonics. The measurement results below 30MHz and above 18GHz were greater than 20dB below the limit, so only the radiated spurious emissions from 30MHz to 18GHz were reported.

30MHz - 1GHz (Worst case)

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2440.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.996923	17.45	40.00	22.55	100.0	H	222.0	-18.6
110.883077	29.77	43.50	13.73	100.0	H	189.0	-19.5
189.527692	29.81	43.50	13.69	100.0	H	352.0	-19.9
346.891539	38.20	46.00	7.80	100.0	H	173.0	-15.3
750.075769	40.98	46.00	5.02	100.0	H	181.0	-7.6
900.052692	40.73	46.00	5.27	100.0	H	173.0	-5.4

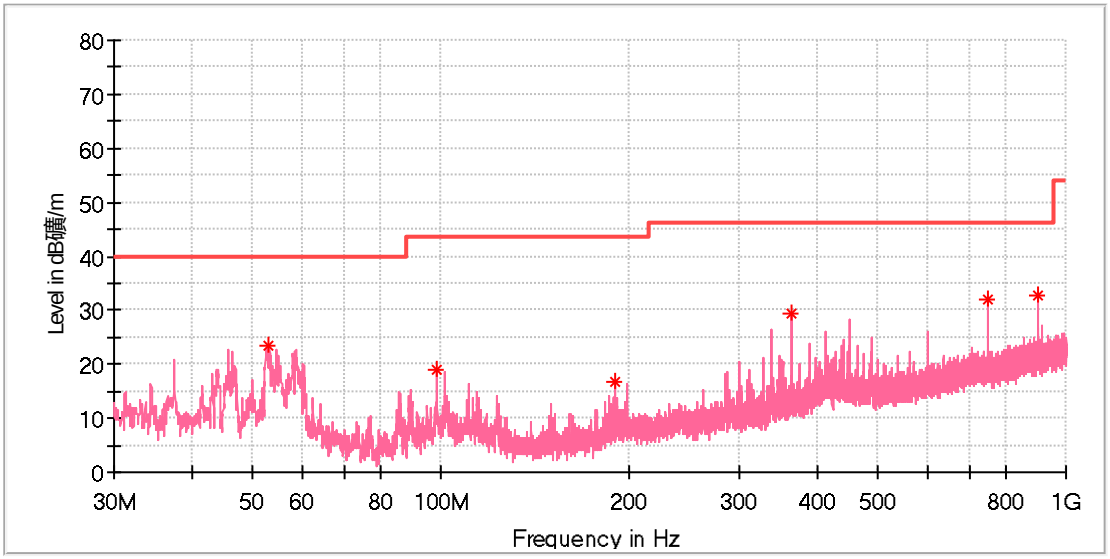
Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2440.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
53.130769	23.56	40.00	16.44	100.0	V	304.0	-18.7
98.385000	18.90	43.50	24.60	100.0	V	54.0	-19.5
189.378462	16.60	43.50	26.90	100.0	V	225.0	-19.9
362.523462	29.57	46.00	16.43	100.0	V	20.0	-14.9
750.038462	32.13	46.00	13.87	100.0	V	216.0	-7.6
900.052692	32.71	46.00	13.29	100.0	V	141.0	-5.4

Final_Result

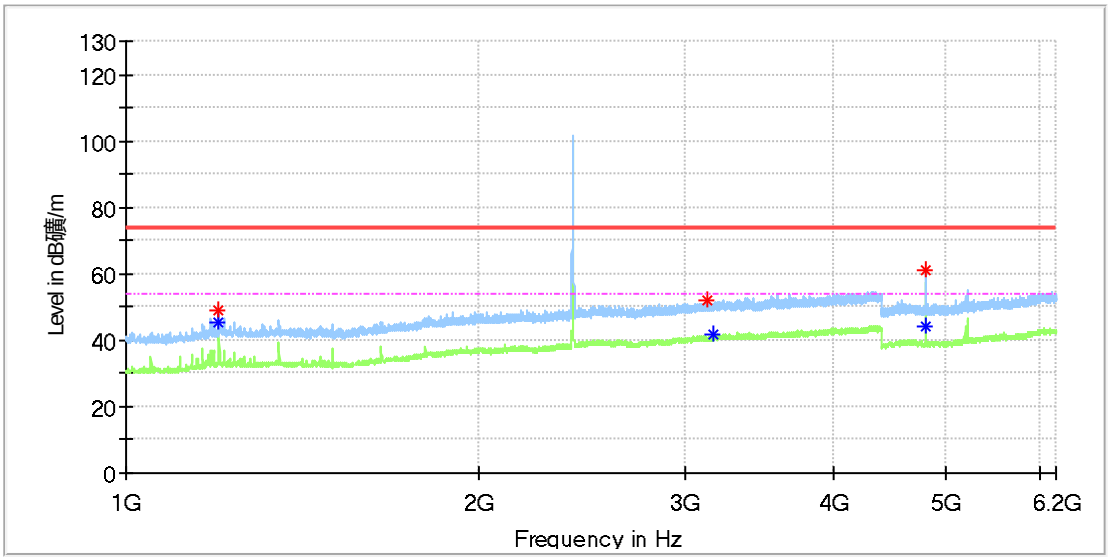
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

1G~18GHz

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2402.3
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1200.000000	---	45.29	54.00	8.71	150.0	H	37.0	1.1
1200.000000	49.18	---	74.00	24.82	150.0	H	37.0	1.1
3129.500000	52.25	---	74.00	21.75	150.0	H	279.0	8.6
3164.000000	---	41.50	54.00	12.50	150.0	H	88.0	8.6
4804.500000	60.95	---	74.00	13.05	150.0	H	158.0	11.8
4806.000000	---	43.94	54.00	10.06	150.0	H	158.0	11.8

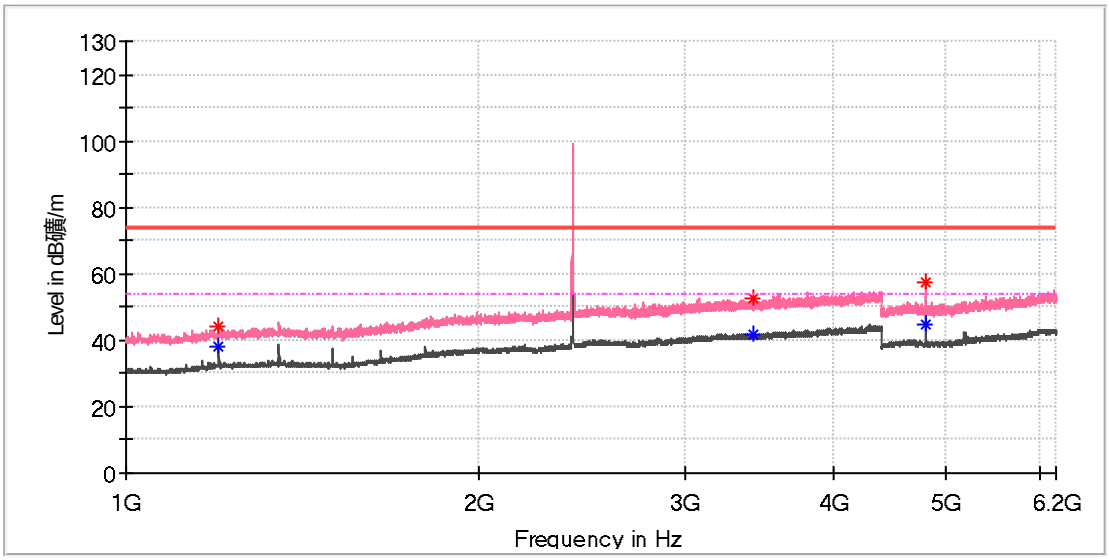
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2402.3
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1200.000000	---	38.05	54.00	15.95	150.0	V	205.0	1.1
1200.500000	44.44	---	74.00	29.56	150.0	V	227.0	1.1
3421.000000	52.66	---	74.00	21.34	150.0	V	227.0	8.8
3422.000000	---	41.54	54.00	12.46	150.0	V	147.0	8.8
4803.500000	57.64	---	74.00	16.36	150.0	V	254.0	11.8
4805.500000	---	45.02	54.00	8.98	150.0	V	254.0	11.8

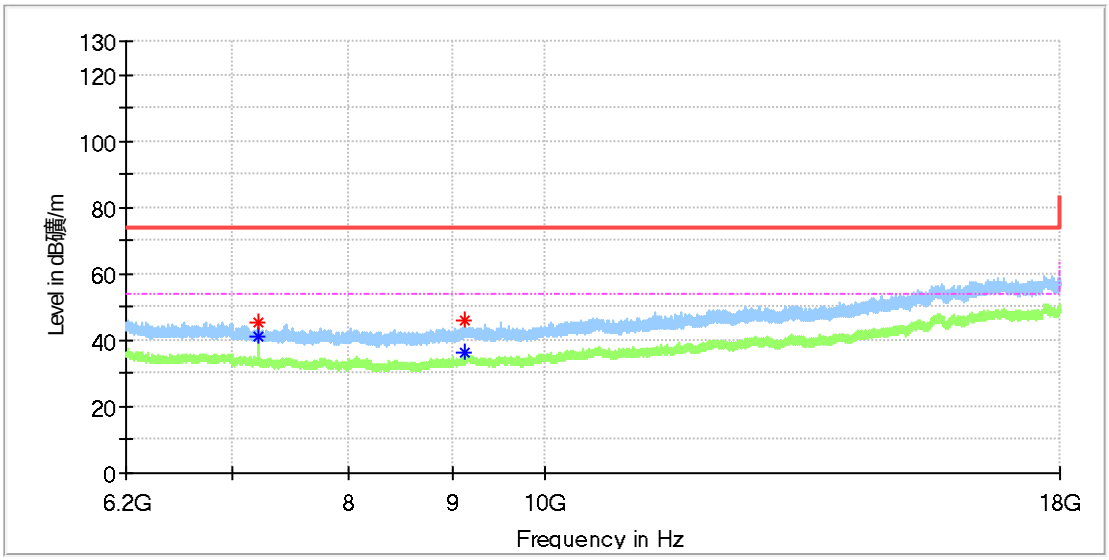
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2402.3
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7206.441667	45.55	---	74.00	28.45	150.0	H	49.0	8.8
7206.441667	---	41.05	54.00	12.95	150.0	H	49.0	8.8
9122.958333	---	36.00	54.00	18.00	150.0	H	13.0	10.2
9134.758333	45.69	---	74.00	28.31	150.0	H	132.0	10.3

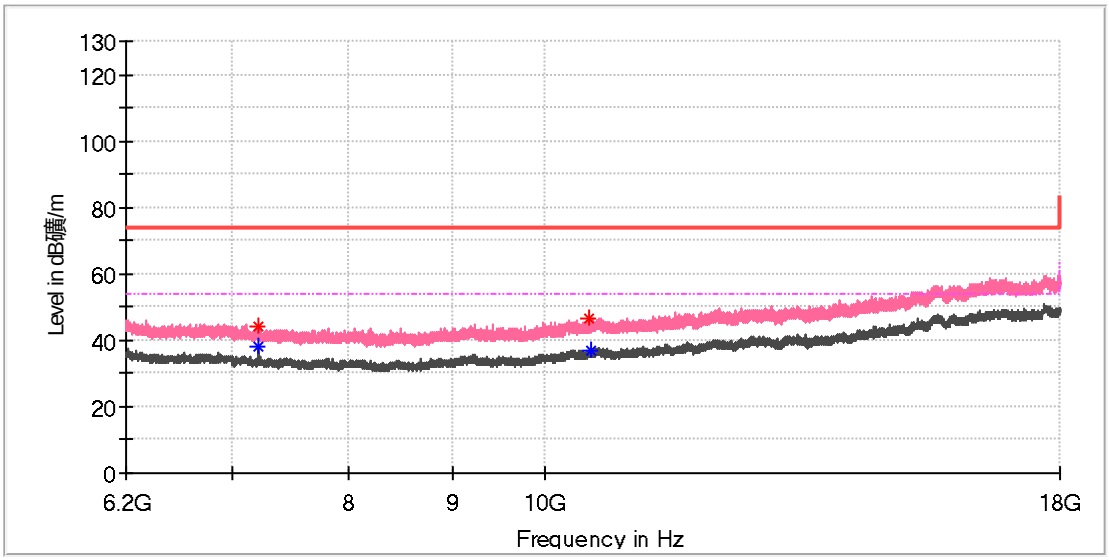
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2402.3
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7207.425000	44.43	---	74.00	29.57	150.0	V	166.0	8.8
7207.425000	---	38.23	54.00	15.77	150.0	V	166.0	8.8
10511.425000	46.73	---	74.00	27.27	150.0	V	202.0	12.0
10530.600000	---	37.12	54.00	16.88	150.0	V	214.0	12.0

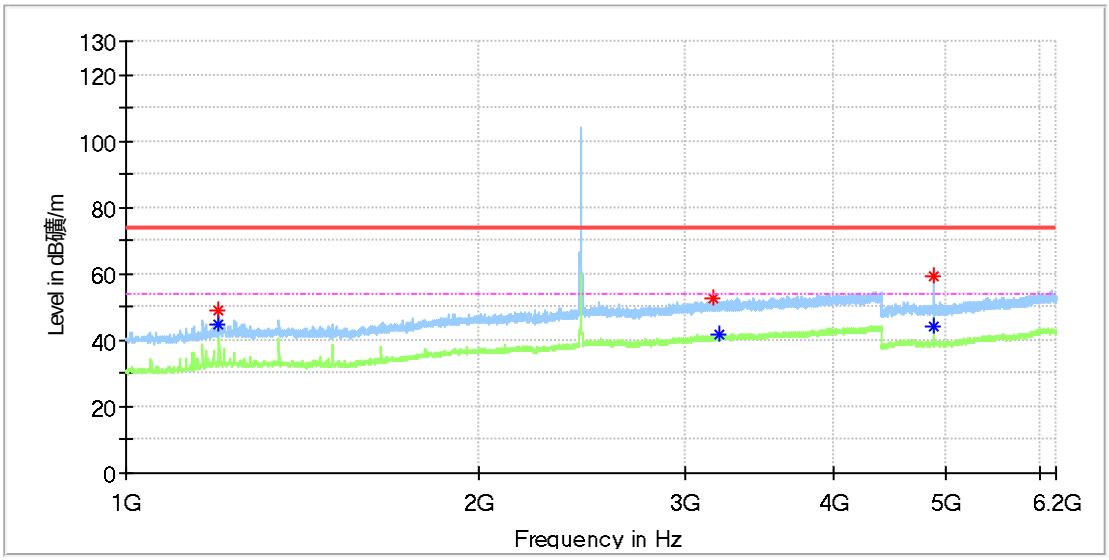
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2440.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1200.000000	49.22	---	74.00	24.78	150.0	H	231.0	1.1
1200.000000	---	44.74	54.00	9.26	150.0	H	231.0	1.1
3163.000000	52.49	---	74.00	21.51	150.0	H	85.0	8.6
3201.500000	---	41.78	54.00	12.22	150.0	H	78.0	8.6
4880.000000	---	44.19	54.00	9.81	150.0	H	226.0	11.8
4881.500000	59.20	---	74.00	14.80	150.0	H	156.0	11.8

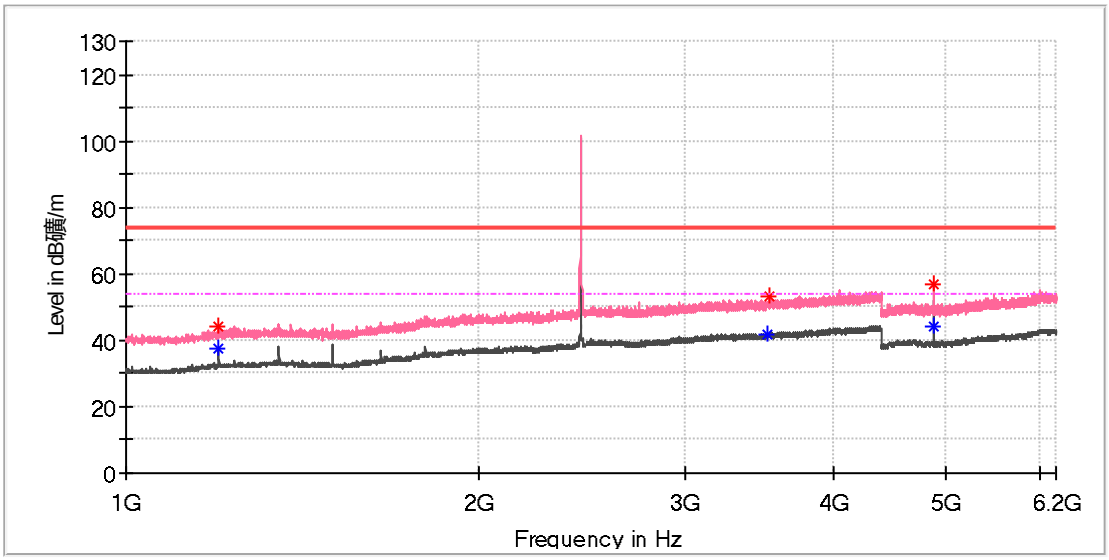
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2440.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1200.000000	---	37.27	54.00	16.73	150.0	V	78.0	1.1
1200.500000	43.85	---	74.00	30.15	150.0	V	176.0	1.1
3525.000000	---	41.96	54.00	12.04	150.0	V	53.0	9.1
3528.000000	53.15	---	74.00	20.85	150.0	V	100.0	9.1
4880.500000	56.86	---	74.00	17.14	150.0	V	246.0	11.8
4882.500000	---	43.96	54.00	10.04	150.0	V	246.0	11.8

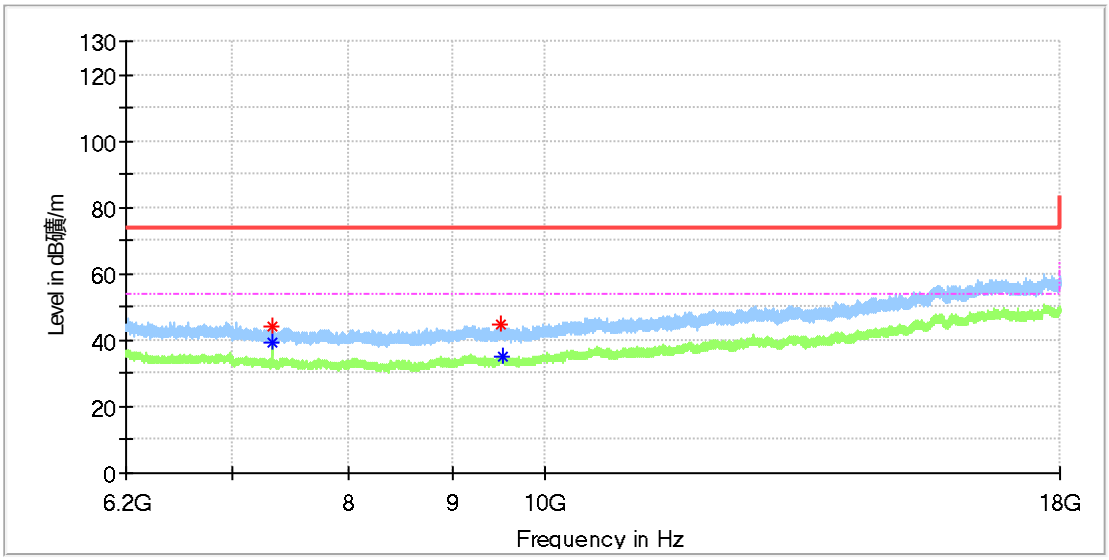
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2440.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7321.491667	44.38	---	74.00	29.62	150.0	H	154.0	8.2
7321.491667	---	39.16	54.00	14.84	150.0	H	154.0	8.2
9507.441667	44.48	---	74.00	29.52	150.0	H	242.0	10.0
9532.025000	---	35.35	54.00	18.65	150.0	H	10.0	10.1

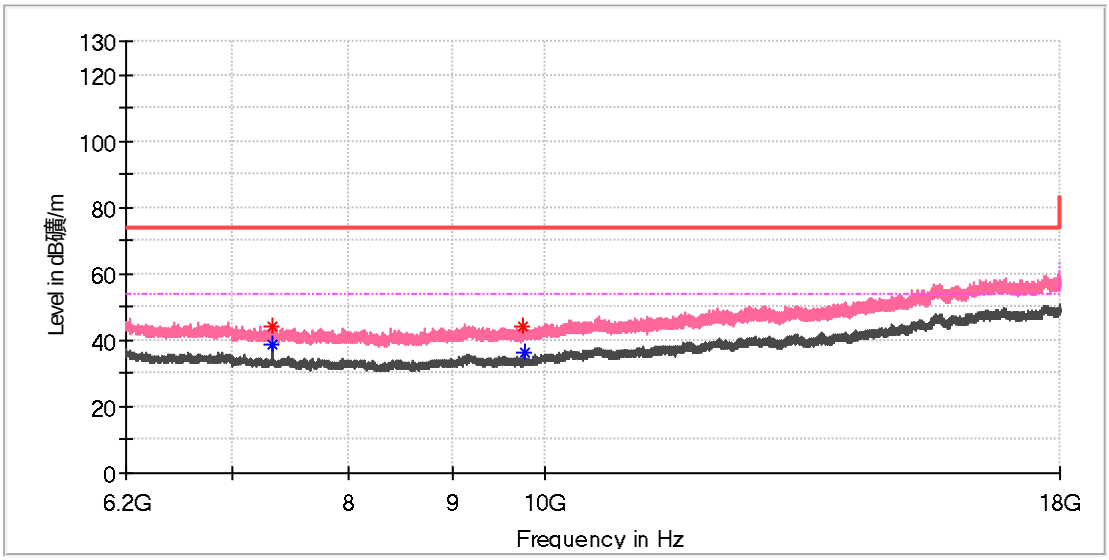
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2440.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7321.000000	44.17	---	74.00	29.83	150.0	V	303.0	8.2
7321.000000	---	38.81	54.00	15.19	150.0	V	303.0	8.2
9761.633333	44.16	---	74.00	29.84	150.0	V	222.0	10.4
9764.091667	---	36.28	54.00	17.72	150.0	V	222.0	10.4

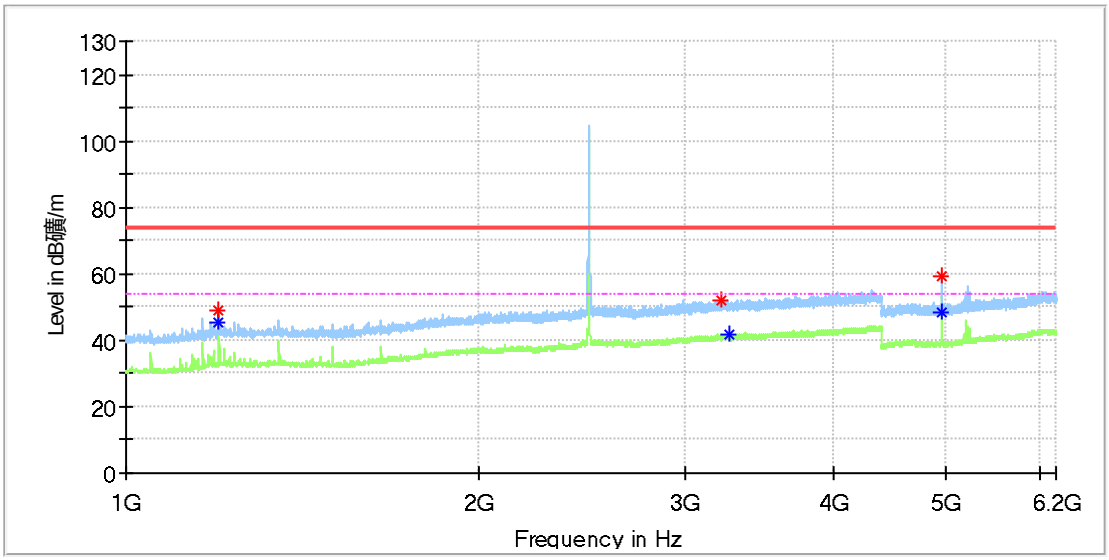
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2479.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1200.000000	---	45.08	54.00	8.92	150.0	H	253.0	1.1
1200.000000	48.84	---	74.00	25.16	150.0	H	253.0	1.1
3210.500000	52.03	---	74.00	21.97	150.0	H	277.0	8.6
3264.500000	---	41.86	54.00	12.14	150.0	H	32.0	8.5
4958.500000	---	48.26	54.00	5.74	150.0	H	205.0	11.8
4960.000000	59.48	---	74.00	14.52	150.0	H	154.0	11.8

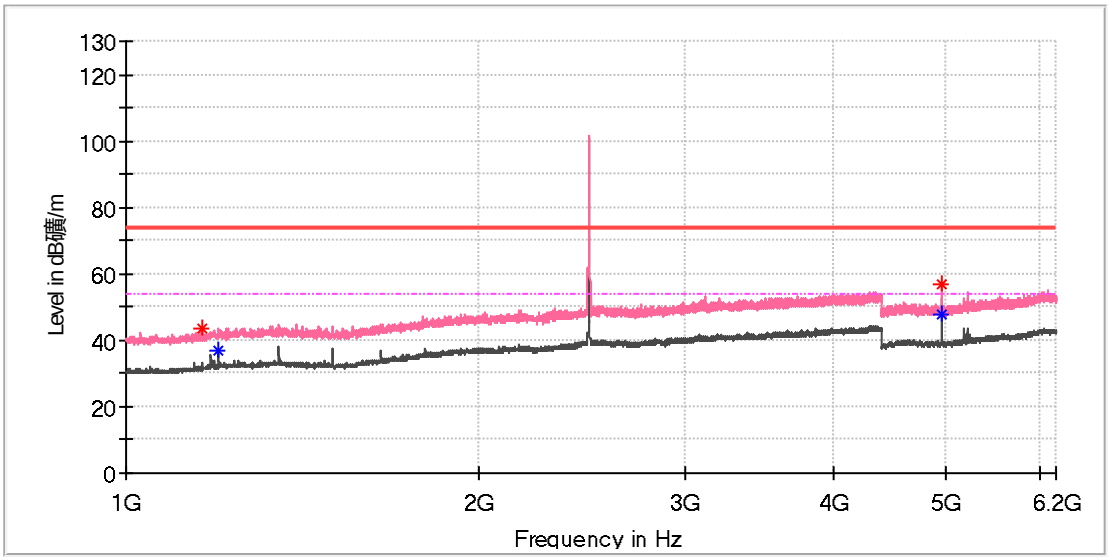
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2479.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1162.000000	43.75	---	74.00	30.25	150.0	V	249.0	0.9
1200.000000	---	37.11	54.00	16.89	150.0	V	6.0	1.1
4958.500000	---	47.67	54.00	6.33	150.0	V	258.0	11.8
4959.500000	56.92	---	74.00	17.08	150.0	V	258.0	11.8

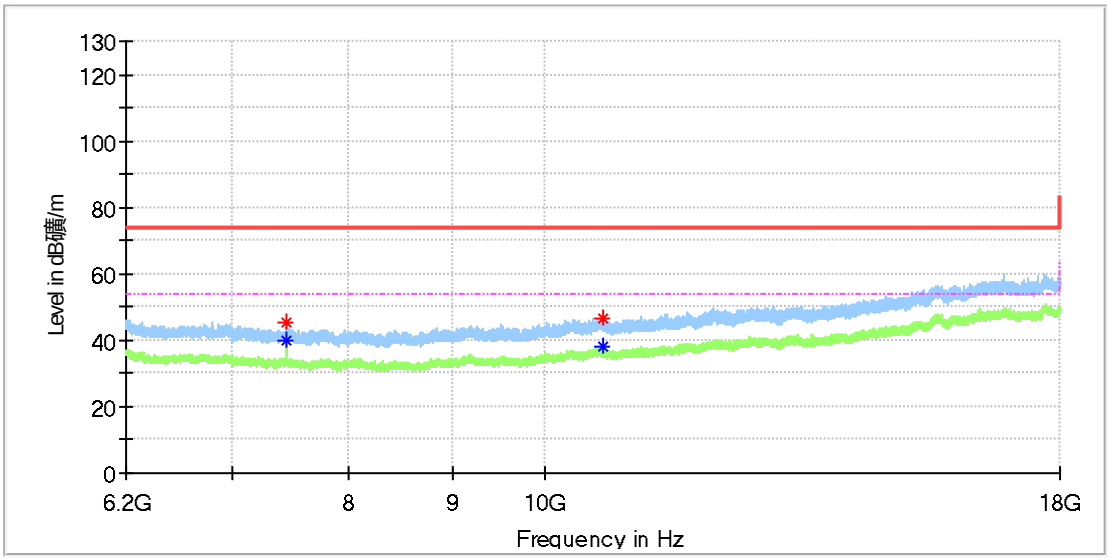
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2479.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.000000	---	39.66	54.00	14.34	150.0	H	264.0	8.4
7439.983333	45.62	---	74.00	28.38	150.0	H	264.0	8.4
10677.608333	46.82	---	74.00	27.18	150.0	H	299.0	11.9
10678.591667	---	38.31	54.00	15.69	150.0	H	18.0	11.9

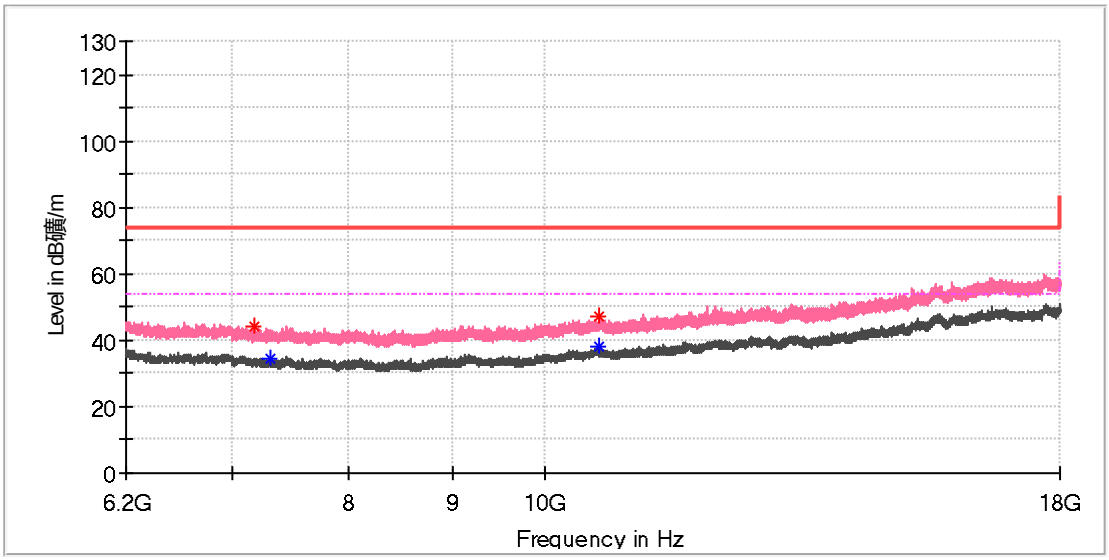
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2479.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7185.300000	43.88	---	74.00	30.12	150.0	V	85.0	8.8
7309.200000	---	34.53	54.00	19.47	150.0	V	169.0	8.2
10627.950000	---	37.94	54.00	16.06	150.0	V	263.0	12.0
10627.950000	47.41	---	74.00	26.59	150.0	V	263.0	12.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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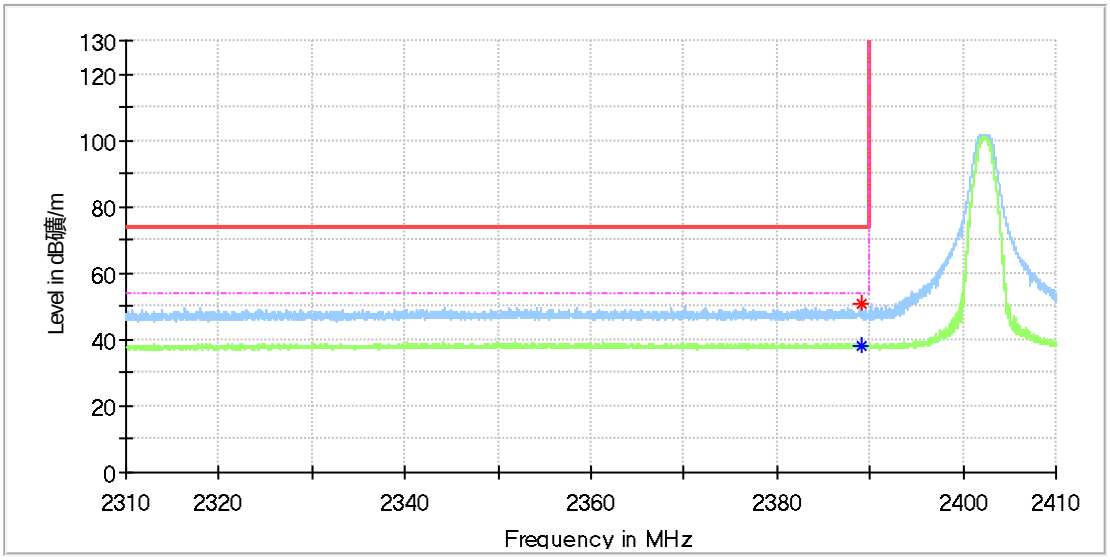
Appendix A.6: Test Results of RADIATED EMISSIONS IN RESTRICTED BANDS

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2402.3
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2389.000000	50.62	---	74.00	23.38	150.0	H	206.0	7.0
2389.117647	---	38.36	54.00	15.64	150.0	H	213.0	7.0

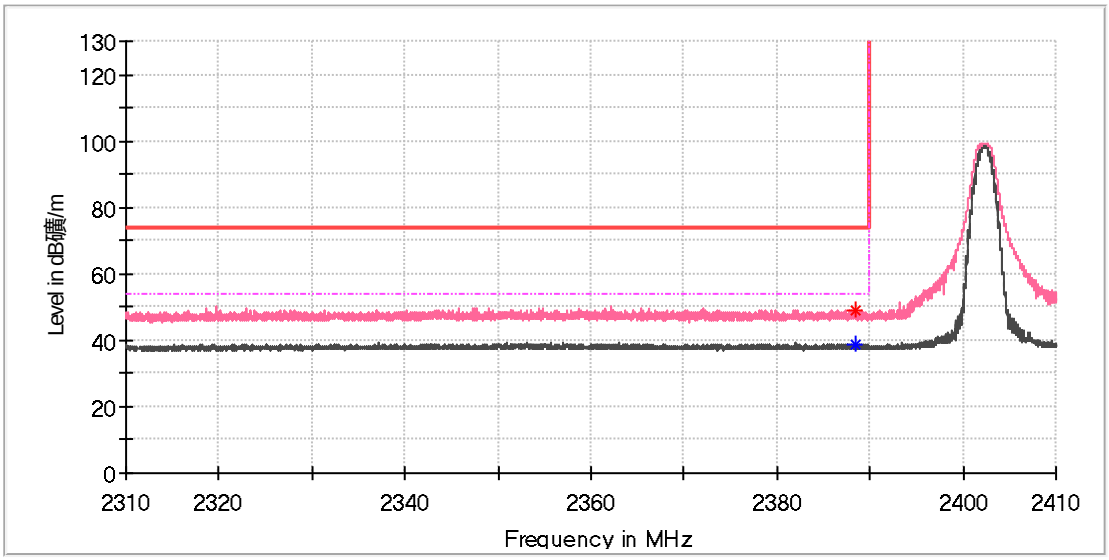
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2402.3
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2388.441177	49.25	---	74.00	24.75	150.0	V	141.0	7.0
2388.485294	---	38.84	54.00	15.16	150.0	V	289.0	7.0

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
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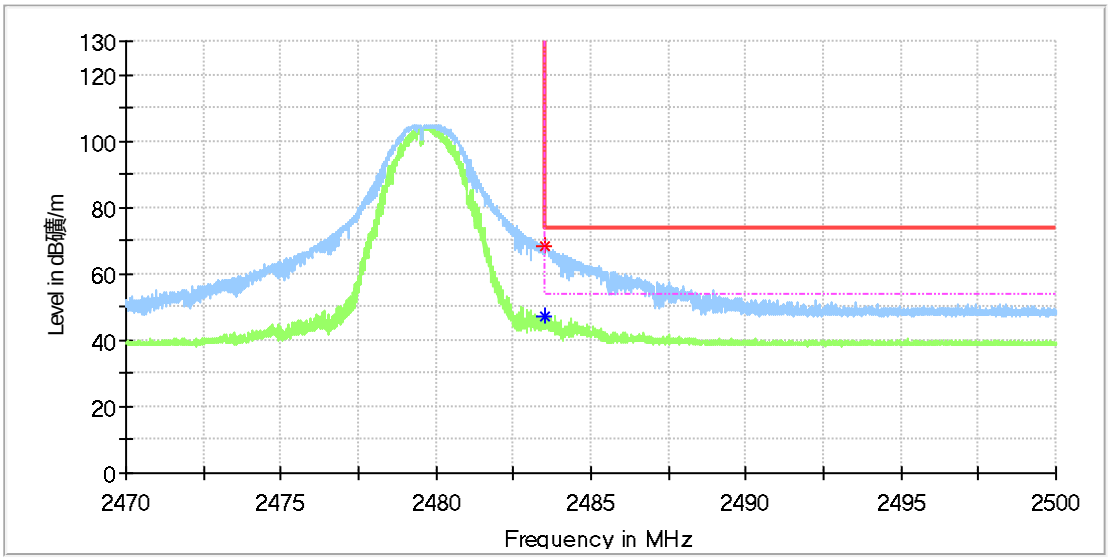
Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2479.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.526471	68.12	---	74.00	5.88	150.0	H	133.0	7.4
2483.544118	---	47.02	54.00	6.98	150.0	H	209.0	7.4

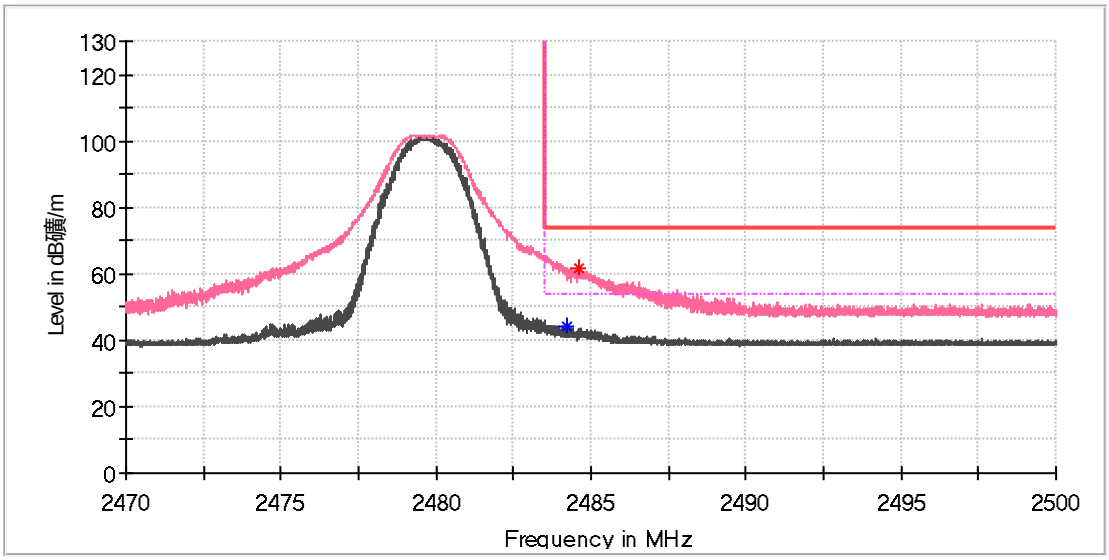
Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

Test Report

EUT Information

EUT Name:	Remote Controller
Model:	ZMRCSAFG1
Test Mode:	SRD 2.4G_2479.7
Order No/Sample No:	168457207/A003680935-004
Test Voltage::	Battery
Remark:	Temp 23 Humi:56%
Test Standard:	FCC 15.247
Tested By:	Lich Chen
Reviewed By:	Terry Yin



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2484.254412	---	44.14	54.00	9.86	150.0	V	290.0	7.4
2484.580882	61.75	---	74.00	12.25	150.0	V	317.0	7.4

Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
---	---	---	---	---		---	---

--End of Appendix--