

Prüfbericht-Nr.: <i>Test report no.:</i>	CN21JUEF 001	Auftrags-Nr.: <i>Order no.:</i>	168294786	Seite 1 von 22 <i>Page 1 of 22</i>
Kunden-Referenz-Nr.: <i>Client reference no.:</i>	N/A	Auftragsdatum: <i>Order date:</i>	2020-12-07	
Auftraggeber: <i>Client:</i>	Cooper Lighting LLC 1121 Highway 74 South, Peachtree City, Georgia 30269, United States Of America			
Prüfgegenstand: <i>Test item:</i>	In-Wall Accessory Smart Switch			
Bezeichnung / Typ-Nr.: <i>Identification / Type no.:</i>	HIWACS1BLE40AWH, HIWACS1BLE40AWH-C			
Auftrags-Inhalt: <i>Order content:</i>	FCC and IC approval			
Prüfgrundlage: <i>Test specification:</i>	CFR47 FCC Part 15: Subpart C Section 15.247 RSS-247 Issue 2 February 2017 CFR47 FCC Part 15: Subpart C Section 15.207 RSS-Gen Issue 5 March 2019 CFR47 FCC Part 15: Subpart C Section 15.209 RSS-102 Issue 5 March 2015 CFR47 FCC Part 2.1091			
Wareneingangsdatum: <i>Date of sample receipt:</i>	2020-12-10	Please refer to photo documents		
Prüfmuster-Nr.: <i>Test sample no.:</i>	A002964799-004 A002964799-005			
Prüfzeitraum: <i>Testing period:</i>	2021-01-04 – 2021-01-15			
Ort der Prüfung: <i>Place of testing:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: <i>tested by:</i>	genehmigt von: <i>authorized by:</i>			
Datum: <i>Date:</i> 2021-02-02	 Signed by: Alex Lan		 Signed by: Winnie Hou	
Stellung / Position	Senior Project Engineer	Stellung / Position	Department Manager	
Sonstiges / Other:				
FCC ID: 2AKCY-HIWACS1BLE40A IC: 4706A-HIWACSBLE40 HVIN: HIWACS1BLE40A				
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged:</i>		
* Legende: 1 = sehr gut 2 = gut 3 = befriedigend 4 = ausreichend 5 = mangelhaft P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: 1 = very good 2 = good 3 = satisfactory 4 = sufficient 5 = poor P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(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. <i>This test report only relates to the a. m. 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.</i>				

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 99%dB BANDWIDTH

RESULT: Pass

5.1.5 6dB BANDWIDTH

RESULT: Pass

5.1.6 CONDUCTED SPURIOUS EMISSIONS MEASURED IN 100 KHz BANDWIDTH

RESULT: Pass

5.1.7 RADIATED SPURIOUS EMISSION

RESULT: Pass

5.1.8 CONDUCTED EMISSION ON AC MAINS

RESULT: Pass

6.1.1 ELECTROMAGNETIC FIELDS

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: Photographs of the Test Set-up

Appendix B: Test Results of Conducted & Radiated Testing

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.

No. 362 Huanguan Road Middle, Longhua District, Shenzhen 518110, People's Republic of China

FCC Registration No.: 694916

IC Registration No.: 25069

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Radio Spectrum Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Wireless Connectivity Tester	Rohde & Schwarz	CMW270	101375	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101441	2021-08-30
Control PC	DELL	OptiPlex 7050	FTJZ9P2	N/A
Test Software	Rohde & Schwarz	WMS32 (V10.40.10)	N/A	N/A
Power Meter	Rohde & Schwarz	NRP2	107105	2021-12-20
Wideband Power Sensor	Rohde & Schwarz	NRP-Z81	105350	2021-12-20
Unwanted Emission Testing				
Equipment	Manufacturer	Model No.	Serial No.	Cal. Until
Signal Generator	Rohde & Schwarz	SMB100A	180840	2021-08-30
Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	165339	2021-08-30
Signal Analyzer	Rohde & Schwarz	FSV 40	101440	2021-08-30
System Controller Interface	Rohde & Schwarz	SCI-100	S10010036	N/A
Filterbank	Rohde & Schwarz	CDMA	100751	2021-08-30
Filterbank	Rohde & Schwarz	GSM	100811	2021-08-30
OSP	Rohde & Schwarz	OSP 120	102041	N/A
OSP	Rohde & Schwarz	OSP 150	101385	N/A
Pre-amplifier	Rohde & Schwarz	SCU08F1	08320030	2021-08-30
Amplifier	Rohde & Schwarz	SCU-18F	180079	2021-08-30
Amplifier	Rohde & Schwarz	SCU40A	100450	2021-09-03
Trilog Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VULB9162	192	2021-09-02
Double-Ridged Antenna (1 -18 GHz)	ETS-LINDGREN	3117	00218719	2021-09-02
Wideband Ridged Horn Antenna (12- 18 GHz)	Steatite	QMS-00208	18312	2021-09-02
Wideband Ridged Horn Antenna (18- 40 GHz)	Steatite	QMS-00880	19066	2021-09-02
Biconical Broadband Antenna (30 MHz - 1 GHz)	Schwarzbeck	VUBA 9117	357	2021-09-02

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 basis 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.

Item		Extended Uncertainty
Conducted Emission		± 2.74 dB
Radiated Emission (30-1000MHz)	Field strength (dB μ V/m)	4.27dB
Radiated Emission (above 1000MHz)	Field strength (dB μ V/m)	4.46dB
Radio Spectrum		± 1.5 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) file for certification follow-up purposes.

2.7 Status of Facility Used for Testing

The TÜV Rheinland (Shenzhen) Co., Ltd. Test facility located at East of F/1, F/2 - F/4, Building 1, Cybio Technology Building, No. 6 Langshan No. 2 Road, North Hi-tech Industry Park, Nanshan District, Shenzhen, P.R. China, P. R. 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 EUT is an In-Wall Accessory Smart Switch, it supports Bluetooth Low Energy wireless technology. Both models are identical except model number for different regions. Model HIWACS1BLE40AWH is for United States market and the model HIWACS1BLE40AWH-C is for Canada market.

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

3.2 Ratings and System Details

Table 2: Technical Specification of EUT

General Information of EUT	Value
Kind of Equipment	In-Wall Accessory Smart Switch
Type Designation	HIWACS1BLE40AWH, HIWACS1BLE40AWH-C
FCC ID	2AKCY-HIWACS1BLE40A
IC	4706A-HIWACSBLE40
HVIN	HIWACS1BLE40A
Operating Voltage	AC 120V, 60Hz
Testing Voltage	AC 120V, 60Hz
Technical Specification of Bluetooth Low Energy	
Operating Frequency	2402 – 2480 MHz
Bluetooth Core Version	Bluetooth 4.0, single mode
Data rate	1Mbps
Channel Number	40 channels
Channel separation	2MHz
Modulation	GFSK
Antenna Type	IFA Antenna
Smart Antenna Systems:	Not Applicable
Number of Antenna	1
Antenna Gain	1.85 dBi

Table 3: RF Channel and Frequency of Bluetooth Low Energy

RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)	RF Channel	Frequency (MHz)
00	2402.00	10	2422.00	20	2442.00	30	2462.00
01	2404.00	11	2424.00	21	2444.00	31	2464.00
02	2406.00	12	2426.00	22	2446.00	32	2466.00
03	2408.00	13	2428.00	23	2448.00	33	2468.00
04	2410.00	14	2430.00	24	2450.00	34	2470.00
05	2412.00	15	2432.00	25	2452.00	35	2472.00
06	2414.00	16	2434.00	26	2454.00	36	2474.00
07	2416.00	17	2436.00	27	2456.00	37	2476.00
08	2418.00	18	2438.00	28	2458.00	38	2478.00
09	2420.00	19	2440.00	29	2460.00	39	2480.00

3.3 Independent Operation Modes

The basic operation modes are:

- A. On, transmitting mode
 - 1. Low channel
 - 2. Middle channel
 - 3. High channel
- B. On, Operating
- C. Off

3.4 Noise Generating and Noise Suppressing Parts

Refer to Circuit Diagram for further details.

3.5 Submitted Documents

- Application Form
- Block Diagram
- FCC/IC Label and Location Info
- Operation Description
- Photo Document
- Schematics
- User Manual

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 testing were performed according to the procedures in ANSI C63.10: 2013.

According to clause 3.1, all test items were applied on model HIWMAS1BLE40AWH.

4.3 Special Accessories and Auxiliary Equipment

Table 4: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Notebook	Lenovo	ThinkPad X260	N/A

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)

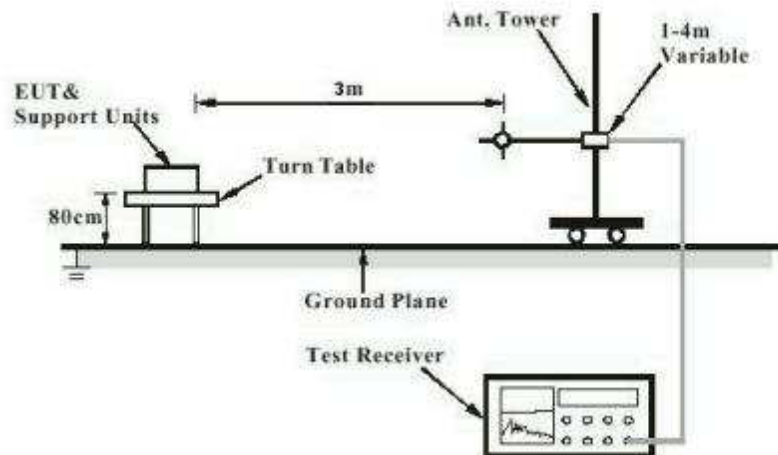


Diagram of Measurement Configuration for Radiation Test (Above 1GHz)

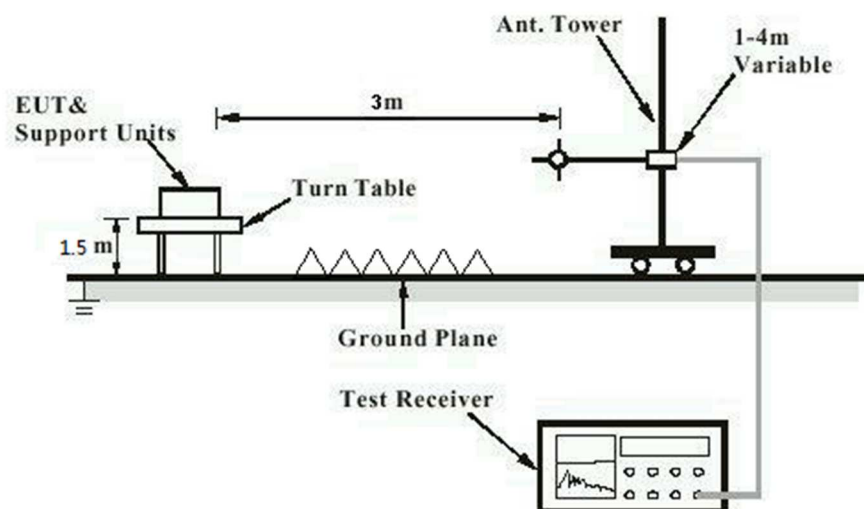


Diagram of Measurement Configuration for Mains Conduction Measurement

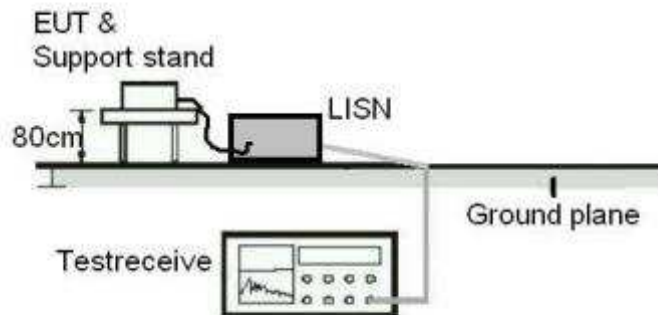
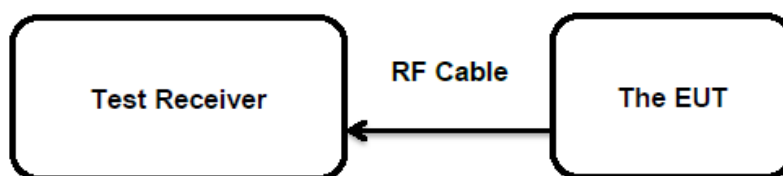


Diagram of Measurement Configuration for Conducted Transmitter Measurement



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
	:	RSS-Gen Clause 6.7
Limit	:	the use of antennas with directional gains that do not exceed 6 dBi

According to the manufacturer declared, the EUT has an internal antenna, the directional gain of antenna is 1.85 dBi, 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)
	:	RSS-247 Clause 5.4(d)
Basic standard	:	ANSI C63.10: 2013
Limits	:	< 1 Watt (Maximum Conducted Peak Power)
	:	e.i.r.p. <4W
Kind of test site	:	Shielded Room

Test Setup

Date of testing	:	2021-01-06
Input voltage	:	AC 120V, 60Hz
Operation mode	:	A
Test channel	:	Low / Middle / High
Ambient temperature	:	24.3 °C
Relative humidity	:	52 %
Atmospheric pressure	:	101 kPa

For details refer to following test result.

Table 5: Test Result of Maximum Peak Conducted Output Power,

Channel	Channel Frequency (MHz)	Peak Output Power		Limit
		(dBm)	(W)	(W)
Low Channel	2402	5.4	0.00347	1
Middle Channel	2440	6.2	0.00417	1
High Channel	2480	6.8	0.00479	1

Note: The cable loss is taken into account in results and the e.i.r.p. is 8.65 dBm less than 4W (36 dBm).

5.1.3 Conducted Power Spectral Density

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(e) RSS-247 Clause 5.2(b)
Basic standard	: ANSI C63.10: 2013
Limits	: 8 dBm / 3kHz
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2021-01-06
Input voltage	: AC 120V, 60Hz
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
Atmospheric pressure	: 101 kPa

For details refer to following test result.

Table 6: Test Result of Power Spectral Density

Channel	Channel Frequency (MHz)	Power Spectral Density (dBm/3kHz)	Limit (dBm/3kHz)
Low Channel	2402	3.84	8
Middle Channel	2440	4.70	8
High Channel	2480	5.12	8

Note: The cable loss is taken into account in results.

For the measurement records, refer to the appendix B.

5.1.4 99%dB Bandwidth

RESULT:**Pass****Test Specification**

Test standard : RSS-Gen clause 6.7
Basic standard : ANSI C63.10: 2013
Kind of test site : Shielded Room

Test Setup

Date of testing : 2021-01-06
Input voltage : AC 120V, 60Hz
Operation mode : A
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 7: Test Result of 99% Bandwidth

Channel	Channel Frequency (MHz)	99% Bandwidth (kHz)	Limit (MHz)	Result
Low Channel	2402	1035	/	Pass
Mid Channel	2440	1035	/	Pass
High Channel	2480	1030	/	Pass

For the measurement records, refer to the appendix B.

5.1.5 6dB Bandwidth

RESULT:**Pass****Test Specification**

Test standard : FCC Part 15.247(a)(2)
RSS-247 Clause 5.2(a)
Basic standard : ANSI C63.10: 2013
Kind of test site : Shielded Room

Test Setup

Date of testing : 2021-01-06
Input voltage : AC 120V, 60Hz
Operation mode : A
Test channel : Low / Middle / High
Ambient temperature : 25 °C
Relative humidity : 56 %
Atmospheric pressure : 101 kPa

Table 8: Test Result of 6dB Bandwidth

Channel	Channel Frequency (MHz)	-6dB Bandwidth (kHz)	Limit (kHz)	Result
Low Channel	2402	712.872	500	Pass
Mid Channel	2440	712.872	500	Pass
High Channel	2480	712.872	500	Pass

For the measurement records, refer to the appendix B.

5.1.6 Conducted Spurious Emissions Measured in 100 kHz Bandwidth

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) RSS-247 Clause 5.5
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	: 2021-01-06
Input voltage	: AC 120V, 60Hz
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 25 °C
Relative humidity	: 56 %
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 B.

5.1.7 Radiated Spurious Emission

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.247(d) & FCC Part 15.205 RSS-247 Clause 3.3 & 5.5
Basic standard	: ANSI C63.10: 2013
Limits	: Refer to 15.209(a) of FCC part 15.247(d) RSS-Gen Table 4 & Table 5
Kind of test site	: 3m Semi-anechoic Chamber

Test Setup

Date of testing	: 2021-01-04 – 2021-01-12
Input voltage	: AC 120V, 60Hz
Operation mode	: A
Test channel	: Low / Middle / High
Ambient temperature	: 24°C
Relative humidity	: 47 %
Atmospheric pressure	: 101 kPa

Remark:

Testing was carried out within frequency range 9kHz to the tenth harmonics. Only the worst case spurious emissions configuration of the each mode were reported.

For the measurement records, refer to the appendix B.

5.1.8 Conducted Emission on AC Mains

RESULT:**Pass****Test Specification**

Test standard	: FCC Part 15.207(a) RSS-Gen Clause 8.8
Basic standard	: ANSI C63.10: 2013
Frequency range	: 0.15 – 30MHz
Limits	: FCC Part 15.207(a) RSS-Gen Table 4
Kind of test site	: Shielded Room

Test Setup

Date of testing	: 2021-01-15
Input voltage	: AC 120V/60Hz
Operation mode	: B
Earthing	: Not connected
Ambient temperature	: 24.3 °C
Relative humidity	: 52 %
Atmospheric pressure	: 101 kPa

For the measurement records, refer to the appendix B.

6 Safety Human Exposure

6.1 Radio Frequency Exposure Compliance

6.1.1 Electromagnetic Fields

RESULT:**Pass****Test Specification**

Test standard : CFR47 FCC Part 2.1091
RSS-102 Issue 5 March 2015
FCC KDB Publication 447498 v06

Limit : CFR47 FCC Part 1.1310

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

MPE Calculation Method according to OET Bulletin 65

Power Density: $S_{(mW/cm^2)} = PG/4\pi R^2$ or $EIRP/4\pi R^2$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (cm)

The nominal maximum conducted output power specified:

BLE: 6.80 dBm

From the peak RF output power, the minimum mobile separation distance, d=20 cm, as well as the antenna gain (1.85 dBi), the RF power density can be calculated as below:

For BLE: $S_{(mW/cm^2)} = PG/4\pi R^2 = 0.001 \text{ mW/cm}^2$

Limits for Maximum Permissible Exposure (MPE) according to FCC Part 1.1310: 1.0 mW/cm²

➤ **IC requirements:** The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for 2.4G DTS: 2.676 W

The nominal maximum conducted output power specified:

BLE: 6.80 dBm

Antenna Gain: 1.85 dBi

The Max. e.i.r.p. for BLE: 8.65dBm = 0.007 W

The e.i.r.p. of BLE is less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”

7 Photographs of the Test Set-Up

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

8 List of Tables

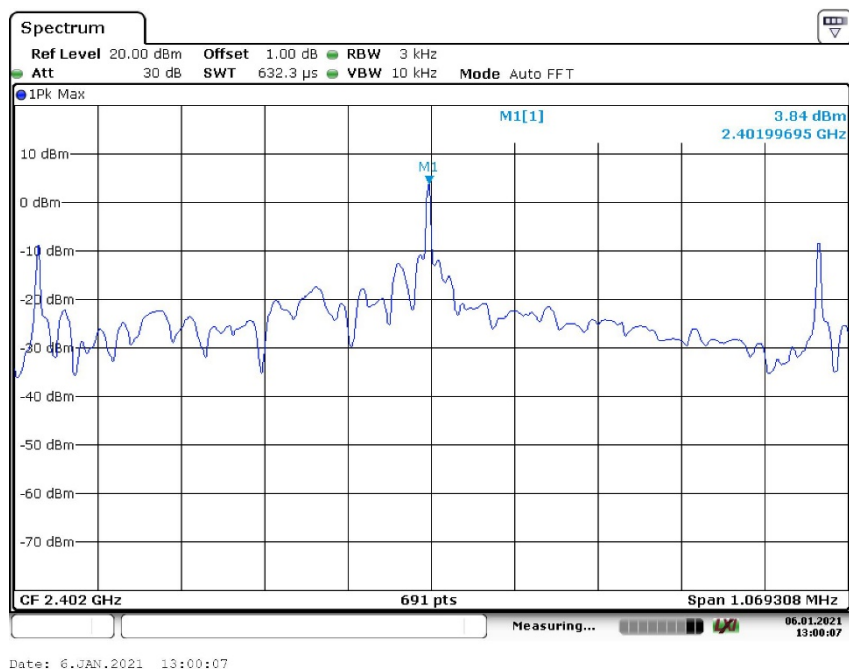
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Appendix B: Test Results

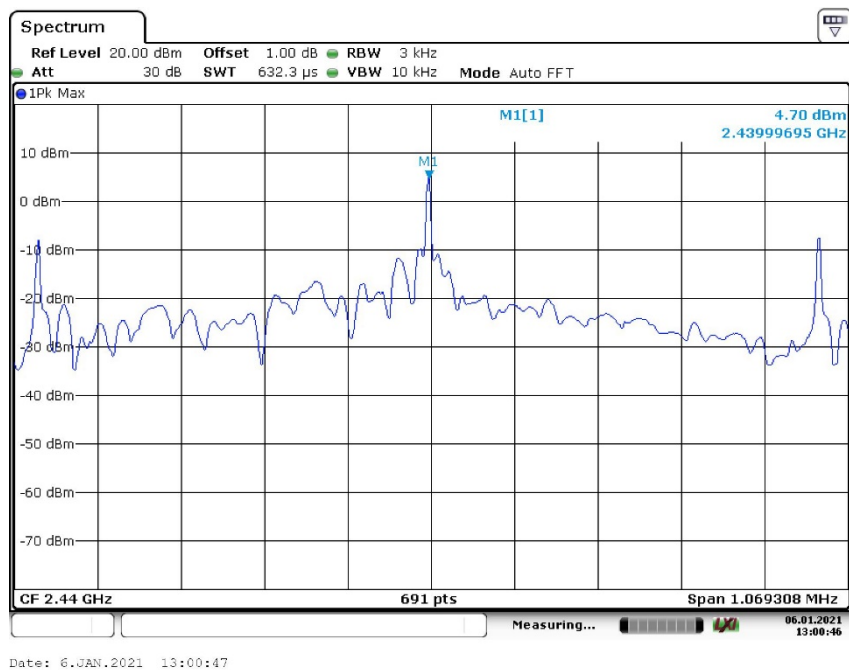
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Appendix B.1: Conducted Power Spectral Density

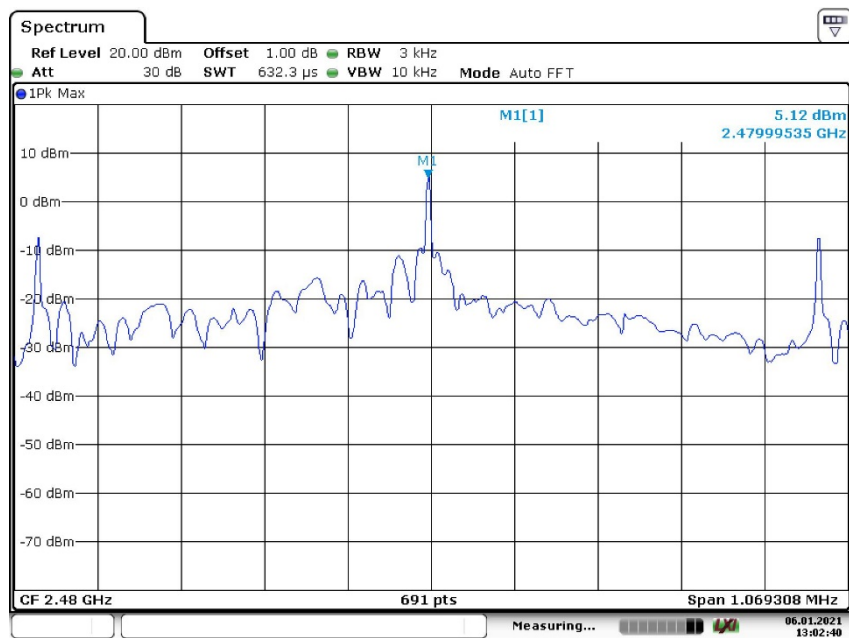
Low Channel



Middle Channel



High Channel

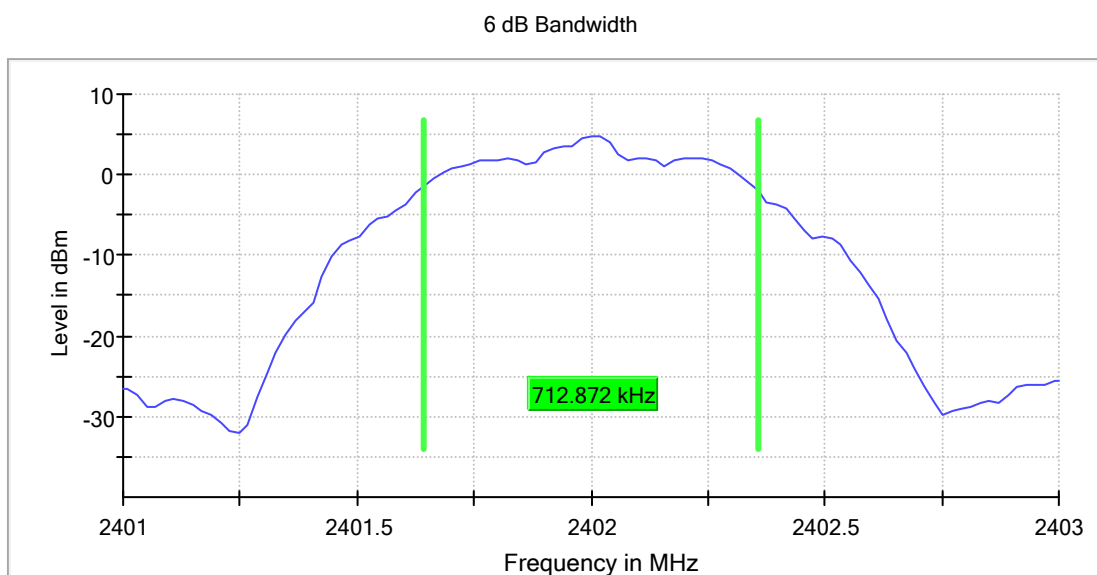


Date: 6.JAN.2021 13:02:41

Appendix B.2: 6dB Bandwidth

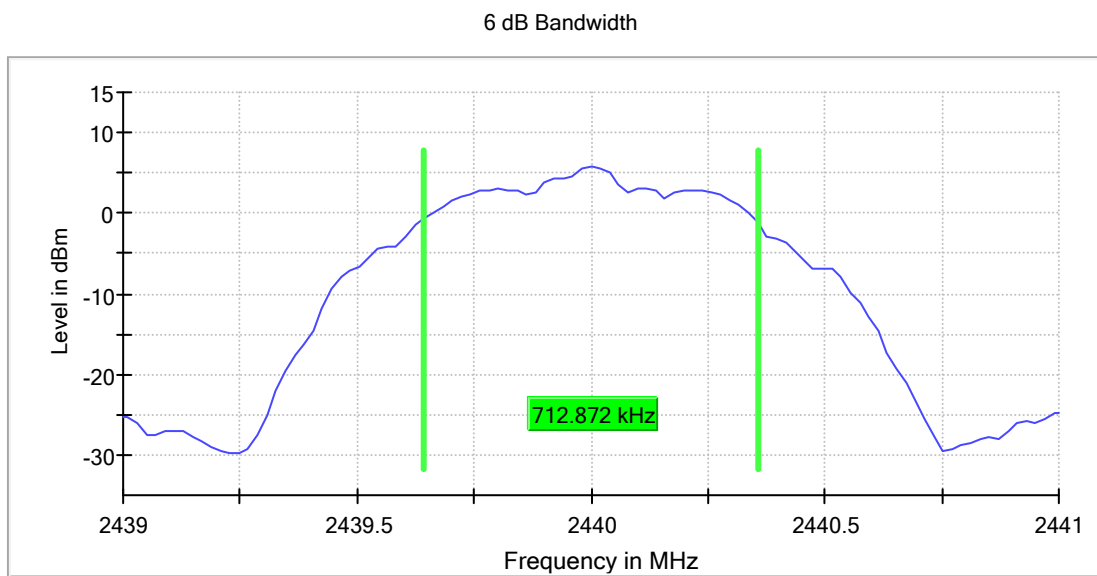
Low Channel

RBW=100KHz, VBW=300KHz



Middle Channel

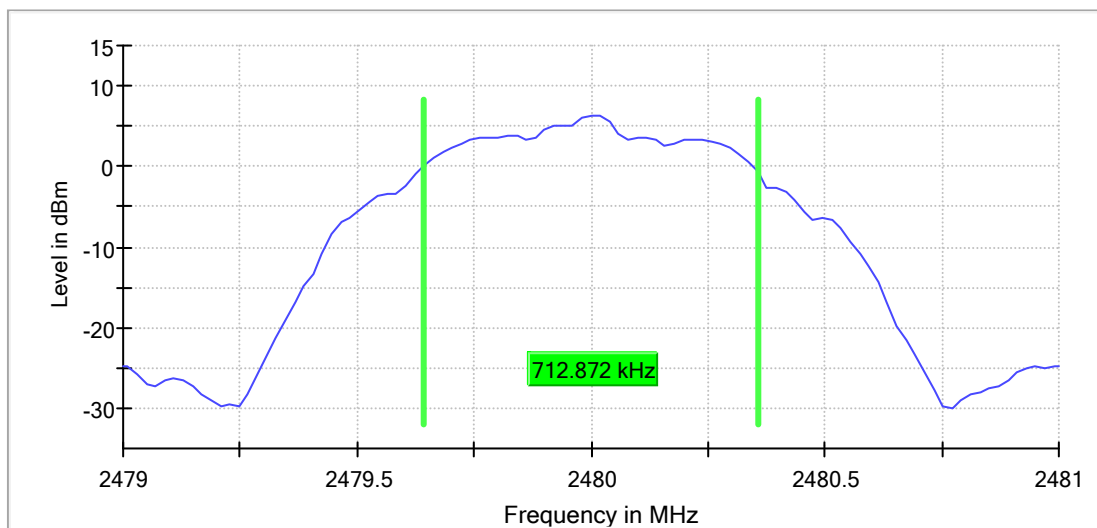
RBW=100KHz, VBW=300KHz



High Channel

RBW=100KHz, VBW=300KHz

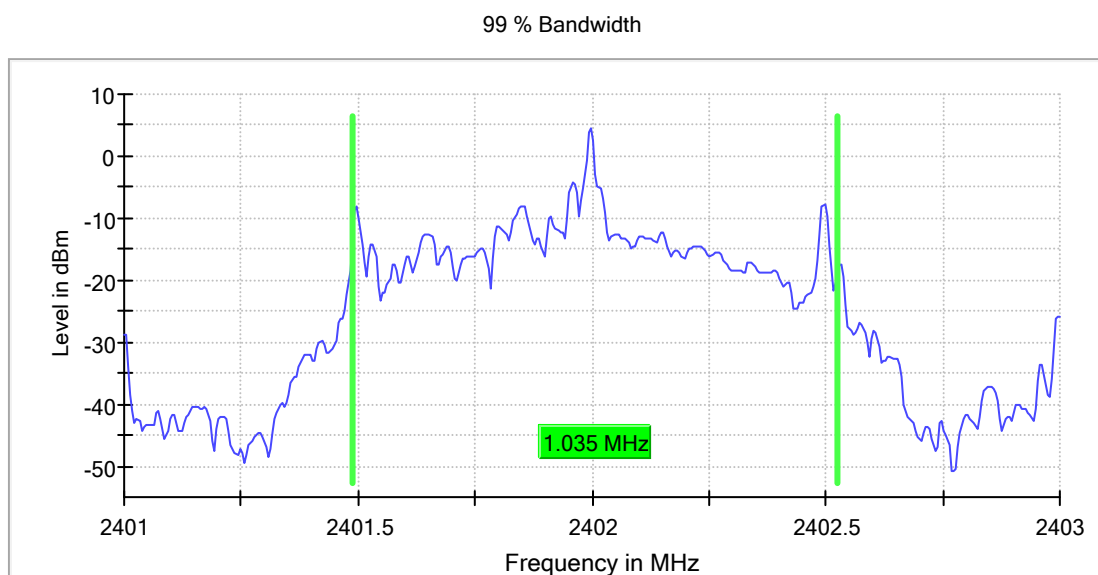
6 dB Bandwidth



Appendix B.3: 99% Bandwidth

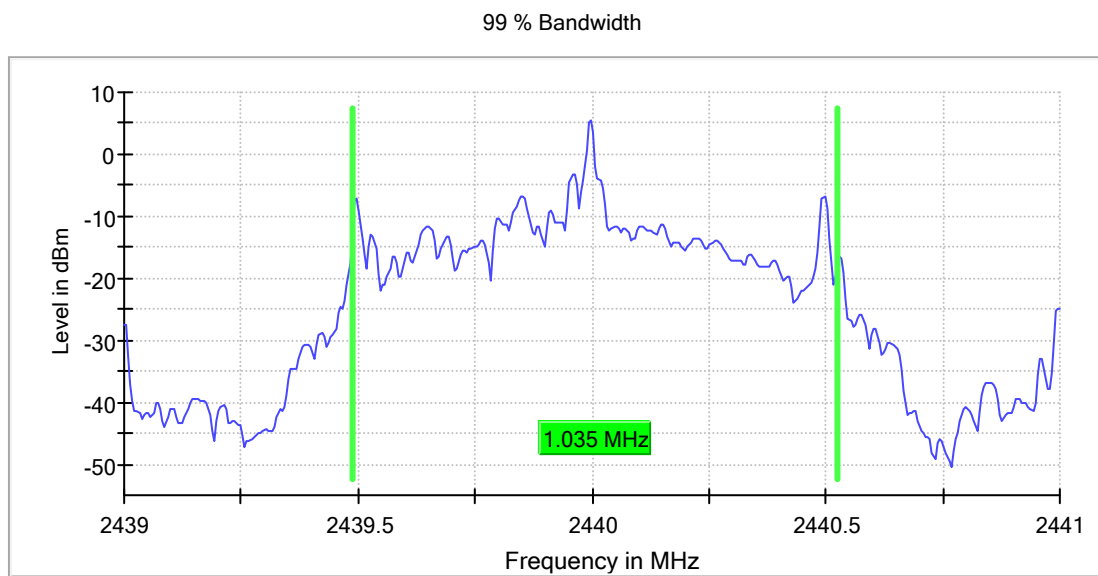
Low Channel

RBW=50KHz, VBW=200KHz



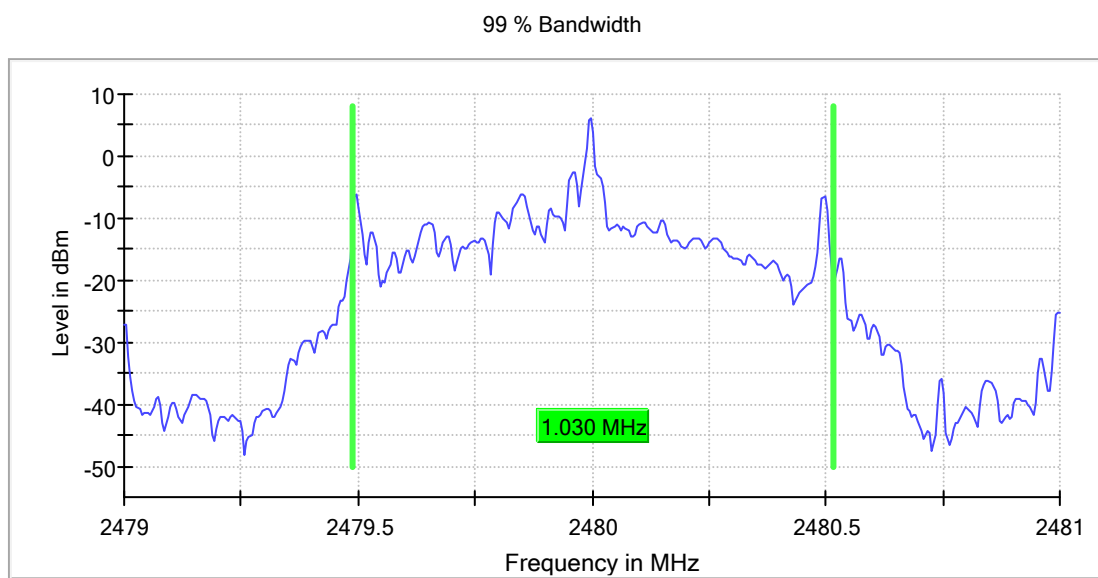
Middle Channel

RBW=50KHz, VBW=200KHz



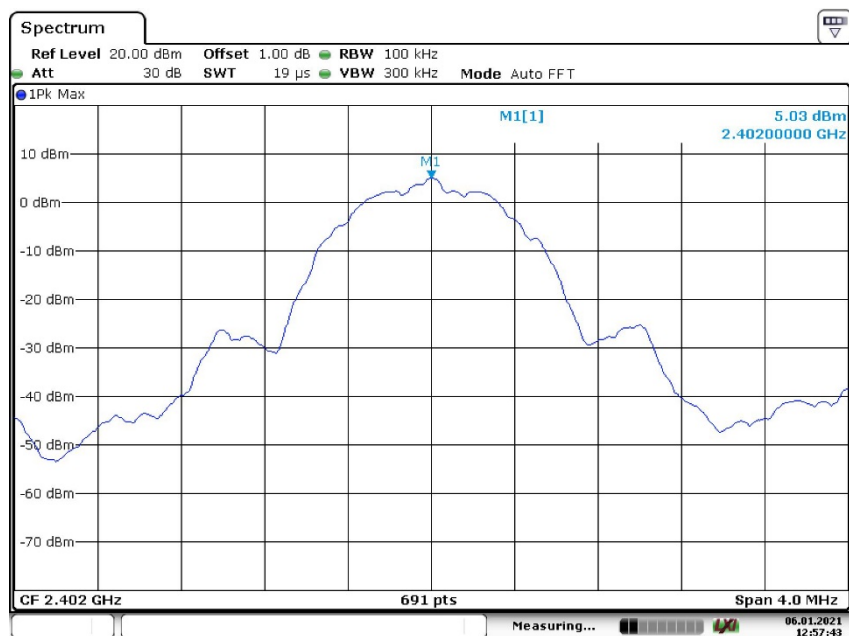
High Channel

RBW=50KHz, VBW=200KHz

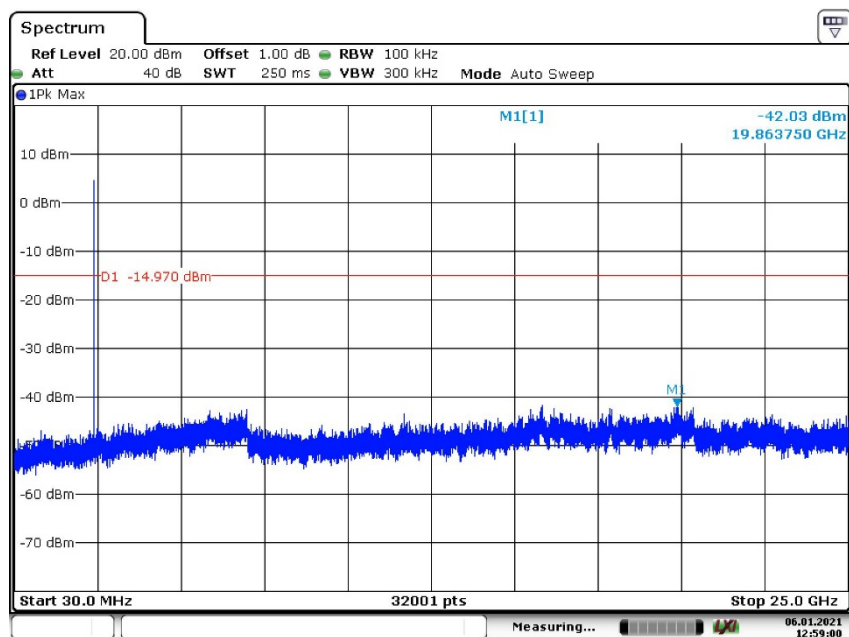


Appendix B.4: Conducted Spurious Emissions Measured in 100 kHz Bandwidth

Low Channel

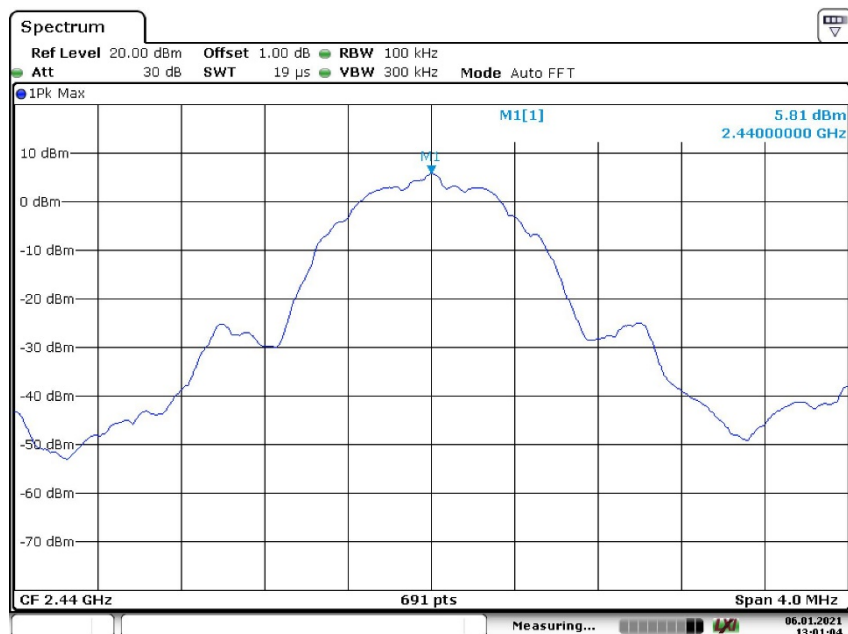


Date: 6.JAN.2021 12:57:43

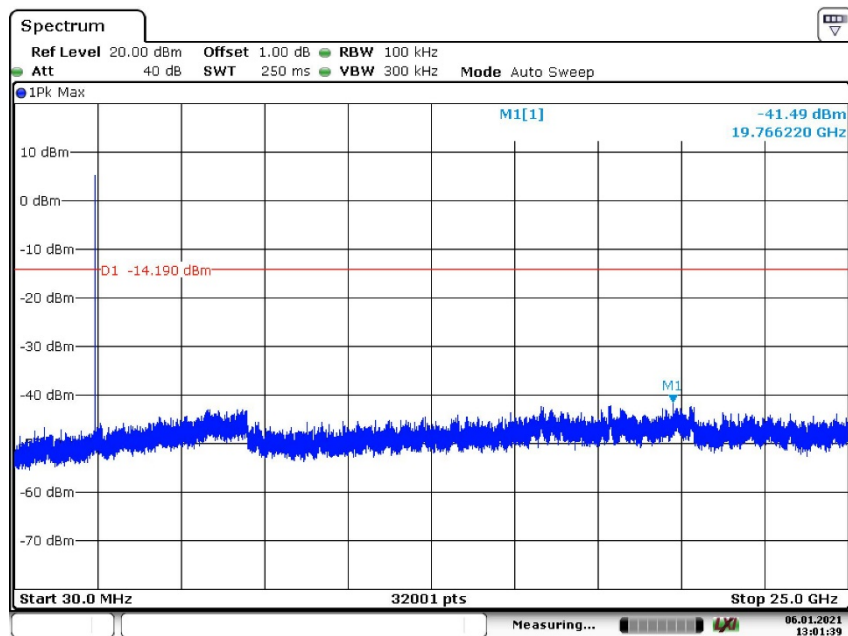


Date: 6.JAN.2021 12:59:00

Middle Channel

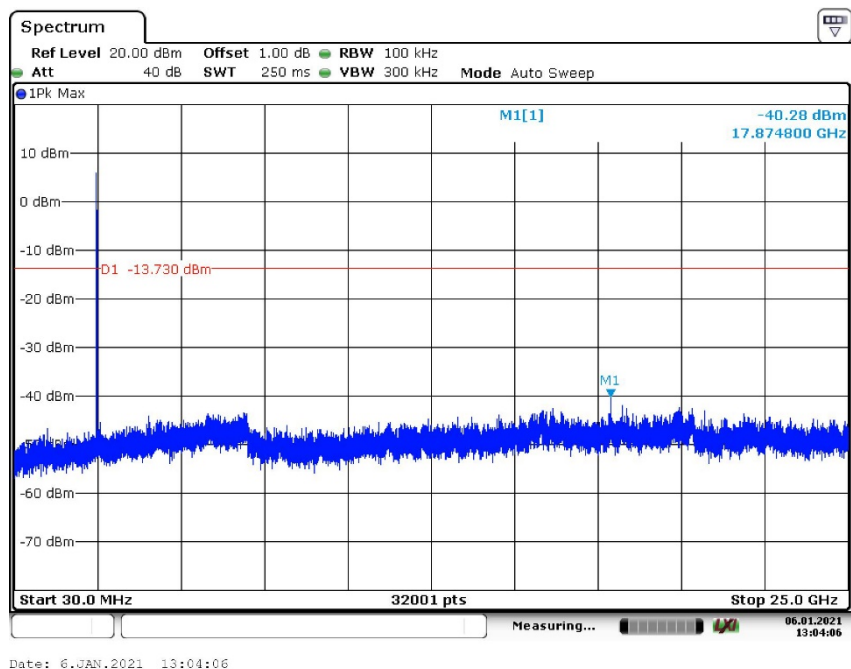
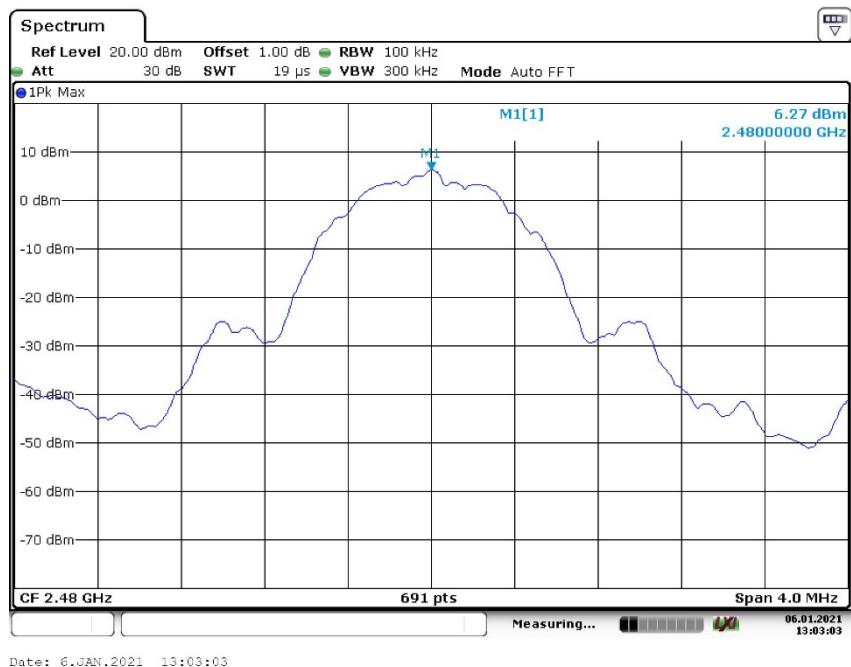


Date: 6.JAN.2021 13:01:05

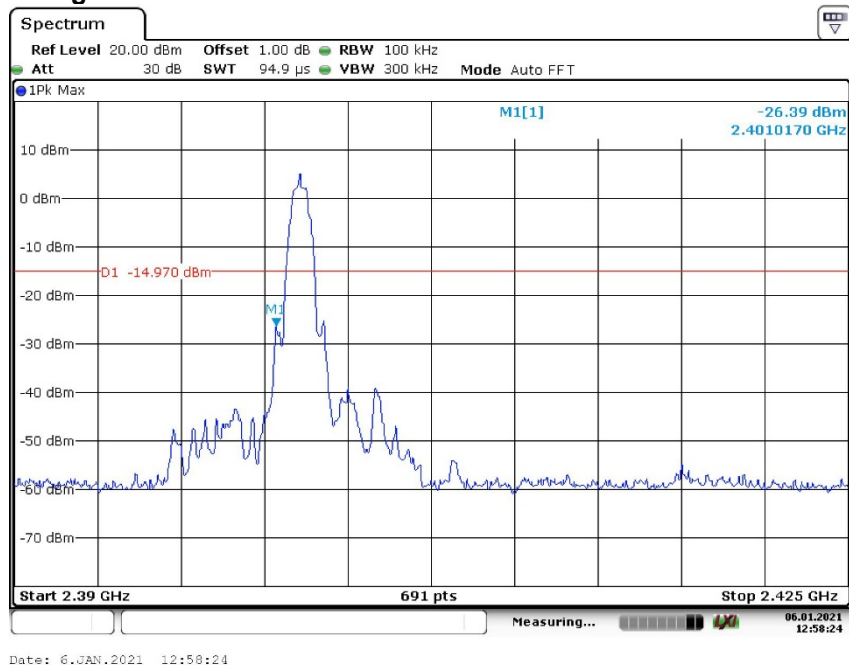


Date: 6.JAN.2021 13:01:39

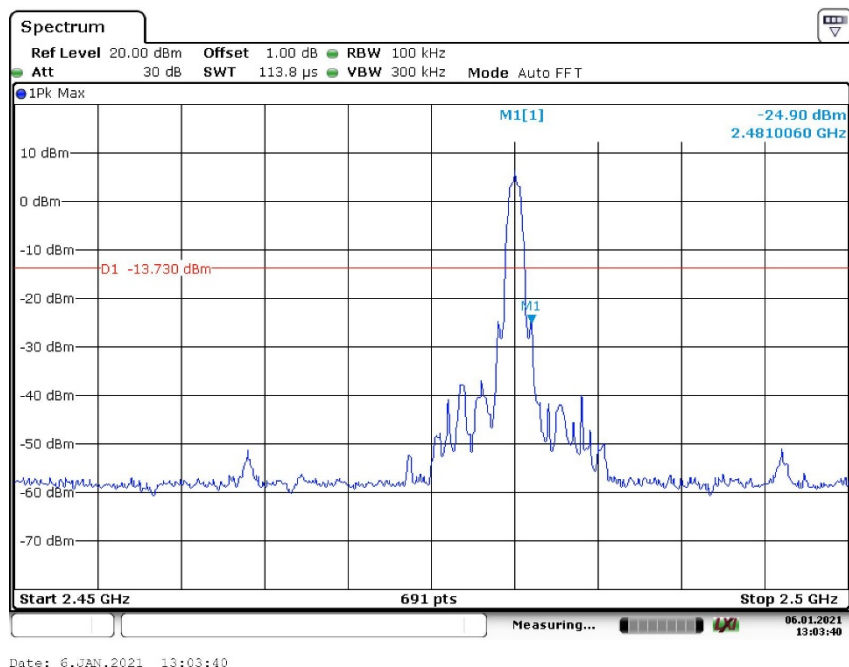
High Channel



Low Channel_Band Edge



High Channel_Band Edge

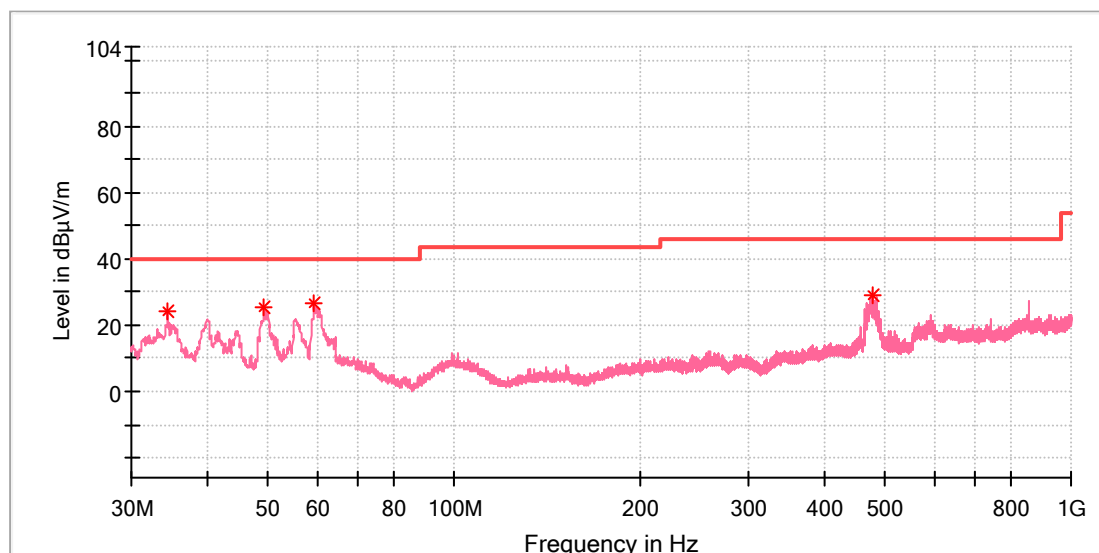


Appendix B.5: Test Results of Radiated Spurious Emissions

Note 1: Testing was carried out within frequency range 9 kHz 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.

EUT Information

EUT Name:	In-Wall Accessory Smart Switch
Model:	HIWACS1BLE40AWH
Test Mode:	TX_BLE_Low CH
Test Voltage::	AC 120V, 60Hz
Remark:	Temp 24 Humi:47%
Test Standard:	FCC 15.247
Tested By:	Alano Qu
Reviewed By:	Terry Yin

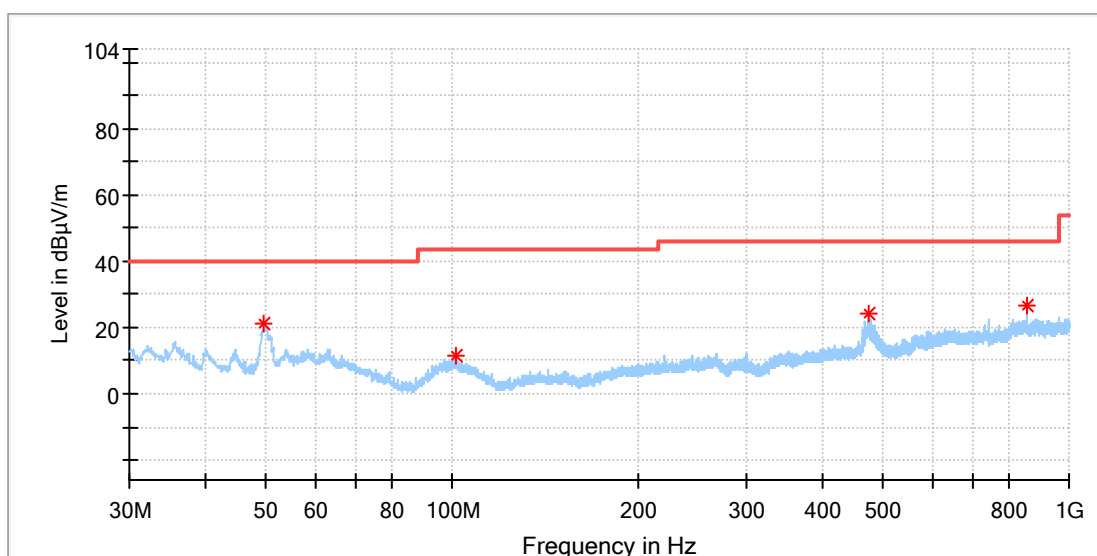


Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.365000	24.05	40.00	15.95	100.0	V	207.0	-22.5
49.254500	25.28	40.00	14.72	100.0	V	48.0	-18.6
59.342500	26.62	40.00	13.38	100.0	V	264.0	-19.2
476.006000	29.20	46.00	16.80	100.0	V	178.0	-12.7

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



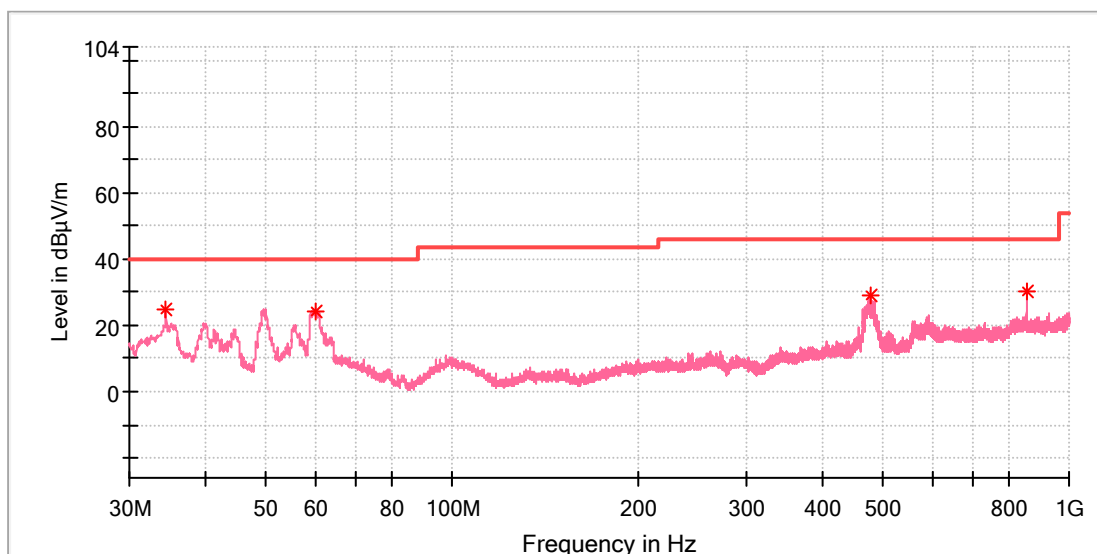
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.691000	21.02	40.00	18.98	100.0	H	41.0	-18.6
101.246500	11.45	43.50	32.05	100.0	H	127.0	-19.3
471.980500	24.25	46.00	21.75	100.0	H	127.0	-12.8
852.560000	26.65	46.00	19.35	100.0	H	0.0	-5.9

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

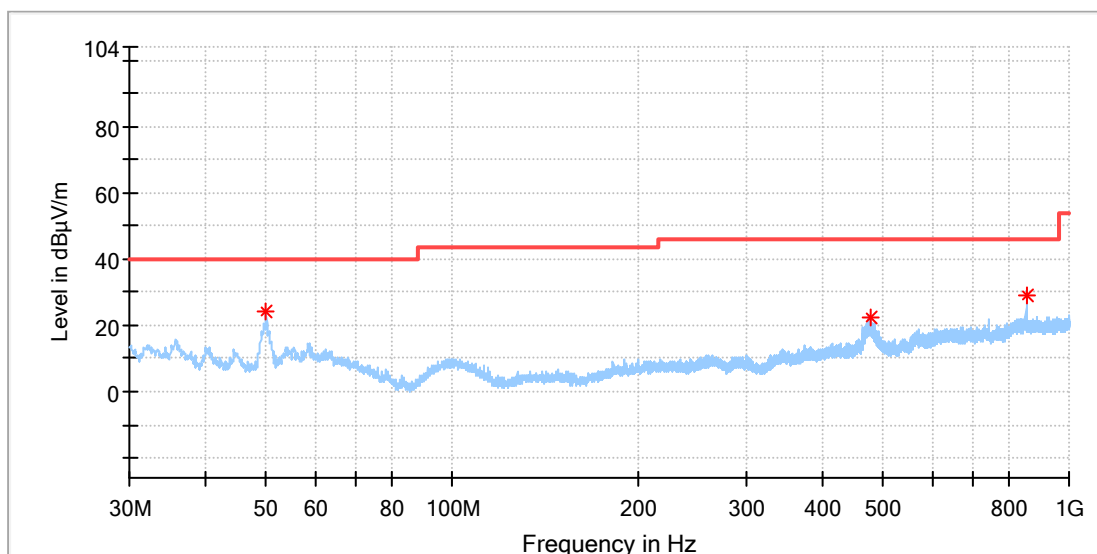


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
34.365000	24.50	40.00	15.50	100.0	V	74.0	-22.5
60.215500	24.44	40.00	15.56	100.0	V	249.0	-19.3
476.006000	28.89	46.00	17.11	100.0	V	169.0	-12.7
852.560000	30.14	46.00	15.86	100.0	V	354.0	-5.9

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



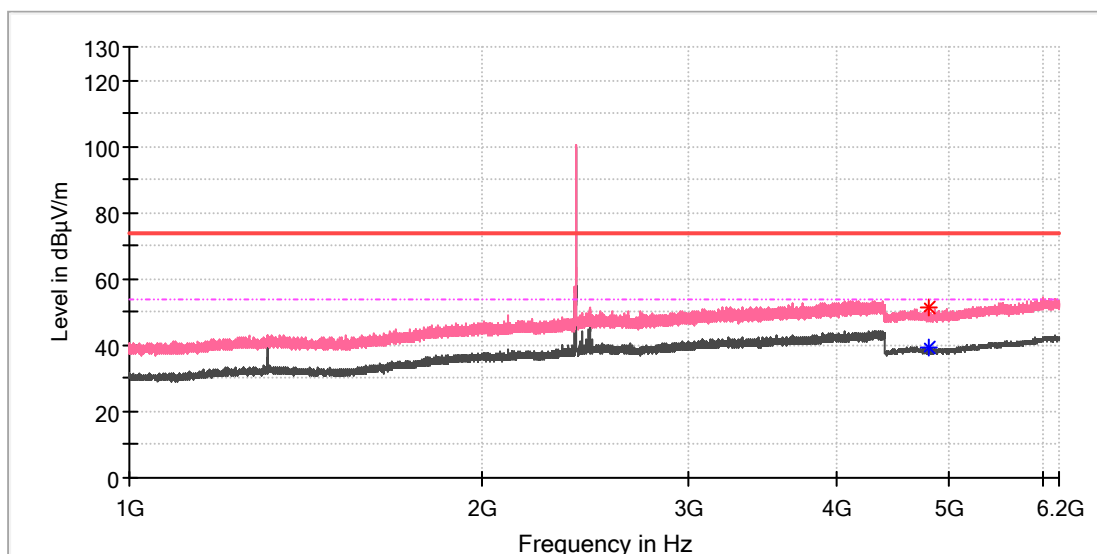
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
49.982000	24.14	40.00	15.86	100.0	H	257.0	-18.6
476.006000	22.46	46.00	23.54	100.0	H	27.0	-12.7
852.560000	28.82	46.00	17.18	100.0	H	86.0	-5.9

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



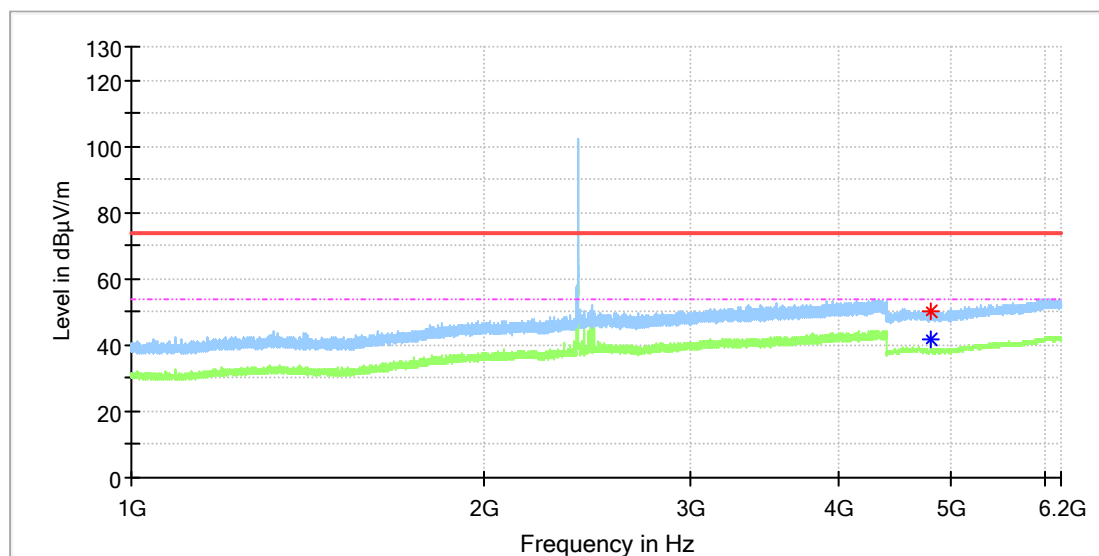
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4798.000000	51.32	---	74.00	22.68	100.0	V	92.0	11.8
4804.000000	---	39.47	54.00	14.53	100.0	V	310.0	11.8

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



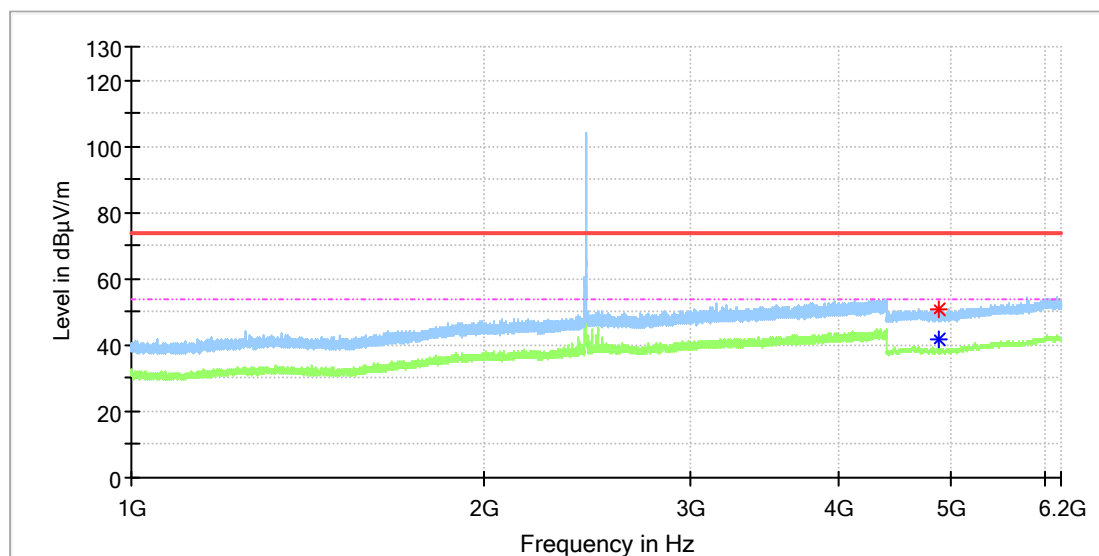
Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4802.000000	50.06	---	74.00	23.94	100.0	H	143.0	11.8
4804.000000	---	41.61	54.00	12.39	100.0	H	232.0	11.8

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Mid CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

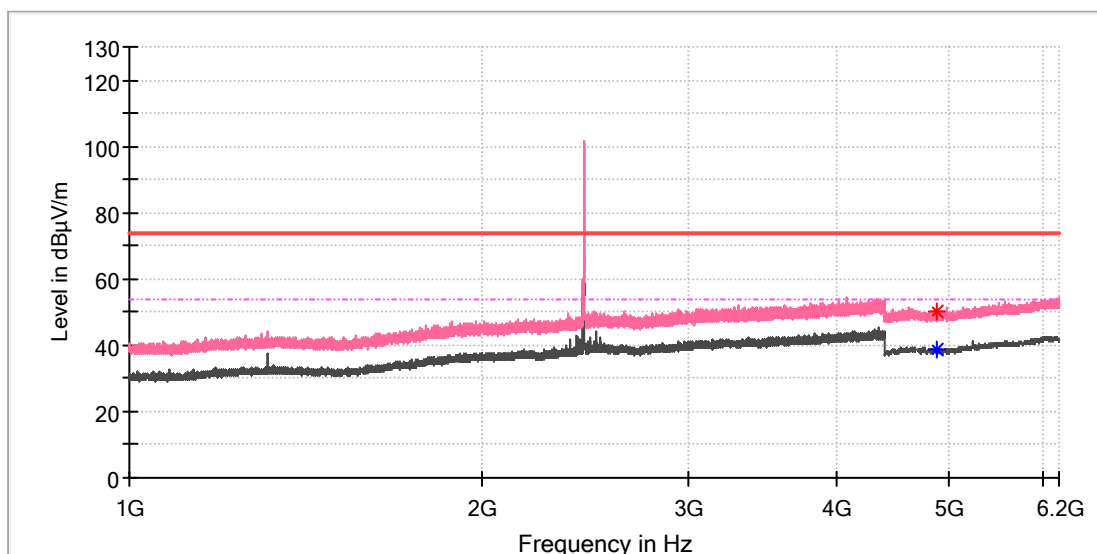


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4879.500000	50.84	---	74.00	23.16	100.0	H	225.0	11.8
4879.500000	---	41.80	54.00	12.20	100.0	H	225.0	11.8

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Mid CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

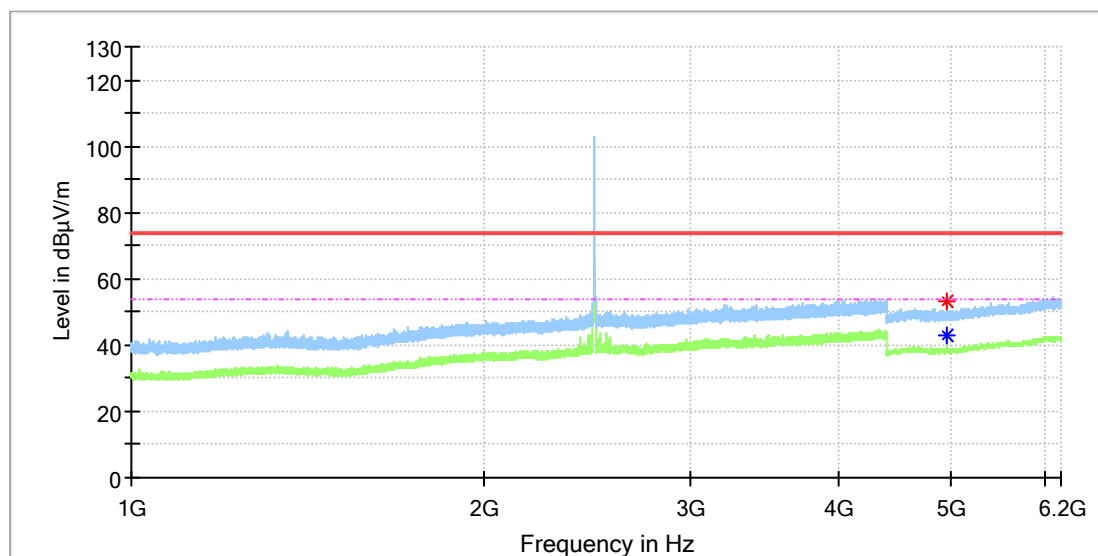


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4874.500000	50.17	---	74.00	23.83	100.0	V	288.0	11.8
4880.000000	---	38.84	54.00	15.16	100.0	V	44.0	11.8

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

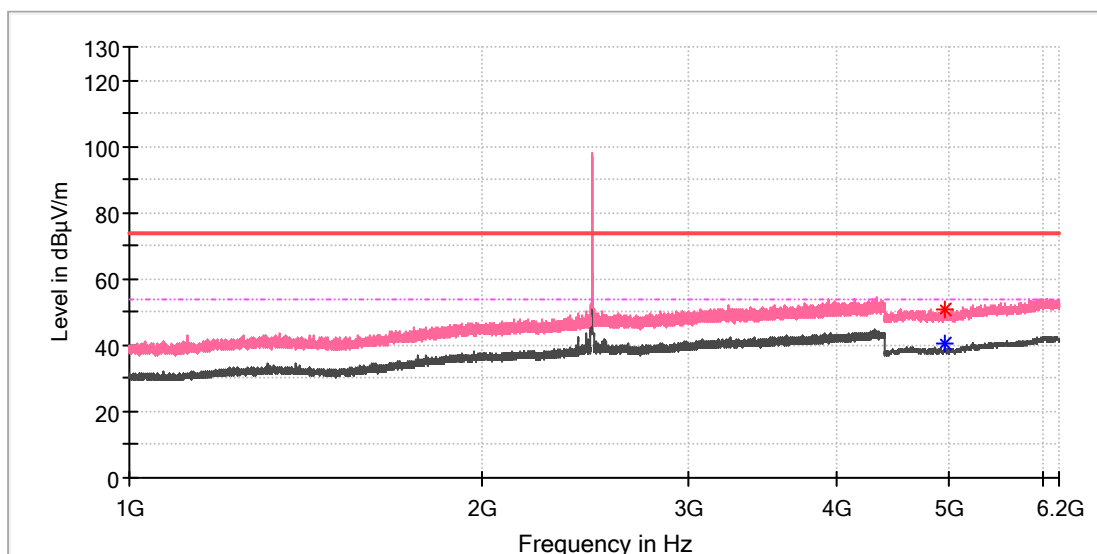


Critical Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.500000	52.95	---	74.00	21.05	100.0	H	220.0	11.8
4960.500000	---	42.95	54.00	11.05	100.0	H	227.0	11.8

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

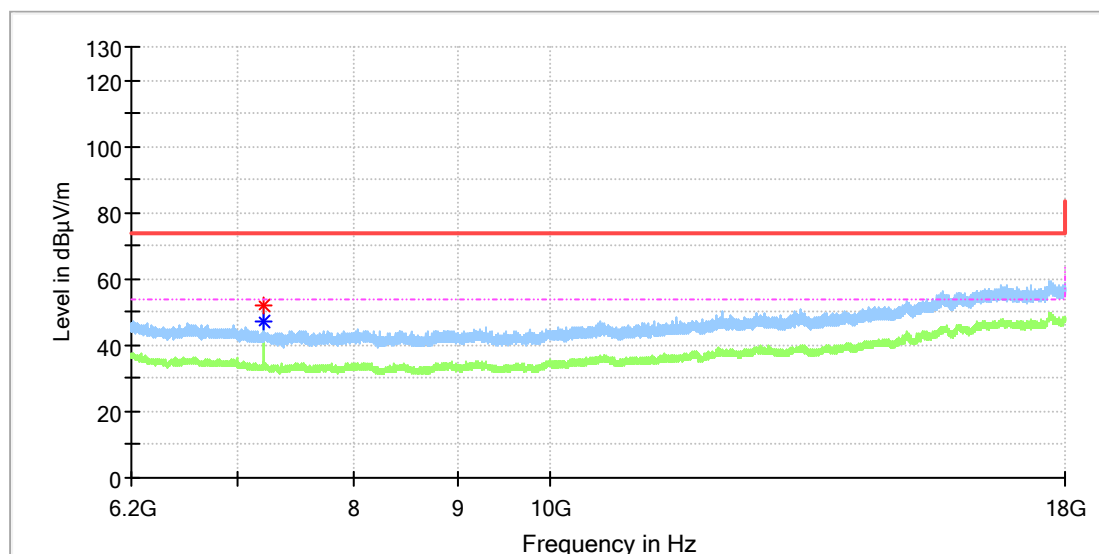


Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
4959.500000	50.56	---	74.00	23.44	100.0	V	195.0	11.8
4960.000000	---	40.45	54.00	13.55	100.0	V	238.0	11.8

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

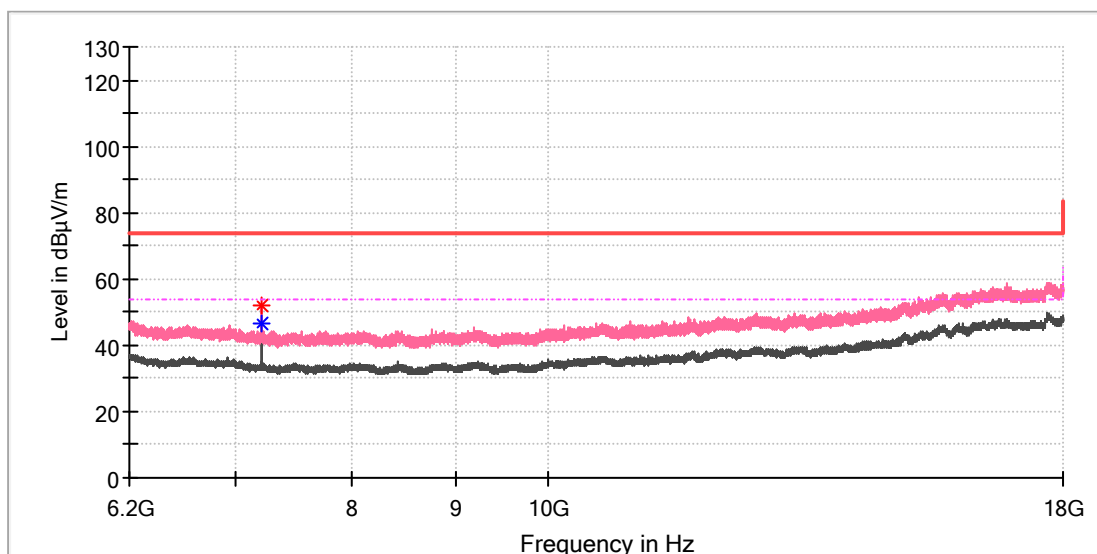


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7206.441667	---	47.15	54.00	6.85	100.0	H	133.0	8.8
7206.441667	52.21	---	74.00	21.79	100.0	H	133.0	8.8

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



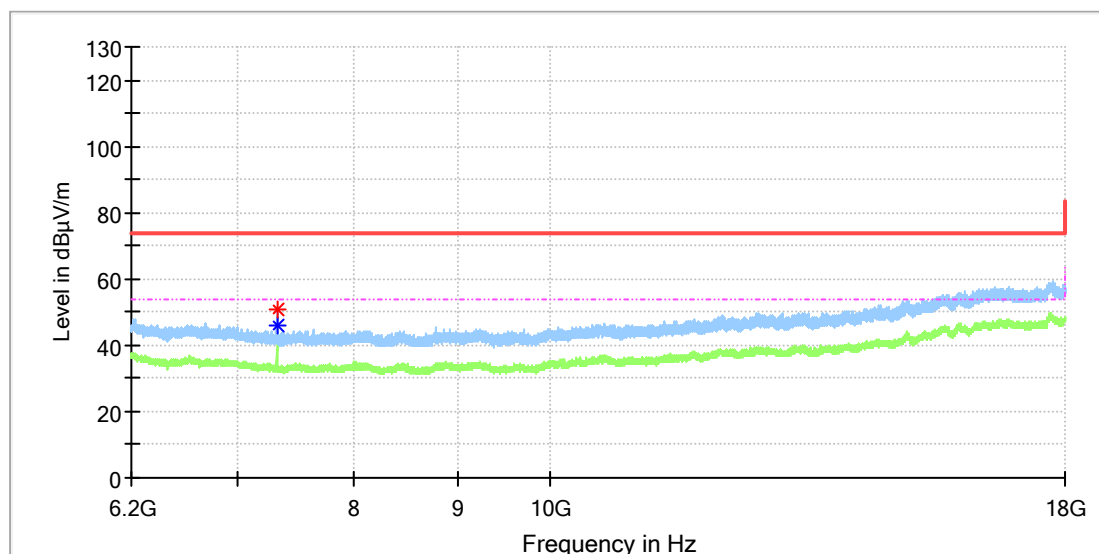
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7205.458333	---	46.56	54.00	7.44	100.0	V	0.0	8.8
7206.933333	52.14	---	74.00	21.86	100.0	V	324.0	8.8

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Mid CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

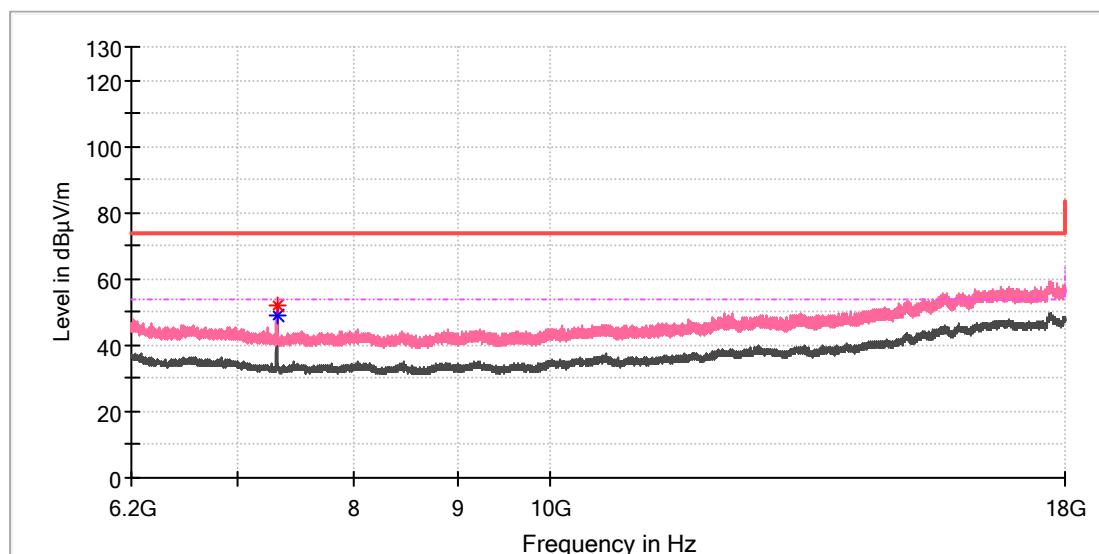


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7319.525000	---	45.72	54.00	8.28	100.0	H	138.0	8.2
7320.508333	50.89	---	74.00	23.11	100.0	H	138.0	8.2

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Mid CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

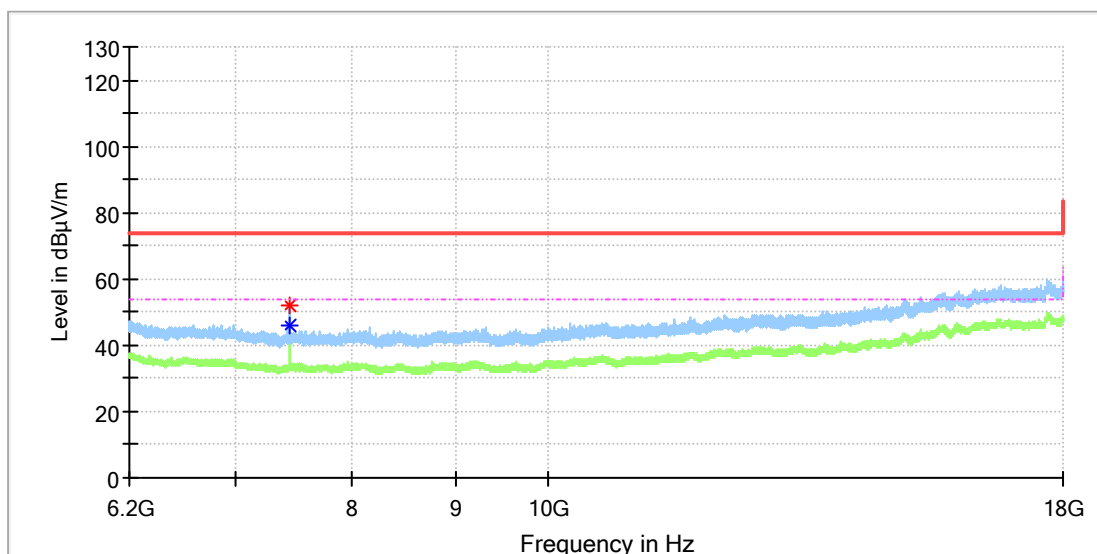


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7319.033333	51.76	---	74.00	22.24	100.0	V	0.0	8.2
7320.016667	---	48.69	54.00	5.31	100.0	V	0.0	8.2

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin

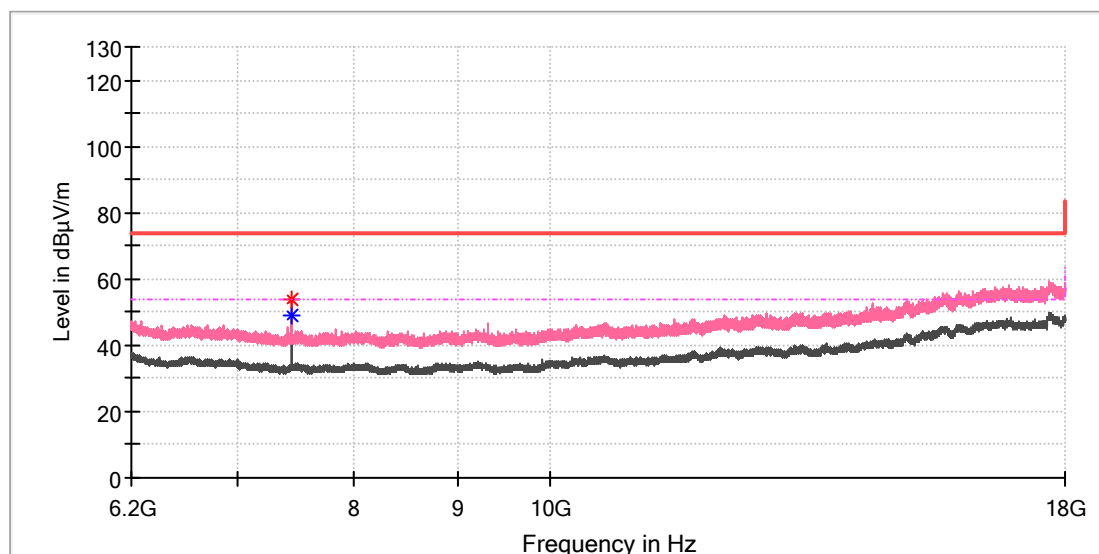


Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.000000	---	45.95	54.00	8.05	100.0	H	122.0	8.4
7439.000000	51.71	---	74.00	22.29	100.0	H	122.0	8.4

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



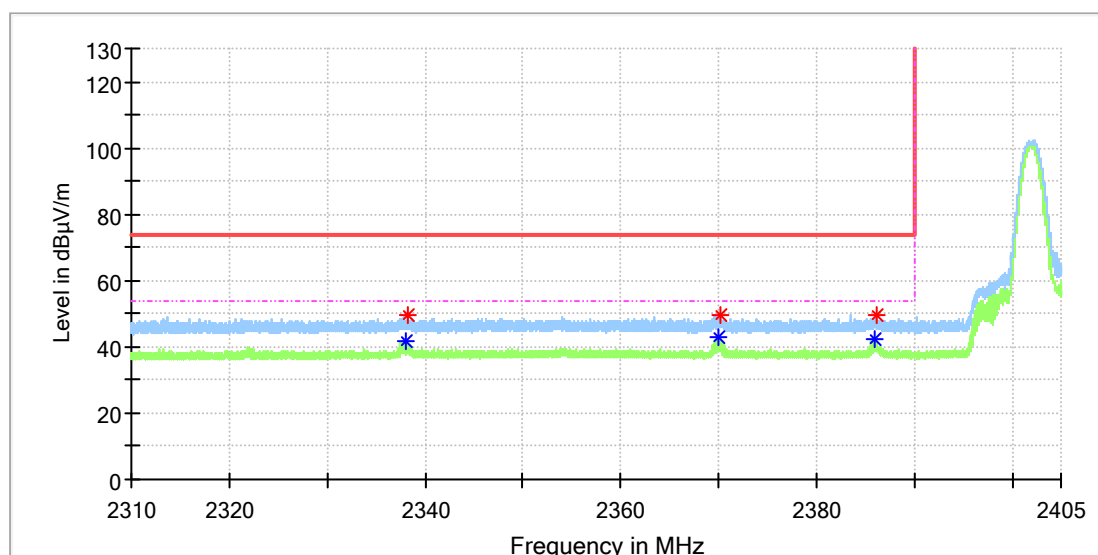
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
7439.000000	---	48.78	54.00	5.22	100.0	V	356.0	8.4
7439.000000	53.54	---	74.00	20.46	100.0	V	356.0	8.4

Appendix B.6: Test Results of Radiated Emissions in Restricted Bands

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



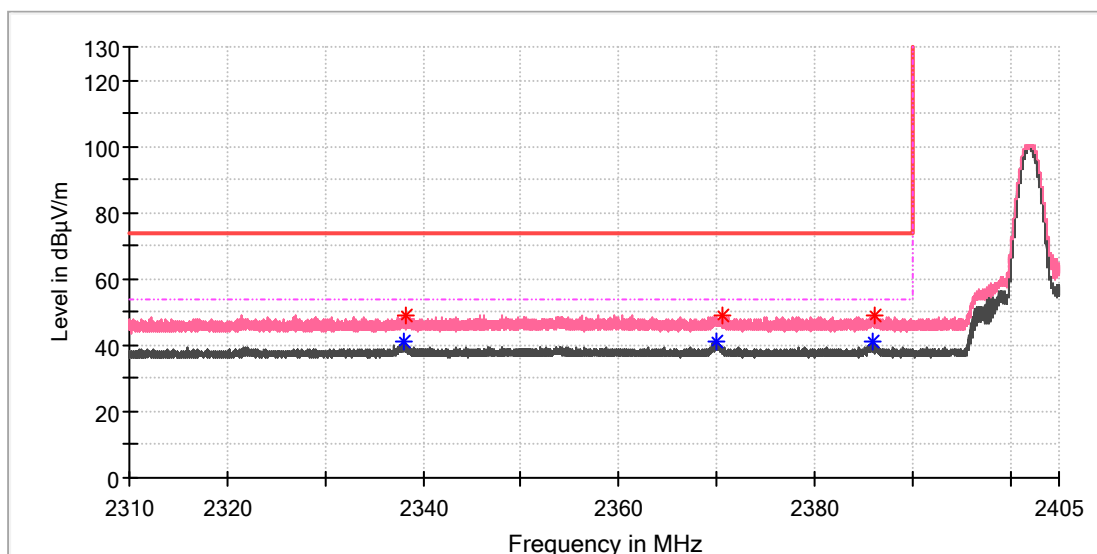
Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2337.958500	---	41.81	54.00	12.19	100.0	H	187.0	6.8
2338.219750	49.29	---	74.00	24.71	100.0	H	42.0	6.8
2370.011500	---	42.76	54.00	11.24	100.0	H	187.0	6.9
2370.263250	49.72	---	74.00	24.28	100.0	H	212.0	6.9
2385.966750	---	42.25	54.00	11.75	100.0	H	187.0	7.0
2386.061750	49.35	---	74.00	24.65	100.0	H	201.0	7.0

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_Low CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



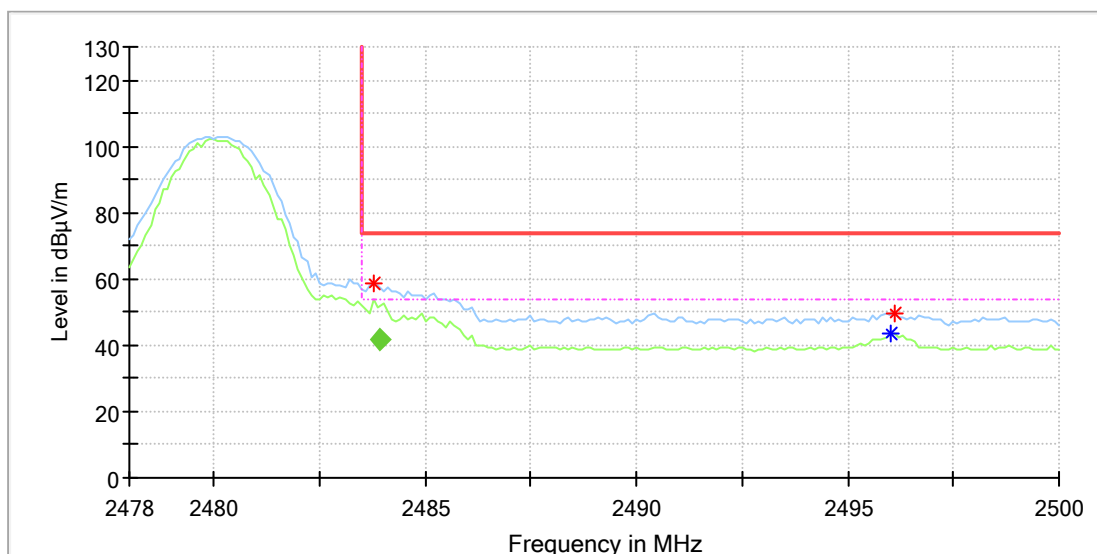
Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2338.006000	---	40.83	54.00	13.17	100.0	V	0.0	6.8
2338.234000	48.95	---	74.00	25.05	100.0	V	356.0	6.8
2370.049500	---	41.10	54.00	12.90	100.0	V	336.0	6.9
2370.548250	48.78	---	74.00	25.22	100.0	V	0.0	6.9
2385.976250	---	41.18	54.00	12.82	100.0	V	336.0	7.0
2386.232750	49.01	---	74.00	24.99	100.0	V	279.0	7.0

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



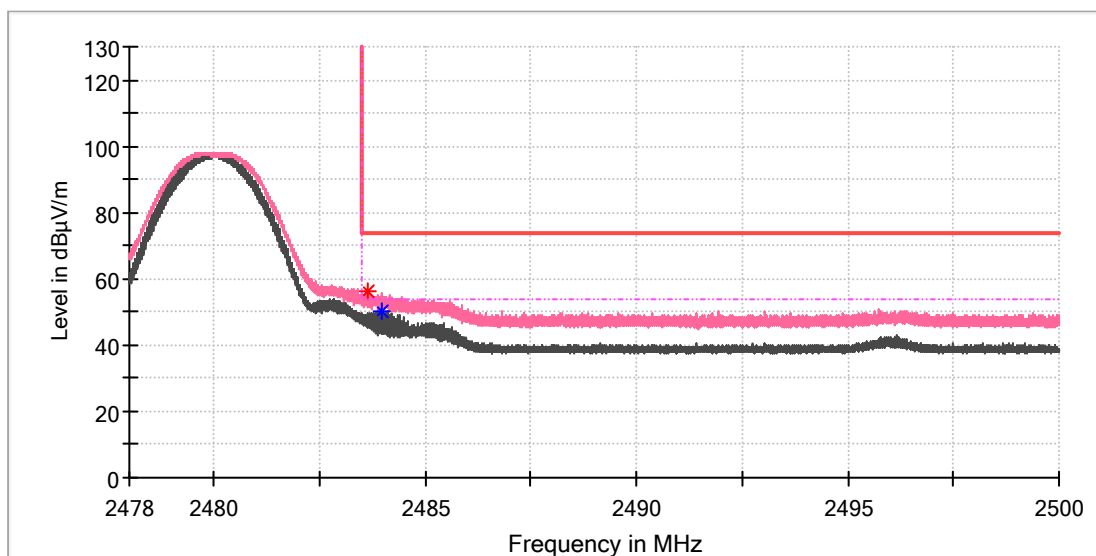
Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.800000	58.56	---	74.00	15.44	100.0	H	191.0	7.4
2496.000000	---	43.60	54.00	10.40	100.0	H	191.0	7.4
2496.100000	49.66	---	74.00	24.34	100.0	H	186.0	7.4

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: TX_BLE_High CH
Test Voltage:: AC 120V, 60Hz
Remark: Temp 24 Humi:47%
Test Standard: FCC 15.247
Tested By: Alano Qu
Reviewed By: Terry Yin



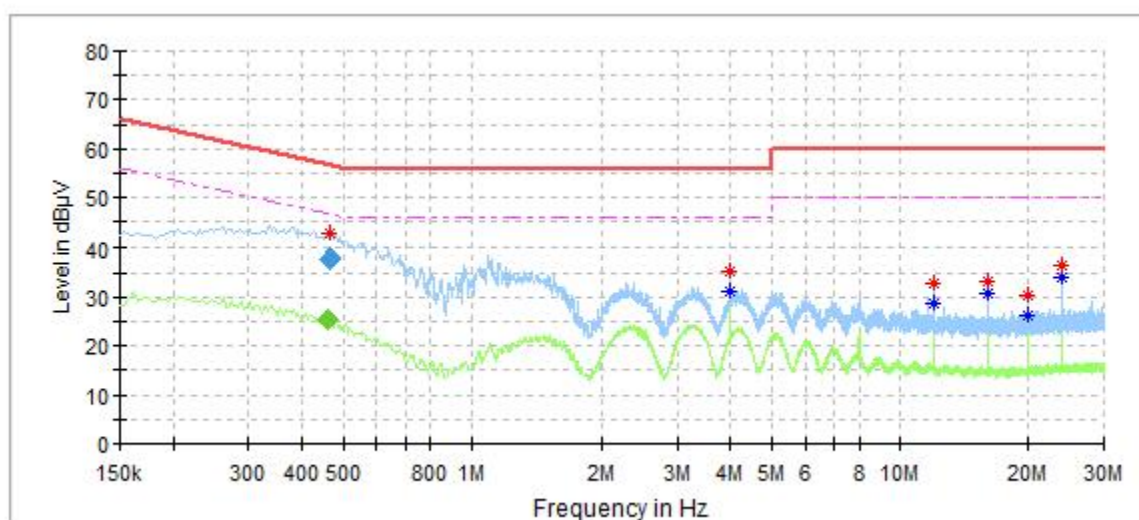
Critical Freqs

Frequency (MHz)	MaxPeak (dBμV/m)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
2483.655100	56.00	---	74.00	18.00	100.0	V	354.0	7.4
2483.964200	---	50.07	54.00	3.93	100.0	V	15.0	7.4

Appendix B.7: Test Results of Conducted Emissions on AC Mains

EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: Full Load
Test Voltage: AC 120V/60Hz
Test By: Shower.Dai
Review By: Gary Chen
Remark: Auxiliary



Critical_Freqs

Frequency (MHz)	MaxPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Line	Corr. (dB)
0.460500	---	25.29	46.59	21.29	L1	9.7
0.464500	42.76	---	56.59	13.82	L1	9.7
4.000000	---	31.35	46.00	14.65	L1	9.8
4.000000	35.39	---	56.00	20.61	L1	9.8
12.000000	---	28.90	50.00	21.10	L1	10.2
12.000000	32.75	---	60.00	27.25	L1	10.2
16.000000	---	30.88	50.00	19.12	L1	10.3
16.000000	33.42	---	60.00	26.58	L1	10.3
20.000000	---	26.09	50.00	23.91	L1	10.5
20.000000	30.27	---	60.00	29.73	L1	10.5
24.000000	---	34.19	50.00	15.81	L1	10.5
24.000000	36.38	---	60.00	23.62	L1	10.5

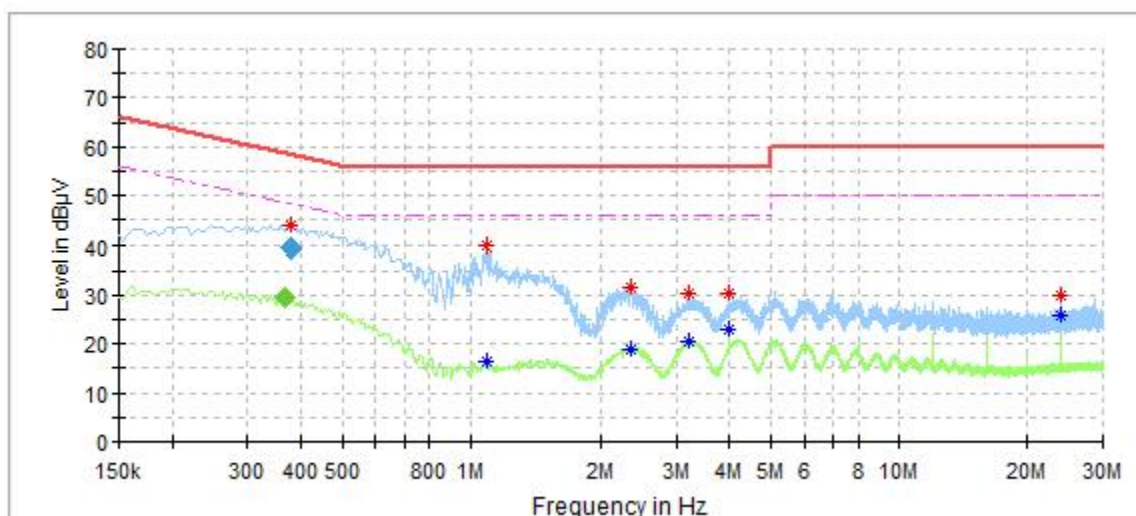
Final_Result

Frequency (MHz)	QuasiPeak (dBμV)	Average (dBμV)	Limit (dBμV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.460500	---	25.37	46.68	21.32	200.0	9.000	L1	9.7
0.464500	37.90	---	56.61	18.72	200.0	9.000	L1	9.7

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EUT Information

EUT Name: In-Wall Accessory Smart Switch
Model: HIWACS1BLE40AWH
Test Mode: Full Load
Test Voltage: AC 120V/60Hz
Test By: Shower.Dai
Review By: Gary Chen
Remark: Auxiliary



Critical_Freqs

Frequency (MHz)	MaxPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Corr. (dB)
0.368500	---	29.15	48.24	19.08	N	9.7
0.380500	43.88	---	58.24	14.36	N	9.7
1.088000	---	16.48	46.00	29.52	N	9.7
1.088000	39.64	---	56.00	16.36	N	9.7
2.360000	---	18.88	46.00	27.12	N	9.7
2.360000	31.71	---	56.00	24.29	N	9.7
3.216000	---	20.63	46.00	25.37	N	9.8
3.216000	30.24	---	56.00	25.76	N	9.8
4.000000	---	22.84	46.00	23.16	N	9.8
4.000000	30.31	---	56.00	25.69	N	9.8
24.000000	---	26.02	50.00	23.98	N	10.5
24.000000	29.98	---	60.00	30.02	N	10.5

Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)
0.368500	---	29.34	48.54	19.19	200.0	9.000	N	9.7
0.380500	39.32	---	58.27	18.95	200.0	9.000	N	9.7