Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 1 of 38

TEST REPORT

Test Result :	PASS *
Date of Issue:	2022/11/29
Date of Test:	2022/11/24 to 2022/11/29
Date of Receipt:	2022/11/09
Standards:	FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C
FCC ID:	2AU8HSRT421-CBRS
Trade Mark:	Smawave
Model No.:	SRT421
EUT Description:	LTE Indoor CPE
Address of Manufacturer:	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China
Manufacturer:	Smawave Technology Co. ,Ltd
Address of Applicant:	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China
Applicant:	Smawave Technology Co. ,Ltd
Application No.:	SEWM2211000238RG

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Sun

Panta Sun Wireless Laboratory Manager



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 2 of 38

1 Version

	Revision Record					
Version Chapter Date Modifier Re						
01		2022/11/29		Original		

Prepared By	(Ives Cheng) / Test Engineer
Checked By	(Well Wei) / Reviewer



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 3 of 38

2 Test Summary

S

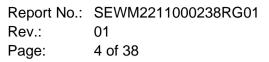
Test Item	FCC Rule No.	Test Method	Test Result	Result
Antenna Requirement	15.203/15.247(b)		Clause 4.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10 2013 Section 6.2	Clause 4.2	PASS
Duty Cycle			Reference report SZCR210402049802	
Conducted Output Power	15.247 (b)(3)	ANSI C63.10 2013 Section11.9.2.3	Clause 4.4	PASS
DTS (6 dB) Bandwidth & 99% Occupied Bandwidth	15.247 (a)(2)	ANSI C63.10 2013 Section 11.8 Option 2 / 6.9.3		ference report R210402049802
Power Spectral Density	15.247 (e)	ANSI C63.10 2013 Section 11.10.2	Reference report SZCR210402049802	
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 2013 Section 11.11		ference report R210402049802
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 2013 Section 11.11	C63.10 Reference repoi SZCR2104020498	
Radiated Spurious Emissions 15.247(d);15.205/15.20		ANSI C63.10 2013 Section 11.12	Clause 4.9	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d);15.205/15.209	ANSI C63.10 2013 Section 11.12	Clause 4.10	PASS

Remark:

The items of AC Power Line Conducted Emission and Conducted Output Power were fully retested, Radiated Spurious Emissions and Restricted bands around fundamental frequency were checked on 802.11n40_Channel 03, and other items data please refer to the test report SZCR210402049802 issue on 2021/05/18.



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Contents

1	Versio	n	2
2	Test S	Summary	3
3	Gener	al Information	5
	3.1	Details of Client	5
	3.2	Test Location	5
	3.3	Test Facility	5
	3.4	General Description of EUT	6
	3.5	Test Environment and Mode	8
	3.6	Description of Support Units	8
	3.7	Worst-case configuration and mode	8
4	Test re	esults and Measurement Data	9
	4.1	Antenna Requirement	9
	4.2	AC Power Line Conducted Emissions	11
	4.3	Duty Cycle	15
	4.4	Conducted Output Power	16
	4.5	DTS (6 dB) Bandwidth & 99% Occupied Bandwidth	17
	4.6	Power Spectral Density	18
	4.7	Band-edge for RF Conducted Emissions	19
	4.8	RF Conducted Spurious Emissions	20
	4.9	Radiated Spurious Emissions	21
	4.10	Restricted bands around fundamental frequency	24
5	Measu	urement Uncertainty (95% confidence levels, k=2)	27
6		ment List	
7	Photog	graphs - Setup Photos	



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 5 of 38

3 General Information

3.1 Details of Client

Applicant:	Smawave Technology Co. ,Ltd
Address of Applicant:	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China
Manufacturer:	Smawave Technology Co. ,Ltd
Address of Manufacturer:	3/F, Building 8, 1001 North Qinzhou Road, Xuhui District, Shanghai, China

3.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.			
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzho Area, China (Jiangsu) Pilot Free Trade Zone			
Post code:	215000			
Test engineer:	Ives Cheng, King-p Li			

3.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

• A2LA (Certificate No. 6336.01)

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

Innovation, Science and Economic Development Canada

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• FCC –Designation Number: CN1312

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 6 of 38

3.4 General Description of EUT

EUT Description:	LTE Indoor C	PE		
Model No.:	SRT421			
Trade Mark:	Smawave			
Hardware Version:	V1.0			
Software Version:	ST_CBRS_V	2.0.0		
	RF Conducte	d	862165041541640	
IMEI:	RSE & AC po	ower line	862165041541358	
	802.11b/g/n(H	HT20):	2412MHz to 2462MHz	
Operation Frequency:	802.11n(HT4	0):	2422MHz to 2452MHz	
Martine Trans	802.11b:	DSSS (DB	PSK, DQPSK, CCK)	
Modulation Type:	802.11g/n:	OFDM (BP	SK, QPSK, 16QAM, 64QAM)	
Number of Channels:	802.11b/g/n(H 802.11n(HT4	,		
Channel Spacing:	5MHz			
	SISO	802.11b/g/r	ı	
Smart System:		802.11n: 2	Tx & 2Rx	
	Diversity	802.11b/g:	2Tx & 2Rx	
Antenna Type:	Internal Anter	nna		
	2.27dBi(Ant0));1.82dBi(Ant	1)	
Antenna Gain:		Note: The antenna gain are derived from the gain information report provided by the manufacturer.		
RF Cable:	1dB			
Romark:				

Remark:

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Report No.:	SEWM2211000238RG01
Rev.:	01
Page:	7 of 38

	Operation Frequency of each channel (802.11b/g/n HT20)							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency	
1	2412MHz	4	2427MHz	7	2442MHz	10	2457MHz	
2	2417MHz	5	2432MHz	8	2447MHz	11	2462MHz	
3	2422MHz	6	2437MHz	9	2452MHz			
	Operation Frequency of each channel (802.11n HT40)							
Channel	Channel Frequency Channel Frequency Channel Frequency Channel Frequency						Frequency	
3	2422MHz	6	2437MHz	9	2452MHz			
4	2427MHz	7	2442MHz					
5	5 2432MHz 8 2447MHz							
-			Remark:					
Remark:	II		•					
	5.31(m), regard	ls to the opera	ating frequency	range over 1	0 MHz, the Lo	west frequenc	cy, the	
In section 15		•	ating frequency ency of channe	•	-	•		

channel see below:

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Channel	Frequency for 802.11 b/g/n (HT20)	Frequency for 802.11n (HT40)
The Lowest channel	2412MHz	2422MHz
The Middle channel	2437MHz	2437MHz
The Highest channel	2462MHz	2452MHz



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 8 of 38

3.5 Test Environment and Mode

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Environment Parameter	101.0 kPa Selected Values During Tests		
Relative Humidity	44-46 % RH Ambient		
Value	Temperature(°C)	Voltage(V)	
NTNV	22~23	12	
Remark: NV: Normal Voltage NT: Normal Temperature			

3.6 Description of Support Units

The EUT has been tested as an independent unit.

3.7 Worst-case configuration and mode

Low data rate was used to test on antenna port conducted tests and radiated spurious emissions since it has the highest maximum power. Following are the worst-case data rates set for test:

Modulation Type	SISO - Data Rate	CDD/MIMO - Data Rate
802.11b	/	2 Mbps
802.11g	/	12 Mbps
802.11n (HT 20)	/	MCS0 (13 Mbps)
802.11n (HT 40)	/	MCS0 (27 Mbps)



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 9 of 38

4 Test results and Measurement Data

4.1 Antenna Requirement

Standard requirement: 47 CFR Part 15C Section 15.203 /247(b)	Standard requirement:	47 CFR Part 15C Section 15.203 /247(b)
--	-----------------------	--

15.203 requirement:

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 a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna is Internal Antenna and no consideration of replacement. The best case gain of the antenna is 2.27dBi(Ant0);1.82dBi(Ant1).*

*Note:

The antenna gain are derived from the gain information report provided by the manufacturer. Remark:

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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 10 of 38

Cyclic Delay Diversity (CDD) System:

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

If all antennas have the same gain, G_{ANT} , Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power measurements on IEEE 802.11 devices:

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \le 4$; Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ; Array Gain = 5 log($N_{ANT}/N_{SS}=1$) dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \ge 5$.

Unequal antenna gains, with equal transmit powers. For antenna gains given by G1, G2, ..., GN dBi

- If transmit signals are correlated, then
 Directional gain = 10 log[(10^{G1/20} + 10^{G2/20} + ... + 10^{GN/20})² /N_{ANT}] dBi [Note the "20"s in the denominator of
 each exponent and the square of the sum of terms; the object is to combine the signal levels coherently.]
- If all transmit signals are completely uncorrelated, then Directional gain = 10 log[(10^{G1/10} + 10^{G2/10} + ... + 10^{GN/10})/N_{ANT}] dBi

The Power and PSD limit should be modified if the directional gain of eut is over 6dBi.

Power Limit Reduction = The EUT supports CDD System.

Unequal antenna gain:

ANT Gain0	ANT Gain1	Power DG	PSD DG	Power Limit	PSD Limit
(dBi)	(dBi)	(dBi)	(dBi)	Reduction(dB)	Reduction(dB)
2.27	1.82	2.05	5.06	0	0

Power Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0 PSD Limit Reduction = Directional gain – 6dBi, (Directional gain < 6dBi) =0



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 11 of 38

4.2 AC Power Line Conducted Emissions

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Test Requirement:	47 CFR Part 15C Sectio	n 15.207			
Test Method:	ANSI C63.10: 2013 Sect	tion 6.2			
Test Frequency Range:	150kHz to 30MHz				
Receiver Setup:	RBW = 9kHz, VBW = 30kHz				
Limit:	Frequency range (MHz)				
	Frequency range (MHZ)	Quasi-peak	Average		
	0.15-0.5	66 to 56*	56 to 46*		
	0.5-5	56	46		
	5-30	60	50		
	* Decreases with the log	arithm of the frequency.			
Test Procedure:	 room. 2) The EUT was connect Impedance Stabilization impedance. The power of a second LISN 2, which plane in the same way a multiple socket outlet str single LISN provided the 3) The tabletop EUT was ground reference plane. placed on the horizontal 4) The test was perform of the EUT shall be 0.4 r vertical ground reference reference plane. The LIS unit under test and bond mounted on top of the gribetween the closest point the EUT and associated In order to find the maxing 	ed with a vertical ground referent from the vertical ground reference plane was bonded to the hores of the second reference of the second reference plane. This detect to a ground reference plane. This detect of the LISN 1 and the EUT equipment was at least 0.8 mmum emission, the relative point interface cables must be charter of the c	ugh a LISN 1 (Line $D\Omega/50\mu$ H + 5Ω linear EUT were connected to ference g measured. A ble power cables to a xceeded. table 0.8m above the ement, the EUT was rence plane. The rear erence plane. The rizontal ground he boundary of the he for LISNs istance was C All other units of h from the LISN 2. ositions of		

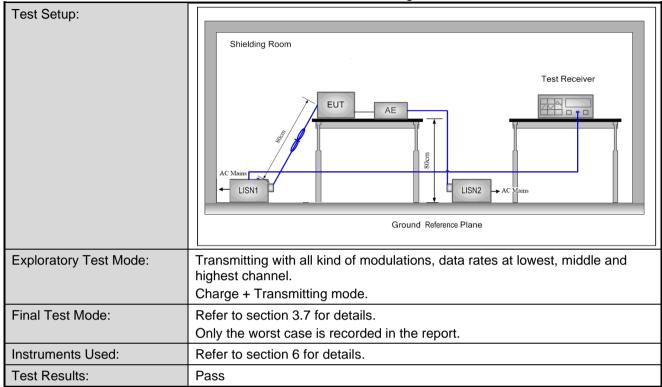


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Report No.: SEWM2211000238RG01 Rev.: 01 Page:

12 of 38





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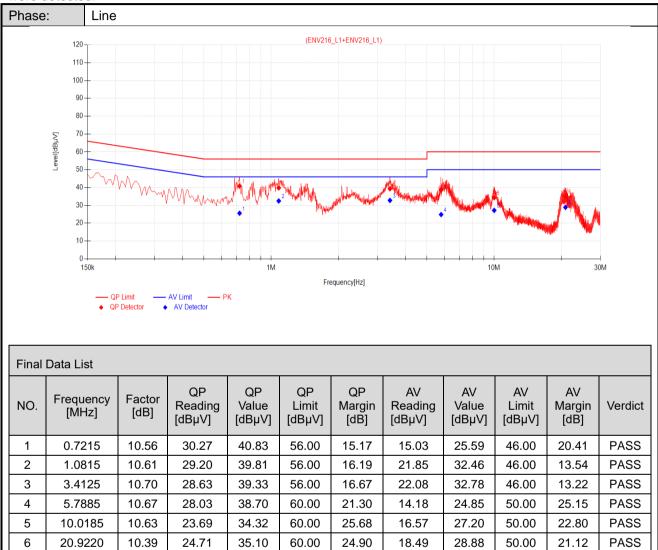
 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 13 of 38

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.



Remark:

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).

3. Margin = Limit[dB μ V] – Value[dB μ V]



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								Report N Rev.: Page:	01	WM2211 of 38	1000238	RG01
Phase:	:	Neut	tral									
	120 -					(ENV21	6_N+ENV216_N)					
	110-											
	100 -											
	90 -											
	80 -											
	5 70-	_										
	-00 - 00 - 00 - 00 - 00 - 00 - 00 - 00											-
	- 50 –											-
	40 -	\sim	Marial		M. M. M. MY	My where have been been been been been been been be	. 11an	<u>// </u>		5	6	
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	20 -	_			•	¢ ²						
	20											
	10-											
	10- 0-								10	I DM	3(DM
Final [10- 0-	50k QF + QF	P Limit — 9 Detector 4	AV Limit — P AV Detector		Fre	quency[Hz]		10	M	30	M
Final I NO.	10 - 0 - 15	50k approximate of the second				Fre QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdic
	10- 0- 15 Data Lis	st ency [z]	Factor	AV Detector QP Reading	k QP Value	QP Limit	QP Margin	Reading	AV Value	AV Limit	AV Margin	
NO.	10- 0- 15 Data Lis Freque	50k → QF st ency Iz]	Factor [dB]	QP Reading [dBµV]	κ QP Value [dBμV]	QP Limit [dBµV]	QP Margin [dB]	Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdic
NO. 1	Data Lis Freque [MH 0.72	50k af af af af af af af af af af	Factor [dB]	QP Reading [dBµV] 29.27	K QP Value [dBμV] 40.08	QP Limit [dBµV] 56.00	QP Margin [dB] 15.92	Reading [dBµV] 14.95	AV Value [dBµV] 25.76	ΑV Limit [dBµV] 46.00	AV Margin [dB] 20.24	Verdic
NO. 1 2	10- 0- 15 Data Lis Freque [MH 0.72 1.45	ook • QF • QF	Factor [dB] 10.81 10.77	QP Reading [dBµV] 29.27 23.83	 QP Value [dBμV] 40.08 34.60 	QP Limit [dBµV] 56.00 56.00	QP Margin [dB] 15.92 21.40	Reading [dBµV] 14.95 11.43	ΑV Value [dBμV] 25.76 22.20	AV Limit [dBµV] 46.00 46.00	AV Margin [dB] 20.24 23.80	Verdic PASS PASS
NO. 1 2 3	10- 0- 15 Data Lis Freque [MH 0.72 1.45 3.61	st ency [z] 15 50 50 65	Petector Image: Factor [dB] 10.81 10.77 10.68 Image: Factor	AV Detector QP Reading [dBµV] 29.27 23.83 25.66	к QP Value [dBµV] 40.08 34.60 36.34	QP Limit [dBµV] 56.00 56.00 56.00	QP Margin [dB] 15.92 21.40 19.66	Reading [dBµV] 14.95 11.43 17.70	ΑV Value [dBμV] 25.76 22.20 28.38	AV Limit [dBµV] 46.00 46.00	AV Margin [dB] 20.24 23.80 17.62	Verdic PASS PASS PASS

1. The following Quasi-Peak and Average measurements were performed on the EUT:

2. Value =Reading[dB μ V] + Factor(Lisn factor[dB] + cable loss[dB]).

3. Margin = Limit[dBµV] – Value[dBµV]



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 15 of 38

4.3 Duty Cycle

The detailed test data see: Reference report SZCR210402049802



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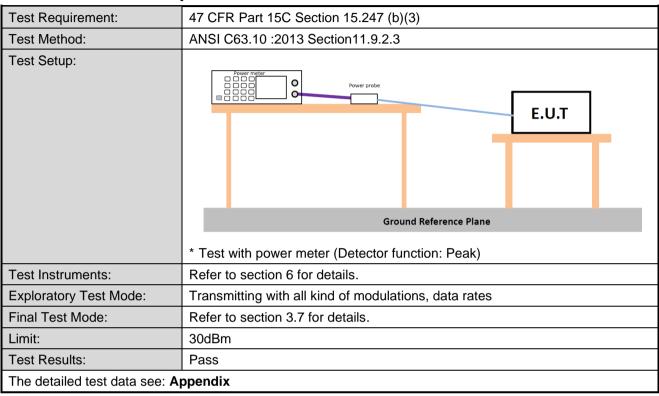
 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 16 of 38

4.4 Conducted Output Power

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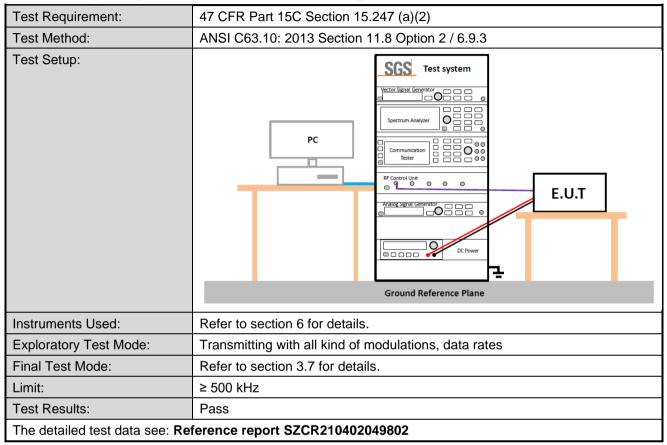
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 SEWM2211000238RG01

 Rev.:
 01

 Page:
 17 of 38

4.5 DTS (6 dB) Bandwidth & 99% Occupied Bandwidth

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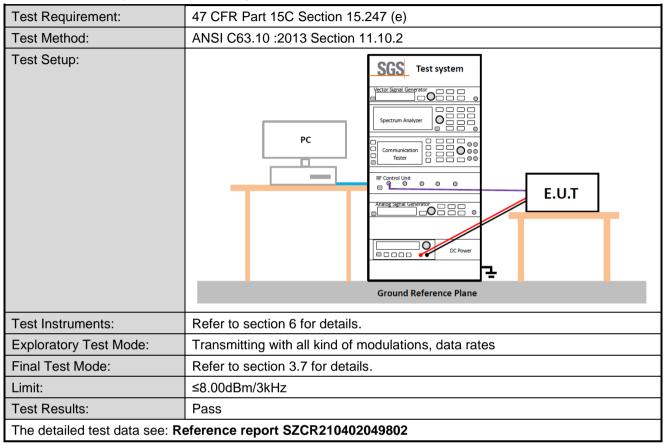
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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 18 of 38

4.6 Power Spectral Density





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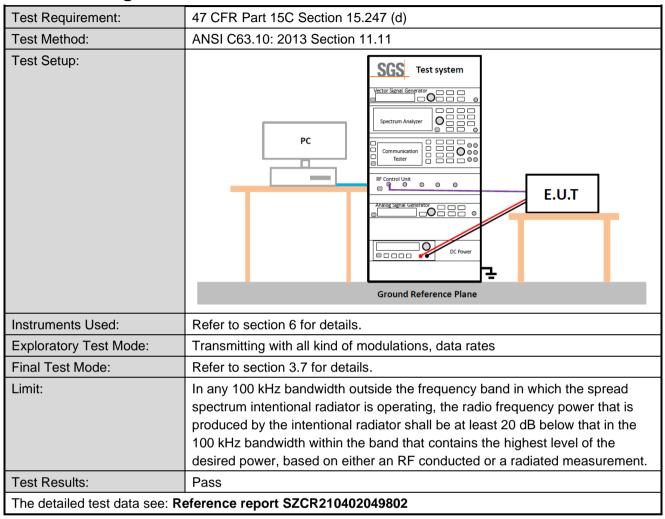
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 Rev.:
 01

 Page:
 19 of 38

4.7 Band-edge for RF Conducted Emissions





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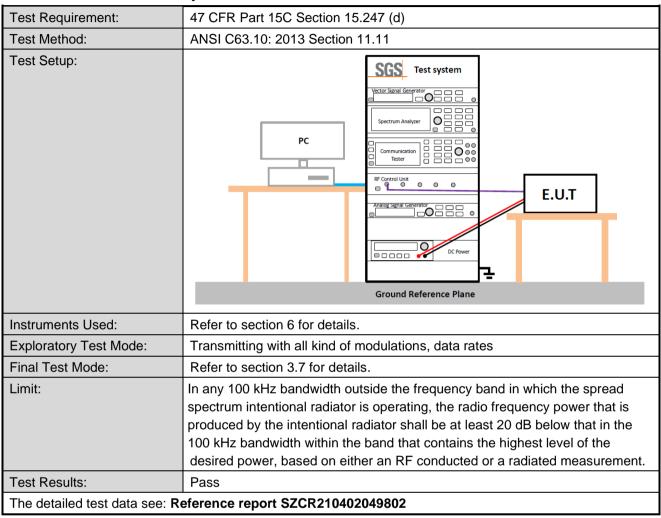
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 Rev.:
 01

 Page:
 20 of 38

4.8 **RF Conducted Spurious Emissions**





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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 21 of 38

4.9 Radiated Spurious Emissions

SG

Test Requirement:	47 CFR Part 15C Section		05					
Test Method:	ANSI C63.10 :2013 Sect	ion 11.12						
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)							
Test Frequency:	9kHz ~ 25GHz							
Receiver Setup:	Frequency Detector RBW VBW R							
	0.009MHz-0.090MHz	Peak	10kHz	30kHz	Peak			
	0.009MHz-0.090MHz	Average	10kHz	30kHz	Average			
	0.090MHz-0.110MHz	Quasi-peak	10kHz	30kHz	Quasi-peak			
	0.110MHz-0.490MHz	Peak	10kHz	30kHz	Peak			
	0.110MHz-0.490MHz	Average	10kHz	30kHz	Average			
	0.490MHz -30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak			
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak			
		Peak	1MHz	3MHz	Peak			
	Above 1GHz	Peak	1MHz	3MHz	Peak			
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)			
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300			
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30			
	1.705MHz-30MHz	30	-	-	30			
	30MHz-88MHz	100	40.0	Quasi-peak	3			
	88MHz-216MHz	150	43.5	Quasi-peak	3			
	216MHz-960MHz	200	46.0	Quasi-peak	3			
	960MHz-1GHz	500	54.0	Quasi-peak	3			
	Above 1GHz	500	54.0	Average	3			
	Remark: 15.35(b),Unless emissions is 20dB above applicable to the equipm emission level radiated b	e the maximum per ent under test. Thi	mitted avera	ige emission lir	nit			



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		Report No.: SEWM2211000238RG01 Rev.: 01 Page: 22 of 38
Test Setup:]	
AE EUT Ground Reference		Alterna Tower Alterna Tower (Turntable) Test Receiver Test Receiver
Figure 1. Be	low 30MHz	Figure 2. 30MHz to 1GHz
	Figure 3. Ab	
Test Procedure:	 meters above the groun table was rotated 360 of radiation. b. For above 1GHz, the E meters above the groun was rotated 360 degree (Distance from antenna c. The EUT was set 3 or 7 antenna, which was modified of the antenna height is was ground to determine the horizontal and vertical p measurement. e. For each suspected erric then the antenna was t frequency of below 30M 	JT was placed on the top of a rotating table 0.8 and at a 3 or 10 meter semi-anechoic camber. The legrees to determine the position of the highest UT was placed on the top of a rotating table 1.5 and at a 3 meter semi-anechoic camber. The table es to determine the position of the highest radiation to EUT is 1m for measurements >18GHz). 0 meters away from the interference-receiving punted on the top of a variable-height antenna tower. raried from one meter to four meters above the e maximum value of the field strength. Both bolarizations of the antenna are set to make the dission, the EUT was arranged to its worst case and uned to heights from 1 meter to 4 meters(for the test 1Hz, the antenna was tuned to heights 1 meter) and turned from 0 degrees to 360 degrees to find the



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Report No.: SEWM2211000238RG01

	Rev.: 01
	Page: 23 of 38
	maximum reading.
	 f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
	g. Test the EUT in the lowest channel, the middle channel ,the Highest channel.
	h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case.
	i. Repeat above procedures until all frequencies measured was complete.
	j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported
	k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed.
	 At a measurement distance of 1 meter the limit line was increased by 20*LOG(3/1) = 9.54 dB.
Test Configuration:	Measurements Below 1000MHz
	• RBW = 120 kHz
	• VBW = 300 kHz
	• Detector = Peak
	Trace mode = max hold
	Peak Measurements Above 1000 MHz
	• RBW = 1 MHz
	• VBW ≥ 3 MHz
	Detector = Peak
	Sweep time = auto
	Trace mode = max hold
	Average Measurements Above 1000MHz
	• RBW = 1 MHz
	• VBW ≥ [3 *RBW]
	• Detector = RMS (power averaging), if span / (# of points in sweep) ≤ (RBW / 2). Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If this condition cannot be satisfied, then the detector mode shall be set to peak.
	Sweep time = auto
	Perform a trace average of at least 100 traces.
Exploratory Test Mode:	Transmitting with all kind of modulations, data rates.
	Charge + Transmitting mode.
Final Test Mode:	Refer to section 3.7 for details.
Instruments Used:	Refer to section 6 for details.
Test Results:	Pass
The detailed test data see	e: Appendix



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 Report No.:
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 Rev.:
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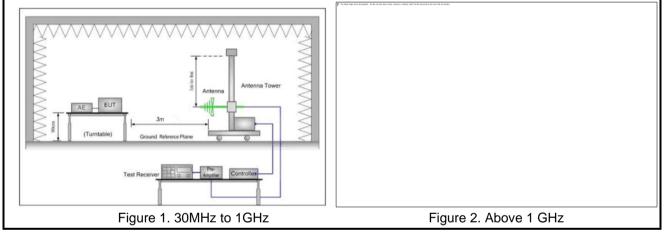
 Page:
 24 of 38

4.10Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205						
Test Method:	ANSI C63.10: 2013 Section 11.12						
Test Site:	Measurement Distance: 3m	Measurement Distance: 3m (Semi-Anechoic Chamber)					
Limit:	Frequency	Limit (dBuV/m)	Remark				
	30MHz-88MHz	40.0	Quasi-peak				
	88MHz-216MHz	Quasi-peak					
	216MHz-960MHz 46.0 Quasi-peak						
	960MHz-1GHz	Quasi-peak					
		54.0	Average Value				
	Above 1GHz	74.0	Peak Value				

Test Setup:

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Report No.:	SEWM2211000238RG01
Rev.:	01
Page:	25 of 38

Test Procedure: a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. b. For above 1 GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation. c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was uned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. g. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel h. Test the EUT in the lowest channel, the Highest channel h. Test the EUT in the lowest channel, the X, Y. Z axis positioning for Transmitting mode, And found the X axis positioning which it is worse case. j. Repeat above procedures until all frequencies measured was complete.		1 age. 25 01 50						
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		•						
Perform a trace average of at least 100 traces.	-							
Exploratory Test Mode: Transmitting with all kind of modulations, data rates.	Exploratory Test Mode:	-						
Charge + Transmitting mode.		Charge + Transmitting mode.						



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		Report No.: Rev.: Page:	SEWM2211000238RG01 01 26 of 38			
Final Test Mode:	Refer to section 3.7 for details.	Ŭ				
Instruments Used:	Refer to section 6 for details.					
Test Results:	Pass					
The detailed test data see: Appendix						



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 27 of 38

5 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty			
1	Total RF power, conducted	±0.54dB			
2	Conduction Emission	± 2.90dB (150kHz to 30MHz)			
		± 3.13dB (9k -30MHz)			
2	Dedicted Emission	± 4.80dB (30M -1GHz)			
3	Radiated Emission	± 4.80dB (1GHz to 18GHz)			
		± 4.80dB (Above 18GHz)			

Remark:

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The U_{Iab} (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results

- compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;

- non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 28 of 38

6 Equipment List

SG

	RF Test Equipment									
Test Equipment	Manufacturer	Model No.	Model No. Inventory No.		Cal.Due date (yyyy/mm/dd)					
Shielding Room	Brilliant-emc	N/A	SUWI-04-01-06	2021/05/08	2024/05/07					
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2022/02/16	2023/02/15					
Signal Analyzer	ROHDE& SCHWARZ	FSV3030	SUWI-01-02-02	2022/05/17	2023/05/16					
Measurement SoftwareTonscendSignal AnalyzerROHDE& SCHWARZWideband RadioROHDE& SCHWARZCommunication TesterSCHWARZ		JS1120-3 Test System V3.1.55	SUWI-02-09-09	NCR	NCR					
		FSW43	SUWI-01-02-04	2022/05/28	2023/05/27					
		CMW500	SUWI-01-16-05	2022/02/14	2023/02/13					
DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	2022/02/15	2023/02/14					
Power meter	Anritsu	ML2495A	SUWI-01-31-01	2021/12/04	2022/12/03					
Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	2021/12/04	2022/12/03					
MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	2022/02/14	2023/02/13					
Temperature Chamber	ESPEC	SU-242	SUWI-01-13-01	2022/02/15	2023/02/14					

CE Test System									
Test Equipment	Manufacturer	Model No. Inventory No.		Cal. date (yyyy/mm/dd)	Cal.Due date (yyyy/mm/dd)				
Shielding Room	Brilliant-emc	N/A	SUWI-04-03-01	2021/05/08	2024/05/07				
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19	2023/02/18				
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-06	2022/02/16	2023/02/15				
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-01	2022/02/19	2023/02/18				
Artificial network	ROHDE&SCHWARZ	ENV216	SUWI-01-19-02	2022/02/19	2023/02/18				
Measurement Software	Tonscend	JS32-CE 4.0.0.2	SUWI-02-09-05	NCR	NCR				



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 29 of 38

RSE Test System							
Test Equipment	Manufacturer	Model No.	Model No. Inventory No.		Cal.Due date (yyyy/mm/dd)		
Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	2021/05/08	2024/05/07		
Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2022/02/16	2023/02/15		
Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2022/05/28	2023/05/27		
Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-05	2021/12/04	2022/12/03		
Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	2022/02/19	2023/02/18		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	VULB 9163	SUWI-01-11-01	2021/05/16	2023/05/15		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	2021/05/16	2023/05/15		
Receiving antenna	SCHWRZBECK MESS- ELEKTRONIK	BBHA 9170	SUWI-01-11-03	2021/05/14	2023/05/13		
Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	2022/02/14	2023/02/13		
Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	2022/02/14	2023/02/13		
Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	2022/02/19	2023/02/18		
Active Loop Antenna	SCHWRZBECK MESS- ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	2021/06/10	2023/06/09		
Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-04	NCR	NCR		



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 30 of 38

7 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 31 of 38

Appendix



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 32 of 38

Conducted Output Power

For new report:									
Test Mode	Frequency		Measure	d Output Pow	ver (dBm)	Limit) (and ist		
Test Wode	(MHz)	Тх Туре	Ant 1	Ant 2	Total	(dBm)	Verdict		
	2412	MIMO	14.21	14.71	17.48	30	PASS		
802.11b	2437	MIMO	14.8	14.67	17.75	30	PASS		
	2462	MIMO	14.00	14.32	17.17	30	PASS		
	2412	MIMO	12.21	12.9	15.58	30	PASS		
802.11g	2437	MIMO	13.12	12.84	15.99	30	PASS		
	2462	MIMO	12.25	12.32	15.30	30	PASS		
	2412	MIMO	12.00	12.66	15.35	30	PASS		
802.11n(HT20)	2437	MIMO	12.80	12.62	15.72	30	PASS		
	2462	MIMO	11.98	12.21	15.11	30	PASS		
	2422	MIMO	11.74	10.73	14.27	30	PASS		
802.11n(HT40)	2437	MIMO	12.06	11.42	14.76	30	PASS		
	2452	MIMO	12.51	13.01	15.78	30	PASS		

For original report:

Teet Mede	Frequency		Measure	d Output Pow	Limit	Vardiat	
Test Mode	(MHz)	Тх Туре	Ant 1	Ant 2	Total	(dBm)	Verdict
	2412	MIMO	14.27	14.77	17.54	30	PASS
802.11b	2437	MIMO	14.88	14.67	17.79	30	PASS
	2462	MIMO	14.10	14.34	17.23	30	PASS
	2412	MIMO	12.30	12.93	15.64	30	PASS
802.11g	2437	MIMO	13.12	12.84	15.99	30	PASS
	2462	MIMO	12.32	12.38	15.36	30	PASS
	2412	MIMO	12.06	12.66	15.38	30	PASS
802.11n(HT20)	2437	MIMO	12.83	12.70	15.78	30	PASS
	2462	MIMO	12.04	12.23	15.15	30	PASS
	2422	MIMO	11.76	10.79	14.31	30	PASS
802.11n(HT40)	2437	MIMO	12.08	11.49	14.81	30	PASS
	2452	MIMO	12.59	13.07	15.85	30	PASS

Remark:

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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 33 of 38

Radiated Spurious Emissions

Radiated emission below 1GHz

Worst case Mode: 802.11n40_Channel 03

For new report:

S

Final	Final Data List										
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity	
1	38.245	48.86	-28.17	11.61	32.30	40.00	7.70	102	17	Horizontal	
2	42.125	46.02	-28.07	12.53	30.48	40.00	9.52	174	309	Horizontal	
3	50.855	39.86	-27.98	13.59	25.48	40.00	14.52	142	270	Horizontal	
4	66.6175	38.96	-27.70	9.61	20.87	40.00	19.13	256	21	Horizontal	
5	99.84	31.24	-27.36	10.78	14.65	43.50	28.85	235	249	Horizontal	
6	249.9475	30.27	-26.00	11.90	16.17	46.00	29.83	214	60	Horizontal	

Fina	Final Data List												
NO.	Frequency [MHz]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	44.065	49.62	-28.05	12.91	34.48	40.00	5.52	102	360	Vertical			
2	50.37	45.75	-28.00	13.71	31.47	40.00	8.53	185	21	Vertical			
3	75.105	47.26	-27.84	7.83	27.25	40.00	12.75	263	101	Vertical			
4	129.91	32.65	-27.16	8.21	13.70	43.50	29.80	254	21	Vertical			
5	160.7075	34.04	-26.75	7.81	15.10	43.50	28.40	142	21	Vertical			
6	249.9475	30.28	-26.00	11.90	16.18	46.00	29.82	232	0	Vertical			

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain.

The basic equation with a sample calculation is as follows:

Value = Reading($dB\mu V$) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB) Margin = Limit(dBµV/m) – Value(dBµV/m)



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 34 of 38

For o	For original report:												
Data	Data List												
NO.	Frequency [MHz]	Cable Loss [dB]	AF [dB/m]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Over Limit [dB]	Polarity				
1	33.33	0.64	21.10	27.72	24.88	18.90	40.00	-21.10	Horizontal				
2	60.28	0.80	12.83	27.66	32.73	18.70	40.00	-21.30	Horizontal				
3	87.42	1.28	12.78	27.62	27.59	14.03	40.00	-25.97	Horizontal				
4	196.51	1.20	15.70	27.15	32.59	22.34	43.50	-21.16	Horizontal				
5	250.30	1.64	18.20	26.99	32.86	25.71	46.00	-20.29	Horizontal				
6	993.01	3.59	29.70	26.69	25.41	32.01	54.00	-21.99	Horizontal				

Data	Data List												
NO.	Frequency [MHz]	Cable Loss [dB]	AF [dB/m]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Over Limit [dB]	Polarity				
1	48.67	0.70	14.43	27.69	36.89	24.33	40.00	-15.67	Vertical				
2	86.50	1.27	12.60	27.63	38.60	24.84	40.00	-15.16	Vertical				
3	181.92	1.19	15.42	27.21	30.28	19.68	43.50	-23.82	Vertical				
4	472.18	2.45	23.75	27.69	26.13	24.64	46.00	-21.36	Vertical				
5	627.27	2.76	26.55	28.07	25.08	26.32	46.00	-19.68	Vertical				
6	982.62	3.58	29.54	26.74	26.59	32.97	54.00	-21.03	Vertical				

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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 35 of 38

Transmitter emission Above 1GHz

802.11n40_Channel 03

For new report:

S

Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4904	48.82	32.37	-44.88	36.31	74.00	37.69	296	132	Horizontal			
2	7356	45.78	36.41	-41.88	40.31	74.00	33.69	255	166	Horizontal			
3	9808	42.37	38.52	-37.48	43.41	74.00	30.59	241	66	Horizontal			
4	4904	40.45	32.37	-44.88	27.94	54.00	26.06	142	3	Horizontal			
5	7356	38.16	36.41	-41.88	32.69	54.00	21.31	255	66	Horizontal			
6	9808	34.32	38.52	-37.48	35.36	54.00	18.64	286	132	Horizontal			

Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	4904	47.98	32.37	-44.88	35.47	74.00	38.53	201	64	Vertical			
2	7356	45.60	36.41	-41.88	40.13	74.00	33.87	142	32	Vertical			
3	9808	42.54	38.52	-37.48	43.58	74.00	30.42	266	66	Vertical			
4	4904	40.74	32.37	-44.88	28.23	54.00	25.77	266	251	Vertical			
5	7356	37.68	36.41	-41.88	32.21	54.00	21.79	254	142	Vertical			
6	9808	34.47	38.52	-37.48	35.51	54.00	18.49	185	131	Vertical			

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain.

The basic equation with a sample calculation is as follows:

Level = Reading($dB\mu V$) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit(dBµV/m) – Level(dBµV/m)



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 36 of 38

For o	For original report:												
Data	Data List												
NO.	Frequency [MHz]	Cable Loss [dB]	AF [dB/m]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Over Limit [dB]	Polarity				
1	1653.550	3.39	26.48	40.04	46.64	36.47	74.00	-37.53	Horizontal				
2	4062.629	6.34	33.60	41.46	48.08	46.56	74.00	-27.44	Horizontal				
3	4844.000	7.14	34.23	42.17	46.80	46.00	74.00	-28.00	Horizontal				
4	6995.172	8.54	36.49	41.70	47.05	50.38	74.00	-23.62	Horizontal				
5	7266.000	8.79	36.39	41.45	47.86	51.59	74.00	-22.41	Horizontal				
6	9688.000	10.78	37.54	37.63	42.36	53.05	74.00	-20.95	Horizontal				

Data	Data List												
NO.	Frequency [MHz]	Cable Loss [dB]	AF [dB/m]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Over Limit [dB]	Polarity				
1	1677.621	3.41	26.58	40.05	45.31	35.25	74.00	-38.75	Vertical				
2	4495.125	6.76	33.60	41.87	48.13	46.62	74.00	-27.38	Vertical				
3	4844.000	7.14	34.23	42.17	46.07	45.27	74.00	-28.73	Vertical				
4	6954.852	8.52	36.38	41.73	47.11	50.28	74.00	-23.72	Vertical				
5	7266.000	8.79	36.39	41.45	47.19	50.92	74.00	-23.08	Vertical				
6	9688.000	10.78	37.54	37.63	43.11	53.80	74.00	-20.20	Vertical				

Remark:

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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 37 of 38

Restricted bands around fundamental frequency

802.11n40_Channel 03

For new report:

Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2389.7599	64.83	27.68	-24.42	68.09	74.00	5.91	232	98	Horizontal			
2	2484.76	52.93	27.87	-23.95	56.85	74.00	17.15	232	98	Horizontal			
3	2389.3264	46.60	27.68	-24.42	49.86	54.00	4.14	232	98	Horizontal			
4	2484.76	38.33	27.87	-23.95	42.25	54.00	11.75	232	98	Horizontal			

Data	Data List												
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity			
1	2389.4565	67.86	27.68	-24.42	71.12	74.00	2.88	385	66	Vertical			
2	2484.58	49.50	27.87	-23.95	53.42	74.00	20.58	385	66	Vertical			
3	2389.9767	49.39	27.68	-24.42	52.65	54.00	1.35	385	66	Vertical			
4	2484.28	36.38	27.87	-23.95	40.30	54.00	13.70	385	66	Vertical			

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Level = Reading($dB\mu V$) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit(dBµV/m) – Level(dBµV/m)



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 Report No.:
 SEWM2211000238RG01

 Rev.:
 01

 Page:
 38 of 38

For o	For original report:												
Data	Data List												
NO.	Frequency [MHz]	Cable Loss [dB]	AF [dB/m]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Over Limit [dB]	Polarity				
1	2387.723	4.34	28.87	40.42	69.56	62.35	74.00	-11.65	Horizontal				
2	2390.000	4.34	28.88	40.42	68.64	61.44	74.00	-12.56	Horizontal				
3	2422.000	4.40	28.94	40.44	107.15	100.05	74.00	26.05	Horizontal				
4	2389.226	4.34	28.88	40.42	57.30	50.10	54.00	-3.90	Horizontal				
5	2390.000	4.34	28.88	40.42	57.22	50.02	54.00	-3.98	Horizontal				
6	2422.000	4.40	28.94	40.44	97.76	90.66	54.00	36.66	Horizontal				

Data	Data List												
NO.	Frequency [MHz]	Cable Loss [dB]	AF [dB/m]	Factor [dB]	Reading [dBµV]	Level [dBµV/m]	Limit [dBµV/m]	Over Limit [dB]	Polarity				
1	2388.925	4.34	28.88	40.42	72.89	65.69	74.00	-8.31	Vertical				
2	2390.000	4.34	28.88	40.42	71.54	64.34	74.00	-9.66	Vertical				
3	2422.000	4.40	28.94	40.44	110.10	103.00	74.00	29.00	Vertical				
4	2389.526	4.34	28.88	40.42	60.13	60.13	52.93	54.00	Vertical				
5	2390.000	4.34	28.88	40.42	60.38	60.38	53.18	54.00	Vertical				
6	2422.000	4.40	28.94	40.44	100.46	100.46	93.36	54.00	Vertical				

Remark:

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---End of Report---



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