Prüfbericht-Nr.: *Test report no.:*	CN216UQE(P15C-RFID) 001	**Auftrags-Nr.:** *Order no.:*	238519089	Seite 1 von 35 *Page 1 of 35*
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2021-08-19	
Auftraggeber: *Client:*	Nedap N.V. Parallelweg 2, 7141, DC Groenlo Netherlands			
Prüfgegenstand: *Test item:*	SENSIT NVS2002 US			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	SENSIT NVS2002 US			
Auftrags-Inhalt: *Order content:*	FCC Part 15C Test report			
Prüfgrundlage: *Test specification:*	FCC 47CFR Part 15: Subpart C Section 15.247			
Wareneingangsdatum: *Date of sample receipt:*	2021-09-29			
Prüfmuster-Nr.: *Test sample no:*	A003137907-001 A003137907-004			
Prüfzeitraum: *Testing period:*	2021-10-06 - 2021-10-27			
Ort der Prüfung: *Place of testing:*	EMC/RF Taipei Testing Site			
Prüflaboratorium: *Testing laboratory:*	Taipei Testing Laboratories			
Prüfergebnis*: *Test result*:*	Pass			

überprüft von: *compiled by:*	Ryan Chen	**genehmigt von:** authorized by:	Brenda Chen
Datum: *Date:* 2021-11-01		**Ausstellungsdatum:** *Issue date:* 2021-11-01	
Stellung / *Position:*	Senior Project Manager	**Stellung** / *Position:*	Senior Project Manager

Sonstiges / *Other:*

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

* 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 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 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.
V05

TEST SUMMARY

Report Section	FCC Clause	Test Item	Result
5.1.1	15.247(b) & 15.203	Antenna Requirement	Pass
5.1.2	15.247(b)(2)	Peak Output Power	Pass
5.1.3	15.247(a)(1)	20 dB Bandwidth	Pass
5.1.3	2.1049	99% Occupied Bandwidth	Pass
5.1.4	15.247(d)	Conducted Spurious Emission and Band Edges	Pass
5.1.5	15.247(d) & 15.205 & 15.209	Radiated Spurious Emissions and Band Edges	Pass
5.1.6	15.247(a)(1)	Hopping Channel Separation	Pass
5.1.7	15.247(a)(1) (i)	Number of Hopping Channels Used	Pass
5.1.8	15.247(a)(1)(i)	Dwell Time on Each Channel	Pass
5.2.1	15.207	Mains Conducted Emission	Pass

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

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APPENDIX A - TEST RESULT OF RADIATED EMISSIONS & MAINS CONDUCTED EMISSION

APPENDIX SP - PHOTOGRAPHS OF TEST SETUP

APPENDIX EP - PHOTOGRAPHS OF EUT

HISTORY OF THIS TEST REPORT

Report No.	Description	Date Issued
CN216UQE(P15C-RFID) 001	Original Release	2021-11-01

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 Result of Radiated Emissions & Mains Conducted Emission
Appendix SP - Photographs of Test Setup
Appendix EP - Photographs of EUT

Applied Standard and Test Levels

Radio
FCC 47CFR Part 15: Subpart C Section 15.247 FCC 47CFR Part 2: Subpart J Section 2.1049 ANSI C63.10:2013 KDB 558074 D01 15.247 Meas Guidance v05r02

1.2 Decision Rule of Conformity

The decision rule of conformity of this test report is following the requirements of the requested standard in the quotation, and agreed among testing laboratory and manufacturer (applicant) to exclude the consideration of Measurement Uncertainty, unless it is required by the specific standard.

2. Test Sites

2.1 Test Laboratory

Taipei Testing Laboratories

11F. No.758, Sec. 4, Bade Rd., Songshan Dist.
Taipei City 105
Taiwan (R.O.C.)

2.2 Test Facility

Taipei Testing Laboratories

No.458-18, Sec. 2, Fenliao Rd., Linkou Dist.,
New Taipei City 244
Taiwan (R.O.C.)
FCC Registration No.: 226631
ISED Registration No.: 25563

2.3 Traceability

All measurement equipment calibrations are traceable to NML(Taiwan)/NIST(USA) or where calibration is performed outside Taiwan, to equivalent nationally recognized standards organizations.

2.4 Calibration

Equipment requiring calibration is calibrated periodically in a suitably accredited Calibration Lab. Additionally all equipment is verified for proper performance on a regular basics using in house standards or comparisons.

2.5 Measurement Uncertainty

All measurement uncertainty values are shown with a coverage factor of k=2 to indicate a 95% level of confidence.

Emission Measurement Uncertainty

Parameter	Uncertainty
Radiated Emission (9 kHz ~ 30 MHz)	± 1.15 dB
Radiated Emission (30 MHz ~ 200 MHz)	± 1.30 dB
Radiated Emission (200 MHz ~ 1 GHz)	± 1.30 dB
Radiated Emission (1 GHz ~ 18 GHz)	± 1.54 dB
Radiated Emission (18 GHz ~ 40 GHz)	± 2.52 dB
Mains Conducted Emission	± 1.65 dB

3. General Product Information

3.1 Product Function and Intended Use

The EUT is a SENSIT NVS2002 US. It contains a wireless enabling the user to communicate data through a Wireless interface.
For details refer to the User Guide, Data Sheet and Circuit Diagram.

3.2 System Details and Ratings

Basic Information of EUT

Item	EUT information
Kind of Equipment/Test Item	SENSIT NVS2002 US
Type Identification	SENSIT NVS2002 US
FCC ID	CGDNVS2002

Technical Specification of EUT

Item	EUT information
Operating Frequency	902.4 – 927.6 MHz
Channel Spacing	400 kHz
Channel Number	63
Operation Voltage	14Vdc
Modulation	GFSK
Maximum Output Power (mW)	5.37
Antenna Information	Refer to 5.1.1
Accessory Device	Refer to 4.3

3.3 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram.

3.4 Submitted Documents

- Circuit Diagram
- Instruction Manual
- Rating Label
- Technical Description

4. Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

The test modes were adapted accordingly in reference to the instructions for use.
During testing, Channel and Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output expected by the customer and is going to be fixed on the firmware of the final end product.

Table for Parameters of Test Software Setting

Mode	Channel Frequency (MHz)		
	902.4	915.2	927.2
GFSK	Default	Default	Default

4.2 Test Operation and Test Software

Setup for testing: Test samples are provided with a LAN interface which makes it possible to control them through a test software installed on a notebook computer.
This software was running on the laptop computer connected to the EUT. It was used to enable the operation modes listed as below.

Test Software	iTerminal

The samples were used as follows:
A003137907-001 for radiated test
A003137907-004 for conducted test
Full test was applied on all test modes, but only worst case was shown.

EUT Configure Mode	Applicable To				Description
	Antenna Port Conducted Measurement	Radiated Spurious Emissions above 1 GHz	Radiated Spurious Emissions below 1 GHz	Mains Conducted Emission	
-	√	√	√	√	-

Note:
1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when position on Z-plane.
2. "-" means no effect.
3. the 4G mobile communication is on.

Antenna Port Conducted Measurement

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type
-	902.4 to 927.2	902.4, 915.2, 927.2	GFSK

Radiated Spurious Emissions (Above 1 GHz)

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type
-	902.4 to 927.2	902.4, 915.2, 927.2	GFSK

Radiated Spurious Emissions (Below 1 GHz)

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type
-	902.4 to 927.2	902.4, 915.2, 927.2	GFSK

Mains Conducted Emission Test

☒ Pre-Scan full test was applied on all test modes, but only worst case was shown.
☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Available Frequency (MHz)	Tested Frequency (MHz)	Modulation Type
-	902.4 to 927.2	902.4, 915.2, 927.2	GFSK

Test Condition

Test Item	Ambient Temperature	Relative Humidity	Tested by
Conducted Measurement	23.2-24 °C	54-61 %	Stanislas Charles
Radiated Spurious Emissions above 1 GHz	23.6-24.1 °C	49-52 %	Hunter Wang
Radiated Spurious Emissions below 1 GHz	23.6-24.1 °C	49-52 %	Hunter Wang
Mains Conducted Emission	23.6-24.1 °C	49-52 %	Hunter Wang

4.3 Special Accessories and Auxiliary Equipment

The product has been tested together with the following additional accessories:

Accessory of EUT

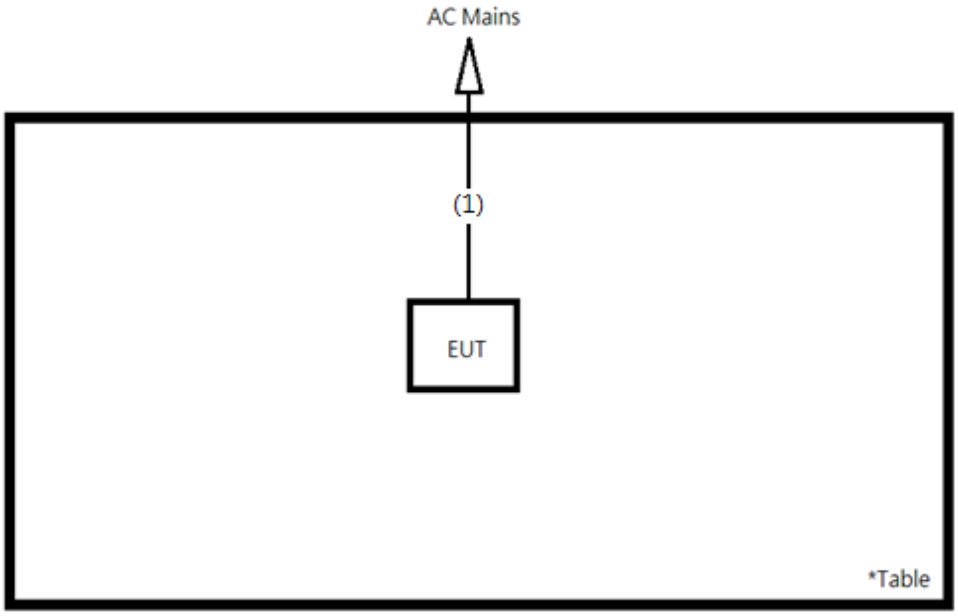
None.

Support Unit

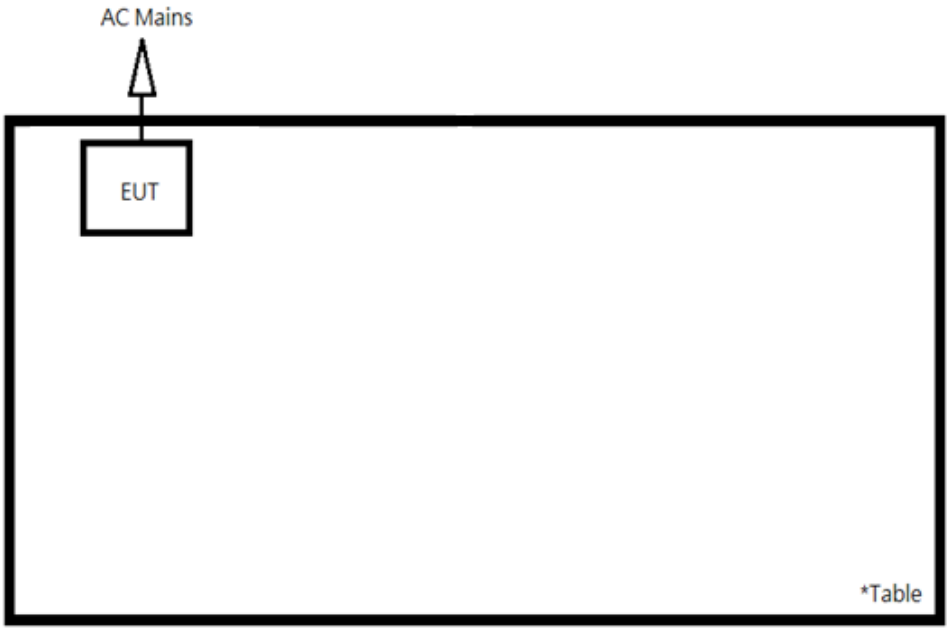
No.	Description	Brand	Model	S/N	Remark
Radiated and Mains Conducted Tests					
1	Power Cable	TUV	TUV-006	-	180cm non-shielded cable w/o core
Conducted Test					
-	Power Supply	PeakTech	2250	188	-

4.4 Test Setup Diagram

<Radiated Spurious Emissions mode>



<Mains Conducted Emission mode>



5. Test Results

5.1 Transmitter Requirement & Test Suites

5.1.1 Antenna Requirement

Requirement Use of approved antennas only.

According to the manufacturer declaration, the EUT has an antenna with a directional gain of 0 dBi. The antenna is a pointing antenna with no possibility of replacement with a non-approved antenna by the end-user. Therefore, the EUT is considered to comply with this provision.

5.1.2 Peak Output Power

Limit

1 watt for systems employing at least 50 hopping channels; and 0.25 watts for systems employing less than 50 hopping channels.

Kind of Test Site Shielded room

Test Setup

Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Power Meter	Anritsu	ML2495A	1901008	2021/3/24	2022/3/23	2021/10/8	2021/10/8
Power Sensor	Anritsu	MA2411B	1725269	2021/3/24	2022/3/23	2021/10/8	2021/10/8

Test Procedures

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the power level.

Average power sensor was used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

Test Result

Peak Output Power

Channel	Channel Frequency	Peak Output Power		Limit
	(MHz)	(dBm)	(mW)	(mW)
Low Channel	902.4	7.30	5.370	1000
Middle Channel	915.2	7.00	5.012	1000
High Channel	927.2	6.26	4.227	1000

Average Power

Channel	Channel Frequency	Average Power	
	(MHz)	(dBm)	(mW)
Low Channel	902.4	7.20	5.248
Middle Channel	915.2	6.94	4.943
High Channel	927.2	6.18	4.150

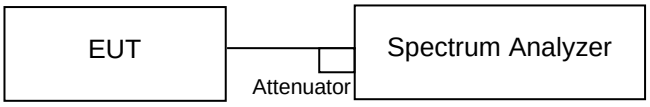
5.1.3 20 dB Bandwidth and 99% Occupied Bandwidth

Limit

The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV40	101512	2021/1/29	2022/1/28	2021/10/6	2021/10/8

Test Procedure

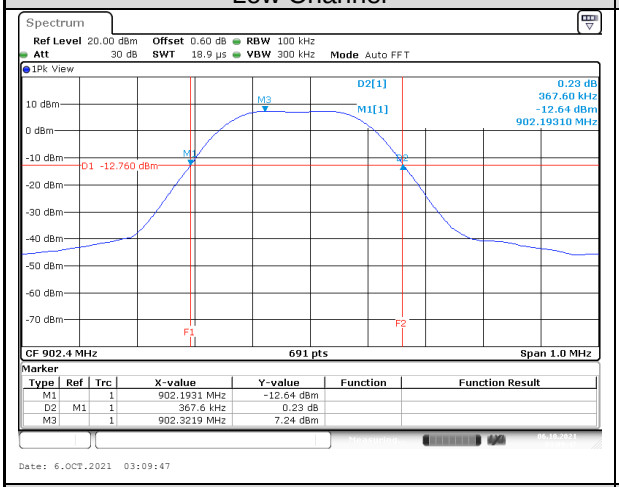
a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
c. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
d. Repeat above procedures until all frequencies measured were complete.
e. The transmitter output was connected to the spectrum analyzer through an attenuator.
The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to PEAK. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.

Test Results

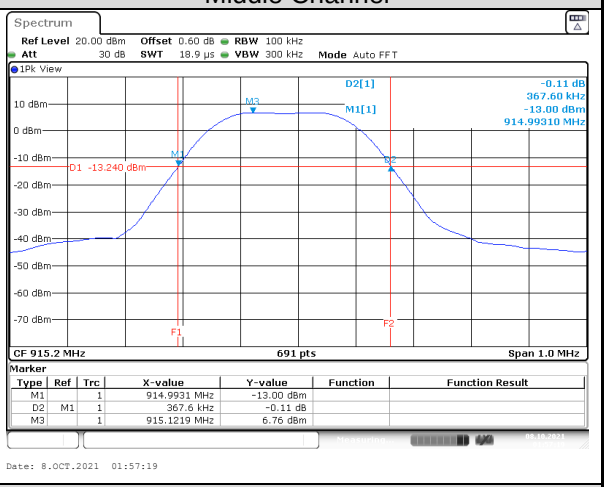
<20 dB Bandwidth>

Channel	Channel Frequency (MHz)	20 dB Bandwidth (kHz)	Result
Low Channel	902.4	367.60	Pass
Middle Channel	915.2	367.60	Pass
High Channel	927.2	377.70	Pass

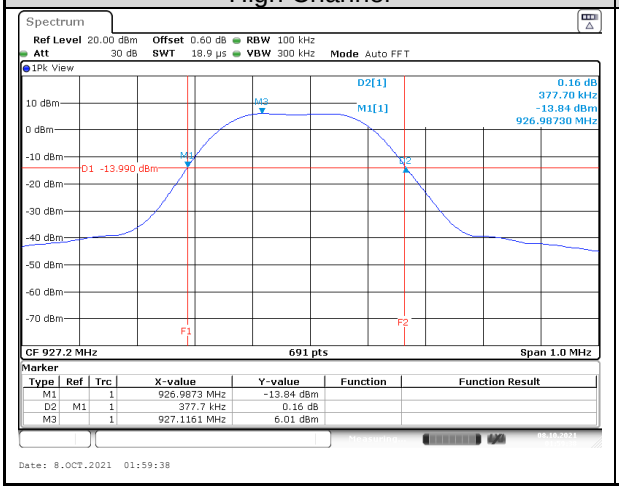
Low Channel



Middle Channel



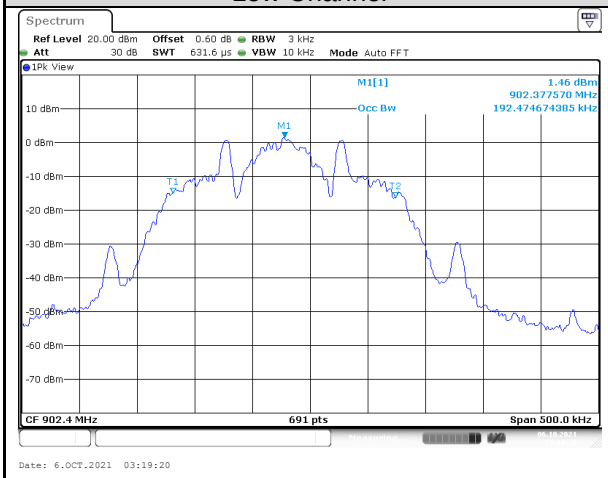
High Channel



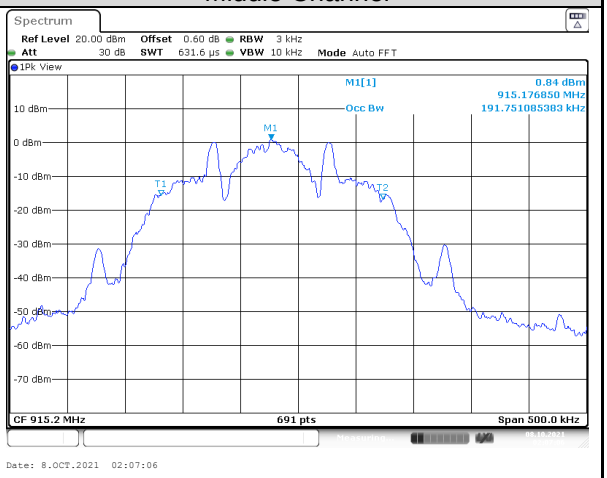
<99% Occupied Bandwidth>

Channel	Channel Frequency (MHz)	99% Occupied Bandwidth (kHz)
Low Channel	902.4	192.47
Middle Channel	915.2	191.75
High Channel	927.2	198.26

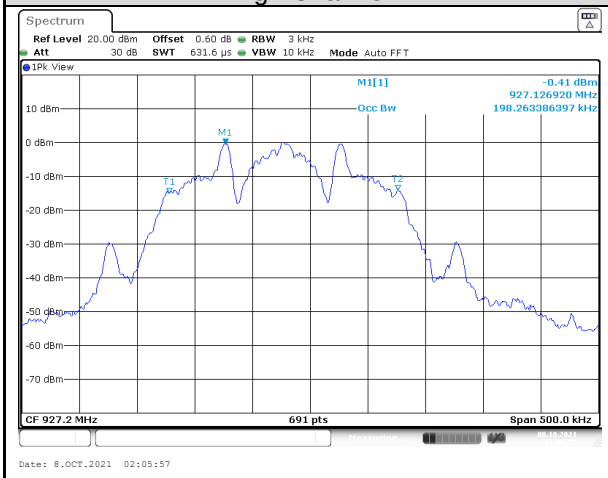
Low Channel



Middle Channel



High Channel



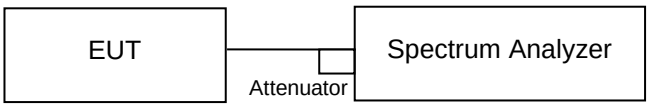
5.1.4 Conducted Spurious Emissions and Frequency Band Edges Measured in 100 kHz Bandwidth

Limit

20 dB (below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.)

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV40	101512	2021/1/29	2022/1/28	2021/10/6	2021/10/8

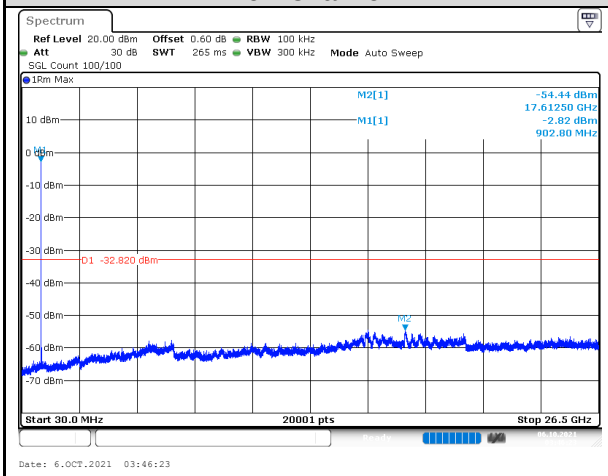
Test Procedure

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz and 300 kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

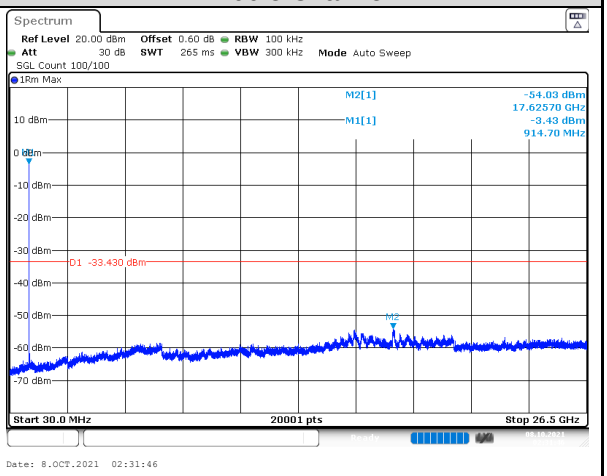
Test Results

Conducted Spurious Emissions

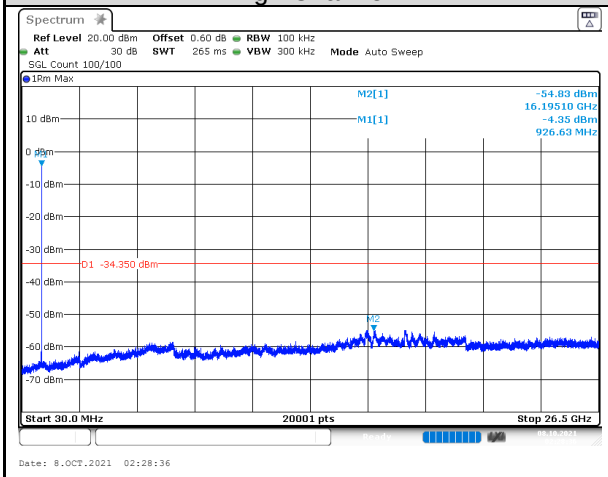
Low Channel



Middle Channel

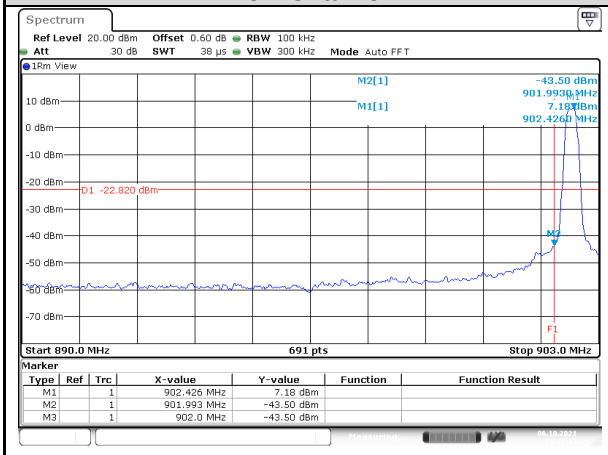


High Channel

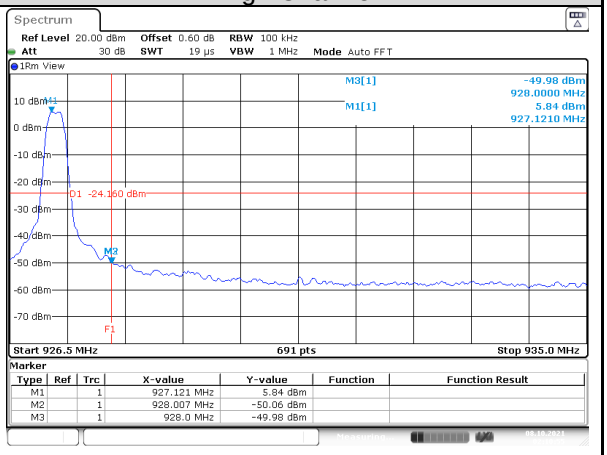


Frequency Band Edge

Low Channel



High Channel



5.1.5 Radiated Spurious Emissions and Band Edges

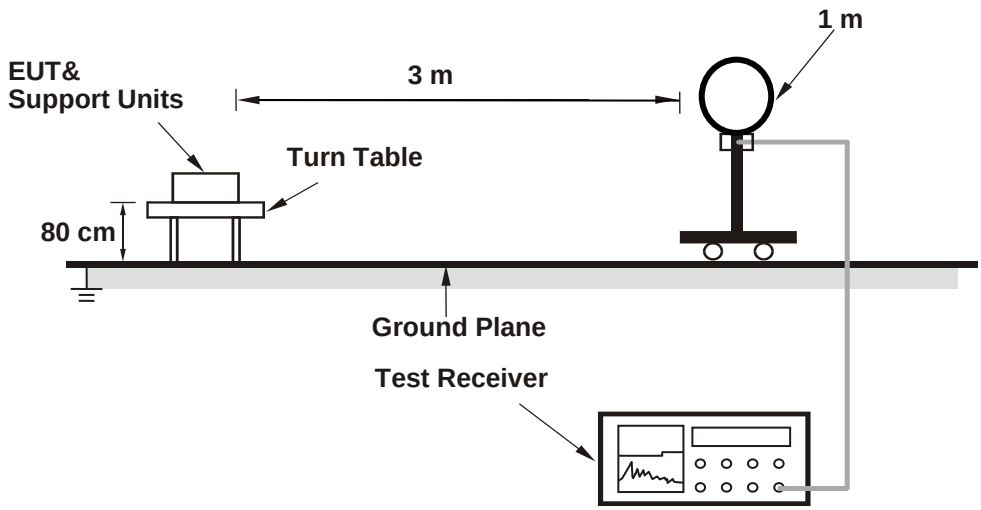
Limit

Radiated emissions which fall in the restricted bands, as defined in §15.205(a), must comply with the radiated emission limits specified in §15.209(a).
Emissions radiated outside the restricted and authorized frequency bands must either comply with the radiated emission limits specified for the restricted bands or in §15.247(d).

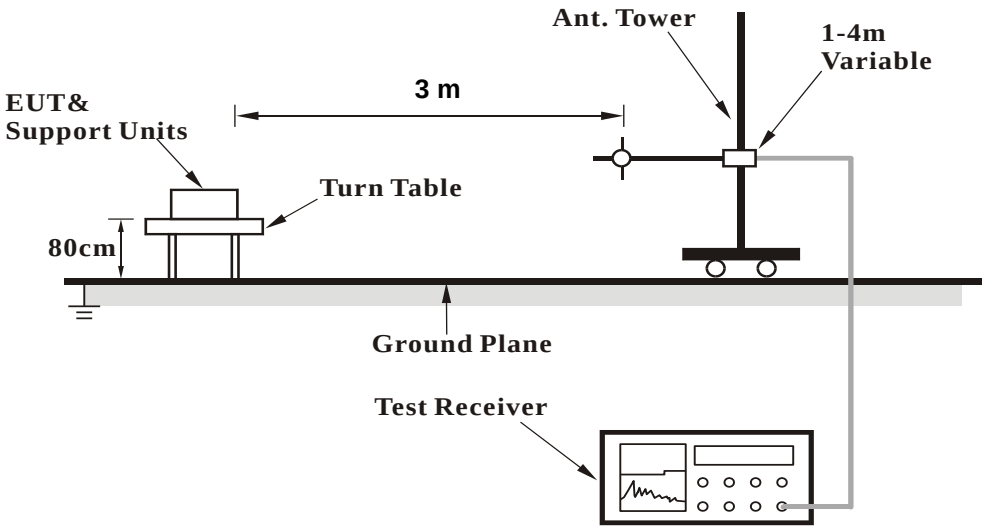
Kind of Test Site 3m Semi-Anechoic Chamber

Test Setup

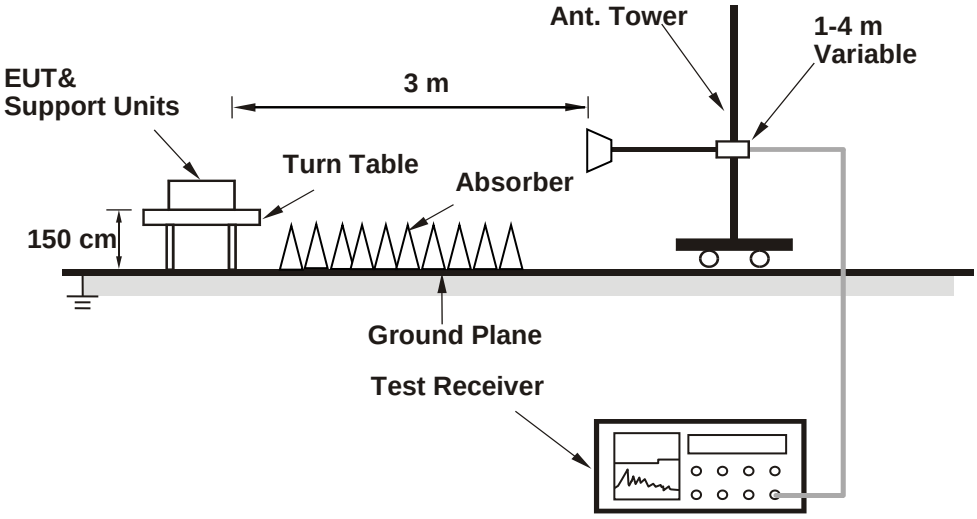
<Radiated Emissions below 30 MHz>



<Radiated Emissions 30 MHz to 1 GHz>



<Radiated Emissions above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

Test Instruments

Test Date: 2021/10/22

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
Signal Analyzer	R&S	FSV40	101508	2021/3/16	2022/3/15
Receiver	R&S	ESR7	102109	2021/3/16	2022/3/15
Bilog Antenna	SCHWARZBECK	VULB-9168	00951	2021/2/18	2022/2/17
Horn Antenna	ETS-Lindgren	3117	00218930	2020/12/1	2021/11/30
LF-AMP	Agilent	8447D	2944A10772	2021/2/18	2022/2/17
HF-AMP + AC source	EMCI	EMC051845SE	980633	2021/2/9	2022/2/8
HF-AMP + AC source	EMCI	EMC184045SE	980657	2021/2/1	2022/1/31
Horn Antenna	SCHWARZBECK	BBHA 9170	00887	2021/4/8	2022/4/7
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104EA	800056/4EA	2021/3/17	2022/3/16
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	804680/4	2021/3/17	2022/3/16
Microwave Cable	HUBER+SUHNER	SUCOFLEX 104	MY37202/4	2021/3/17	2022/3/16
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	800898/2EA	2021/4/16	2022/4/15
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	800901/2EA	2021/4/16	2022/4/15
Microwave Cable	HUBER+SUHNER	SUCOFLEX 102EA	801027/2EA	2021/4/16	2022/4/15
Loop Antenna	SCHWARZBECK	FNZB1519B	00215	2021/9/17	2022/9/16

Test Procedures

For Radiated Emissions below 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. Parallel (OPEN), perpendicular (CLOSE), and ground-parallel (GROUND) orientations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

For Radiated Emissions above 30 MHz

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The height of antenna 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.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned 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.
e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

Note:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98 %) or 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.
5. The Radiated Emissions testing was performed in the X(E1), Y(H) and Z(E2) axis orientation. The worst-case Axis orientation is recorded in this test report.

Test Results

Factor (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB)
Level (dBuV/m) = Reading (dBuV) + Factor (dB/m)

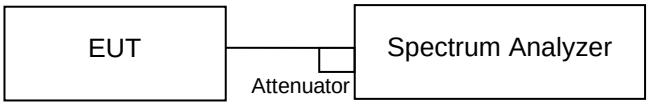
Please refer to Appendix A.

5.1.6 Hopping Channel Separation

Limit ≥ 25 kHz or 20 dB bandwidth, whichever is greater

Kind of Test Site Shielded room

Test Setup



Test Instruments

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV40	101512	2021/1/29	2022/1/28	2021/10/8	2021/10/8

Test Procedure

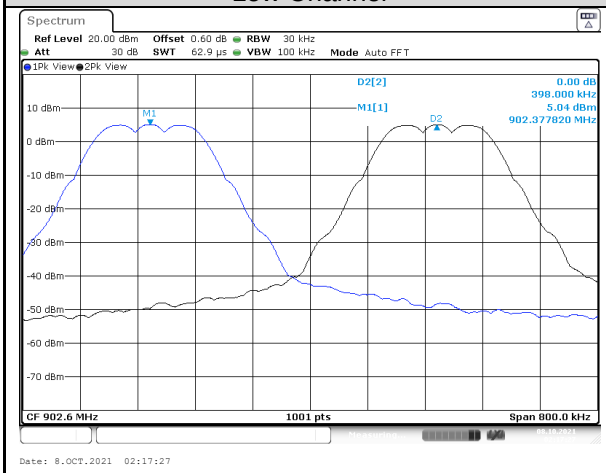
Measurement Procedure REF

a. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range.
c. By using the MaxHold function record the separation of two adjacent channels.
d. Measure the frequency difference of these two adjacent channels by SA MARK function. And then plot the result on SA screen.
e. Repeat above procedures until all frequencies measured were complete.

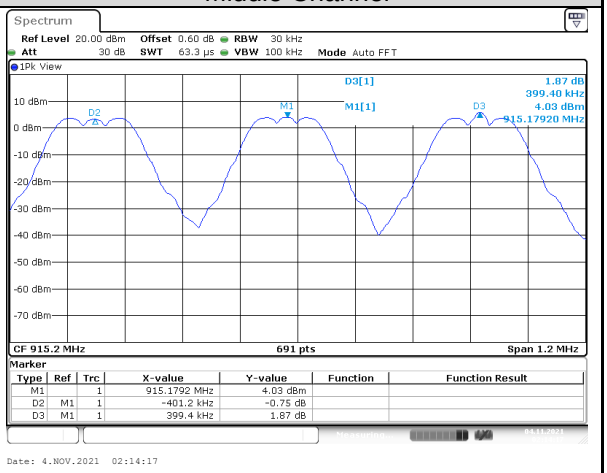
Test Results

Channel	Channel Frequency (MHz)	Adjacent Channel Separation (MHz)	20 dB Bandwidth (MHz)	Minimum Limit (MHz)	Result
Low	902.4	0.40	0.37	0.245	Pass
Middle	915.2	0.40	0.37	0.245	Pass
High	927.2	0.41	0.38	0.252	Pass

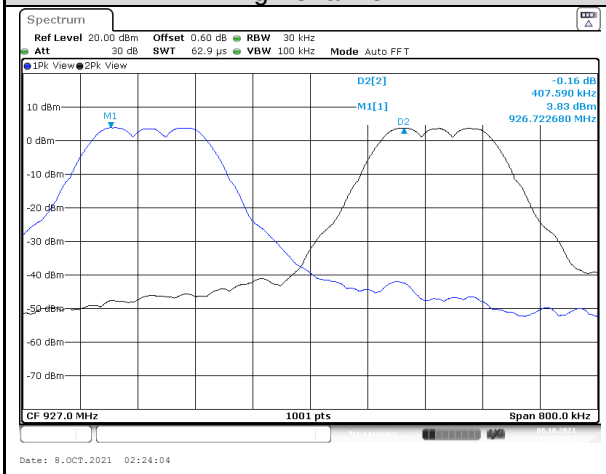
Low Channel



Middle Channel



High Channel



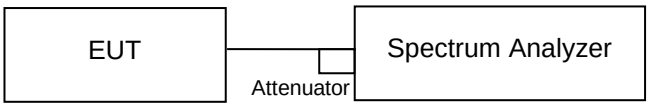
5.1.7 Number of Hopping Channels

Limit

If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies.

Kind of Test Site Shielded room

Test Setup



Test Instruments

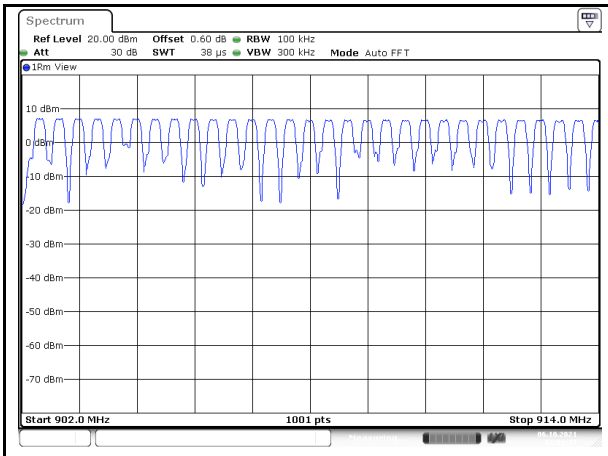
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV40	101512	2021/1/29	2022/1/28	2021/10/6	2021/10/6

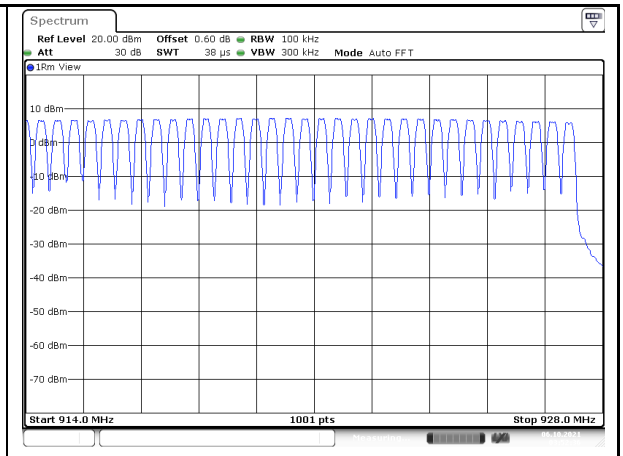
Test Procedure

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

Test Results

Frequency Range	Measured Quantity of Hopping Channel	Result
902.4 to 927.6 MHz	63	Pass





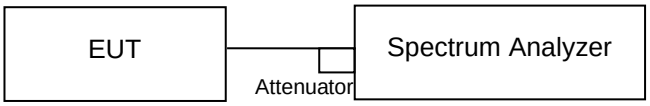
5.1.8 Dwell Time

Limit

If the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the average time of ccupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.

Kind of Test Site Shielded room

Test Setup



Test Instruments

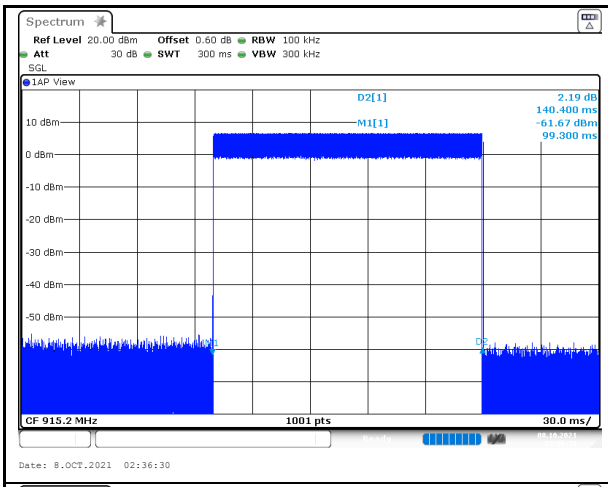
Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date	Test Date	
						From	Until
Spectrum Analyzer	R&S	FSV40	101512	2021/1/29	2022/1/28	2021/10/8	2021/10/14

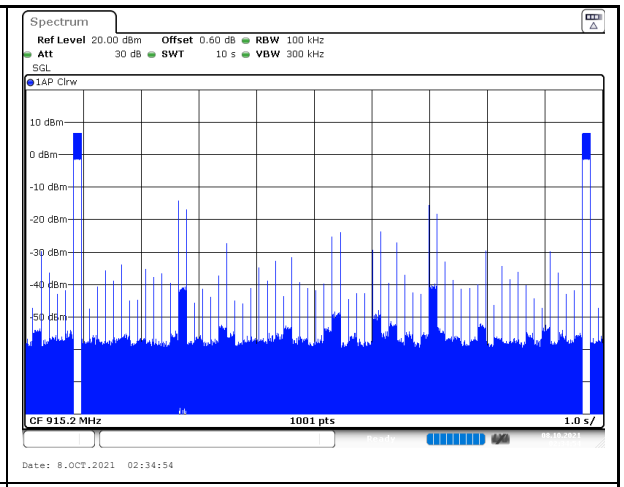
Test Procedures

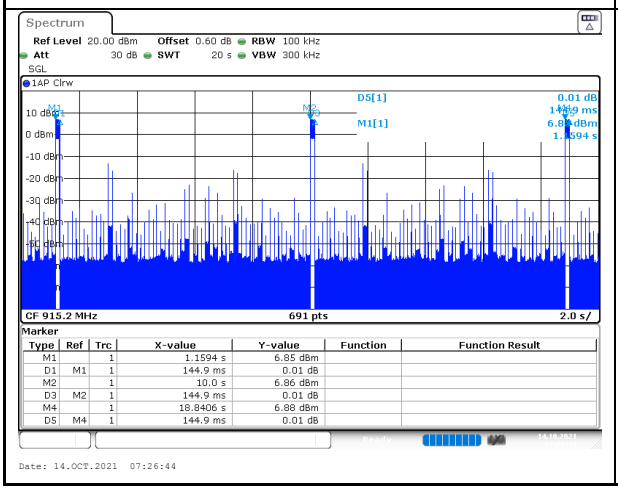
a. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
b. Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and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

Test Results

Number of transfer in 10s	Package transfer time (msec)	Dwell time (ms)	Limit (ms)	Result
2	140.40	280.80	400	Pass







5.2 Mains Emission

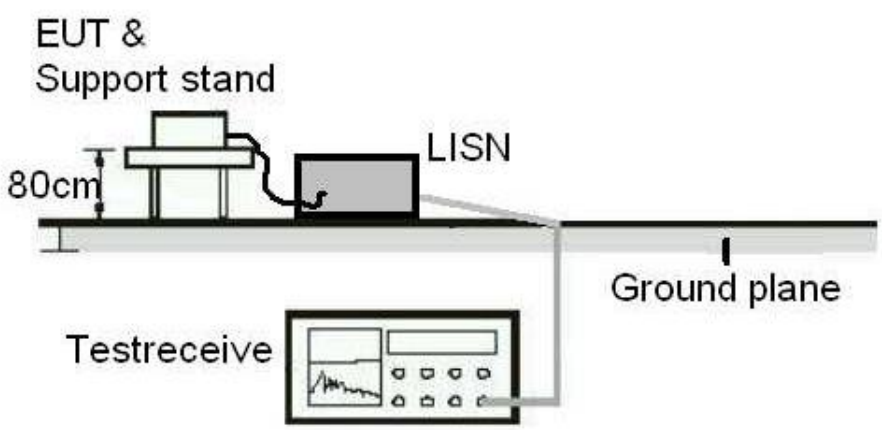
5.2.1 Mains Conducted Emission

Limit

Mains Conducted emission as defined in §15.207 must comply with the mains conducted emission limits.

Kind of Test Site Shielded room

Test Setup



Test Instruments

Test Date: 2021/10/27

Kind of Equipment	Manufacturer	Type	S/N	Calibration Date	Calibration Due Date
TWO-LINE V-NETWORK	SCHWARZBECK	NSLK 8127	8127-00976	2020/11/3	2021/11/2
EMI Test Receiver	R&S	ESCI	1816063	2020/11/17	2021/11/16
RF Cable	N/A	N/A	EMC-003	2020/11/15	2021/11/14

Test Procedures

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/50 uH of coupling impedance for the measuring instrument.
b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit – 20 dB) was not recorded.

Note: The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz – 30 MHz.

Test Results

Please refer to Appendix A.

Appendix A: Test Results of Radiated Spurious Emissions & Mains Conducted Emission Test

Band Edges

902.4 MHz

(Horizontal) Peak

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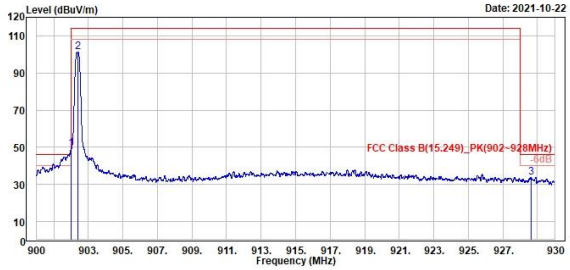

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	902.00	49.13	45.62	3.51	81.17	-32.04	100	105	QP	Horizontal	
2	902.40	101.17	97.65	3.52	114.00	-12.83	100	105	Peak	Horizontal	
3	928.63	33.93	30.03	3.90	46.00	-12.07	100	105	QP	Horizontal	

(Vertical) Peak

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No. 458-18,Sec 2,Fenliao.,Linkou Dist.,New Taipei City 244, Taiwan(R.O.C.)
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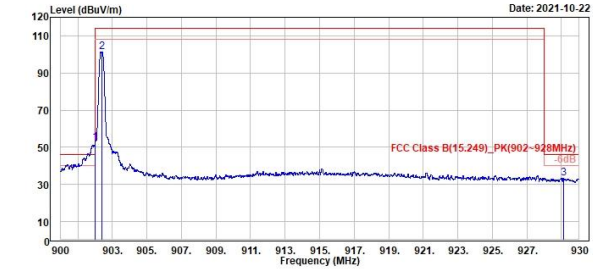

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	902.00	52.70	49.19	3.51	81.30	-28.60	112	282	QP	Vertical	
2	902.40	101.30	97.78	3.52	114.00	-12.70	112	282	Peak	Vertical	
3	929.12	33.48	29.58	3.90	46.00	-12.52	112	282	QP	Vertical	

902.4 MHz

(Horizontal) Average

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	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	902.40	96.17	3.52	99.69	114.00	-14.31	100	105	Average	Horizontal	

(Vertical) Average

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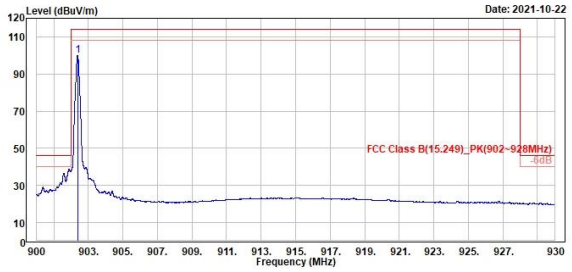
No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
Tel:+886-2172-1000 Fax:+886-2172-1322



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	902.40	96.42	3.52	99.94	114.00	-14.06	112	282	Average	Vertical	

915 MHz

(Horizontal) Peak

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No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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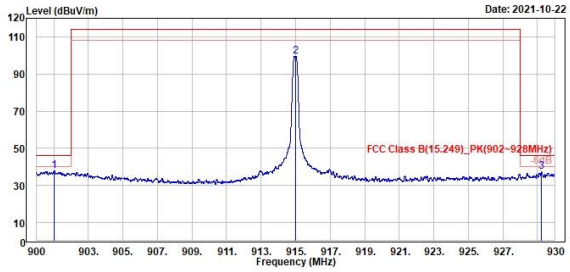

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	901.04	34.50	3.48	37.98	46.00	-8.02	100	104	QP	Horizontal	
2	915.00	95.81	3.74	99.55	114.00	-14.45	100	104	Peak	Horizontal	
3	929.23	33.38	3.91	37.29	46.00	-8.71	100	104	QP	Horizontal	

(Vertical) Peak

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No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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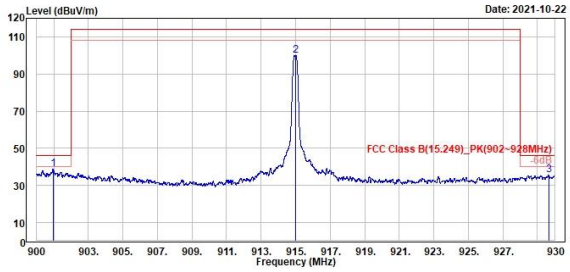

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	900.96	35.26	3.48	38.74	46.00	-7.26	115	279	QP	Vertical	
2	915.00	96.03	3.74	99.77	114.00	-14.23	115	279	Peak	Vertical	
3	929.65	31.63	3.92	35.55	46.00	-10.45	115	279	QP	Vertical	

915 MHz

(Horizontal) Average

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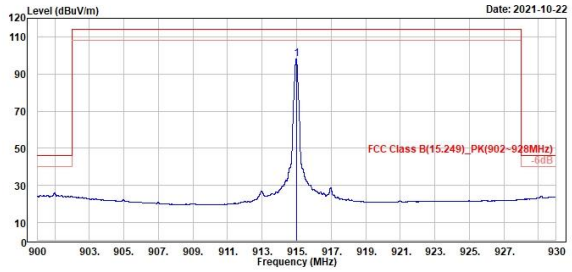

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	915.00	94.22	3.74	97.96	114.00	-16.04	100	104	Average	Horizontal	

(Vertical) Average

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No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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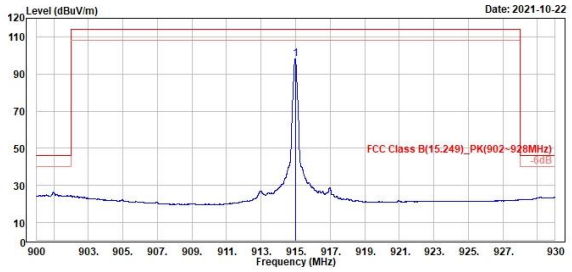

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	915.00	94.31	3.74	98.05	114.00	-15.95	115	279	Average	Vertical	

927.6 MHz

(Horizontal) Peak

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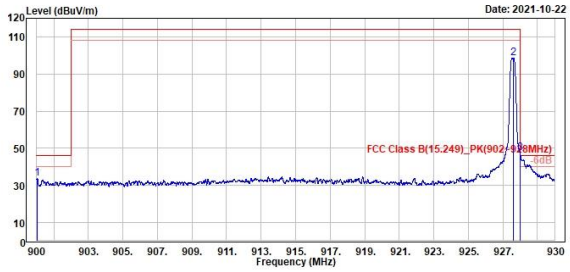

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	900.05	33.57	30.11	3.46	46.00	-12.43	100	107	QP	Horizontal	
2	927.60	98.46	94.56	3.90	114.00	-15.54	100	107	Peak	Horizontal	
3	928.00	47.28	43.38	3.90	78.46	-31.18	100	107	QP	Horizontal	

(Vertical) Peak

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No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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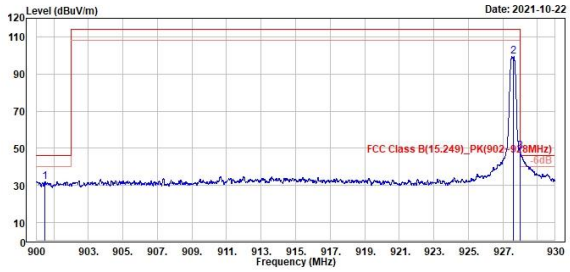

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	900.49	32.13	28.66	3.47	46.00	-13.87	111	276	QP	Vertical	
2	927.60	99.29	95.39	3.90	114.00	-14.71	111	276	Peak	Vertical	
3	928.00	48.37	44.47	3.90	79.29	-30.92	111	276	QP	Vertical	

927.6 MHz

(Horizontal) Average

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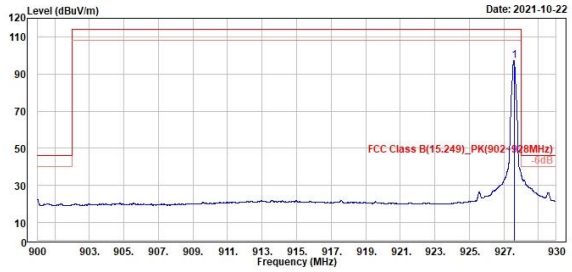

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	927.60	93.50	3.90	97.40	114.00	-16.60	100	107	Average	Horizontal	

(Vertical) Average

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No. 458-18, Sec 2, Fenliao., Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)
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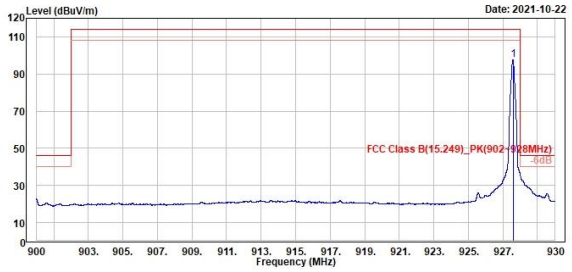

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	927.60	93.85	3.90	97.75	114.00	-16.25	111	276	Peak	Vertical	

Spurious Emissions, Tx Mode, 9kHz ~ 10GHz

902.4 MHz

(Open/Horizontal) 9kHz~10GHz

TÜVRheinland

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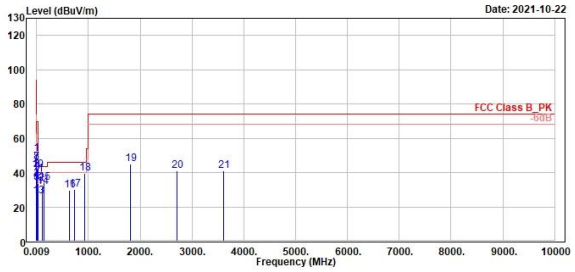

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	0.01	31.12	19.97	51.09	127.58	-76.49	100	46	QP	Open	
2	0.06	21.22	20.29	41.51	111.83	-70.32	100	287	QP	Open	
3	0.07	15.91	20.27	36.18	110.36	-74.18	100	248	QP	Open	
4	0.10	15.18	20.25	35.43	107.85	-72.42	100	116	QP	Open	
5	0.12	14.01	20.22	34.23	105.92	-71.69	100	262	QP	Open	
6	0.15	13.74	20.19	33.93	104.34	-70.41	100	283	QP	Open	
7	0.76	25.95	20.12	46.07	70.00	-23.93	100	335	QP	Open	
8	2.90	25.98	20.17	46.15	69.50	-23.35	100	191	QP	Open	
9	5.67	19.93	20.23	40.16	69.50	-29.34	100	28	QP	Open	
10	7.74	21.35	20.31	41.66	69.50	-27.84	100	346	QP	Open	
11	17.15	18.73	20.47	39.20	69.50	-30.30	100	121	QP	Open	
12	24.23	12.89	20.53	33.42	69.50	-36.08	100	196	QP	Open	
13	30.00	34.93	-8.61	26.32	40.00	-13.68	200	235	QP	Horizontal	
14	108.76	42.79	-10.99	31.80	43.50	-11.70	300	258	QP	Horizontal	
15	148.15	41.74	-7.50	34.24	43.50	-9.26	200	106	QP	Horizontal	
16	631.11	30.46	-0.83	29.63	46.00	-16.37	300	102	QP	Horizontal	
17	735.58	29.29	0.93	30.22	46.00	-15.78	300	359	QP	Horizontal	
18	930.65	35.65	3.95	39.60	46.00	-6.40	100	111	QP	Horizontal	
19	1804.80	61.76	-16.71	45.05	74.00	-28.95	100	90	Peak	Horizontal	
20	2707.20	54.61	-13.50	41.11	74.00	-32.89	200	144	Peak	Horizontal	
21	3609.60	52.76	-11.74	41.02	74.00	-32.98	166	360	Peak	Horizontal	

(Close/Vertical) 9kHz~10GHz

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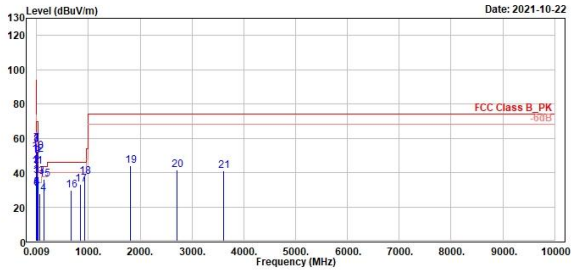

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1	0.01	37.05	19.97	57.02	127.58	-70.56	100	89	QP	Close	
2	0.03	23.77	20.31	44.08	118.05	-73.97	100	300	QP	Close	
3	0.06	17.97	20.29	38.26	111.83	-73.57	100	145	QP	Close	
4	0.10	11.07	20.24	31.31	107.77	-76.46	100	15	QP	Close	
5	0.12	10.86	20.22	31.08	105.90	-74.82	100	198	QP	Close	
6	0.15	10.68	20.19	30.87	104.24	-73.37	100	202	QP	Close	
7	0.77	36.78	20.12	56.90	69.83	-12.93	100	333	QP	Close	
8	2.72	36.19	20.16	56.35	69.50	-13.15	100	333	QP	Close	
9	5.61	29.32	20.23	49.55	69.50	-19.95	100	283	QP	Close	
10	7.73	32.09	20.31	52.40	69.50	-17.10	100	152	QP	Close	
11	10.28	23.33	20.36	43.69	69.50	-25.81	100	238	QP	Close	
12	17.46	30.14	20.47	50.61	69.50	-18.89	100	8	QP	Close	
13 !	30.00	46.03	-8.61	37.42	40.00	-2.58	100	156	QP	Vertical	
14	68.22	37.55	-9.77	27.78	40.00	-12.22	100	228	QP	Vertical	
15	150.77	43.42	-7.39	36.03	43.50	-7.47	100	167	QP	Vertical	
16	662.25	29.79	-0.31	29.48	46.00	-16.52	200	17	QP	Vertical	
17	845.96	30.49	2.55	33.04	46.00	-12.96	100	341	QP	Vertical	
18	930.55	33.67	3.94	37.61	46.00	-8.39	100	276	QP	Vertical	
19	1804.80	60.61	-16.71	43.90	74.00	-30.10	100	69	Peak	Vertical	
20	2707.20	54.84	-13.50	41.34	74.00	-32.66	100	134	Peak	Vertical	
21	3609.60	52.69	-11.74	40.95	74.00	-33.05	200	257	Peak	Vertical	

915 MHz

(Open/Horizontal) 9kHz~10GHz

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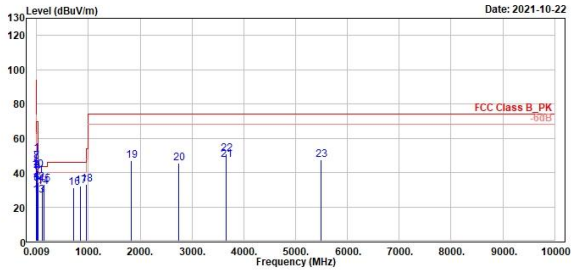

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01	50.90	30.93	19.97	127.63	-76.73	100	360	QP	Open	
2	0.02	42.52	22.26	20.26	119.90	-77.38	100	288	QP	Open	
3	0.06	41.21	20.92	20.29	111.83	-70.62	100	133	QP	Open	
4	0.10	34.59	14.34	20.25	107.86	-73.27	100	104	QP	Open	
5	0.12	33.83	13.61	20.22	105.91	-72.08	100	258	QP	Open	
6	0.15	33.81	13.62	20.19	104.33	-70.52	100	258	QP	Open	
7	0.78	46.41	26.30	20.11	69.76	-23.35	100	317	QP	Open	
8	2.85	46.35	26.19	20.16	69.50	-23.15	100	216	QP	Open	
9	5.52	40.07	19.84	20.23	69.50	-29.43	100	42	QP	Open	
10	7.72	41.53	21.22	20.31	69.50	-27.97	100	286	QP	Open	
11	16.96	38.06	17.59	20.47	69.50	-31.44	100	155	QP	Open	
12	26.20	34.05	13.50	20.55	69.50	-35.45	100	126	QP	Open	
13	30.78	26.51	35.33	-8.82	40.00	-13.49	300	262	QP	Horizontal	
14	109.25	31.44	42.28	-10.84	43.50	-12.06	300	282	QP	Horizontal	
15	146.59	33.20	40.64	-7.44	43.50	-10.30	200	93	QP	Horizontal	
16	709.68	30.93	30.54	0.39	46.00	-15.07	281	0	QP	Horizontal	
17	845.29	32.24	29.69	2.55	46.00	-13.76	300	111	QP	Horizontal	
18	960.52	32.88	28.41	4.47	54.00	-21.12	300	214	QP	Horizontal	
19	1830.00	46.90	63.33	-16.43	74.00	-27.10	100	88	Peak	Horizontal	
20	2745.00	45.48	59.02	-13.54	74.00	-28.52	100	33	Peak	Horizontal	
21	3660.00	47.65	59.20	-11.55	54.00	-6.35	293	143	Average	Horizontal	
22	3660.00	51.09	62.64	-11.55	74.00	-22.91	293	143	Peak	Horizontal	
23	5490.00	47.22	55.60	-8.38	74.00	-26.78	200	101	Peak	Horizontal	

(Close/Vertical) 9kHz~10GHz

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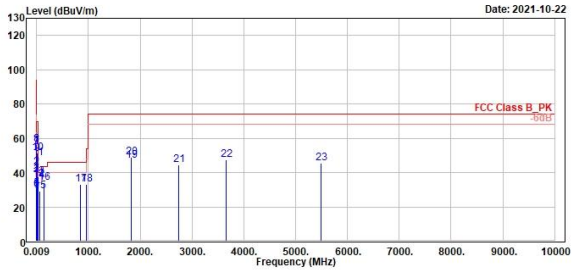

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
	MHz	dBuV/m	dBuV	dB/m	dBuV/m	dB	cm	deg			
1	0.01	55.41	35.44	19.97	127.56	-72.15	100	30	QP	Close	
2	0.03	43.12	22.81	20.31	118.04	-74.92	100	204	QP	Close	
3	0.06	38.69	18.40	20.29	111.83	-73.14	100	4	QP	Close	
4	0.10	31.12	10.87	20.25	107.83	-76.71	100	8	QP	Close	
5	0.12	30.83	10.61	20.22	105.92	-75.09	100	25	QP	Close	
6	0.15	29.72	9.53	20.19	104.31	-74.59	100	174	QP	Close	
7	0.78	55.44	35.33	20.11	69.76	-14.32	100	207	QP	Close	
8	2.88	56.49	36.32	20.17	69.50	-13.01	100	104	QP	Close	
9	5.58	50.79	30.56	20.23	69.50	-18.71	100	346	QP	Close	
10	7.74	51.19	30.88	20.31	69.50	-18.31	100	256	QP	Close	
11	17.58	48.27	27.80	20.47	69.50	-21.23	100	154	QP	Close	
12	27.97	35.88	15.35	20.53	69.50	-33.62	100	302	QP	Close	
13 !	30.00	37.61	46.22	-8.61	40.00	-2.39	100	82	QP	Vertical	
14 !	34.75	35.53	44.24	-8.71	40.00	-4.47	100	1	QP	Vertical	
15	66.96	29.33	39.14	-9.81	40.00	-10.67	100	22	QP	Vertical	
16	149.80	33.99	41.49	-7.50	43.50	-9.51	100	49	QP	Vertical	
17	845.19	33.05	30.50	2.55	46.00	-12.95	201	0	QP	Vertical	
18	956.64	33.09	28.71	4.38	46.00	-12.91	200	118	QP	Vertical	
19	1830.00	47.00	63.43	-16.43	54.00	-7.00	102	74	Average	Vertical	
20	1830.00	49.18	65.61	-16.43	74.00	-24.82	102	74	Peak	Vertical	
21	2745.00	44.58	58.12	-13.54	74.00	-29.42	100	1	Peak	Vertical	
22	3660.00	47.57	59.12	-11.55	74.00	-26.43	100	8	Peak	Vertical	
23	5490.00	45.51	53.89	-8.38	74.00	-28.49	100	51	Peak	Vertical	

927.6 MHz

(Open/Horizontal) 9kHz~10GHz

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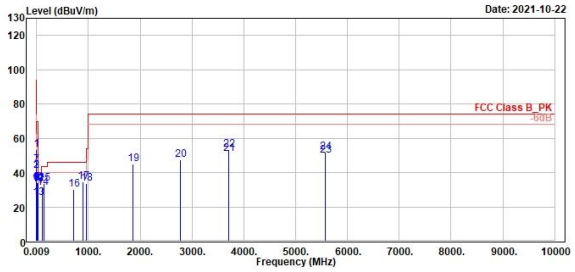

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1		0.01	33.31	19.97	53.28	127.61	-74.33	100	360	QP	Open	
2		0.03	20.57	20.29	40.86	118.50	-77.64	100	173	QP	Open	
3		0.06	20.82	20.29	41.11	111.83	-70.72	100	153	QP	Open	
4		0.09	14.02	20.26	34.28	108.44	-74.16	100	111	QP	Open	
5		0.11	13.89	20.23	34.12	106.51	-72.39	100	326	QP	Open	
6		0.14	13.46	20.20	33.66	104.93	-71.27	100	286	QP	Open	
7		0.22	24.26	20.16	44.42	100.57	-56.15	100	92	QP	Open	
8		2.59	13.98	20.15	34.13	69.50	-35.37	100	309	QP	Open	
9		11.31	13.66	20.37	34.03	69.50	-35.47	100	350	QP	Open	
10		16.82	12.77	20.47	33.24	69.50	-36.26	100	179	QP	Open	
11		23.47	13.51	20.53	34.04	69.50	-35.46	100	138	QP	Open	
12		27.75	12.91	20.53	33.44	69.50	-36.06	100	130	QP	Open	
13		30.00	33.59	-8.61	24.98	40.00	-15.02	200	270	QP	Horizontal	
14		108.96	42.23	-10.92	31.31	43.50	-12.19	300	92	QP	Horizontal	
15		147.47	41.17	-7.45	33.72	43.50	-9.78	200	118	QP	Horizontal	
16		715.21	29.82	0.43	30.25	46.00	-15.75	200	224	QP	Horizontal	
17		899.61	31.19	3.45	34.64	46.00	-11.36	100	96	QP	Horizontal	
18		960.42	29.04	4.47	33.51	54.00	-20.49	150	360	QP	Horizontal	
19		1855.20	60.97	-16.19	44.78	74.00	-29.22	200	153	Peak	Horizontal	
20		2782.80	60.81	-13.44	47.37	74.00	-26.63	200	169	Peak	Horizontal	
21	!	3710.40	62.18	-11.51	50.67	54.00	-3.33	102	128	Average	Horizontal	
22		3710.40	64.83	-11.51	53.32	74.00	-20.68	102	128	Peak	Horizontal	
23	!	5565.60	58.62	-8.60	50.02	54.00	-3.98	154	168	Average	Horizontal	
24		5565.60	60.48	-8.60	51.88	74.00	-22.12	154	168	Peak	Horizontal	

(Close/Verical) 9kHz~10GHz

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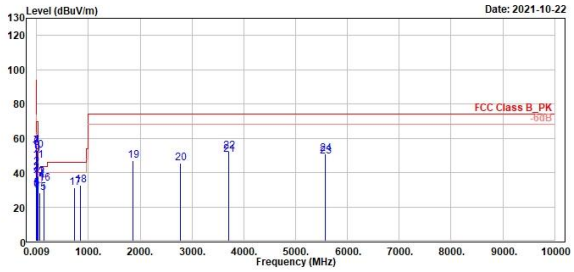

		Freq	Read Level	Factor	Level	Limit Line	Over Limit	APos	TPos	Remark	Pol/Phase	Note
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	cm	deg			
1		0.01	35.90	19.97	55.87	127.60	-71.73	100	10	QP	Close	
2		0.03	22.46	20.31	42.77	118.05	-75.28	100	7	QP	Close	
3		0.06	18.56	20.29	38.85	111.83	-72.98	100	203	QP	Close	
4		0.09	11.38	20.26	31.64	108.68	-77.04	100	23	QP	Close	
5		0.11	10.46	20.23	30.69	106.51	-75.82	100	19	QP	Close	
6		0.14	9.44	20.20	29.64	104.93	-75.29	100	216	QP	Close	
7		0.76	35.34	20.12	55.46	69.97	-14.51	100	202	QP	Close	
8		2.76	34.24	20.16	54.40	69.50	-15.10	100	277	QP	Close	
9		5.61	30.21	20.23	50.44	69.50	-19.06	100	342	QP	Close	
10		7.74	32.50	20.31	52.81	69.50	-16.69	100	338	QP	Close	
11		17.39	26.61	20.47	47.08	69.50	-22.42	100	1	QP	Close	
12		27.98	16.68	20.53	37.21	69.50	-32.29	100	150	QP	Close	
13	!	30.00	46.04	-8.61	37.43	40.00	-2.57	100	188	QP	Vertical	
14	!	34.95	43.80	-8.67	35.13	40.00	-4.87	100	188	QP	Vertical	
15		66.86	37.94	-9.82	28.12	40.00	-11.88	100	9	QP	Vertical	
16		159.57	41.23	-7.41	33.82	43.50	-9.68	100	196	QP	Vertical	
17		734.61	30.21	0.90	31.11	46.00	-14.89	300	11	QP	Vertical	
18		845.09	29.92	2.55	32.47	46.00	-13.53	300	298	QP	Vertical	
19		1855.20	63.36	-16.19	47.17	74.00	-26.83	100	61	Peak	Vertical	
20		2782.80	58.97	-13.44	45.53	74.00	-28.47	300	295	Peak	Vertical	
21	!	3710.40	61.85	-11.51	50.34	54.00	-3.66	100	319	Average	Vertical	
22		3710.40	63.80	-11.51	52.29	74.00	-21.71	100	319	Peak	Vertical	
23	!	5565.60	57.86	-8.60	49.26	54.00	-4.74	195	58	Average	Vertical	
24		5565.60	59.60	-8.60	51.00	74.00	-23.00	195	58	Peak	Vertical	

Mains Conducted Emission, 150kHz ~ 30MHz

Worst Band

(Line)

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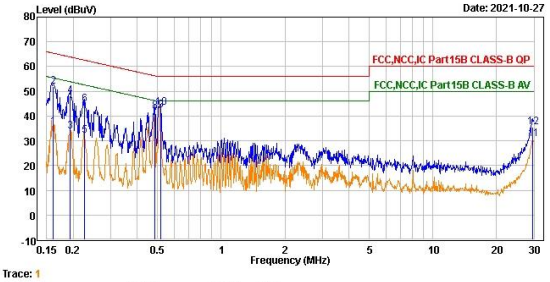

Trace: 1

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dBuV	dB	dBuV	dB			
1	0.16	35.61	25.55	10.06	55.42	-19.81	Average	line1	
2	0.16	51.98	41.92	10.06	65.42	-13.44	QP	line1	
3	0.19	33.67	23.61	10.06	53.89	-20.22	Average	line1	
4	0.19	48.17	38.11	10.06	63.89	-15.72	QP	line1	
5	0.23	32.13	22.07	10.06	52.61	-20.48	Average	line1	
6	0.23	44.81	34.75	10.06	62.61	-17.80	QP	line1	
7	0.48	39.23	29.16	10.07	46.27	-7.04	Average	line1	
8	0.48	41.85	31.78	10.07	56.27	-14.42	QP	line1	
9	0.52	42.30	32.22	10.08	46.00	-3.70	Average	line1	
10	0.52	43.52	33.44	10.08	56.00	-12.48	QP	line1	
11	29.70	30.59	19.96	10.63	50.00	-19.41	Average	line1	
12	29.70	35.55	24.92	10.63	60.00	-24.45	QP	line1	

(Neutral)

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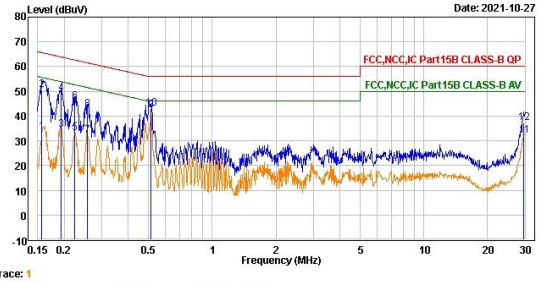

Trace: 1

	Freq	Level	Read Level	Factor	Limit Line	Over Limit	Remark	Pol/Phase	Note
	MHz	dBuV	dBuV	dB	dBuV	dB			
1	0.16	33.56	23.52	10.04	55.63	-22.07	Average	neutral	
2	0.16	50.40	40.36	10.04	65.63	-15.23	QP	neutral	
3	0.19	34.55	24.51	10.04	53.89	-19.34	Average	neutral	
4	0.19	49.06	39.02	10.04	63.89	-14.83	QP	neutral	
5	0.22	33.18	23.14	10.04	52.65	-19.47	Average	neutral	
6	0.22	45.85	35.81	10.04	62.65	-16.80	QP	neutral	
7	0.26	31.92	21.88	10.04	51.53	-19.61	Average	neutral	
8	0.26	42.67	32.63	10.04	61.53	-18.86	QP	neutral	
9	0.51	42.31	32.25	10.06	46.00	-3.69	Average	neutral	
10	0.51	43.08	33.02	10.06	56.00	-12.92	QP	neutral	
11	29.70	32.13	21.51	10.62	50.00	-17.87	Average	neutral	
12	29.70	37.23	26.61	10.62	60.00	-22.77	QP	neutral	